



UltimateITcourses | Mile2 Canada

Email: info@ultimatelTcourses.ca

Cell: 613-297-5886

Web: <u>www.ultimateITcourses.ca</u>





NMSO: Canadian Federal Government 775820533PG0002

# Microsoft 365 Excel: Part 2

Microsoft 365 Training

### Microsoft<sup>®</sup> 365 Excel<sup>®</sup>: Part 2

**Courseware Release Version 4.0** 

#### © 2020 by Velsoft Training Materials, Inc.

#### Notice of Rights

No part of this publication may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language or computer language, in any form or by any means, electronic, mechanical, magnetic, optical, chemical, manual, or otherwise, without the prior written permission of Velsoft Training Materials, Inc., except under the terms of a courseware site license agreement.

#### **Trademark Notice**

Terms such as PowerPoint, Windows, Word, Microsoft, etc. are trademarks of Microsoft, Inc. Throughout this courseware title, trademark names are used. Rather than just put a trademark symbol in each occurrence of a trademarked name, we state we are using the names only in an editorial fashion and to the benefit of the trademark owner with no intention of infringement of the trademark.

#### Notice of Liability

The information in this courseware title is distributed on an 'as is' basis, without warranty. While every precaution has been taken in the preparation of this course, neither the authors nor Velsoft Training Materials, Inc. shall have any liability to any person or entity with respect to any loss or damage caused or alleged to be caused directly or indirectly by the instructions contained in this book or by the computer software and hardware products described in it.

#### Disclaimer

We make a sincere effort to ensure the accuracy of the material described herein; however, Velsoft Training Materials, Inc. makes no warranty, expressed or implied, with respect to the quality, correctness, reliability, accuracy, or freedom from error of this document or the products it describes. Data used in examples and sample data files are intended to be fictional. Any resemblance to real persons or companies is entirely coincidental.

All information in this manual was correct at the time of writing. We are not affiliated with nor have any control over changes made to the product described in this manual. These include, but are not limited to, changes in the application's color scheme, icon appearance and locations, addition or removal of program features, online templates, and help content. We reserve the right to make corrections to the courseware at any time and without notification.

### Terms and conditions

**Sample versions**: If the version of courseware that you are viewing is marked as NOT FOR TRAINING, SAMPLE, or similar, then it is made available for content and style review only and cannot be used in any part of a training course. Sample versions may be shared but cannot be re-sold to a third party. **For licensed users**: This document may only be used under the terms of the license agreement from Velsoft Training Materials, Inc. We reserve the right to alter the licensing conditions at any time, without prior notice.

## Microsoft<sup>®</sup> 365 Excel<sup>®</sup>: Part 2

### Contents

About This Course	
Course Prerequisites	12
Course Overview	12
Course Objectives	12
How to Use This Book	13
Lesson 1: Creating Advanced Formulas	14
TOPIC A: Apply Range Names	
Range Names	16
Adding Range Names Using the Name Box	
Adding Range Names Using the New Name Dialog Box	20
Using Range Names in Formulas	23
Activity 1-1: Using Range Names in Formulas	25
TOPIC B: Use Specialized Functions	
Function Categories	
Function Syntax	35
Finding Excel Functions	
Function Entry Dialog Boxes	41
Using Nested Functions	45
Automatic Workbook Calculations	45
Showing and Hiding Formulas	
Enabling Iterative Calculations	

Summary Review Questions	54 54
Review Questions	54
Lesson 2: Analyzing Data with Logical and Lookup Functions	22
TOPIC A: Use Text Functions	56
Text Functions	
The LEFT and RIGHT Functions57	
The MID Function	
The LEN Function	
The TRIM Function	
The UPPER, LOWER, and PROPER Functions61	
The TEXTJOIN Function	
The TRANSPOSE Function64	
Activity 2-1: Analyzing Data Using Text Functions67	
TOPIC B: Use Logical Functions	71
Logical Functions	
Logical Operators72	
The AND Function73	
The OR Function	
The IF Function	
The IFS Function	
Activity 2-2: Analyzing Data Using Logical Functions78	
TOPIC C: Use Lookup Functions	82
Lookup Functions	
The LOOKUP Function	
The VLOOKUP Function	
The HLOOKUP Function	
The MATCH Function	

The INDEX Function	
Activity 2-3: Analyzing Data Using Lookup Functions	92
TOPIC D: Use Date Functions	96
The TODAY Function	
The NOW Function	
Serializing Dates and Times with Functions	
Activity 2-4: Analyzing Data Using Date Functions	
TOPIC E: Use Financial Functions	
The IPMT Function	
The PPMT Function	
The NPV Function	
The FV Function	
Activity 2-5: Using Financial Functions	
Summary	
Review Questions	
Review Questions Lesson 3: Organizing Worksheet Data with Tables	
Review Questions Lesson 3: Organizing Worksheet Data with Tables TOPIC A: Create and Format Tables	
Review Questions Lesson 3: Organizing Worksheet Data with Tables TOPIC A: Create and Format Tables Tables	
Review Questions Lesson 3: Organizing Worksheet Data with Tables TOPIC A: Create and Format Tables Tables Table Components	
Review Questions Lesson 3: Organizing Worksheet Data with Tables TOPIC A: Create and Format Tables Tables Table Components The Create Table Dialog Box	
Review Questions Lesson 3: Organizing Worksheet Data with Tables TOPIC A: Create and Format Tables Tables Table Components The Create Table Dialog Box The Table Design Contextual Tab	
Review Questions Lesson 3: Organizing Worksheet Data with Tables TOPIC A: Create and Format Tables Tables Tables Table Components The Create Table Dialog Box The Table Design Contextual Tab Styles and Quick Style Sets	
Review Questions Lesson 3: Organizing Worksheet Data with Tables TOPIC A: Create and Format Tables Tables Table Components The Create Table Dialog Box The Table Design Contextual Tab Styles and Quick Style Sets Customizing Row Display	
Review Questions Lesson 3: Organizing Worksheet Data with Tables TOPIC A: Create and Format Tables Tables Table Components The Create Table Dialog Box The Table Design Contextual Tab Styles and Quick Style Sets Customizing Row Display Activity 3-1: Creating and Modifying a Table	
Review Questions Lesson 3: Organizing Worksheet Data with Tables TOPIC A: Create and Format Tables Tables Table Components The Create Table Dialog Box The Create Table Dialog Box The Table Design Contextual Tab Styles and Quick Style Sets Customizing Row Display Activity 3-1: Creating and Modifying a Table TOPIC B: Modifying Tables	
Review Questions Lesson 3: Organizing Worksheet Data with Tables TOPIC A: Create and Format Tables Tables Table Components The Create Table Dialog Box The Create Table Dialog Box The Table Design Contextual Tab Styles and Quick Style Sets Customizing Row Display Activity 3-1: Creating and Modifying a Table TOPIC B: Modifying Tables Adding Rows and Columns	
Review Questions Lesson 3: Organizing Worksheet Data with Tables TOPIC A: Create and Format Tables Tables Table Components Table Components The Create Table Dialog Box The Table Design Contextual Tab Styles and Quick Style Sets Customizing Row Display Activity 3-1: Creating and Modifying a Table TOPIC B: Modifying Tables Adding Rows and Columns Total Row Functions	

Activity 3-2: Modifying Tables	144
TOPIC C: Table References	
Naming Tables	153
Using Structured References	155
Database Functions	159
Converting to Range	166
Activity 3-3: Table References	167
Summary	
Review Questions	
Lesson 4: Visualizing Data with Charts	174
TOPIC A: Create Charts	
Charts	176
Chart Types	177
Chart Insertion Methods	
Resizing and Moving the Chart	
Adding Additional Data	
Switching Between Rows and Columns	
Activity 4-1: Creating Charts	190
TOPIC B: Modify and Format Charts	
The Difference Between Modifying and Formatting	194
Chart Elements	195
Minimize Extraneous Chart Elements	195
The Chart Contextual Tabs	
Formatting the Chart with a Style	
Adding a Legend to the Chart	
Activity 4-2: Modifying and Formatting Charts	200
TOPIC C: Create a Trendline	
Trendlines	207

Types of Trendlines	
Adding a Trendline	211
The Format Trendline Task Pane	212
Activity 4-3: Create a Trendline	214
TOPIC D: Create Advanced Charts	219
Combination Charts	
Dual Axis Charts	
Creating Custom Chart Templates	227
Activity 4-4: Creating Advanced Charts	
Summary	238
Review Questions	238
Lesson 5: Analyzing Data with PivotTables, Slicers, and PivotCharts	239
TOPIC A: Create a PivotTable	240
PivotTables	241
Start with Questions, End with Structure	242
The Create PivotTable Dialog Box	244
The PivotTable Fields Task Pane	245
Summarize Data in a PivotTable	247
The "Show Values As" Functionality of a PivotTable	250
Format a PivotTable	251
External Data	251
PowerPivot	253
PowerPivot Functions	253
Activity 5-1: Creating PivotTables	255
TOPIC B: Filter Data Using Slicers	
Slicers	264
The Insert Slicers Dialog Box	

TOPIC C: Analyze Data with PivotCharts	270
PivotCharts	271
Creating PivotCharts	271
Applying a Style to a PivotChart	273
Activity 5-3: Analyzing Data with PivotCharts	274
Summary	
Review Questions	
Lesson 6: Working with Graphical Objects	281
TOPIC A: Insert and Modify Graphic Objects	
Graphical Objects	
Inserting Shapes	
Inserting WordArt	
Inserting Text Boxes	
Inserting Images	
The Picture Format Contextual Tab	291
The Shape Format Contextual Tab	
The SmartArt Contextual Tabs	
Activity 6-1: Inserting Graphical Objects	
TOPIC B: Layer and Group Graphical Objects	
Layering Objects	
Grouping Objects	
Positioning Objects	
Activity 6-2: Layering and Grouping Shapes	
TOPIC C: Incorporate SmartArt	309
About SmartArt	
The Choose a SmartArt Graphic Dialog Box	
About the Text Pane	
Activity 6-3: Incorporating SmartArt	

Sumr	mary	
Revie	ew Questions	
Less	on 7: Enhancing Workbooks	319
ΤΟΡΙ	C A: Customize Workbooks	320
	Notes and Comments	321
	Comments	321
	Notes	325
	Watermarks	328
	Background Pictures	331
	Activity 7-1: Customizing Workbooks	334
ΤΟΡΙ	C B: Manage Themes	
	About Themes	342
	Customizing Themes	344
	Activity 7-2: Managing Themes	348
TOPI	C C: Protect Files	351
ΤΟΡΙ	C C: Protect Files	<b>351</b> 352
ΤΟΡΙ	C C: Protect Files Recovering Lost Data The Protect Group	<b>351</b> 352 354
ΤΟΡΙ	C C: Protect Files Recovering Lost Data The Protect Group The Protect Worksheet Option	352 354 354
ΤΟΡΙ	C C: Protect Files Recovering Lost Data The Protect Group The Protect Worksheet Option The Protect Workbook Option	352 354 354 354 359
ΤΟΡΙ	C C: Protect Files	352 354 354 354 359 361
ΤΟΡΙ	C C: Protect Files	352 354 354 354 359 361 363
ΤΟΡΙ	C C: Protect Files	352 354 354 354 359 361 363 366
ΤΟΡΙ	C C: Protect Files	352 354 354 354 359 361 363 366 367
τορι	C C: Protect Files	352 354 354 354 359 361 363 366 367 367
τορι	C C: Protect Files Recovering Lost Data The Protect Group The Protect Worksheet Option The Protect Workbook Option Mark Workbooks as Final Encrypting a Workbook Digitally Signing a Workbook Activity 7-3: Protecting a Worksheet and a Workbook C D: Preparing a Workbook for Multiple Audiences Displaying Data in Multiple International Formats	352 354 354 354 359 361 363 366 367 374
τορι	C C: Protect Files Recovering Lost Data The Protect Group The Protect Worksheet Option The Protect Workbook Option Mark Workbooks as Final Encrypting a Workbook Digitally Signing a Workbook Activity 7-3: Protecting a Worksheet and a Workbook <b>C D: Preparing a Workbook for Multiple Audiences</b> Displaying Data in Multiple International Formats Utilize International Symbols	352 354 354 354 359 361 363 366 367 374 379
τορι	C C: Protect Files	352 354 354 354 359 361 363 366 367 367 374 379 380
τορι	C C: Protect Files	352 354 354 354 359 361 363 366 367 367 374 379 379 380 382

Summary	391
Review Questions	391
Lesson Labs	392
Lesson 1	392
Lesson Lab 1-1	
Lesson 2	393
Lesson Lab 2-1	
Lesson Lab 2-2	
Lesson 3	395
Lesson Lab 3-1	
Lesson 4	396
Lesson Lab 4-1	
Lesson Lab 4-2	
Lesson 5	398
Lesson Lab 5-1	
Lesson Lab 5-2	
Lesson 6	400
Lesson Lab 6-1	400
Lesson 7	401
Lesson Lab 7-1	401
Lesson Lab 7-2	
Course Wrap-Up	403
Post-Course Assessment	403
Course Summary	406
Answer Keys	407
Lesson 1 Review Questions	407
Lesson 2 Review Questions	408
Lesson 3 Review Questions	409

Lesson 4 Review Questions	
Lesson 5 Review Questions	
Lesson 6 Review Questions	
Lesson 7 Review Questions	
Post-Course Assessment	
Appendices	
Keyboard Shortcut Quick Reference Sheet	
Glossary	
Index	

### ABOUT THIS COURSE

### **Course Prerequisites**

This manual assumes the user has completed the first part of the Microsoft 365 Excel courseware or has an understanding of the information presented in that course, including:

- Getting started with the app
- Working with formulas and functions
- Modifying worksheets
- Printing workbook contents
- Managing workbooks
- Customizing the Excel environment

### **Course Overview**

Welcome to the second part of our Microsoft 365 Excel courseware. This version of Excel incorporates some new features and connectivity options in efforts to make collaboration and production as easy as possible.

This course is intended to help all users become familiar with the more advanced selection of features of Excel. We will cover how to create and use advanced formulas, analyze data, organize worksheet data with tables, visualize data with charts, work with graphical objects, and enhance workbooks.

### **Course Objectives**

By the end of this course users should be comfortable in creating advanced formulas, analyzing data with functions, analyzing data using functions and PivotTables, working with tables, visualizing data with charts, working with graphical objects, and enhancing workbooks.

### How to Use This Book

This course is divided into seven lessons. Each lesson focuses on several key topics, each of which are broken down into easy-to-follow concepts. At the end of each topic, you will be given an activity to complete. At the end of each lesson, we will summarize what has been covered and provide a few review questions for you to answer. Supplemental learning for selected topics is provided in the form of Lesson Labs at the end of this book.

Before you begin, download the course's Exercise Files to a convenient location. They will be referenced throughout this course and are a key part of your learning experience.

### LESSON 1: CREATING ADVANCED FORMULAS

### **Lesson Objectives**

In this lesson you will learn how to:

- Apply range names
- Use specialized functions

### **TOPIC A: Apply Range Names**

To help ensure that everyone who works on the same workbook can understand the formulas and calculations, one option is to use cell and range names. While cell references can be used to identify where formulas are getting information to calculate data, it is not always obvious. Excel allows you to give names to individual cells and cell ranges, and then use those names in formulas and functions. Then, at a glance you can understand what data is being used in a formula or function.

### **Topic Objectives**

In this session, you will learn:

- About cell and range names
- How to add range names using the Name box and the New Name dialog box
- How to edit and delete range names
- How cell and range names are used in formulas

### **Range Names**

**Range names** are meaningful labels that you can assign to individual cells or cell ranges. You can use a range name anywhere you would use a cell reference or cell range reference. This means you can use a name such as "Employees" to describe a range of cells rather than their reference (such as C2:C55).

For example, consider the following worksheet. Cells A2 and B2 have been given names (TotalSales and TotalExpenses, respectively) and those names have been used in a formula in cell C2 (=TotalSales-TotalExpenses):

AutoSave 💽 🗗 🖓 🗸 🖓 🤜 🗸 🤜 🗸 🗸 🗸 🗸 🗸 🗸 AutoSave								
File Home Insert Page Layout Formulas Data Review View Help								
$ \begin{array}{c c} & & \\ & $								
✓	Painter	East	-			ant	E	
Cipboard	Clipboard Izi Font Izi Alignment Izi							
C2 *	: _ × _ <	J <sub>*</sub> =lotalSales-	lotalExper	nses				
A	В	C D	E	F	G	Н	I.	
1 Sales	Expenses	Profit						
2 \$152,348.88	\$128,854.32 \$	23,494.56						
2		T						

As an added bonus, range names are **absolute references**. This means that if you copy a formula or use AutoFill while using named ranges, the formula will maintain its original cell references:

,	AutoSave 💽 🗗 🏷 - 🖓 - 🤍 - Ə - 🗸 Book1.xlsx -								
Fi	ile Home	Insert	Page Layout	Formula	s Da	ta Revie	w View	/ Help	
Calibri ↓11 ↓ A^ A <sup>*</sup> = = = ≫ → eb Wrap Text									
Pa	ste Ll≞ Copy ∙ √ ∛ Format	Painter B	I <u>U</u> ~	~   <u></u> ~	<u>A</u> ~	$\equiv \equiv \equiv$	<u>←</u> ≡ →=	🖶 Merge & Cer	nter 🗸
	Clipboard	Гы	Font		L2		Alignm	ent	٦
H7	7 -	: × 🗸	f <sub>x</sub> =To	otalSales-T	otalExpe	enses			
	А	В	с	0	K	F	G	Н	I.
1	Sales	Expenses	Profit 🌙						
2	\$152,348.88	\$128,854.32	\$23,494.56						
3									
4									
5									
6									
7								\$ 23,494.56	
0								1 T	

Range names make formulas much more readable, improve worksheet clarity, and greatly improve worksheet organization. Range names can even help in the overall design of your worksheet.

Most small worksheets are usually constructed by filling a sheet with data and then performing calculations. However, range names enable you to create a worksheet by doing the opposite: constructing formulas and then adding the data. When you are designing your worksheet, you can create formulas using names instead of traditional cell references, and then define the names for the corresponding ranges as data becomes available. For example, below is an empty worksheet with a defined formula but no defined names, which results in a #NAME error. This error will remain visible until both "Value1" and "Value2" have been defined:

AutoSave 💽 🗄 りょ	C - Q =	Во	ok1.xlsx +	
File Home Insert F	Page Layout Formulas [	Data Review	View Help	
Calif Calif Paste ↓ Cut Calif Copy ↓ B	bri v 11 v A* A* I U v I I v ∆ v A v		<ul> <li>→ ab Wrap Text</li> <li>→ = ⊕ Merge &amp; Ce</li> </ul>	enter 👻
Clipboard 🛛	Font F	4 12	Alignment	آيا ا
A1 • : × ✓	f <sub>∗</sub> =Value1-Value2			
A	B C	D	E	
1 #NAME?				
2				

Keep in mind when choosing cell or range names that all names must start with a letter, underscore, or backslash. Beyond the first character, you can add any letter or number you wish. Additionally, names cannot contain any spaces, nor can they contain cell references. Finally, it is important to know that cell and range names are **not** case-sensitive.

### Adding Range Names Using the Name Box

To apply a cell name or range name, first use your cursor to select the cell(s) that you want to name. Next, type the name that you would like to use into the **Name Box**:

4	AutoSave 💽 Off	り 🛛 り・	℃ . Q . S	Ŧ			Book1.xl	5x <del>-</del>					
Fi	File Home Insert Page Layout Formulas Data Review View Help												
Ľ	Calibri ↓11 ↓ A^ A = = = ≫ ↓ db Wrap Text												
- P d	∽ 🗳 Format	Painter	I <u>U</u> ~   <u>H</u>	- ×   🖉 ×	∕ <u>A</u> ~	= = =	<u>← = → =</u>	🔁 Merge & Ce	nter 👻				
	Clipboard	۲ <u>م</u>	Fon	t	Г		Alignm	ent	۲ <u>م</u>				
He	aders	: × 🗸	<i>f</i> ∗ Sa	les									
	А	В	С	D	E	F	G	н	I				
1	Sales	Expenses	Profit										
2													

Pressing **Enter** will apply this name. From then on, you will be able to select this range by clicking the Name Box drop-down menu and clicking on the range name that you set:

AutoSave 💽 🕅	∃ り~	9~U :	÷			Book1.xl
File Home Ir	nsert	Page Layout	Formula	as Data	a Revie	w View
	Ca	ibri	<b>~</b> 11 <b>~</b>	A^ A	ΞΞΞ	≫ <b>~</b> ~
Paste Verter Vorter Paste Verter Vorter Verter Vert	er B	I <u>U</u> •		<u>A</u> ~	≣≡≡	<u>∓</u> ≡ <u>→</u> Ξ
Clipboard	ы	For	t	Гы		Alignm
<b>C4</b> :	×	f <sub>x</sub>				
Headers	в	С	D	E	F	G

### Adding Range Names Using the New Name Dialog Box

Cells and cell ranges can also be named using the **New Name** dialog box. While this technique takes a little bit longer, you have more control over what cells the name refers to. To open the New Name dialog box, click **Formulas** → **Define Name**:



When the New Name dialog box is displayed, you will see that the **Name** field appears at the top. The **Scope** drop-down menu allows you to choose if this new name will be applied to only the current worksheet or the entire workbook. Inside the **Comment** text area, you can enter a brief description of the named cell or range. By default, the cells that were selected when the Define Name command was clicked will already be filled into the **Refers to** field. If you wish, you can change this selection by clicking on the cell selector (1):

New Name			?	×
<u>N</u> ame:				
<u>S</u> cope:	Workbook	~	]	
C <u>o</u> mment:			-	~
				$\vee$
<u>R</u> efers to:	=Sheet1!\$C\$9			Ť
		OK	Ca	ncel

Name Manager				? ×
<u>N</u> ew	<u>E</u> dit <u>D</u> elete			<u>F</u> ilter ▼
Name	Value	Refers To	Scope	Comment
Headers	{"Sales","Expenses",	=Sheet1!\$A\$1:\$C\$1	Workbo	
TotalExpenses	\$128,854.32	=Sheet1!\$B\$2	Workbo	
TotalSales	\$152,348.88	=Sheet1!\$A\$2	Workbo	
Refers to:				
Sheet1!	\$A\$1:\$C\$1			Ť
				Close

Once you enter your options and click **OK**, the named range will be created.

Clicking the **New** button will open the **New Name** dialog box, which you can use to create a new range name:

New Name	2		?	×
<u>N</u> ame:				
<u>S</u> cope:	Workbook	~	]	
C <u>o</u> mment:				~
				× .
<u>R</u> efers to:	=Sheet1!\$C\$9			Ť
		OK	Car	ncel

If you select a name from the list in the Name Manager dialog box and then click the **Edit** button, the **Edit Name** dialog box will be shown:

Edit Name			?	$\times$
<u>N</u> ame:	Headers			
Scope:	Workbook	$\sim$		
C <u>o</u> mment:				^
				×
Refers to:	=Sheet1!\$A\$1:\$C\$1			Ť
	ОК		Ca	ncel

This dialog box is identical to the New Name dialog box; the only difference is that it will be prepopulated with information from the selected range name.

To delete a range name, click to select the range name in question and then click the **Delete** button:

Name Manager				? ×
<u>N</u> ew	<u>E</u> dit <u>D</u> elete			<u>F</u> ilter ▼
Name	Value	Refers To	Scope	Comment
Headers	{"Sales", "Expenses",	=Sheet1!\$A\$1:\$C\$1	Workbo	
TotalExpenses	\$128,854.32	=Sheet1!\$B\$2	Workbo	
TotalSales	\$152,348.88	=Sheet1!\$A\$2	Workbo	

A dialog box will then open to ask you to confirm this action. Click **OK** to complete the deletion process.

Name Manager					? ×
<u>N</u> ew	<u>E</u> dit <u>D</u> elete				<u>F</u> ilter
Name	Value	Refers To	Scope	Comme	Clear Filter
Headers	{"Sales", "Expenses",	=Sheet1!\$A\$1:\$C\$1	Workbo		Names Scoped to Worksheet
TotalExpenses	\$128,854.32	= Sheet1!\$B\$2	Workbo		Names Scoped to Work <u>b</u> ook
	\$152,540.00	=Sheeth\$A\$2	WORKDO		Names <u>w</u> ith Errors
					Names without Errors
					Defined <u>N</u> ames
					Table Names

Finally, the **Filter** command is used to show only certain ranges based on specified criteria:

This is particularly useful when working with a workbook that contains a large amount of range names, as you can quickly narrow down the list to only those ranges that you would like to work with.

### **Using Range Names in Formulas**

Cell and range names are not just useful in keeping your workbooks more organized; they can also help immensely in the creation of formulas. This is because after you have defined a cell or range name, you are able to use that name in place of the usual cell reference. This makes formulas much more readable.

For example, below you can clearly and quickly see what this formula does. If it used standard cell references, it would be more difficult to understand:

D4	D4 • : × ✓ f <sub>x</sub> =Price*Quantity											
	А		В	с		D	E	F	G			
1												
2												
3			Price	Quantity		Cost						
4		\$	4.99	5	\$	24.95						
5		\$	24.69	33	\$	814.77						
6												
-												

Perhaps one of the easiest methods to enter cell and range names into a formula is to use the **Formula AutoComplete** feature. In the same way the AutoComplete feature suggests function names based on the first few characters that you type into the Formula Bar, it will also suggest cell and range names in a small menu. Double-clicking on a suggestion in this menu will insert it into the formula:

AutoSave 💽 🗗 🎾 🏱 🏹 🤜 🛛 🖘 🛛 Book2 - Excel													
File	Home	Insert	Page l	ayout	Fo	ormulas	Data	Review	View	Help			
fx Insert Function	AutoSum	Recently Used ~	Financial L	.ogical	A Text	<mark>℃</mark> Date & Time ~	Q Lookup & Reference ~	⊖ Math & Trig ∽ Fu	More nctions ~	Name Manager	0 G.		
			F	Function	Librar	у					De		
AVERAG	AVERAGEIF ▼ : × ✓ f <sub>x</sub> =Price*Quan												
A		В		С		🛄 Quar	ntity	E	F	G			

You can differentiate names from functions and other objects suggested by the small tag icon that appears by each name ( - function,  $\blacksquare$  - named cell or range,  $\blacksquare$  - table).

In addition to manually entering cell and range names, you can also utilize the **Use in** Formula command to insert existing cell and range names into formulas. To access this command, click Formulas → Use in Formula:

AutoSav	ve 💽	89						Book2 -	Excel		,∕⊃ Sei	arch				
File	Home	Insert	Page Layo	ut F	ormulas	Data	Review	View	Help							
fx Insert Function	AutoSum	Recently Used ~	Financial Logic	al Text	<mark>℃</mark> Date & Time ~	Q Lookup & Reference ~	Hath & Trig ~ Fi	More unctions	Name Manager	Define Name ~       Image: Control of the second secon	문 <sub>년</sub> Trace 다금 Trace , VX Reme	Precedent Depender	its Øgr its Øgr	Show Forn Error Chec Evaluate Fe	nulas king ~ ormula	Watch Window
			Fund	ion Libra	ry					Quantity			Formula	Auditing		
D4	• :	×	✓ f <sub>x</sub>	=Price	•	D	F	F	G	Paste Names		к	L L		M	N

This action will display a drop-down menu listing all of the existing cell and range names. Clicking on an option will insert its reference into the Formula Bar.

### Activity 1-1: Using Range Names in Formulas

Using the features that you learned about in this topic, you will complete a small sales worksheet.

**1.** To begin, open Activity 1-1 from your Exercise Files folder:



2. To create the first range name, use your cursor to select cells B4:B6:

	А	В	С	D	
1					
2					
3		Price	Quantity	Cost	
4		\$ 2.9	9 5		
5		\$ 34.9	9 65		
6		\$ 42.5	0 45		
7		5			
8					

3. Next, type "Prices" inside the Name Box. Press Enter:

,	AutoSave 💽 🛱 🖉 × 🖓 × 🖓 🗢 🛛 Activity 1-1.xlsx 🕶										
Fi	le Ho	me Inse	ert Page	Layout	Formulas	Data	Review	View	Help		
Pa	Cu Cu Ste ✓ ✓ For	t py ~ rmat Painter	Calibri B I L	-   -	11 → A^   <u> </u>	A <sup>*</sup>   Ξ • Ξ	= = » = = =	'* ₿\ Ξ ĒN	Wrap Text Merge & Cen	ter v	
	Clipboa	rd	r <u>s</u>	Font		۲ <u>م</u>		Alignment		۲ <u>م</u>	
Pr	ices	÷ 2	t 🗸 X	£ 2.99							
	А	В	с	D	E	F	G	н	I.	J	
1											
2											
3		Price	Quantity	Cost							
4		\$ 2.99	5								
5		\$ 34.99	65								
6		\$ 42.50	45								
7											

4. The selected range now has "Prices" as a range name:



5. Now, let's try another method to create another range name. First, use your cursor to select cells **C4:C6**:

	А	В	С	D	E	F	G
1							
2							
3		Price	Quantity	Cost			
4		\$ 2.99	5				
5		\$ 34.99	65				
6		\$ 42.50	45 <sub>6</sub> 5				
7							
0							

6. Next, click Formulas → Define Name:



7. The New Name dialog box is now displayed. Ensure that "Quantity" appears inside the Name text box and that the Scope drop-down menu is set to Workbook. Click OK:

New Name	1		?	×
<u>N</u> ame:	Quantity			
<u>S</u> cope:	Workbook	$\sim$		
C <u>o</u> mment:				~
				$\sim$
<u>R</u> efers to:	=Sheet1!\$C\$4:\$C\$6			Ť
	ОК	-C	Canc	el

8. The selected range now has "Quantity" as a range name:



9. You have one more range name to create. Use your cursor to select cells D3:D6:

	Α	В	С	D	E	F	G
1							
2							
3		Price	Quantity	Cost			
4		\$ 2.99	5				
5		\$ 34.99	65				
6		\$ 42.50	45	÷			
7							
8							

**10.** Click Formulas → Create from Selection:



11. In the Create Names from Selection dialog box, ensure that the "Top row" checkbox is selected and click OK:



 Next, you need to create a formula that will calculate the cost of the items (Quantity\*Prices). Select cell D4:

	А	В	С	D	E	F	G
1							
2							
3		Price	Quantity	Cost			
4		\$ 2.99	5	Ċ.			
5		\$ 34.99	65				
6		\$ 42.50	45				
7							

**13.** Click inside the Formula Bar and type "=":



14. Next, type "Prices" followed by an asterisk:

AutoSa	ve 🧿	off) (		<b>) ~</b> (* )		÷			Ad	tivity 1-1.xl
File	Hon	ne l	nsert	Page	Layout	F	ormulas	Data	Review	View
fx Insert Function	Auto	∑ oSum Re ~ U	cently sed ~	Financial	Cogical	A Text	<mark>©</mark> Date & Time ∽	Q Lookup & Reference ~	⊖ Math & Trig ∽ Fu	More nctions ~
					Functior	n Libra	iry			
SUM		•	×	<ul> <li>J</li> </ul>	fx =	Price	s*			
A		В		С	D		Е	F	G	н
1										
2										
3		Price	Q	uantity	Cos	t				
4		\$ 2.9	9	5	=Prices	*				
5		\$ 34.9	9	65						
6		\$ 42.5	i0	45						
7										

Note that because Prices is a range name, its text will appear blue in the Formula Bar and blue shading will appear around that range of data on the worksheet. **15.** Still inside the Formula Bar, type "**Q**" and then **double-click the Quantity result** from the small menu that appears:

A	utoSave 🤇		<b>७</b> - ९				Ac	tivity 1-1.xls
Fil	e Ho	me Ins	ert Page	Layout	Formulas	Data	Review	View
) In: Fun	fx sert Au	toSum Rece VUse	ently Financial	Cogical Tex	t Date & Time ~ F	Q Lookup & Reference ~	⊖ Math & Trig ∽ Fur	More
				Function Lib	rary			
SU	м	• : [	× 🗸 .	f <sub>x</sub> =Price	es*q			
	А	В	С	D	Quar	ntity	G	н
1						RTILE.EXC		
2						RTILE.INC		
3		Price	Quantity	Cost				
4		\$ 2.99	5	=Prices*q	L CW COM	KIILL		
5		\$ 34.99	65					
6		\$ 42.50	45					
7								
-								

**16.** The Quantity name now appears within the Formula Bar in red text, with its associated range shaded in red in the worksheet:

Insert Page Layout Formulas Data Review View Recently Financial Logical Text Date & Lookup & Math & More Used ~ ~ ~ ~ Time ~ Reference ~ Trig ~ Functions ~
Lecently Financial Logical Text Date & Lookup & Math & More Used ~ ~ ~ Time ~ Reference ~ Trig ~ Functions ~
Function Library
× ✓ f <sub>x</sub> =Prices*Quantity
C D E F G H
e Quantity Cost
99 5 Quantity
99 65
50 45
C         D         E         F         G           e         Quantity         Cost

Press Enter to apply the formula. You will see the results appear in cells D4 through D6:

	А	В	С	D	E	F	G
1							
2							
3		Price	Quantity	Cost			
4		\$ 2.99	5	\$ 14.95			
5		\$ 34.99	65	\$2,274.35			
6		\$ 42.50	45	\$1,912.50			
7							

(You may receive a "Formula Spilled" alert, indicating that the formula returned multiple values, so they were spilled into the neighboring blank cells. Because each of the named ranges contains more than one value, Excel must predict the correct calculation for each value.)

Save the current workbook as Activity 1-1 Complete and then close Microsoft 365
 Excel to complete the exercise.

### **TOPIC B: Use Specialized Functions**

A function is a predefined formula that is available in Excel and performs a specific calculation based on specified values, called arguments. While the basic functions in Excel cover the majority of use cases, there are some situations where a specialized function is more appropriate. To find and use specialized functions, you must be familiar with their syntax and understand how they work on a fundamental level.

### **Topic Objectives**

In this session, you will learn:

- About function categories
- About function syntax
- About function entry dialog boxes
- How to use nested functions
- About automatic workbook calculations
- How to show and hide formulas
- How to enable iterative calculations
- About finding Excel Functions

### **Function Categories**

Every built-in **function** that is available in Excel has been categorized into one of 12 standard categories. These categories are available on the **Formulas** tab, with some categories available under the More Functions drop-down menu:



(Note that you can expand the number of standard categories using add-ons.)

Financial	This category contains dozens of functions that can be used to calculate financial data such as compound interest, rates of return, and depreciation.
Logical	The functions in this category are used to return values that are either true or false. Typically, these functions are used in conjunction with other formulas.
Text	Functions in this category are used to manipulate text. For example, you will find functions that will replace text or convert text to uppercase.
Date & Time	These functions can be as simple as calculating the current date to calculating the number of workdays in a year.
Lookup & Reference	The functions in this category are used to find specific values in a specified range or table.
Math & Trig	This category includes a variety of common mathematical functions.

Here is a list of what types of functions each of the available categories contains:

Statistical	The functions in this group are used to perform a variety of statistical analysis tasks. For example, you will find functions to calculate mean and median data.
Engineering	This category includes functions that are commonly used in engineering settings.
Cube	The functions in this category are used to perform complex data analysis using OLAP (Online Analytical Processing) cubes.
Information	Functions in this category give you information about the worksheets in your workbook and the data that they contain. For example, one function has the ability to determine the type of data in a cell.
Compatibility	The functions in this category are unique in that they are actually older versions of functions that are still available. Such functions are useful if you are working with workbooks that were created in older versions of Excel.
Web	The functions found in this category are used to return data from web services, return data from XML content, and return URL-encoded string data.

### **Function Syntax**

To successfully use functions in Excel, you must first understand the required values for the function, and the order in which they are used. This is known as **syntax**. Excel displays the syntax of a function by first stating the function, then, in brackets, listing the required arguments. Any argument enclosed in square brackets ([]) is optional, where all other arguments are required. Whenever you are entering a function, either in a cell or in the Formula Bar, Excel will display the function syntax in a **ScreenTip**, and the current argument will be bold:

=SUM(			
SUM(nur	nber1, [num	nber2],)	

Functions are a major part of what makes Excel so popular, so now we will explore some different types of functions and learn some tricks that you can use to perform complex calculations. Just keep in mind that even the most complex of formulas can be broken down into simple parts. Remember to pay attention to the order of precedence (using the **BEDMAS** acronym) and the number of parentheses you use.

### The SUMIF Function

### =SUMIF(range, criteria, [sum\_range])

The **SUMIF** function is used to calculate the sum of values in a specified **range** if they meet a specified **criteria**. For example, you could calculate total sales figures and only include numbers that are less than a specified value. The **sum\_range** argument is optional; you can use it if you want to add cells to the sum other than those specified in the argument. If you choose to leave out this argument, the function will only calculate the sum of the values from the previous **range** argument.

36

Below are some example of the SUMIF function in action:

Function	Description
=SUMIF(A1:C10, "<5")	Only numbers in the range A1:C10 that are under 5 will be added together.
=SUMIF(A1:C10, "December", D1:D10)	Only numbers in the range D1:D10 will be added together where they correspond with the text entry of "December" in the range A1:C10.
=SUMIF(A1:A10, 5)	All numbers with the value of 5 that fall within the A1:A10 range will be added together.

### The AVERAGEIF Function

### =AVERAGEIF(range, criteria, [average\_range])

The **AVERAGEIF** function will return the average of every cell within a range if the specified criteria are met. For example, if you want to calculate the average sale amount in a set range of sales data only for sales below a certain amount you could use this function. The **average\_range** argument is optional; it can be used if you want to add cells to the sum other than those specified by the **range** argument. If you choose to leave out this argument, the function will only calculate the average of the values from the **range** argument.

Below are some AVERAGEIF functions in action:

Function	Description
=AVERAGEIF(A1:C10, "<5")	The average of all numbers in the range A1:C10 that are under 5 will be calculated.
=AVERAGEIF(A1:C10, "December", D1:D10)	The average for the numbers in the range D1:D10 will be calculated where they correspond with the text entry of "December" in the range A1:C10.
#### The COUNTIF Function

#### =COUNTIF(range, criteria)

The **COUNTIF** function will count the number of cells in a specified **range** if the **criteria** are met. For example, this function could be used to count the number of sales associates who have sold X number of products.

Function	Description
=COUNTIF(A1:C10, "<5")	This function will count all cells within the A1:C10 range where the value is 5 or lower.
=COUNTIF(A1:A10, 5)	This function will count all cells within the A1:A10 range only where the value is 5.

#### **IFS Functions**

The functions that have been covered so far (AVERAGEIF, COUNTIF, and SUMIF) all have an equivalent **IFS** function that allow you to perform those respective calculations on data that requires more than just one specified criteria.

With a few exceptions, such functions have very similar syntax:

=SUMIFS(sum\_range, criteria\_range1, criteria1, [criteria\_range2], [criteria2], ...)

=AVERAGEIFS(average\_range, criteria\_range1, criteria1, [criteria\_range2], [criteria2], ...)

=COUNTIFS(criteria\_range, criteria1, [criteria\_range2], [criteria2], ...)

#### The COUNTA Function

=COUNTA(value1, [value2],...)

The **COUNTA** function is used to count the number of cells specified by the argument (value1, value2, etc.) that are not empty.

Function	Description
=COUNTA(A1:A10)	All cells that contain data within the A1:A10 cell range will be counted.
=COUNTA(A1:A10, B1, C1)	All cells that contain data within the A1:A10 range, as well as cells B1 and C1, will be counted.

### **Finding Excel Functions**

While you become familiar with Excel functions, you may find it challenging to know which function to use in specific situations. In such cases tools are available to help you identify an appropriate function for your purpose.

One option is the **Search for a function** feature in the **Insert Function** dialog box:

Insert Function	?		×
Search for a function:			
Type a brief description of what you want to do and then click Go		<u>G</u> o	
Or select a <u>c</u> ategory: Most Recently Used $\sim$			
Select a functio <u>n</u> :			
SUM AVERAGEIF MAX AVERAGE VLOOKUP IF			
SUM(number1,number2,) Adds all the numbers in a range of cells.			
Help on this function OK		Cance	el

As the Search for a function textbox suggests, type a brief description of what you want to do and then click **Go**. Excel will offer matching suggestions in the **Select a function** list. Clicking a function will display the syntax and provide a brief description:

Insert Function	?	×
Search for a function:		
sum		<u>G</u> o
Or select a <u>category</u> : Recommended		
Select a functio <u>n</u> :		
SUM SUMIF SUMIES		^
SUMPRODUCT SUMSQ SUMX2MY2 SUMX2PY2		~
SUMIFS(sum_range,criteria_range,criteria,) Adds the cells specified by a given set of conditions or criteria.		
Help on this function OK	(	Cancel

You can also select a function category from the **Or select a category** drop-down list. This will display a list of available functions in that category, in alphabetical order, in the **Select a function** list:

Insert Function	?	×
Search for a function:		
sum		<u>G</u> o
Or select a <u>c</u> ategory: Logical		
Select a functio <u>n</u> :		
AND FALSE		^
IFERROR		
IFNA		
NOT		~
IF(logical_test,value_if_true,value_if_false) Checks whether a condition is met, and returns one value if T another value if FALSE.	RUE, ar	nd
Help on this function OK	Ca	ancel

Once you have selected the appropriate function, click **OK** to open the **Function Arguments** dialog box, where you can define the required parameters:

Function Arguments		?	$\times$
SUM Number1 Number2	A1:A6		
Adds all the numbers in	= 21 a range of cells. Number1: number1,number2, are 1 to 255 numbers to sum. Lo text are ignored in cells, included if typed as argumer	gical valu nts.	ies and
Formula result = 21 Help on this function	ОК	Car	ncel

## **Function Entry Dialog Boxes**

Functions can be entered into a worksheet using a number of different methods. Perhaps the most straightforward way is to type the function directly into the Formula Bar – in the same way that you would type a regular formula. For example, if we want to use the SUM function to calculate the sum total of the values inside the A1:A6 range, we would select the cell where the result will be displayed and type "=SUM(A1:A6)" into the formula bar:

,	Auto	Save Off		) ~ (	5 ₹			Во	ok1.xlsx +
Fi	ile	Home	Insert	Page Lay	out F	ormulas	Data	Review	View H
Pa	 aste	X Cut [₽ Copy ~ ≪ Format	Painter	Calibri B I U	~ 1 -   🖽 -	1 ~ A^	Aĭ   ≡ ∃ -   ≡ ₹	= =   » = =   =	× đề Wr ∋Ξ ∰ Me
		Clipboard	L2		Font		5	,	Alignment
SU	м	Ŧ	: ×	✓ f <sub>x</sub>	=SUM(	A1:A6) ┥			
		А	В	С	D	E	F	G	н
1		1							
2		2							
3		3							
4		4							
5		5							
6		6							
7	=SU	M(A1:A6)							
8									
0									

Pressing Enter or clicking the Enter button will then enter the function into your worksheet and then produce the result:

,	AutoSave 💽 O		<b>) -</b> C - i	J -			Во	ok1.xlsx 👻
Fi	ile Home	Insert	Page La	yout F	ormulas	Data	Review	View
Pa	Cut □□ aste ↓	* t Painter	Calibri B I U	• 1 •	1 ~ A^ /	4*   ≡ ≡ *   ≡ ≡	E = 87	י ∰ו י ∰ו
	Clipboard	۲ <u>م</u>		Font		LZI	Д	lignment
A7	7 <del>-</del>	: ×	$\checkmark f_x$	=SUM(	A1:A6)			
	А	В	С	D	E	F	G	н
1	1							
2	2							
3	3							
4	4							
5	5							
6	6							
7	21							
8								
0								

While manually entering a function into the Formula Bar can often be the fastest way to enter a function, it is sometimes a difficult method to take advantage of when you are unsure of a function's syntax. In such cases, you want to open the **Insert Function** dialog box. To open this dialog box, first select the cell in which you want the result of the function entered and then click **Formulas** → **Insert Function**, or click the Insert Function button that is beside the Formula Bar:



The Insert Function dialog box provides you with a **search area (1)** that you can use to find a particular function that you need, as well as a **category drop-down menu (2)** that displays all of the functions that belong to a specified category:

Insert Function	?	×
Search for a function:		
Type a brief 1 tion of what you want to do and then click Go		<u>G</u> o
Or select a <u>c</u> ategory: Most Recently Used	(2)	
Select a functio <u>n</u> :	-	
SUM AVERAGEIF MAX AVERAGE VLOOKUP IF HYPERLINK SUM(number1,number2,) Adds all the numbers in a range of cells.		~
Help on this function OK	Ca	ancel

Near the bottom of this dialog box you will see a **list of functions (3)** that are shown based on your search or the category that you selected. Clicking any of the functions that are listed here shows you a **preview (4)** of what the syntax for the selected function is and a brief description of what that function is used for.

Once you find and select a function, click **OK** to enter it into your worksheet. This action typically displays the **Function Arguments** dialog box:

Function Arguments						?	$\times$
SUM Number1 Number2	A1:A6	<u>1</u>	=	{1;2;3;4;5;6} number	1		
Adds all the numbers ir	a range of cells.		=	21	2		
	Number1:	number1,number2, text are ignored in ce	are ells,	e 1 to 255 num included if typ	bers to sum. Lo bed as argumen	gical valı Its.	ues and
Formula result = 21 <u>Help on this function</u>	3				ОК	Ca	ncel

Using the controls in this dialog box, you are able to **(1) add arguments** to the function that you selected. For this example, as we are working with the SUM function, we are able to choose data ranges that will be entered into the function for us. You will also see **(2) a description of the current argument** and the result in the middle section of the dialog box. You will also see **(3) the formula result** and have access to a link at the bottom of the dialog box to get help on the function.

Clicking the **OK** button will enter the function into the worksheet using the arguments that you selected.

## **Using Nested Functions**

Some situations require that a function be **nested** inside of another function. This means that you are using the results of the nested function as arguments. For example, here is an example of a nested function:

#### =IF(SUM(A1:A5)>10, SUM(A6:A10), 0)

In this example, two SUM functions have been nested inside of a single IF function. The way this example works is that IF the SUM of data in cells A1:A5 is greater than 10, then this formula will SUM the values of cells A6:A10 and display that result. IF the SUM of data in cells A1:A5 is less than 10, then "0" will be displayed instead.

## **Automatic Workbook Calculations**

By default, Excel workbooks will calculate the results of formulas automatically. Occasionally, you may want to switch your workbook calculations to manual recalculation so that you have more control over when formulas are calculated. Typically you would do this if you are working with a particularly large workbook and the response times in Excel are slowed when you change a value and numerous formulas calculate the results of this change at the same time.

To change the calculation options, click **Formulas** → **Calculate Options.** This drop-down command includes the Automatic (default), Automatic Except for Data Tables, and Manual options:



If you switch to the Manual option, you can then calculate formulas in your workbook manually by clicking Formulas  $\rightarrow$  Calculate Now:

AutoSave 💽 🕼 🥬 Y 🗸 🖑 🗸 🤿	Book1.xlsx -	♀ Search	
File Home Insert Page Layout Formulas Data	Review View Help		
$ \begin{array}{c c} f_{X} \\ Inset \\ Function \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ $	Image: Base of the second	□     □     Trace Precedents     √/t Show Formulas       □     □     Trace Dependents     ♠/t Error Checking     ↓       □     ↓     ↓     ↓     ↓       □     ↓     ↓     ↓     ↓       □     ↓     ↓     ↓     ↓       ↓     ↓     ↓     ↓     ↓       ↓     ↓     ↓     ↓     ↓       ↓     ↓     ↓     ↓     ↓       ↓     ↓     ↓     ↓     ↓       ↓     ↓     ↓     ↓     ↓       ↓     ↓     ↓     ↓     ↓       ↓     ↓     ↓     ↓     ↓       ↓     ↓     ↓     ↓     ↓       ↓     ↓     ↓     ↓     ↓       ↓     ↓     ↓     ↓     ↓       ↓     ↓     ↓     ↓     ↓       ↓     ↓     ↓     ↓     ↓       ↓     ↓     ↓     ↓     ↓       ↓     ↓     ↓     ↓     ↓       ↓     ↓     ↓     ↓     ↓       ↓     ↓     ↓     ↓     ↓       ↓     ↓     ↓     ↓     ↓	Calculate Nov Calculation Options ~
Function Library	Defined Names	Formula Auditing	Calculation

Alternatively, you can also choose to calculate only those formulas on the current worksheet by clicking **Formulas** → **Calculate Sheet**:

AutoSave 🧿	● E 9· ?· ひ ▼	Book1.xlsx	•	𝒫 Search	
File Hom	ne Insert Page Layout F	ormulas Data Review View	Help		
$\int x$ Insert Auto Function	Soum Recently Financial Logical Text	Date & Lookup & Math & More Time ~ Reference ~ Trig ~ Functions ~	Ø Define Name → Name Gr Use in Formula → Manager Ø Create from Selection	□     □ </td <td>Calculation Options ~ Calculate Speet</td>	Calculation Options ~ Calculate Speet
	Function Libra	ary	Defined Names	Formula Auditing	Calculation

## **Showing and Hiding Formulas**

To make creating and reviewing worksheets a bit easier, you can show the formulas (instead of the result) on the worksheet and the printed page. To do this, click **Formulas → Show Formulas:** 

AutoSave 💽 0ff 📙	∎ 9· °· D <del>-</del>	Book1.xisx 👻		
File Home Ins	isert Page Layout Formulas (	Data Review View Help		
$ \int_{\substack{\text{Insert}\\\text{Function}}} \sum_{\substack{\text{AutoSum Rece}\\ \stackrel{\circ}{\text{Use}}} E$	tently Financial Logical Text Date & Lool red * * * * Time * Refer	kup & Math & More ence × Trig × Functions ×	ne Name 👻 🗄 Trace Precedents 📝 Show Formula in Formula × 🍄 Trace Dependents 🍌 Error Checking × ste from Selection 🖓 kenove Arrows × 🛞 Evaluate Formula	Watch Window Watch Window
	Function Library	Defined	d Names Formula Auditing	Calculation

This action shows formulas within the sheet instead of the calculated results:

	А	В	С	D	E
1	100				
2	200			=A1+A2+A3	
3	300				
4					
5					

### **Enabling Iterative Calculations**

While you would typically want to avoid circular references (formulas that refer to cells that contain the same formula), there are situations where this is desirable. In Excel, you are able to accommodate such situations by enabling **iterative calculations** and choosing the exact number of iterations required. Iterative calculations are those calculations that repeat until a desired condition is reached. Typically, these are used when building more complex calculations, such as those used to calculate tax accrual.

To enable iterative calculations, first open the Excel Options dialog box by clicking File  $\rightarrow$  **Options.** Next, display the **Formulas** category. Finally, check the **Enable iterative calculation** check box:

General	Change options related to formula calculation, performance, and error handling.
Formulas	
Data	Calculation options
Proofing	Workbook Calculation ()
Save	● <u>A</u> utomatic Ma <u>x</u> imum Iterations: 100 ↓
Language	Automatic except for <u>d</u> ata tables     Maximum <u>C</u> hange:
Ease of Access	Recalculate workbook before saving
Advanced	Working with formulas
Customize Ribbon	
Quick Access Toolbar	RICI reference style U
	✓ Eormula AutoComplete()
Add-ins	✓ Use table names in formulas
Trust Center	✓ Use GetPivotData functions for PivotTable references
	✓ Suggest formula variations that are supported by older versions of Excel <sup>①</sup>

With iterative calculation enabled, any formulas that contain circular references will calculate up to the value found in the Maximum Iterations increment box (100 by default). The Maximum Change text box contains the maximum change value (.001 by default) to control how much the results change.

## **Activity 1-2: Using Specialized Functions**

You have a large worksheet that contains the details of dozens of loans. A payment rate for each loan must be calculated according to the terms that have been provided for each. You will use the PMT function and the Function Arguments dialog box to complete this task.

**1.** To begin, open Activity 1-2 from your Exercise Files folder:



Activity 1-2.xlsx Microsoft Excel Worksheet 11.3 KB

2. First, click to select cell G3:



3.	Next, click	Formulas →	Financial $\rightarrow$ PMT:	
----	-------------	------------	------------------------------	--

AutoSa	ave 💽 Off	89	- C · D =			А	ctivity 1-2.xl	sx 🔹		𝒫 Search		
File	Home	Insert	Page Layout Fo	rmula	is Data	Review	View	Help				
fx Insert Function	AutoSum R	ecently Jsed ~	Financial Logical Text	Date &	Q & Lookup & * Reference *	⊖ Math & Trig ∽ Fu	More unctions ~	Name Manager Crea	ine Name 👻 in Formula 🛩 ate from Selection d Names	Eu Trace Precedents  ∬r Sho ☐ Trace Dependents	w Formulas r Checking ~ uate Formula diting	Watch Window
63	- · ·	×	MDURATION									
			MIRR		_			_	-	-		
F	A B	_	NOMINAL		0			. E	⊢ F	G	н	
1			NOMINAL		Loan P	aymen	t Sched	ule				
2		Am	NPER		of Loan (in y	ears)	Annu	al Interest Rate	Payment Period	Amount of Each Payment		
3		\$	NPV		3			5.25%	Monthly		-	
4		- \$ ¢	ODDEPRICE		4			5.25%	Monthly			
6		ŝ	Obbiridee		5			5.25%	Monthly			
7		ś	ODDFYIELD		7			5.25%	Monthly			
8		Ś	ODDLPRICE		8			5.25%	Monthly			
9		\$	ODDLYIELD		9			5.25%	Monthly			
10		\$	PRUPATION		10			5.25%	Monthly			
11		\$	PDUKATION	_	11			5.25%	Monthly			
12		\$	PMT		12			5.25%	Monthly			
13		\$	PPMT		13			5.25%	Monthly			
14		\$	DRICE		14			5.25%	Monthly			
15		\$	PROCE		15			5.25%	Monthly			
16		\$	PRICEDISC		16			5.25%	Monthly			
17		- \$ c	PRICEMAT		1/			5.25%	Monthly			
10		ç	PV		10			5.25%	Monthly			
20		ŝ	DATE:		20			5.25%	Monthly			
21		Ś	RATE		21			5.25%	Monthly			
22		ş	RECEIVED		22			5.25%	Monthly			
23		\$	RRI		23			5.25%	Monthly			
24		\$	(1)		24			5.25%	Monthly			
25		\$	SLIN		25			5.25%	Monthly			
26		\$	SYD		3			5.25%	Monthly			
27		\$	TBILLEQ	-	4			5.25%	Monthly			
28		\$	C. L. LE. C.	<u> </u>	5			5.25%	Monthly			
29		\$	Jx insert Eunction		6			5.25%	Monthly			
( )	She	et1	(+)					L 100/	tonthly			
10		_	0									

**4.** The Function Arguments dialog box appears. Within this dialog box you need to enter all of the arguments. As the interest rate is stored in cell E3, type "E3" into the Rate text box:

Function Arguments		?	×				
PMT							
Rate	E3 = 0.0525						
Nper	1 = number						
Pv	主 = number						
Fv	主 = number						
Туре	主 = number						
= Calculates the payment for a loan based on constant payments and a constant interest rate. <b>Rate</b> is the interest rate per period for the loan. For example, use 6%/4 for quarterly payments at 6% APR.							
Formula result =							
Help on this function	ОК	Car	ncel				

As these are annual interest rates and the payments will be monthly, you need to divide this value by 12. Type "/12" following the cell reference in the Rate text box:

Function Arguments		?	×				
PMT							
Rate	E3/12 = 0.004375						
Nper	主 = number						
Pv	± = number						
Fv	主 = number						
Туре	主 = number						
= Calculates the payment for a loan based on constant payments and a constant interest rate. <b>Rate</b> is the interest rate per period for the loan. For example, use 6%/4 for quarterly payments at 6% APR.							
Formula result =							
Help on this function		OK	Cancel				

6. The next argument is Nper, or the number of payment periods over the life of the loan. This information is contained in cell D3, but it is provided in years. Because you need to enter it as months, type "D3\*12" into the Nper text box:

Function Arguments		?	×				
PMT							
Rate	E3/12 <b>1</b> = 0.004375						
Nper	D3*12 = 36						
Pv	主 = number						
Fv	主 = number						
Туре	主 = number						
= Calculates the payment for a loan based on constant payments and a constant interest rate. <b>Nper</b> is the total number of payments for the loan.							
Formula result =							
Help on this function	ОК	Ca	ancel				

7. The next argument is Pv, or present value. This is the amount of money that is being borrowed. This information is contained in cell C3, so type "C3" into the Pv text box:

Function Arguments		?	$\times$					
PMT								
Rate	E3/12 <b>1</b> = 0.004375							
Nper	D3*12 <b>1</b> = 36							
Pv	C3 = 50000							
Fv	▲ = number							
Туре	▲ = number							
<ul> <li>= -1504.163526</li> <li>Calculates the payment for a loan based on constant payments and a constant interest rate.</li> <li>Pv is the present value: the total amount that a series of future payments is worth now.</li> </ul>								
Formula result = -1504.16352	5							
Help on this function	ОК	Car	ncel					

8. Leave the Fv (Future Value) argument field empty. This argument will default to 0, which is what we want. (This means there will be no part of the loan left outstanding at the end of the payments.) We will also let the Type field default to 0, meaning payments will be due at the end of the payment period. Click OK to create the function:

Function Arguments					?	×	
PMT							
Rate	E3/12	Ť	=	0.004375			
Nper	D3*12	1	=	36			
Pv	C3	1	=	50000			
Fv		Ť	=	number			
Туре		1	=	number			
<ul> <li>-1504.163526</li> <li>Calculates the payment for a loan based on constant payments and a constant interest rate.</li> <li>Pv is the present value: the total amount that a series of future payments is worth now.</li> </ul>							
Formula result = -1504.16352	6						
Help on this function				ок 💡	Can	cel	

**9.** You now have a result in the cell G3. You will also see the PMT function in the Formula Bar:

B	<b>ئ</b> ر ب	ð -	÷						Activity	1-2 - Exc	el		
File	Home	Inse	rt Page Layo	out Form	nulas Data	Review	View						
fx Insert Function	AutoSur	n Recent Used	ly Financial Logi	cal Text D	Date & Lookup &	θ Math & M Trig ≁ Fun	More	Define Name Manager 🗟 Create	e Name 🔻 Formula – e from Selection	∰o Tra o∰ Tra IS Rer	ce Precedents 5 Show Form ce Dependents 4 Error Chec move Arrows - 6 Evaluate Fo	nulas king * ormula	Watch Window
			Fund	tion Library				Defined	Names		Formula Auditing		
G3	Ŧ	+ >	$-\sqrt{-f_X}$	=PMT(E3	/12,D3*12,C3)	-							
	A	в	с		D			E	F		G	н	1.1
1					Loan	Payment	t Sche	dule					
2			Amount of Loa	n Le	ength of Loan (ir	years)	Anr	nual Interest Rate	Payment Pe	rioa	Amount of Each Payment		
3			\$ 50	0,000.00	3			5.25%	Month	ly	(\$1,504.16)		
4			\$ 50	0,000.00	4			5.25%	Month	ly			
5			\$ 50	0,000.00	5			5.25%	Month	ly			
C								= ==0/					

Now it is time to enter this formula for the rest of the data rows. To do this, click cell G3 to make it active, and then drag the AutoFill handle in the lower right corner of the cell down to G94:

A	в		С	D	E	F	G	н	1.1
66		\$	150,000.00	20	5.25%	Monthly			
67		\$	150,000.00	21	5.25%	Monthly			
68		\$	150,000.00	22	5.25%	Monthly			
69		\$	150,000.00	23	5.25%	Monthly			
70		\$	150,000.00	24	5.25%	Monthly			
71		\$	150,000.00	25	5.25%	Monthly			
72		\$	200,000.00	3	5.25%	Monthly			
73		\$	200,000.00	4	5.25%	Monthly			
74		\$	200,000.00	5	5.25%	Monthly			
75		\$	200,000.00	6	5.25%	Monthly			
76		\$	200,000.00	7	5.25%	Monthly			
77		\$	200,000.00	8	5.25%	Monthly		_	
78		\$	200,000.00	9	5.25%	Monthly			
79		\$	200,000.00	10	5.25%	Monthly			
80		\$	200,000.00	11	5.25%	Monthly			
81		\$	200,000.00	12	5.25%	Monthly			
82		\$	200,000.00	13	5.25%	Monthly			
83		\$	200,000.00	14	5.25%	Monthly			
84		\$	200,000.00	15	5.25%	Monthly			
85		\$	200,000.00	16	5.25%	Monthly			
86		\$	200,000.00	17	5.25%	Monthly		_	
87		\$	200,000.00	18	5.25%	Monthly			
88		\$	200,000.00	19	5.25%	Monthly			
89		\$	200,000.00	20	5.25%	Monthly			
90		\$	200,000.00	21	5.25%	Monthly			
91		\$	200,000.00	22	5.25%	Monthly			
92		\$	200,000.00	23	5.25%	Monthly			
93		\$	200,000.00	24	5.25%	Monthly	↓ ↓		
94		\$	200,000.00	25	5.25%	Monthly	<u> </u>	r i	
95									
$\rightarrow - +$	Sheet1		$(\pm)$						
Drag outside sel	ection to fil	l, or in	side to clear						

**11.** Release the mouse button. You will see that the loan payments for each entry have been calculated:

AutoS	iave 💽 Off		<b>9 · </b> (	- ℃ =		Activity 1-2a	lsx +	I	₽ Search						
File	Home	Inser	t Pag	ge Layout P	ormulas Data	Review View	Help								
fr	$\nabla$	$\bigtriangledown$	A	2		A	/ Def	Fine Name 👻	Ran Trace Precedents Sho	w Formulas			Colo	John Marco	
JA							Use	e in Formula ~	The Trace Dependents 🔥 Erro	r Checking 🥆	- <del>63</del>		E Calc	ulate NOW	
Function	AutoSur	m Recent Used	ily Financi	al Logical lext	Time × Reference ×	Trig Y Functions Y	Manager 😨 Cre	ate from Selection	Remove Arrows ~ (1) Eval	uate Formula	Watch Window	Ontions	on 🎛 Calc	ulate Sheet	
				Function Libra	17		Define	d Names	Formula Au	litina			Calculatio	n	
										,					
G3	Ψ.	- ×	~	f <sub>x</sub> =PMT(	E3/12,D3*12,C3)										
1	A	В		С	D		E	F	G	н	1	J.	к	L	M
69			\$	150,000.00	23		5.25%	Monthly	-\$937.1	4					
70			\$	150,000.00	24		5.25%	Monthly	-\$917.1	1					
71			\$	150,000.00	25		5.25%	Monthly	-\$898.8	7					
72			\$	200,000.00	3		5.25%	Monthly	-\$6,016.6	5					
73		_	\$	200,000.00	4		5.25%	Monthly	-\$4,628.5	4					
74		_	s	200,000.00	5		5.25%	Monthly	-\$3,797.2	0					
75		_	Ş	200,000.00	6		5.25%	Monthly	-\$3,244.2	3					
76			\$	200,000.00	7		5.25%	Monthly	-\$2,850.3	4					
77			s	200,000.00	8		5.25%	Monthly	-\$2,555.8	6					
78			ş	200,000.00	9		5.25%	Monthly	-\$2,327.6	S					
79			Ş	200,000.00	10		5.25%	Monthly	-\$2,145.8	3					
80		_	ş	200,000.00	11		5.25%	Monthly	-\$1,997.7	5					
81		_	ş	200,000.00	12		5.25%	Monthly	-\$1,874.9	6					
82		_	Ş	200,000.00	13		5.25%	Monthly	-\$1,771.6	3					
83		_	Ş	200,000.00	14		5.25%	Monthly	-\$1,683.5	8					
84			\$	200,000.00	15		5.25%	Monthly	-\$1,607.7	0					
85		_	>	200,000.00	10		5.25%	Monthly	-\$1,541.8						
86		_	Ş	200,000.00	17		5.25%	Monthly	-\$1,484.1	3					
87			>	200,000.00	18		5.25%	Monthly	-\$1,433.2	1					
00		_	0	200,000.00	19		3.23%	Monthly	-\$1,388.0	2					
00		_	ç ç	200,000.00	20		5.25%	Monthly	-\$1,347.6	2					
91		_	¢	200,000.00	21		5.25%	Monthly	-\$1,311.3	6					
02		_	ć	200,000.00	22		5.25%	Monthly	-\$1,278.9	2					
03			ŝ	200,000.00	25		5 25%	Monthly	-\$1,245.3	1					
94			Ś	200,000.00	24		5.25%	Monthly	-\$1,222.0	0					
95		_	~	200,000.00	23		5.2570	wontiny	-\$1,150.5						
96															
97															
98															
	> 1	Sheet1	(+)									1.1			
100													Average:	-\$1.357.56	Count: 92 N

**12.** Save the current workbook as Activity 1-2 Complete and then close Microsoft 365 Excel to complete this exercise.

## Summary

In this lesson you learned about range names and how to apply them. Additionally, you learned about the different function categories and specialized functions that are available. You should also now be familiar with function syntax, nested functions, automatic workbook calculations, and iterative calculations.

## **Review Questions**

- 1. For a selected range, where do you type in a new range name?
- 2. How many function categories are there in Microsoft 365 Excel?
- 3. What is the command sequence to show formulas rather than calculated values in cells?
- 4. What is a nested function?
- 5. What is the command sequence to change workbook calculations to manual?

# LESSON 2: ANALYZING DATA WITH LOGICAL AND LOOKUP FUNCTIONS

## **Lesson Objectives**

In this lesson you will learn how to:

- Use text functions
- Use logical functions
- Use lookup functions
- Use date functions
- Use financial functions

## **TOPIC A: Use Text Functions**

Now that you are familiar with Excel's more commonly used functions, you will learn about some of its more specialized ones. In this topic you will learn about functions that are specific to text analysis.

## **Topic Objectives**

In this session, you will learn:

- About text functions
- About LEFT and RIGHT functions
- About the MID function
- About the LEN function
- About the TRIM function
- About the UPPER, LOWER, and PROPER functions
- About the TEXTJOIN function
- About the TRANSPOSE function

## **Text Functions**

Text functions are used in Excel to analyze text-based worksheet data. While such functions can be used for data analysis, they are typically used instead to prepare data for analysis. This is because they allow you to format textual data for use in other areas. For example, you can use text functions to import textual data from another workbook and format it so that it meets the formatting requirements for the destination workbook.

## The LEFT and RIGHT Functions

=LEFT(text, [num\_chars])

#### =RIGHT(text, [num\_chars])

The **LEFT** and **RIGHT** functions are used to return a specific number of characters from either the left or the right side of a text string. Typically, these functions are used in situations where you need to transfer text to a destination where there is a limit on the number of characters each entry may have. The **text** argument is used to declare which text you would like to transfer, while the **[num\_chars]** argument is used to declare how many characters you would like transferred. Suppose that cell A1 contains "John Smith" as a text string in a worksheet. Examine the possible examples of how the LEFT and RIGHT functions would work with this data:

Function	Description
=RIGHT(A1)	As the num_chars argument was not set in this function, it will default to one character. This means that the output for this function would be "h" – the last letter on the far right of the text string.
=RIGHT(A1, 5)	With the num_chars argument set to 5, this function would result in "Smith" as an output – the last five letters on the far right of the text string.
=LEFT(A1, 5)	With the num_chars argument set to 5, this function would result in "John" (including the space) as an output – the first five letters on the far left of the text string.
=LEFT("John")	This function would return only "J" as an output because the num_chars argument was not set.

## **The MID Function**

#### =MID(text, start\_num, num\_chars)

Similar in use and design to the LEFT and RIGHT functions, the **MID** function returns characters from the middle of a text string. As with the LEFT and RIGHT functions, the **text** argument is used to reference the cell(s) with the text string in question or to enter a text string directly into the function surrounded by double quotation marks. The **start\_num** argument is unique to the MID function as it tells the function which character in the text string to start with. The **num\_chars** argument then allows you to set the number of characters that you would like to return from the starting point that you set in the previous argument. Keep in mind that while the num\_chars argument behaves the same as it does in the LEFT and RIGHT functions, it is required in order for the MID function to operate correctly.

Suppose that A1 contains "John Smith" as a text string in a worksheet. Examine the possible examples of how the MID function would work with this text string:

Function	Description
=MID(A1, 5, 5)	In this case, the text is contained within cell A1. The start_num argument is set to 5, so the function starts five characters (including spaces) into the text string. The num_chars argument is set to five so the five characters after the starting position will be returned. This means that "Smith" would be the output for this formula.
=MID(A1, 1, 4)	In this case, the text is contained within cell A1. The start_num function is set to 1, so the function starts at the beginning of the text string. The num_chars argument is set to 4 so the four characters after the starting position will be returned. This means that "John" would be the output for this formula.

## **The LEN Function**

#### =LEN(text)

The **LEN** (short for length) function's sole purpose is to return the number of characters that appear within a text string. While there can be many uses for this function, it is typically used to ensure that text strings are of the correct length. For example, you could use this function to make sure that all of the text data within a row is under a specified length. The only argument in this function, **text**, is used to specify where the text data that you would like to count is stored.

Suppose that A1 contains "John Smith" as a text string and B1 contains "Jane Doe" as a text string. Examine the possible examples of how the LEN function would work with this information in mind:

Function	Description
=LEN(A1)	In this case the LEN function has the text argument set to A1. This means that a count of the text string within this cell will be returned. The output of this function would then be 10.
=LEN(B1)	In this case the LEN function has the text argument set to B1. This means that a count of the text string within this cell will be returned. The output of this function would then be 8.

## **The TRIM Function**

#### =TRIM(text)

The **TRIM** function is used to remove any empty spaces from text strings, excluding spaces between words. This function can be very useful in solving data compatibility issues. For example, a frequent problem in data entry is random spaces at the beginning or end of a text string. Such problems can greatly affect your ability to work with text-based data.

Note that the only argument in this function, **text**, is used to specify where the text data that you would like to work with is stored.

Suppose that A1 contains "John Smith" as a text string and B1 contains "Jane" as a text string. Examine the possible examples of how the TRIM function would work with this information in mind:

Function	Description
=TRIM(A1)	In this case the TRIM function has the text argument set to A1. "John Smith" will be returned with all of the spaces at the beginning of this text string removed.
=TRIM(B1)	In this case the TRIM function has the text argument set to B1. "Jane" will be returned with all of the spaces at the end of this text string removed.

## The UPPER, LOWER, and PROPER Functions

=UPPER(text)

=LOWER(text)

#### =PROPER(text)

The **UPPER**, **LOWER**, and **PROPER** functions are used to change the casing of text-based data. The UPPER function converts all lowercase characters into uppercase, while the LOWER function will do the opposite. The PROPER function will only capitalize the first character of each word in a text string. For all of these functions, the only argument is **text**. This is used to indicate the text-based data that you would like this function to work with.

Suppose that A1 contains "John Smith" as a text string and B1 contains "JANe smiTh" as a text string. Examine the possible examples of how the UPPER, LOWER, and PROPER functions would work with this information in mind:

Function	Description
=UPPER(A1)	In this example, the UPPER function converts all of the text within cell A1 to uppercase. This means that the output would be "JOHN SMITH".
=LOWER(A1)	In this example, the LOWER function converts all of the text within cell A1 to lowercase. This means that the output would be "john smith".
=PROPER(B1)	In this example, the PROPER function ensures that only the first character in each word in cell B1 is capitalized. This means that "Jane Smith" would be the resulting output.

## **The TEXTJOIN Function**

#### =TEXTJOIN(delimeter, ignore\_empty, text1, [text2], ...)

The **TEXTJOIN** function allows you to combine (concatenate) text strings together from multiple cells into a single cell. This function can save you an enormous amount of time if you need to combine data from multiple sources into one cell.

The delimiter argument is used to define a text string (empty, or one or more characters) that will separate the text strings you are joining. The ignore\_empty argument is either TRUE (default) or FALSE and allows the function to ignore empty cells that are defined by the text arguments. Finally, the text arguments allow you to define the text strings, or ranges of strings that you want to join.

Suppose that A1 contains "John Smith" as a text string, B1 is blank, and C1 contains "Jane Doe" as a text string. Examine the possible examples of how the TEXTJOIN functions would work with this information in mind:

Function	Description
=TEXTJOIN( ", ", TRUE, A1, B1, C1)	In this example, the TEXTJOIN function combines cell A1, add a comma and a space, ignore cell B1 because it is empty, then add cell C1. The output would be "John Smith, Jane Doe".
=TEXTJOIN( ", ", FALSE, A1, B1, C1)	In this example, the TEXTJOIN function combines cell A1, add a comma and a space, add another comma and space for cell B1, because the empty cell is not ignored, then add cell C1. The output would be "John Smith, , Jane Doe".
TEXTJOIN( , TRUE, A1, B1, C1)	In this example, because the delimiter argument is empty, the TEXTJOIN function combines cell A1, ignore cell B1, because the ignore_empty argument is TRUE, then add cell C1. The output would be "John SmithJane Doe".

## The TRANSPOSE Function

#### =TRANSPOSE(array)

The **Transpose** function shifts a vertical range of cells to a horizontal range or vice versa. To operate correctly, this function needs to be entered as an array formula in a range that has the same number of rows and columns.

For example, suppose that you wanted to transpose the values in column A so that they appear horizontally on row 1:

,	AutoSave 🤇		<b>७</b> • ९	- U -				Book1 - Ex
Fi	ile Ho	me Ins	ert Pag	le Layout	Formula	as Data	Review	View
Pa	- A Cur L Cur aste Co ✓ ✓ For	t py ~ mat Painter	Calibri B I	<u>U</u> • .	<ul> <li>11 </li> <li>&lt; ∆ </li> </ul>	A^ A~ 3		≫~~ et
	Clipboa	rd	ы	Font		۲ <u>م</u>		Alignmen
A	L	• : :	× ✓	<i>f</i> <sub>x</sub> 1				
	А	В	с	D	E	F	G	Н
1	1							
2	2							
3	3							
4	4							
5	5							
6								
7								

Aut	toSave 🧿	ه ۲	<b>5</b> ~ C	- U -				Book1 - Exe
File	Hom	ne Inse	ert Pag	je Layout	Formula	s Data	Review	View
Paste	Cut Cop Sorn≪	y ~ nat Painter	Calibri B I	<u>U</u> ~   <u>+</u>	<ul> <li>11 </li> <li>&lt; 20</li> <li>&lt; 20</li> </ul>	A^ Aĭ   ∃ ~   ≣		** ** e¥
	Clipboard	d	r <u>a</u>	Font		Гъ		Alignmen
C1	,	- : :	× ✓	f <sub>x</sub>				
	Α	В	С	D	E	F	G	Н
1	1							
2	2							
3	3							
4	4							
5	5							
6								
-								

To do this, first select the destination cells that you would like the results to be shown in:

Next, you would enter the transpose function into the Formula Bar with the original cell range as the argument – in this case it would be "=TRANSPOSE(A1:A5)":

2
iew
ab t
nment

Press **Ctrl + Shift + Enter** to enter this function as an array formula and the results will be displayed within the selected cells:

,	AutoSave 🤅		] <b>り・</b>	~ () <b>≂</b>				Book1 - Exc
Fi	ile Ho	me Ins	sert Pag	e Layout	Formula	s Data	Review	v View
Pa	Cu L Cu aste ✓ ✓ Fo	t Py ~ rmat Painte	Calibri B I	⊻ - ⊞	<ul> <li>11 </li> <li>√</li> <li>2/2</li> <li>√</li> </ul>	A^ A~   ∃ ~   ≣	≡≡ ≡≡≡	%~~ @ €= == Ē
	Clipboa	rd	Гы	Font		ГJ		Alignment
C1	L	• :	× ✓	<i>f<sub>x</sub></i> {=TR	ANSPOSE(	A1:A5)}		
	А	В	С	D	E	F	G	н
1	1		1	2	3	4	5	
2	2							
3	3							
4	4							
5	5							
6								

## Activity 2-1: Analyzing Data Using Text Functions

Using some of the text functions that you have learned about in this session, you would like to automate portions of an invoice form to decrease the time needed for data entry.

1. To begin, open Activity 2-1 from your Exercise Files folder:



2. First you would like to find the first initial from the first name that is entered into column A. Click to select cell C2 and type "=LEFT(A2)" into the Formula Bar:

AutoSave 💽 🛱 🤘	• C · D ≠	Activi
File Home Insert	Page Layout Formulas I	Data Review
Paste & Format Painter	- 11 → A^ A` B I U ~   = ~   <u>A</u> ~ <u>A</u> ~	
لاً Clipboard	Font	A l
PMT • : X	✓ f <sub>x</sub> =LEFT(A2)	
A	В	С
1 First Name	Last Name	First Initial
2 John	Smith	=LEFT(A2)
3 Jane	Johnson	
4		

**3.** Press the **Enter** key on your keyboard and you will see that the previously selected cell now displays the initial from the first name ("J" in this case):

	Α	В	C	D	E	F	G	н
1	First Name	Last Name	First Initial	Last Initial	Full Initals	Date:	Invoice #:	Shipment Method:
2	John	Smith	J			2015-11-12	8463157	
3	Jane	Johnson				2015-11-13	45678	
4								
5								

4. Next, you need to do the same thing and find the first initial from the last name that is entered into column B. Click to select cell D2 and type "=LEFT(B2)" into the Formula Bar:

Å	AutoSave 💽 Off	<b>日 ら</b> 、 (	- 0 -	Α	ctivity 2-1.xlsx 👻		۶ مر	
Fi	e Home	Insert Pa	ge Layout Formulas	Data Review	View Helj	p		
Pa	Cut Cut Copy ~ Ste Sormat Pa	ainter B I	- 11 - A^ ⊻ -   ⊞ -   <u>&amp;</u> - <u>A</u>	A <sup>×</sup> = ≡ ≡   × ≡ ≡ ≡	& v eb Wrap د ع ع E Merge	Text	General	
	Clipboard 🖼 Font 🖾				Alignment	ГЪ	Number	
PN	IT 👻	× 🗸	fx =LEFT(B2)					
	А		В	С	D	E	F	
1	First N	lame	Last Name	First Initia	Last Initial	Full Initals	Date:	
2	2 John		Smith	J	=LEFT(B2)		2015-11-12	
3	Jan	ie	Johnson				2015-11-13	
4								
5								

5. Press the Enter key on your keyboard and you will see that the previously selected cell now displays the initial from the last name ("S" in this case):

	А	В	С	D	E	F	G	н
1	First Name	Last Name	First Initial	Last Initial	Full Initals	Date:	Invoice #:	Shipment Method:
2	John	Smith	J	S		2015-11-12	8463157	
3	Jane	Johnson				2015-11-13	45678	
4								
5								

6. Now you need to use the TEXTJOIN function to fill in the Full Initials column. Click to select the E2 cell and then type "=TEXTJOIN(,TRUE,C2,D2)" into the Formula Bar:

ļ	AutoSave 💽 Off	85	<b>) -</b> G - D -	÷	Activit	y 2-1.xlsx 🝷		🔎 Search
Fi	le Home	Insert	Page Layout	Formulas (	Data Review	View He	lp	
Ľ	Cut			~ 11 ~ A^ A`	$\equiv \equiv \equiv   d$	Ŷ~ ą₽ Wrap	Text	General
Pa	ste ✓ ≪ Format Pa	ainter	B I <u>U</u> ~	<u> </u>		E →Ξ 🖶 Merg	e & Center 👻	\$ ~ % 9   50 →
	Clipboard	F3	For	nt r	-	Alignment	5	Number
SU	M -	×	✓ f <sub>x</sub> =1	EXTJOIN(,TRUE,C	2,D2)			
	А			В	C	D	E	F
1	First N	lame	L	ast Name	First Initial	Last Initial	Full Initals	Date:
2	łoł	าท		Smith	J	S	,C2,D2)	11/12/2015
3	Jan	ie		Johnson				11/13/2015
4								

**7.** Press the **Enter** key and you will see that the values from cells C2 and D2 have been combined to show the full initials:

	Α	В	с	D	E	F	G	н
1	First Name	Last Name	First Initial	Last Initial	Full Initals	Date:	Invoice #:	Shipment Method:
2	John	Smith	J	S	JS	2015-11-12	8463157	
3	Jane	Johnson				2015-11-13	45678	
4								
5								

8. Finally, you would like to automatically fill in the shipment method based on the number of characters that appear in the invoice number. If the invoice has more than five characters, then it is designated a rush order and if it is five characters or less, it is a standard order. Select **H2**:

A	utoSave 👓 🗄 🍤 <	× _	Activity 2-1.xlsx 👻						
File	e <mark>Home</mark> Insert Pag	ge Layout Formulas D	ata Review	View Help	>				
Pas	$\begin{array}{c c c c c c c c c c c c c c c c c c c $								
H2	• : × 🗸	f <sub>x</sub>							
	А	В	с	D	Е	F	G	Н	1.1
1	First Name	Last Name	First Initial	Last Initial	Full Initals	Date:	Invoice #:	Shipment Method:	
2	John	Smith	J	S	JS	2015-11-12	8463157		
3	Jane	Johnson				2015-11-13	45678		
4									
5									

9. Type "=IF(LEN(G2)>5, "RUSH", "STANDARD")" into the Formula Bar:

Aut	toSave 💽 🗄 り	• C · D ;	;	Ac	tivity 2-1.xlsx 👻		R	Search		
File	Home Insert	Page Layout	Formulas D	ata Review	View Hel	p				
Paste	$\begin{array}{c c c c c c c c c c c c c c c c c c c $								Bac on Ch	
	Clipboard Gi Font Gi Alignment Gi Number Gi									
PMT	* : ×	✓ f <sub>x</sub> =1	(LEN(G2)>5,"RUSI	H", "STANDARD"						
	А		В	с	D	E	F	G	н	1.1
1	First Name	Li	ist Name	First Initial	Last Initial	Full Initals	Date:	mvoice fi	Shipment Method:	
2	John		Smith	J	S	JS	2015-11-12	8463157	","STANDARD")	
3	Jane	1	ohnson				2015-11-13	45678		
4										
5										

**10.** Press the **Enter** key on your keyboard and you will see that this particular order is a rush order because its invoice number is more than five characters:

	A	В	С	D	E	F	G	Н	1.1
1	First Name	Last Name	First Initial	Last Initial	Full Initals	Date:	Invoice #:	Shinment Method	
2	John	Smith	J	S	JS	2015-11-12	8463157	RUSH	
3	Jane	Johnson				2015-11-13	45678		
4									
5									

**11.** Use the **Auto Fill** feature to copy the formulas that you entered during this activity into the adjacent cells in row 3:

	Α	В	с	D	E	F	G	Н	1
1	First Name	Last Name	First Initial	Last Initial	Full Initals	Date:	Invoice #:	Shipment Method:	
2	John	Smith	J	S	JS	2015-11-12	8463157	RUSH	
3	Jane	Johnson	J	J	11	2015-11-13	45678	STANDARD	
4									<b>.</b>
5									

**12.** Save the current workbook as Activity 2-1 Complete and then close Microsoft 365 Excel to complete this exercise.

## **TOPIC B: Use Logical Functions**

Logical functions are used to ask yes or no questions related to your data. In this session you will learn all about the logical functions that are available in Excel 365, including the AND, OR, and IF functions.

## **Topic Objectives**

In this session, you will learn:

- About logical functions
- About logical operators
- About the AND function
- About the OR function
- About the IF function
- About the IFS function

## **Logical Functions**

Excel contains a collection of **logical functions** that allow you to essentially ask yes or no questions related to your data. Such questions return a positive (**TRUE**) or negative (**FALSE**) response. Logical functions also allow you to perform calculations when certain conditions are met. For example, logical functions could be used to ask your data if the sales department met its goals for this quarter, or it could be used to find out if the sales department met its goal, and if so, what the bonus would be for the team members.

## **Logical Operators**

**Logical operators** are used to compare two values against one another to see if they meet a specified logical condition. For example, should the values meet the logical condition (2 > 1) then the output would be the logical value of TRUE. If the values do not meet the logical condition (2 < 1), then the output would instead be FALSE. Due to this behavior, logical operators are instrumental in constructing conditions for functions and calculations to run correctly.
Operator	Symbol	Examples with TRUE Result
Equal to	=	1 = 1
Greater than	>	2 > 1
Less than	<	1 < 2
Greater than or equal to	>=	2 >= 2 3 >=2
Less than or equal to	<=	2 <= 2 1 <=2
Not equal to	<>	1 <> 2

Below you will find a table with all of the logical operators that are available in Excel 365 and what they do:

# **The AND Function**

### =AND(logical1, [logical2], ...)

This function returns a TRUE value when all of the arguments are true. On the flipside, it returns a FALSE value when any of the arguments in this function are false. While there can be a varied amount of use cases for this function, you would typically use it for conditional purposes. For example, you could use this function to check whether all of the departments in an organization have met all of their goals for the current quarter.

The first argument that is required in this function is **logical1.** You can have up to 30 of these arguments in one **AND** function with each argument separated by a comma. These arguments are where you enter the logical values and operators that you would like to test for (e.g. A1>B2). Additionally, you also have the option of entering a formula as a single argument.

Suppose that A1 contains the value of 15, while cell B1 holds the value 20, and C1 contains 25. Additionally, assume that D1 holds the logical value of FALSE:

	Α	В	С	D	E
1	15	20	25	FALSE	
2					

Function	Description
=AND(A1 <b1, b1="">C1)</b1,>	While the value of A1 is less than the value in B1, B1 is actually less than C1. As not all of the arguments in this function are true, the AND function will output <b>FALSE</b> .
=AND(A1 <b1, b1<c1)<="" td=""><td>The value of A1 is less than B1, and similarly the value of B1 is less than C1. As all of the arguments in this AND function have returned as true, the output for this function would be <b>TRUE</b>.</td></b1,>	The value of A1 is less than B1, and similarly the value of B1 is less than C1. As all of the arguments in this AND function have returned as true, the output for this function would be <b>TRUE</b> .
=AND(D1)	The value of D1 holds the logical value of FALSE so the output of this AND function would also be <b>FALSE</b> .
=AND(2*2=4)	In this function a simple equation has been added as an argument. As this equation is correct (2X2=4) the output from this AND function would be <b>TRUE</b> .

### **The OR Function**

### =OR(logical1, [logical2], ...)

The **OR** function is similar to the AND function with one key difference: the OR function returns a TRUE value if **any** of the arguments evaluate to TRUE. With the same 30 arguments limit as the AND function, the OR function is constructed in the same manner and supports the same items (formulas, cell references, etc.). Typically, this function would be used to determine if there is a TRUE value in a group of data. For example, you could use it to quickly see if anyone in your sales department has made sales over a particular dollar amount in any one of the four months of this quarter.

Suppose that A1 contains the value of 15, while cell B1 holds the value 20, and C1 contains 25. Additionally, assume that D1 holds the logical value of FALSE:



Function	Description
=OR(A1 <b1, b1="">C1)</b1,>	While the value of A1 is less than the value in B1, B1 is actually less than C1. Even though only one of the arguments in this function has returned as TRUE, the OR function will still output <b>TRUE</b> .
=OR(A1 <b1, b1<c1)<="" td=""><td>The value of A1 is less than B1, and similarly the value of B1 is less than C1. As all of the arguments in this OR function have returned as true, the output for this function would be <b>TRUE</b>.</td></b1,>	The value of A1 is less than B1, and similarly the value of B1 is less than C1. As all of the arguments in this OR function have returned as true, the output for this function would be <b>TRUE</b> .
=OR(D1, A1<5)	The value of D1 holds the logical value of FALSE and the data in A1 is not less than 5, so both of these arguments resolve to FALSE. This means that the output for this OR function would also be <b>FALSE</b> .

# **The IF Function**

### =IF(logical\_test, [value\_if\_true], [value\_if\_false])

The **IF** function is one of the most commonly used logical functions. It sets a cell value based upon whether a logical test resolves to be true or false. For example, you could use this function to test if a salesperson in your organization exceeded a sales goal. If that resolves to true, then this function could output a bonus amount. If it resolves to false, then this function could output a zero amount. The IF function has three arguments: **logical\_test**, **value\_if\_true**, and **value\_if\_false**. The **logical\_test** argument is where you create the condition that you would like to test. The **value\_if\_true** argument will be the output of this function if the condition is found to be true. Similarly, the **value\_if\_false** argument will be the output if the condition is found to be false. Keep in mind that the value arguments in this function can hold both text and numerical data; however, all text data must be enclosed in double quotation marks.

Suppose that A1 contains the value of 15, while cell B1 holds the value 20, and C1 contains 25. Additionally, assume that D1 holds the logical value of FALSE:

	Α	В	С	D	E
1	15	20	25	FALSE	
2					

Function	Description
=IF(A1 <b1, "no")<="" "yes",="" td=""><td>In this example, A1 is in fact less than B1 so this function would output <b>Yes</b>.</td></b1,>	In this example, A1 is in fact less than B1 so this function would output <b>Yes</b> .
=IF(A1 <b1, "no")<="" b1*c1,="" td=""><td>In this example, A1 is less than B1 so this function would output the result of the B1*C1 formula - <b>500</b> in this case.</td></b1,>	In this example, A1 is less than B1 so this function would output the result of the B1*C1 formula - <b>500</b> in this case.
=IF(A1>B1, "Yes", "No")	In this example, A1 is less than B1 so this function results in <b>No</b> as the output.

# **The IFS Function**

=IFS(logical\_test1, value\_if\_true1, [logical\_test2], [value\_if\_true2], ...)

The **IFS** function is an evolution of the IF function that was introduced in Excel 2016. It is an alternative to using nested IF functions, where you want to test multiple conditions and return multiple results based on those conditions. It is much easier to use and much easier to understand than a complex nested IF function, and you should keep it mind as you begin to use more complex logical analysis in your workbooks.

The IFS function only has two required arguments: **logical\_test1**, and **value\_if\_true1**. Each argument is similar to those in the IF function, but the benefits of the IFS function are realized when you begin to add additional arguments. The IFS function checks whether the first condition (**logical\_test1**) is true, and, if so, returns the **value\_if\_true1** argument. If the first condition is false, it moves to the next condition and performs the same analysis again, then continues through all of the logical tests. If none of the logical tests are true the IFS function will return #N/A. You can prevent this outcome by making the last logical test in your IFS function TRUE.

Suppose that A1 contains the value of 15, while cell B1 holds the value 20, and C1 contains 25. Additionally, assume that D1 holds the logical value of FALSE:

	Α	A B C		D	E
1	15	20	25	FALSE	
2					

Function	Description
=IFS(A1>B1, A1, B1 <c1,b1)< td=""><td>In this example, A1 is in fact less than B1 so the first logical test is false. In the second logical test, B1 is less than C1, therefore the function would output the contents of cell B1, <b>20</b>.</td></c1,b1)<>	In this example, A1 is in fact less than B1 so the first logical test is false. In the second logical test, B1 is less than C1, therefore the function would output the contents of cell B1, <b>20</b> .
=IFS(A1 <b1, "a1",b1<c1,"b1")<="" td=""><td>In this example, both of the logical tests are true. The function would output the string "A1" because it returns the value_if_true of the first logical test that is true.</td></b1,>	In this example, both of the logical tests are true. The function would output the string "A1" because it returns the value_if_true of the first logical test that is true.
=IFS(A1>B1, A1, B1>C1,B1,TRUE,C1)	In this example, both the first and second logical tests resolve to FALSE. The third logical test has been defined as TRUE, so the function would output the contents of cell C1, <b>25</b> .

### **Activity 2-2: Analyzing Data Using Logical Functions**

You have been tasked with maintaining a worksheet that is used to determine whether employees qualify for a bonus. Use the functions you learned about in this lesson to determine which employees will receive a bonus and complete the data in the ID column.

**1.** To begin, open Activity 2-2 from your Exercise Files folder:



Activity 2-2.xlsx Microsoft Excel Worksheet 9.83 KB

2. First you need to fill in the ID column. This data is the first name and last name separated by an underscore (\_). While you can do this manually, the TEXTJOIN function is built for exactly this type of work. Select cell C5, then, in the Formula Bar, type "=TEXTJOIN("\_",TRUE,A5,B5)"

SU	SUM T : X V fr =TEXTJOIN("_", TRUE, AS, BS)											
	А	В	С	<mark>л</mark> р	E	F	G	н	1	J	к	1
1	Week	ly Sales	s & Bonus Pa	out							Weekly Bonus Amount	
2											\$ 500.00	
3												
4	First Name	Last Name		Call List Comp	Weekly Sales	Weekly Goal	Bonus	Bonus Amount				
5	Jackie	Williamson	A5,B5)	Yes	\$ 16,785.14	\$ 15,000.00						
6	Lucas	Bressan		Yes	\$ 14,687.50	\$ 15,000.00						
7	Stanley	Prestwick		No	\$ 13,478.96	\$ 15,000.00						
8	Jerry	Harrison		No	\$ 21,689.47	\$ 15,000.00						
9	Leah	Thompson		Yes	\$ 25,478.45	\$ 15,000.00						
10	Robyn	Fletcher		No	\$ 7,600.00	\$ 10,000.00						
11	Lisa	McCain		Yes	\$ 5,689.00	\$ 10,000.00						
12	Steven	Stone		Yes	\$ 12,346.87	\$ 10,000.00						
13	Devon	Lawrence		No	\$ 11,687.00	\$ 10,000.00						
14	George	Jackson		Yes	\$ 9,874.45	\$ 10,000.00						
15												

**3.** Press **Enter**, to enter the formula, then select cell **C5** again, hover your cursor over the cell handle until your cursor icon turns into a small black cross:

	Α	В	С	D	E	F	G	Н
1	Week	ly Sales	& Bonus Pay					
2								
3								
4	First Name	Last Name	ID	Call List Comp	Weekly Sales	Weekly Goal	Bonus	<b>Bonus Amount</b>
5	Jackie	Williamson	Jackie_Williamson	Yes Yes	\$ 16,785.14	\$ 15,000.00		
6	Lucas	Bressan		Yes	\$ 14,687.50	\$ 15,000.00		
7	Stanley	Prestwick		No	\$ 13,478.96	\$ 15,000.00		
8	Jerry	Harrison		No	\$ 21,689.47	\$ 15,000.00		
9	Leah	Thompson		Yes	\$ 25,478.45	\$ 15,000.00		
10	Robyn	Fletcher		No	\$ 7,600.00	\$ 10,000.00		
11	Lisa	McCain		Yes	\$ 5,689.00	\$ 10,000.00		
12	Steven	Stone		Yes	\$ 12,346.87	\$ 10,000.00		
13	Devon	Lawrence		No	\$ 11,687.00	\$ 10,000.00		
14	George	Jackson		Yes	\$ 9,874.45	\$ 10,000.00		
15								

4. Double click on the cell handle to automatically copy your formula down the column, to cell C14:

	А	В	С	D	E	F	G	Н
1	Week	y Sales	& Bonus Pay	vout				
2								
3								
4	First Name	Last Name	ID	Call List Comp	Weekly Sales	Weekly Goal	Bonus	Bonus Amount
5	Jackie	Williamson	Jackie_Williamson	Yes	\$ 16,785.14	\$ 15,000.00		
6	Lucas	Bressan	Lucas_Bressan	Yes	\$ 14,687.50	\$ 15,000.00		
7	Stanley	Prestwick	Stanley_Prestwick	No	\$ 13,478.96	\$ 15,000.00		
8	Jerry	Harrison	Jerry_Harrison	No	\$ 21,689.47	\$ 15,000.00		
9	Leah	Thompson	Leah_Thompson	Yes	\$ 25,478.45	\$ 15,000.00		
10	Robyn	Fletcher	Robyn_Fletcher	No	\$ 7,600.00	\$ 10,000.00		
11	Lisa	McCain	Lisa_McCain	Yes	\$ 5,689.00	\$ 10,000.00		
12	Steven	Stone	Steven_Stone	Yes	\$ 12,346.87	\$ 10,000.00		
13	Devon	Lawrence	Devon_Lawrence	No	\$ 11,687.00	\$ 10,000.00		
14	George	Jackson	George _Jackson	Yes	\$ 9,874.45	\$ 10,000.00		
15				<b></b> +				
16								

5. Next, you need to determine which salespeople are going to receive a bonus. Bonuses are dispensed when the representative exceeds their weekly sales goal, and if their call reports are complete. For this purpose, you can use the AND function. Use your cursor to select cells G5 on the worksheet:

	Α	В	С	D	E	F	G	н	1	J	К	L
1	1 Weekly Sales & Bonus Payout									Weekly Bonus Amount		
2											\$ 500.00	
3												
4	First Name	Last Name	ID	Call Rep Comp	Weekly Sales	Weekly Goal	Bonus	Bonus Amount				
5	Jackie	Williamson	Jackie_Williamson	Yes	\$ 16,785.14	\$ 15,000.00						
6	Lucas	Bressan	Lucas_Bressan	Yes	\$ 14,687.50	\$ 15,000.00						
7	Stanley	Prestwick	Stanley_Prestwick	No	\$ 13,478.96	\$ 15,000.00						
8	Jerry	Harrison	Jerry_Harrison	No	\$ 21,689.47	\$ 15,000.00						
9	Leah	Thompson	Leah_Thompson	Yes	\$ 25,478.45	\$ 15,000.00						
10	Robyn	Fletcher	Robyn_Fletcher	No	\$ 7,600.00	\$ 10,000.00						
11	Lisa	McCain	Lisa_McCain	Yes	\$ 5,689.00	\$ 10,000.00						
12	Steven	Stone	Steven_Stone	Yes	\$ 12,346.87	\$ 10,000.00						
13	Devon	Lawrence	Devon_Lawrence	No	\$ 11,687.00	\$ 10,000.00						
14	George	Jackson	George _Jackson	Yes	\$ 9,874.45	\$ 10,000.00						
15												

- AutoSave 💽 🛱 🏷 -Home Insert Page Layout Formulas Data Review View Help Egg Trace Precedents 1/3x Show Formula:  $f_X \mid \Sigma \bowtie \square ? \land \square \square \square \square$ 📲 Trace Dependents 🛛 🔬 Error Checking 🗸 Name Manager 🗑 Create from Selection AutoSum Recently Financial Logical Text Date & Lookup & Math & More Used ~ Jused ~ Time ~ Reference ~ Tirg ~ Functions ~ Insert Function F× Remove Arrows ∽ () Evaluate Formula Windo Function Library Formula Auditing ▼ : × ✓ f<sub>x</sub> =AND(D5="Yes",E5>F5) PMT A B с н і ј D E F G к 1 Weekly Sales & Bonus Payout Weekly Bonus Amount Ś 500.00 
   Last Name
   ID
   Call Rep Comp
   Weekly Sales
   Weekly Goa
   Bonus
   Bonus
   Amount

   VWIIIamson Jackie, Williamson
   Yes
   \$ 16,785.14
   \$ 15,000.00
   =AND(D5="Yes",E5>F5)
   4 First Name Last Name 5 Jackie \$ 14,687.50 \$ 15,000.00 \$ 13,478.96 \$ 15,000.00 \$ 21,689.47 \$ 15,000.00 \$ 26,470 \$ 15,000.00 6 Lucas 7 Stanley Bressan Lucas\_Bressan Prestwick Stanley\_Prestwick Yes No 8 Jerry 9 Leah Harrison Jerry Harrison No 
   NU
   \$ 21,689.47
   \$ 15,000.00

   Yes
   \$ 25,478.45
   \$ 15,000.00

   No
   \$ 7,600.00
   \$ 10,000.00

   Yes
   \$ 5,689.00
   \$ 10,000.00

   Yes
   \$ 12,346.87
   \$ 10,000.00

   No
   \$ 11,682.00
   \$ 10,000.00
   Thompson Leah\_Thompson Fletcher Robyn\_Fletcher McCain Lisa\_McCain 10 Robyn 11 Lisa 12 Steven Stone Steven Stone 13 Devon Lawrence Devon\_Lawrence 11,687.00 \$ 10,000.00 No Jackson 14 George George \_Jackson Yes \$ 9,874.45 \$ 10,000.00 15 16
- 6. Inside the Formula Bar, type "=AND(D5="Yes",E5>F5)" and then press Enter:

Because both logical tests are true, the formula returns the value of TRUE in cell
 G5. Now drag the AutoFill handle at the bottom right of the cell down to cell G14:

	А	В	С	D	E	F	G	Н	1	J	К	L
1	Week	y Sales	& Bonus Pay	out							Weekly Bonus Amount	
2											\$ 500.00	
3												
4	First Name	Last Name	ID	Call Rep Comp	Weekly Sales	Weekly Goal	Bonus	Bonus Amount				
5	Jackie	Williamson	Jackie_Williamson	Yes	\$ 16,785.14	\$ 15,000.00	TRUE					
6	Lucas	Bressan	Lucas_Bressan	Yes	\$ 14,687.50	\$ 15,000.00						
7	Stanley	Prestwick	Stanley_Prestwick	No	\$ 13,478.96	\$ 15,000.00						
8	Jerry	Harrison	Jerry_Harrison	No	\$ 21,689.47	\$ 15,000.00						
9	Leah	Thompson	Leah_Thompson	Yes	\$ 25,478.45	\$ 15,000.00						
10	Robyn	Fletcher	Robyn_Fletcher	No	\$ 7,600.00	\$ 10,000.00						
11	Lisa	McCain	Lisa_McCain	Yes	\$ 5,689.00	\$ 10,000.00						
12	Steven	Stone	Steven_Stone	Yes	\$ 12,346.87	\$ 10,000.00						
13	Devon	Lawrence	Devon_Lawrence	No	\$ 11,687.00	\$ 10,000.00						
14	George	Jackson	George _Jackson	Yes	\$ 9,874.45	\$ 10,000.00						
15												

All sales representatives who have met both conditions now show a value of TRUE in this column. To add the bonus amount to column H, first select cells H5 through H14:

1	Α	В	С	D	E	F	G	Н	1	J	К	L
1	Week	ly Sales	s & Bonus Pay	/out							Weekly Bonus Amount	
2											\$ 500.00	
3												
4	First Name	Last Name	ID	Call Rep Comp	Weekly Sales	Weekly Goal	Bonus	Bonus Amount				
5	Jackie	Williamson	Jackie_Williamson	Yes	\$ 16,785.14	\$ 15,000.00	TRUE					
6	Lucas	Bressan	Lucas_Bressan	Yes	\$ 14,687.50	\$ 15,000.00	FALSE					
7	Stanley	Prestwick	Stanley_Prestwick	No	\$ 13,478.96	\$ 15,000.00	FALSE					
8	Jerry	Harrison	Jerry_Harrison	No	\$ 21,689.47	\$ 15,000.00	FALSE					
9	Leah	Thompson	Leah_Thompson	Yes	\$ 25,478.45	\$ 15,000.00	TRUE					
10	Robyn	Fletcher	Robyn_Fletcher	No	\$ 7,600.00	\$ 10,000.00	FALSE					
11	Lisa	McCain	Lisa_McCain	Yes	\$ 5,689.00	\$ 10,000.00	FALSE					
12	Steven	Stone	Steven_Stone	Yes	\$ 12,346.87	\$ 10,000.00	TRUE					
13	Devon	Lawrence	Devon_Lawrence	No	\$ 11,687.00	\$ 10,000.00	FALSE					
14	George	Jackson	George _Jackson	Yes	\$ 9,874.45	\$ 10,000.00	FALSE	÷.				
15								<b>F</b> .				

9. Inside the Formula Bar, type "=IF(G5:G14=TRUE,K2, 0)". Because this is an array function, press Ctrl + Shift + Enter:

	AutoSave 🧿	₩ 8 %	• ୯੶୰ ≖		Activity 2	2-2.xlsx +			𝒫 Search				
Fi	le Hom	e Insert	Page Layout For	mulas Data	Review Vie	ew Help							
lı Fu	fx Auto	Sum Recently	Financial Logical Text	Date & Lookup & Time * Reference *	Hath & More Trig ~ Function	Name Manager	Define Na Use in For Create from	me mula ~ m Selection	문 <sub>23</sub> Trace Preces 직접 Trace Depen F <sup>*</sup> <sub>X</sub> Remove Arr	dents 🦻 dents 🧟 ows ~ 💪	k Show Formu 2 Error Checkii ) Evaluate Fori	las ng ~ Watch mula Window	Calcul Optic
			Function Library				Defined Nam	es		Formu	la Auditing		1
PN	r TN	- : ×	✓ fx =IF(G5:G)	4=TRUE.K2. 0)									
			C C				C			1.1.1		K	
-		•			-	F	0			,		ĸ	
1	Week	ly Sales	& Bonus Pa	yout							Weekly I	Bonus Amount	
2											\$	500.00	
3													
4	First Name	Last Name	ID	Call Rep Comp	Weekly Sales	Weekly Goal	Bonus	Bonus Am	ount				
5	Jackie	Williamson	Jackie_Williamson	Yes	\$ 16,785.14	\$ 15,000.00	TRUE	=TRUE,K2, 0	)				
6	Lucas	Bressan	Lucas_Bressan	Yes	\$ 14,687.50	\$ 15,000.00	FALSE						
7	Stanley	Prestwick	Stanley_Prestwick	No	\$ 13,478.96	\$ 15,000.00	FALSE						
8	Jerry	Harrison	Jerry_Harrison	No	\$ 21,689.47	\$ 15,000.00	FALSE						
9	Leah	Thompson	Leah_Thompson	Yes	\$ 25,478.45	\$ 15,000.00	TRUE						
10	Robyn	Fletcher	Robyn_Fletcher	No	\$ 7,600.00	\$ 10,000.00	FALSE						
11	Lisa	McCain	Lisa_McCain	Yes	\$ 5,689.00	\$ 10,000.00	FALSE						
12	Steven	Stone	Steven_Stone	Yes	\$ 12,346.87	\$ 10,000.00	TRUE						
13	Devon	Lawrence	Devon_Lawrence	No	\$ 11,687.00	\$ 10,000.00	FALSE						
14	George	Jackson	George Jackson	Yes	\$ 9,874.45	\$ 10,000.00	FALSE						
15													
16													

**10.** The bonus information has now been calculated for all employees in this worksheet:

	Α	В	C	D	E	F	G	Н	1	J	K	L
1	Week	ly Sales	s & Bonus Pay	/out							Weekly Bonus Amount	
2											\$ 500.00	
З												
4	First Name	Last Name	ID	Call Rep Comp	Weekly Sales	Weekly Goal	Bonus	Bonus Amount				
5	Jackie	Williamson	Jackie_Williamson	Yes	\$ 16,785.14	\$ 15,000.00	TRUE	\$ 500.00				
6	Lucas	Bressan	Lucas_Bressan	Yes	\$ 14,687.50	\$ 15,000.00	FALSE	\$ -				
7	Stanley	Prestwick	Stanley_Prestwick	No	\$ 13,478.96	\$ 15,000.00	FALSE	\$ -				
8	Jerry	Harrison	Jerry_Harrison	No	\$ 21,689.47	\$ 15,000.00	FALSE	\$ -				
9	Leah	Thompson	Leah_Thompson	Yes	\$ 25,478.45	\$ 15,000.00	TRUE	\$ 500.00				
10	Robyn	Fletcher	Robyn_Fletcher	No	\$ 7,600.00	\$ 10,000.00	FALSE	\$ -				
11	Lisa	McCain	Lisa_McCain	Yes	\$ 5,689.00	\$ 10,000.00	FALSE	\$ -				
12	Steven	Stone	Steven_Stone	Yes	\$ 12,346.87	\$ 10,000.00	TRUE	\$ 500.00				
13	Devon	Lawrence	Devon_Lawrence	No	\$ 11,687.00	\$ 10,000.00	FALSE	\$ -				
14	George	Jackson	George _Jackson	Yes	\$ 9,874.45	\$ 10,000.00	FALSE	\$ -				
15												
16												

**11.** Save the current workbook as Activity 2-2 Complete and then close Microsoft 365 Excel to complete this exercise.

# **TOPIC C: Use Lookup Functions**

Looking up a specific value within a dataset is one of the more common tasks you will complete in Excel. In this session you will learn about the various lookup functions that are available and the situations where they can be most effective.

## **Topic Objectives**

In this session, you will learn about:

- The LOOKUP function
- The HLOOKUP function
- The VLOOKUP function
- The MATCH function
- The INDEX function

# **Lookup Functions**

**Lookup functions** are used to find and return a value by searching a corresponding row or column. For example, suppose that you are trying to find a product name that corresponds to a product number. You could use one of the lookup functions to search for the product number and then return the value from an adjacent column (Product Name in this case):

	А	В	С	D	E	F
1	Product #	Product Name	<b>Unit Price</b>			
2	54946	USB Cable	4.99			
3	48948	Keyboard	29.99			
4	15467	Wireless Mouse	49.99			
5						
-						

### The LOOKUP Function

=LOOKUP(lookup\_value, lookup\_vector, [result\_vector])

The **LOOKUP** function requires three arguments. The first is the value that you are searching for, followed by the area that you would like to search, and then the corresponding range from which you would like the results to be shown. For example, let's suppose that you want to find out the product name for product number 48948 in the following worksheet:

	Α	В	С	D	E
1	Product #	Product Name	<b>Unit Price</b>		
2	54946	USB Cable	4.99		
3	48948	Keyboard	29.99		
4	15467	Wireless Mouse	49.99		
5					
~					

,	AutoSave 🤇	) Off	E り~		÷			Book1					
Fi	ile Hor	ne l	nsert	Page Layou	ut Forr	nulas	Data	Review V					
Pa	$A^{\circ}$ <												
	Clipboard 🖾 Font 🗔 Align												
PN	ИТ	•	× v	f <sub>x</sub>	=LOOKUP	(48948, <b>A</b> )	2:A4,B2:B	(4)					
	А		В	С	D	E	F	G					
1	Product #	Produ	ct Name	Unit Price	5		B4)						
2	54946	USB	Cable	4.99									
3	48948	Key	board	29.99									
4	15467	Wirele	ss Mouse	49.99									
5													

To do this using a LOOKUP function, you would use the following formula:

As you can see, the value that you are looking up is entered first (48948), followed by the lookup area (A2:A4), and it is ended with the results area where the corresponding result is found (B2:B4). In this case, the result is "Keyboard:"

,	AutoSave 💽 🗗 🏷 - 🖓 - 🏷 - 🗸 🗧 🛛 Book1.>												
Fi	ile Hor	ne Insert	Pa	ige Layou	t Form	ulas Da	ata Revi	ew Vi					
Pa	Cut □		Calibri	i • • • • •	~ 11	► Aˆ Aĭ	==						
	∽ 🗳 For	mat Painter	в 1	<u>u</u> ~		~ A ~	= = =	←= →=					
	Clipboa	rd 🗔		F	ont	Гэ		Aligi					
F1		• : ×	~	$f_{x}$ :	=LOOKUP(4	18948,A2:A	4,B2:B4)						
	А	В		с	D	E	F	G					
1	Product #	Product Nam	e U	Init Price			Keyboard						
2	54946	USB Cable		4.99									
3	48948	Keyboard		29.99									
4	15467	Wireless Mou	ise	49.99									
5													
6													

### **The VLOOKUP Function**

=VLOOKUP(lookup\_value, table\_array, col\_index\_num, [range\_lookup])

The **VLOOKUP** (vertical lookup) function operates in a similar way to the LOOKUP function. It is used when you need to find things in a table or range only by row, and it does this by only looking for a value that appears in the left-most column of an array and then returns the corresponding value from any other column that you specify.

For example, let's suppose that you want to find the unit price for product number 15467. To do this, you would enter the following formula:

,	AutoSave		5-		~			Bool	k1.xlsx ÷
Fi	ile Hor	ne Ins	ert i	Page Layou	t Form	ulas D	ata F	Review	View
Pa	Cut	<b>⊳y ∼</b> mat Painter	В	I <u>U</u> ~	~  11	~ A^ A` ~ <u>A</u> ~		=   » =   =	~ 8₽ M →= 🖶 N
	Clipboar	rd	5	F	ont	12	i l	A	lignment
PN	ИТ	•	× ✓	fx	=VLOOKUP	(15467,A1	L:C4,3,FA	LSE)	
	А	В		С	D	E	F	G	н
1	Product #	Product	Name	Unit Price			FALSE)		
2	54946	USB C	able	4.99					
3	48948	Keybo	oard	29.99					
4	15467	Wireless	Mouse	49.99					
5	5								
6									

As you can see, the value that you are looking for is entered first 15467), followed by the array (A1:C4). Following this is the column index number. Columns in the selected range or table are numbered from left to right, with the first column numbered 1, the next 2, and so on. In this example, as we are looking for the unit price, we entered 3 for the third column. Finally, you can then choose between looking for approximate or exact matches. In this example FALSE was chosen because we wanted an exact match.

,	AutoSave 🤇		9.		÷			Book1.xlsx
Fi	ile Hor	ne Insert		Page Layout	Form	ulas Da	ata Revi	iew View
Pa	□ X Cut □ Cop aste ✓ ダ For	oy ັ mat Painter	Cali B	bri I <u>U</u> ~	~  11 ⊞ ~   ⊘	~ A^ A` ~ <u>A</u> ~	= = =	: ≫~ 
	Clipboar	rd 🗔		F	ont	۲ <u>م</u>		Alignm
F1		• : ×	~	f <sub>x</sub> :	=VLOOKUP	(15467,A1	C4,3,FALSE	)
	А	В		С	D	E	F	G
1	Product #	Product Na	me	<b>Unit Price</b>			49.99	
2	54946	USB Cabl	e	4.99				
3	48948	Keyboar	d	29.99				
4	15467	Wireless M	ouse	49.99				
5								
6								

The final result returned by the formula is 49.99:

# **The HLOOKUP Function**

=HLOOKUP(lookup\_value, table\_array, row\_index\_num, [range\_lookup])

The **HLOOKUP** function is very similar to the VLOOKUP function, but it works horizontally rather than vertically. Like the others, it is used when you need to find things in a table or range only by column. It does this by only looking for a value that appears in the top-most row of a table and then returns the corresponding value from any other row that you specify.

For example, let's suppose that you want to find unit price for "USB Cable" product. To do this, you would enter the following formula:

ļ	AutoSave 💽 Off	E				Во	ok1.xlsx 👻				
Fi	le Home	Insert	Page Layo	ut Formulas	Data	Review	View	Help			
Pa	Image: Copy →         Paste         ✓         ✓         Format Painter         Clipboard         Format Painter         Clipboard										
	Clipboard	I2		Font	ы		Alignment				
F1		×	✓ f <sub>×</sub>	=HLOOKUP("USB	Cable",A	1:D3,3,FALS	E)				
	А	В	С	D	E	F	G	н	1		
1	Product Name	USB Cable	Keyboard	Wireless Mouse		SE)					
2	Product #	54946	48948	15467							
3	Unit Price	4.99	29.99	49.99							
4											
5											

As you can see the value that you are looking up is entered first ("USB Cable"), followed by the lookup area (A1:D3) that includes the whole range (or table). Following this is the row index number. Rows in the selected range or table are numbered from top to bottom, with the first row numbered 1, the next 2, and so on. In this example, as we are looking for the unit price, we entered 3 for the third row. Finally, you can then choose between looking for approximate or exact matches. In this example FALSE was chosen as we wanted an exact match.

,	AutoSave 💽 Off	<u>日</u> り~		÷		Вос	ok1.xlsx ÷				
Fi	le Home	Insert	Page Layo	ut Formulas	Data	Review	View	Help			
Pa	$\begin{array}{c c c c c c c c c c c c c c c c c c c $										
	Clipboard 🔂 Font 🔂 Alignment										
F1	· · · · ·	$\times$	f <sub>x</sub>	=HLOOKUP("USB	Cable",A1	L:D3,3,FALS	E)				
	А	В	С	D	E	F	G	н			
1	Product Name	USB Cable	Keyboard	Wireless Mouse		4.99					
2	Product #	54946	48948	15467							
3	Unit Price	4.99	29.99	49.99							
4											
-											

The final result is 4.99 being returned by the formula:

## **The MATCH Function**

= MATCH(lookup\_value, lookup\_array, [match\_type])

The **MATCH** function searches for a value in a range of cells and then returns its position. This function requires two arguments: the value that you are searching for, followed by the range of cells that you would like to search. Note that this function is not case-sensitive.

You can also use the optional match	_type argument to customize the function's behavior:
-------------------------------------	--

Match_Type	Behavior
1 (or omitted)	Finds the largest value that is less than or equal to the lookup value. Requires the lookup_array argument values to be in ascending order.
0	Finds the first value exactly matching the lookup_value argument.
2	Finds the smallest value that is greater than or equal to the lookup value. Requires the lookup_array argument values to be in descending order.

For example, let's suppose that you want to find the most expensive product in this worksheet:

	А	В	С	D	E	F	G
1	Product #	Product Name	<b>Unit Price</b>				
2	54946	USB Cable	4.99				
3	48948	Keyboard	29.99				
4	15467	Wireless Mouse	49.99				
5							
-							

To do this using a MATCH function, you would use the following formula:

	AutoSave 💽 🛱 🏷 🦿 🖓 マ 🖓 マ 🖓 🗢 🛛 🐱 Book1.x											
F	ile Hor	ne Insei	t	Page Layou	ıt	Form	ulas	Data	Revie	ew Vie		
Pi	$\begin{array}{c c c c c c c c c c c c c c c c c c c $											
	Clipboard 🔂 Font 🗔 Align											
PI	TN	- : >	<	' f <sub>x</sub>	=MA	TCH(10	000,C:C)	-				
	А	В		С		D	E		F	G		
1	Product #	Product N	ame	Unit Price	2			1000	),C:C)			
2	54946	USB Cal	ole	4.99					Ī			
3	48948	Keyboa	rd	29.99								
4	15467	Wireless N	louse	49.99								
5												
-												

We know we do not sell any products over \$1,000, so we have entered that as the lookup value, followed by the lookup area (Column C). We have also omitted the match\_type argument as we want the default behavior.

In this case, results are returned showing the most expensive product is in Row 4 of our dataset:

	AutoSave 💽 🛱 🏷 - 🖓 - マー 👌 - Book1.3											
F	ile Hor	ne Insert	Page Layout	Form	ulas Da	ata Revi	ew Vi					
[ Pi	Cut PasteCalibri11A^ A^ < $\equiv \equiv \equiv$ $\gg$ ~BIU $\blacksquare$ $\bigtriangleup$ $\blacksquare$ $\equiv \equiv \equiv$ $\blacksquare$											
F1	Clipboard For Font Font Align											
			,		-	-	-					
	A	В	C	D	E	ŀ	G					
1	Product #	Product Name	Unit Price			4						
2	54946	USB Cable	4.99									
3	48948	Keyboard	29.99									
4	15467	Wireless Mouse	49.99									
5												
-												

# **The INDEX Function**

```
INDEX(reference, row_num, [column_num], [area_num])
```

The **INDEX** function returns a value from a table or range. It also offers an alternative syntax, which allows you to use it with an array:

INDEX(array, row\_num, [column\_num])

	Α	В	С	D	E	F	G
1	Product #	Product Name	<b>Unit Price</b>				
2	54946	USB Cable	4.99				
3	48948	Keyboard	29.99				
4	15467	Wireless Mouse	49.99				
5							
6							

For example, let's suppose that you want to find the value at the very end of this range:

To do this using an INDEX function, you would use the following formula:

,	AutoSave 💽 🗗 🎐 🏱 🏹 🔻 🛛 🗢 🛛 Book1.x											
Fi	ile Hor	ne Inse	rt	Page Layo	ut	Form	ulas	Data	Revie	ew Vie		
Pa	$\begin{array}{c c} & & & \\ & & & \\$											
	Clipboard 🗔 Font 🗔 Align											
F1		- : >	< 🗸	f <sub>x</sub>	=IND	DEX(A1	:C4,4,3	) 🔶		-		
	А	В		с		D	E		F	G		
1	Product #	Product I	Vame	Unit Price	e			1:C4	4,4,3)			
2	54946	USB Ca	ble	4.99					Ī			
3	48948	Keybo	ard	29.99								
4	15467	Wireless I	Nouse	49.99								
5												

In this case, the value in Row 4, Column 3 of the range A1:C4, 49.99 is returned:

	А	В	С	D	E	F	G
1	Product #	Product Name	Unit Price			49.99	
2	54946	USB Cable	4.99				
3	48948	Keyboard	29.99				
4	15467	Wireless Mouse	49.99				
5							
6							

# Activity 2-3: Analyzing Data Using Lookup Functions

Using a lookup function, you would like to find the total amount of sales that were made by a particular employee.

**1.** To begin, open Activity 2-3 from your Exercise Files folder:



Activity 2-3.xlsx Microsoft Excel Worksheet 10.4 KB

#### 2. Click cell D1 to place your cursor there:

	AutoSave 💽 Off	) 🖪 9° (° -	~ J	А	.ctivity 2-3.xlsx 👻				
F	ile Home	Insert Page L	ayout Formulas	Data Reviev	v View He	lp			
Pa	$\begin{array}{c c c c c c c c c c c c c c c c c c c $								
	Clipboard	L2	Font	ا <sub>ل</sub> ي	Alignment				
D	D1 $\checkmark$ : $\times \checkmark f_x$								
	А	В	с	D	E	F			
1	Weekly S	Sales Report							
2									
3									
4	First Name	Last Name	ID	Weekly Sales	Weekly Goal				
5	Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$ 15,000.00				
6	Lucas	Bressan	Lucas_Bressan	\$ 14,687.50	\$ 15,000.00				
7	Stanley	Prestwick	Stanley_Prestwick	\$ 13,478.96	\$ 15,000.00				
8	Jerry	Harrison	Jerry_Harrison	\$ 21,689.47	\$ 15,000.00				
9	Leah	Thompson	Leah_Thompson	\$ 25,478.45	\$ 15,000.00				
10	Robyn	Fletcher	Robyn_Fletcher	\$ 7,600.00	\$ 15,000.00				
11	Lisa	McCain	Lisa_McCain	\$ 5,689.00	\$ 15,000.00				
12	Steven	Stone	Steven_Stone	\$ 12,346.87	\$ 15,000.00				
13	Devon	Lawrence	Devon_Lawrence	\$ 11,687.00	\$ 15,000.00				
14	George	Jackson	George _Jackson	\$ 9,874.45	\$ 15,000.00				
15									
16									

You would like to find out the weekly sales that Lucas made, so start by typing "=VLOOKUP("Lucas"," into the Formula Bar (without the outer most quotation marks):

	AutoSave 💽 Off	) 🛛 9° (~	⊽ ⊽	ļ	Activity 2-3.xlsx 👻		<i>,</i>		
Fi	ile Home	Insert Page L	ayout Formulas	Data Revie	w View Help				
$\begin{array}{c c c c c c c c c c c c c c c c c c c $									
	Clipboard	E1	Font	F2	Alignment	⊡ Nu	mber		
PI	PMT ▼ : X ✓ fx =VLOOKUP("Lucas",								
	А	В	VLOOKUP(looku	ip_value, <b>table_array</b>	r, col_index_num, [range_lookup])	G	н		
1	Weekly S	Sales Report		s",					
2									
3									
4	First Name	Last Name	ID	Weekly Sales	Weekly Goal				
5	Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$ 15,000.00				
6	Lucas	Bressan	Lucas_Bressan	\$ 14,687.50	\$ 15,000.00				
7	Stanley	Prestwick	Stanley_Prestwick	\$ 13,478.96	\$ 15,000.00				
8	Jerry	Harrison	Jerry_Harrison	\$ 21,689.47	\$ 15,000.00				
9	Leah	Thompson	Leah_Thompson	\$ 25,478.45	\$ 15,000.00				
10	Robyn	Fletcher	Robyn_Fletcher	\$ 7,600.00	\$ 15,000.00				
11	Lisa	McCain	Lisa_McCain	\$ 5,689.00	\$ 15,000.00				
12	Steven	Stone	Steven_Stone	\$ 12,346.87	\$ 15,000.00				
13	Devon	Lawrence	Devon_Lawrence	\$ 11,687.00	\$ 15,000.00				
14	George	Jackson	George _Jackson	\$ 9,874.45	\$ 15,000.00				
15									
16	1								

4. Next, you need to add the cell range that you are working with. For this example, type "A5:E14," (without quotation marks), following the comma:

,	AutoSave 💽 Off	) 🛛 9 • 🤍	⊽ ⊽		Act	ivity 2-3.xlsx 👻			R
Fi	le Home	Insert Page L	ayout Formulas	Data	Review	View He	lp		
Pa	Cut □□ Copy 、 ste ≪ Format	Painter B I U	- 11 → A^ - 🗠 - 🗠 - A	A <sup>×</sup>   ≡ ≡		९००० है Wra च र छ Mer	o Text ge & Center	Gene	eral ~ % 🤊   🕤
	Clipboard	L2	Font	5		Alignment		F3	Number
D1		: × ✓ fx	=VLOOKUP("Luc	as",A5:E14,					
	A Weekly 9	B Bales Report	VLOOKUP(looku	p_value, table	_array, co	ol_index_num, [ra	nge_lookup])	G	Н
2	VUCCRIY			5 ,AJ.E14,					
2									
4	First Name	Last Name	ID	Weekly S	ales	Weekly Goal			
5	Jackie	Williamson	Jackie_Williamson	\$ 16,78	35.14	\$ 15,000.00			
6	Lucas	Bressan	Lucas_Bressan	\$ 14,68	37.50	\$ 15,000.00			
7	Stanley	Prestwick	Stanley_Prestwick	\$ 13,47	78.96	\$ 15,000.00			
8	Jerry	Harrison	Jerry_Harrison	\$ 21,68	39.47	\$ 15,000.00			
9	Leah	Thompson	Leah_Thompson	\$ 25,47	78.45	\$ 15,000.00			
10	Robyn	Fletcher	Robyn_Fletcher	\$ 7,60	00.00	\$ 15,000.00			
11	Lisa	McCain	Lisa_McCain	\$ 5,68	39.00	\$ 15,000.00			
12	Steven	Stone	Steven_Stone	\$ 12,34	16.87	\$ 15,000.00			
13	Devon	Lawrence	Devon_Lawrence	\$ 11,68	37.00 \$	\$ 15,000.00			
14	George	Jackson	George _Jackson	\$ 9,87	74.45	\$ 15,000.00			
15									

5. Now you need to enter the column of the data you would like to use as a result. In this case you want the weekly sales to be shown, so type "4," as the Weekly Sales column is further from the left:

	AutoSave 💽 Off	) 🛛 9• 🖓		Ļ	Activity 2-3.xlsx 🔹	
F	ile Home	Insert Page L	ayout Formulas	Data Review	w View Help	
[	X Cut		~ 11 ~ A^	$A^{\tilde{v}} = \equiv \equiv$	& ab ce Wrap Text	General
P	aste ✓	Painter B I U	~   🖽 ~   💁 ~ 🗚	- E==	E → E Merge & Center →	* \$ * % 9
	Clipboard	L2	Font	rs 🚽	Alignment	Number
PI	TN T	: 🗙 🖌 f <sub>x</sub>	=VLOOKUP("Luc	as",A5:E14,4,		
	А	В	VLOOKUP(looku	p value table arrav.	col index num. [range lookup])	G H
1	Weekly	Sales Report		s".A5:E14.4.	RUE - Approximate match App	roximate match - the
2					ALSE - Exact match	
3						
4	First Name	Last Name	ID	Weekly Sales	Weekly Goal	
5	Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$ 15,000.00	
6	Lucas	Bressan	Lucas_Bressan	\$ 14,687.50	\$ 15,000.00	
7	Stanley	Prestwick	Stanley_Prestwick	\$ 13,478.96	\$ 15,000.00	
8	Jerry	Harrison	Jerry_Harrison	\$ 21,689.47	\$ 15,000.00	
9	Leah	Thompson	Leah_Thompson	\$ 25,478.45	\$ 15,000.00	
10	Robyn	Fletcher	Robyn_Fletcher	\$ 7,600.00	\$ 15,000.00	
11	Lisa	McCain	Lisa_McCain	\$ 5,689.00	\$ 15,000.00	
12	Steven	Stone	Steven_Stone	\$ 12,346.87	\$ 15,000.00	
13	Devon	Lawrence	Devon_Lawrence	\$ 11,687.00	\$ 15,000.00	
14	George	Jackson	George _Jackson	\$ 9,874.45	\$ 15,000.00	
15						
10						

6. Finally, you need to decide if you would like only exact matches to be used or approximate matches. For this example, you would like exact matches, so type "FALSE" followed by a closing parenthesis:

	AutoSave 💽 Off	) 🛛 9 • 🤍		٩	activity 2-3.xlsx 👻			
F	ile Home	Insert Page L	ayout Formulas	Data Review	w View He	elp		
Pa	Cut	Painter B I U	-  11 - A^ -   ⊞ -   <u>&amp;</u> - <u>A</u>	A <sup>×</sup>   ≡ ≡ <u>=</u> • ≡ ≡ ≡	& v eb Wra	p Text ge & Center	Gen ~ \$	eral ~ % 9
	Clipboard	L7	Font		Alignment		F3	Number
P	* TN	: × ✓ f <sub>x</sub>	=VLOOKUP("Luc	as",A5:E14,4,FALS	E)			
	А	В	с	D	E	F	G	н
1	Weekly S	Sales Report		E)				
2								
3								
4	First Name	Last Name	ID	Weekly Sales	Weekly Goal			
5	Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$ 15,000.00			
6	Lucas	Bressan	Lucas_Bressan	\$ 14,687.50	\$ 15,000.00			
7	Stanley	Prestwick	Stanley_Prestwick	\$ 13,478.96	\$ 15,000.00			
8	Jerry	Harrison	Jerry_Harrison	\$ 21,689.47	\$ 15,000.00			
9	Leah	Thompson	Leah_Thompson	\$ 25,478.45	\$ 15,000.00			
10	Robyn	Fletcher	Robyn_Fletcher	\$ 7,600.00	\$ 15,000.00			
11	Lisa	McCain	Lisa_McCain	\$ 5,689.00	\$ 15,000.00			
12	Steven	Stone	Steven_Stone	\$ 12,346.87	\$ 15,000.00			
13	Devon	Lawrence	Devon_Lawrence	\$ 11,687.00	\$ 15,000.00			
14	George	Jackson	George _Jackson	\$ 9,874.45	\$ 15,000.00			
15								
16								

7. With the formula now completed, press **Enter**. The weekly sales that Lucas made will now be shown in D1:

	A	В	С	D	E	F	G	Н
1	Weekly S	Sales Report		14687.5	←			
2								
3								
4	First Name	Last Name	ID	Weekly Sales	Weekly Goal			
5	Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$ 15,000.00			
6	Lucas	Bressan	Lucas_Bressan	\$ 14,687.50	\$ 15,000.00			
7	Stanley	Prestwick	Stanley_Prestwick	\$ 13,478.96	\$ 15,000.00			
8	Jerry	Harrison	Jerry_Harrison	\$ 21,689.47	\$ 15,000.00			
9	Leah	Thompson	Leah_Thompson	\$ 25,478.45	\$ 15,000.00			
10	Robyn	Fletcher	Robyn_Fletcher	\$ 7,600.00	\$ 15,000.00			
11	Lisa	McCain	Lisa_McCain	\$ 5,689.00	\$ 15,000.00			
12	Steven	Stone	Steven_Stone	\$ 12,346.87	\$ 15,000.00			
13	Devon	Lawrence	Devon_Lawrence	\$ 11,687.00	\$ 15,000.00			
14	George	Jackson	George _Jackson	\$ 9,874.45	\$ 15,000.00			
15								

**8.** Save the current workbook as Activity 2-3 Complete and then close Microsoft 365 Excel to complete this exercise.

# **TOPIC D: Use Date Functions**

Entering the current date and time into a worksheet is one of the more common tasks that you will complete using Excel. In this topic, you will learn how to add date information using the TODAY and NOW date functions.

## **Topic Objectives**

In this session, you will learn:

- About the TODAY function
- About the NOW function
- How to serialize dates and times with functions

## **The TODAY Function**

About as simple as a function can get, the **TODAY** function has no arguments:



When executed, it will simply print today's date into a cell:

	AutoSave Off 🗄 り・ペー ひ 🗢 🛛 E						
F	ile <mark>Home</mark> Insert	Page Layout	Formula	s Data	Review		
Ľ	- X Cut - ∏∋ Copy →	Calibri	<b>~</b> 11 <b>~</b>	A^			
Pa	→ SFormat Painter	B I <u>U</u> ∽	🎝 -	<u>A</u> ~			
	Clipboard 🕞	F	ont	Г			
A	1 • i ×	√ f <sub>x</sub> :	TODAY()				
	А	В	С	D	E		
1	2020/07/26						
2							
3							

## **The NOW Function**

The **NOW** function is also very simple and uses no arguments:



It prints the current date and time into the cell where the function is placed:

AutoSave 💽 Off)	E り、	- C - D -	;		8
File Home	Insert	Page Layout	Formula	s Data	Review
Cut	Ca	alibri	~ 11 ~ /	A^	= = =
Paste v 🎸 Format Pair	nter B	B I <u>U</u> → 🗄	~ <u> </u>	<u>A</u> ~	≣ ≡   :
Clipboard	Гъ	Font	t	Гъ	
A1 • :	×	<i>√ f</i> <sub>x</sub> =N	OW()		
A		В	С	D	E
1 7/26/2020 17:	39				
2					
3					

Usually this function would be used in conjunction with others to complete time calculations.

## **Serializing Dates and Times with Functions**

If you are using formulas where you only need the month or a specific time of day, there are a number of different functions that you can use to gather that information from an original date or time serial value. For example, here you can see the YEAR, MONTH, DAY, HOUR, MINUTE, and SECOND functions **serializing** the date in A1 and the time in A2:

AutoSave ● Off 🗄 🍤 × 🖓 マ 🔿 🗢 🛛 Book1.xlsx 🔸					
File Home Insert	Page Layout	Formulas	Data	Review	
$ \begin{array}{c c}  & & \\  & & \\  & & \\  & Paste \\  & & & & \\  & & & & \\  & & & & \\  & & & &$	$\begin{array}{c c} 11 & \bullet \\ A^{*} & A^{*} \\ \hline A \\ \hline A \\ \bullet \end{array} = \boxed{\begin{array}{c} \blacksquare \\ \blacksquare \\ \hline \blacksquare \\ \blacksquare \\$	≡ ∰ ≡ ∰ ~	General \$ ~ % €0 .00	- ₩0 5 9 ₩ F	
Clipboard 🖾 🛛 Font	r <u>s</u> Align	nment 🔽	Number		
H25 🔻 : 🗙	$\int f_x$				
A	В	С	D	E	
1 Sunday, July 26, 2020		YEAR	2020		
2 5:43:12 PM		MONTH	7		
3		DAY	26		
4		HOUR	17		
5		MINUTE	43		
6		SECOND	12		
7					

Each of these functions only accept one argument – a reference to the cell that contains the date or time value. For example, here you can see the syntax of a YEAR function pointing to cell A1:



# Activity 2-4: Analyzing Data Using Date Functions

You would like to fill out an invoice tracking sheet using some of the date functions that you learned about in this topic.

**1.** To begin, open Activity 2-4 from your Exercise Files folder:



Activity 2-4.xlsx Microsoft Excel Worksheet 8.88 KB

2. Ensure that cell **B2** is selected and then type "**TODAY()**" into the formula bar:



**3.** Press **Enter** and the current date will be shown as a value in previously selected cell:

.00 →0
۲ <u>م</u>
F

Aut	coSave 💽 🗍 🏷 -	୧ ୦ -	Activity 2-4	l.xlsx 👻		𝒫 Search	
File	File Home Insert Page Layout Formulas Data Review View Help						
Paste	Cut Cali Copy ~ Sormat Painter	bri v 11 v I U v   II v   💁 v	A^ A   ≡ ≡ =   ≫ <u>A</u> ~   ≡ ≡ ≡   =	<ul> <li>→ Be Wrap Text</li> <li>→ E I I Merge &amp; C</li> </ul>	enter ~	Custom \$ ~ % 9   €₿	~ 00. 0:€
	Clipboard 🕞	Font	rs I	Alignment	F <sub>N</sub>	Number	F3
PMT		<i>f</i> <sub>x</sub> =NOW()					
	А	В	С	D		E	F
1	Name:	Date:	Time:	Invoice #:	Co	omment:	
2		7/20	5/2020 =NOW()				
3							
4							

5. Press Enter and the current date and time will be the value shown in the previously selected cell:

Aut	oSave 💽 🛱 🖾	9 · C · D		Activity 2-4	xlsx <del>-</del>		₽ Search	
File	Home Insert	Page Layo	ut Formulas [	Data Review	View Help			
Ĉ	X Cut	Calibri	~ 11 ~ A^ A*	=== 🔊	∽ Č Wrap Text		General	•
Paste ~	Sormat Painter	B I <u>U</u> ∽	- <u>A</u> - <u>A</u> -	≡≡≡∣⊡	连 🔛 Merge & Ce	enter 👻	\$ ~ % 9 🔝	.00 - <b>.</b> 0
	Clipboard 🛛		Font F	ر اء	Alignment	٦	Number	۲ <u>۵</u>
C3	• : ×	$\checkmark f_x$						
	А		В	С	D		E	F
1	Name:		Date:	Time:	Invoice #:	(	Comment:	
2			7/26/2020	7/26/2020 17:53				
З								
4								
-								

6. Select cell C2 once again. Change the number format to Time by clicking Home →
 Number Format → Time:

AutoSave 💽 🗄 りゃく	÷ ℃ ÷	Activity 2-4.xlsx 👻	م	) Search
File Home Insert Pa	ige Layout Formulas I	Data Review View Help		
Calibri	- 11 - A^ A	≡ ≡		
Paste Sopy B I	U • H • 🗠 • A •	≡ ≡ ≡   ±≡ ±≡   ⊞ Merge & Cente	er * 12	General onal 23 No specific format ing ~
Clipboard Isi	font f	S Alignment	12	2 Number 44038.75
A	B	C D		G S44,038.75
2 3	7/26/2020	7/26/2020 17:53		Accounting
4 5			Ē	Short Date     Z/35/3020
6 7			Ē.	Long Date
8 9				Sunday, July 26, 2020
10				/ S:53:09 PM k <sup>3</sup>
13			9	O 4403874.52%
15			2	2 44038 3/4
17 18			10	) <sup>2</sup> Scientific 4.40E+04
19 20			a	O 44038.74524
21 22 23				More Number Formats
23				

**7.** With the time number format applied to the selected cell, you will see that its value will now only show the current time:

Aut	oSave 💽 🛱 🏷 🗧	× ∑ ÷	Activity 2-4	.xlsx 👻		🔎 Search	
File	File Home Insert Page Layout Formulas Data Review View Help						
Ĉ	X Cut Calibri	~ 11 ~ A^ A	== = 🗞	∽ de Ce Wrap Text		Time	~
Paste	✓ Format Painter B I	<u>u</u> •   <u>•</u> •   <u>•</u> • <u>A</u> •		➡ 🗄 Merge & Ce	enter ~	\$ ~ % 🤊 😘	00.00 0 <del>∕</del> 0
	Clipboard 🕞	Font F	. l	Alignment	<sub>لا</sub> ا	Number	٦.
C2	• : × 🗸	<i>f</i> <sub>*</sub> =NOW()					
	А	В	С	D		E	l f
1	Name:	Date:	Time:	Invoice #:	C	omment:	
2		7/26/2020	5:53:09 PM				
3							
4							

**8.** Save the current workbook as Activity 2-4 Complete and then close Microsoft 365 Excel to complete this exercise.

# **TOPIC E: Use Financial Functions**

As Microsoft Excel is widely used by many accounting and finance professionals, it includes a number of special financial functions. For example, some financial functions can be used to calculate loan interest, while others can be used to determine the value of investments over time. During this topic you will learn about the four major financial functions that are available in Excel 365.

# **Topic Objectives**

In this session, you will learn about:

- The IPMT function
- The PPMT function
- The NPV function
- The FV function

### **The IPMT Function**

#### =IPMT(rate, per, nper, pv, [fv], [type])

The **IPMT** function is used to calculate the interest payment that is due for a period on a loan that has a fixed interest rate with regular payments. Alternatively, this function could also be used to calculate the return per period on an investment with the same restrictions.

The **rate** argument is where you declare the interest rate per period. For example, if you were trying to calculate the interest payment on a loan that has a 3% annual interest rate, you would divide 3% by 12.

The **per** argument is the period over which you need to calculate the interest. For example, if the period of the loan is four years and payments are being made monthly, the per argument would be 48. If annual payments are being made, the per argument would be 4.

The total number of payments for the loan or investment are entered as the **nper** argument. For example, if payments are being calculated on a three-year investment, nper would be 36.

Finally, the **pv** argument is where you enter the principal of the loan or total amount of money being invested.

In addition to the required argument, the IPMT function includes two optional arguments: **fv** and **type**. The **fv** argument is used to enter the future value of the investment after all payments have been made to it, or if working with a loan, the balance of the loan. If you choose not to set this argument, it defaults to 0 (the typical balance of a loan after all the payments are made). Finally, the **type** argument is used to indicate if payments are due at the end of each payment period (indicated by "0" or by omitting the argument), or at the beginning (indicated by "1"). If left blank, this argument defaults to 0.

Suppose that in a worksheet, A1 contains the value of \$15,000, while cell B1 holds the value 6%, and C1 contains the value 4:

	А	В	С	D	E	
1	\$15,000.00	6%	4			
2						
-						

With that information in mind, below you can see how an IPMT function could be constructed to determine how much interest the borrower would owe one and a half years into the four-year loan:

Function	Description	Result
=IPMT(B1/12, 18, C1*12, A1)	This function calculates how much interest a borrower will owe for the loan (A1), one and a half years into the term (18) with an annual interest rate of 6% (B1/12) and a total term of four years (C1*12).	(\$50.46)

If this was from the lender's perspective, the function would be almost the same, but the principal would be a negative value as they would be paying that out. This would result in a positive end result rather than a negative one.

Function	Description	Result
=IPMT(B1/12, 18, C1*12, -A1)	This function calculates how much interest is owed to you as the lender of the loan (-A1), one and a half years into the loan (18) with an annual interest rate of 6% (B1/12) and a total term of four years (C1*12).	\$50.46

## **The PPMT Function**

#### =PPMT(rate, per, nper, pv, [fv], [type])

The **PPMT** (payment) function is used to calculate the amount owed against the principal on a loan (or gained from an investment) over a select period and a fixed interest rate. Like the IPMT function, the PPMT function uses the exact same arguments: rate, per, nper, pv, [fv], and [type]. You could even add the result from the same period of the same loan calculated by the IPMT function to the result using the same arguments from the PPMT function to calculate the total payment for the selected period.

Suppose that in a worksheet, A1 contains the value of \$15,000, while cell B1 holds the value 6%, and C1 contains the value 4:

	А	В	С	D	E	
1	\$15,000.00	6%	4			
2						

With that information in mind, below you can see how a PPMT function could be constructed to determine the required payment on the principal of a loan, one and a half years into the four-year loan:

Function	Description	Result
=PPMT(B1/12, 18, C1*12, A1)	This function calculates the amount owed to the principal of a loan (A1), one and a half years into the loan (18) with an annual interest rate of 6% (B1/12) and a total term of four years (C1*12).	\$(301.81)

## **The NPV Function**

=NPV(rate, value1, [value2], ...)

If you are unfamiliar with **NPV** (net present value) calculations, they are used to compare the value of money today to the value of money in the future, taking inflation and returns into account. In particular, the NPV function is used to calculate the net present value of an asset or investment using the estimated (or known) future cash flow, as well as the discount rate per period.

The **rate** argument in this function is used to declare the discount rate per period. The **value** arguments are used to represent any future cash flow. For example, suppose that an initial cost of \$75,000 is incurred (A1) with a discount rate of 9% (A2). The cash flows for the next consecutive four years are \$16,000, \$14,000, \$12,000, and \$10,000 (A3:A6) respectively:

	А	В	С	D	E
1	\$(75,000.00)				
2	9%				
3	\$ 16,000.00				
4	\$ 14,000.00				
5	\$ 12,000.00				
6	\$ 10,000.00				
7					
0					

The NPV function could then be constructed as follows:

Function	Description	Result
=NPV(A2, A3:A6)	This function calculates the net present value of \$75,000 with a discount rate of 9% (A2) and future cash flow (A3:A6).	\$42,812.87

Keep in mind that the output from this formula does not include the initial cost. To factor that into the result, you would subtract the result from the initial cost. With that in mind, the NPV for this example would be \$32,187.13.

### **The FV Function**

### =FV(rate, nper, pmt, [pv], [type])

The **FV** function is used to calculate the future value of an investment that has a fixed interest rate, as well as a fixed or periodic payment schedule. Like most of the other financial functions covered in this topic, the FV function uses many of the same arguments.

The **rate** argument is where you declare the interest rate per period. For example, if you are trying to calculate the interest payment on an investment that has a 3% annual interest rate, you divide .03 by 12 and enter that result (.0025 in this case) as the argument.

The total number of periods from now that you want to use to calculate the future value of the investment are entered as the **nper** argument. Keep in mind that the periods entered into this argument are the same as the ones used to calculate the rate argument.

The **pmt** argument is where you enter the payment that is being made for each period. For example, if you are paying \$200 a month into this investment over 10 years, you would enter 200 as the pmt value. It would also mean that the nper value would be 120 ( $12 \times 10$ ).

In addition to the required argument, the FV function includes two optional arguments: pv and type. The **pv** argument is used to enter the present value of the investment. This would be used if you need to calculate the future value of a one-time investment that has a fixed interest rate. The **type** argument is used to indicate if payments are due at the end of each payment period (indicated by "0" or by omitting the argument), or at the beginning (indicated by "1"). If left blank, this argument defaults to 0.

Suppose that in a worksheet, A1 contains the value of -\$15,000 (initial investment), while cell B1 holds the value 6% (annual interest), and C1 contains the value -\$200 (additional monthly payments). As well, assume that the investor wants to contribute the additional monthly payments for a period of 25 years:

	А	В	С	D	E
1	\$(15,000.00)	6%	\$(200.00)		
2					
2					
With that information in mind, below you can see how an FV function could be constructed to determine the future value of this investment:

Function	Description	Result
=FV(B1/12, 25*12, C1, A1)	This function calculates the future value of the initial investment (A1), combined with a monthly contribution of (C1) over a period of 25 years (25*12) with a fixed annual interest rate of 6% (B1/12).	\$205,573.34

Note that because you are calculating an investment, the initial payment (pv) and monthly payment (pmt) need to be entered as negative values to receive a positive result. On the other hand, entering positive values would result in a negative value.

#### **Activity 2-5: Using Financial Functions**

You have been given the task of calculating the net present value of an investment, as well as calculating the future value of an investment.

1. To begin, open Activity 2-5 from your Exercise Files folder:



Activity 2-5.xlsx Microsoft Excel Worksheet 9.58 KB

2. Let's start with the NPV calculation. Click inside cell **B8** to select it:

AutoSave 💽 👘 🖫 🥍 ୯ ୯ 🗸 🗢 🛛 Activity 2-5.xlsx 🗸							
File Home Insert Page Layout Forn	nulas Data	Review	View	Help			
Paste 2 Copy ~ B I U ~ H ~ 0		:== %	≻∽ ≀₽	Wrap Text Merge & Ce	nter 🗸		
V V Format Painter		-	Alignment	incige a ce	г <u>.</u>		
B8 ▼ : × √ fx			-				
A	В	с	D	E	F		
1 CALCULATE NET PRESENT VALUE							
2 Initial Investment	\$ (250,000.00)						
3 Discount Rate	3%						
4 Cash Flow Year 1	\$ 210,000.00						
5 Cash Flow Year 2	\$ 190,000.00						
6 Cash Flow Year 3	\$ 150,000.00						
7 Cash Flow Year 4	\$ 110,000.00						
8 Net Present Value							
9							
10							
11 CALCULATE FUTURE INVESTMENT							
12 Initial Investment	\$ (1,500.00)						
13 Annual Interest Rate	5%						
14 Monthly Contribution	\$ (300.00)						
15 Value After 25 Years							
16							

3. Next, in the Formula Bar, type "=NPV(":

	AutoSave Off	<b>୨ ·</b> ୯ · <u></u> ଧ				Activity	/2-5.xlsx	-	
F	ile <u>Home</u> Insert	Page Layou	ut Forr	nulas D	ata	Review	View	Help	
	Cut		~ 11	~ A^ A`	= =	= =   %	Z~ ab	9 Wrap Text	
P	aste 🗳 Format Painter	B I <u>U</u> ∽		<u>h</u> ~ <u>A</u> ~			→= 🛱	Merge & Ce	enter ~
	Clipboard 🛛		Font	F⊒			Alignmen	t	F3
IP	MT - : ×	✓ f <sub>x</sub>	=NPV(	<u> </u>					
		A	NPV(rate	e, value1, [va	ue2],)	с	D	E	F
1	CALCULATE NET	PRESENT V	ALUE						
2	Initial Investment			\$ (250,000	.00)				
3	Discount Rate				3%				
4	Cash Flow Year 1			\$ 210,000	.00				
5	Cash Flow Year 2			\$ 190,000	0.00				
6	Cash Flow Year 3			\$ 150,000	00.00				
7	Cash Flow Year 4			\$ 110,000	.00				
8	Net Present Value			=NPV(					
9									
10									
11	CALCULATE FUT	JRE INVEST	MENT						
12	Initial Investment			\$ (1,500	.00)				
13	Annual Interest Rate				5%				
14	Monthly Contribution			\$ (300	.00)				
15	Value After 25 Years								

**4.** Now you need to enter the discount rate (rate argument). In this example it is **3%**, so enter the **B3** cell reference:

AutoSave 💽 🗗 🏷 Y Y 🔿 🗢 🛛 Activity 2-5.xlsx 🔸							
File Home Insert Page Layout For	mulas Data Review View Help						
Cut Paste ✓ Format Painter	→ A <sup>^</sup> A <sup>×</sup> = = =   ≫ ~ eb Wrap Text △ ~ A ~ = = =   •= = = ⊡ Merge & Center ~						
Clipboard 🕞 Font	🖾 Alignment 🖂						
IPMT ▼ : × ✓ <i>f</i> <sub>x</sub> =NPV(B3	<b>↓</b>						
A NPV(rat	e, value1, [value2],) C D E F						
2 Initial Investment	\$ (250,000.00)						
3 Discount Rate	3%						
4 Cash Flow Year 1	\$ 210,000.00						
5 Cash Flow Year 2	\$ 190,000.00						
6 Cash Flow Year 3	\$ 150,000.00						
7 Cash Flow Year 4	\$ 110,000.00						
8 Net Present Value	=NPV(B3						
9							

5. The future cash flow (value argument) now needs to be entered. Add a **comma** and then enter the **B4:B7** range followed by a **closing parenthesis**:

AutoSave	AutoSave Off 日 ウィ C マ し マ Activity 2-5.xlsx ・								
File H	ome	Insert	Page Lay	out Forr	nulas Data	Review	View	Help	
Paste	Cut Copy ~	[	B T U V	~ 11			> ~ ee	Wrap Text	inter v
∽ 💞 i Clipb	ormat Pa	inter Is		Font	5	_	Alignment	t merge oc oe	F2
B8	-	×	$\checkmark f_x$	=NPV(B3,	B4:B7) 🗲				
		Д	L		В	С	D	E	F
1 CALC	JLATE	NET P	RESENT	VALUE					
2 Initial Ir	vestme	nt			\$ (250,000.00)				
3 Discour	t Rate				3%				
4 Cash Flo	w Year :	1			\$ 210,000.00	Ī			
5 Cash Flo	w Year 2	2			\$ 190,000.00				
6 Cash Flo	w Year	3			\$ 150,000.00				
7 Cash Flo	w Year 4	4			\$ 110,000.00	ļ			
8 Net Pre	ent Val	ue			7)				
9						T			

**6.** Press **Enter** to apply the new function. You will see the result in the currently selected cell:

	А	В	С	D	E	F
1	CALCULATE NET PRESENT VALUE					
2	Initial Investment	\$ (250,000.00)				
3	Discount Rate	3%				
4	Cash Flow Year 1	\$ 210,000.00				
5	Cash Flow Year 2	\$ 190,000.00				
6	Cash Flow Year 3	\$ 150,000.00				
7	Cash Flow Year 4	\$ 110,000.00				
8	Net Present Value	\$617,981.54				
9						
10						

7. Keep in mind that this result does not factor in the initial cost (B2). In order to calculate the true NPV of this investment, the initial cost of the investment needs to be subtracted from the value that was returned from the NPV function. In this example, the NPV for this investment would be \$367,981.54.

8. Next, you need to calculate the future investment value using the information a little lower on this worksheet. Click to select cell **B15**:

	A	В	С	D	E	F
1	CALCULATE NET PRESENT VALUE					
2	Initial Investment	\$ (250,000.00)				
3	Discount Rate	3%				
4	Cash Flow Year 1	\$ 210,000.00				
5	Cash Flow Year 2	\$ 190,000.00				
6	Cash Flow Year 3	\$ 150,000.00				
7	Cash Flow Year 4	\$ 110,000.00				
8	Net Present Value	\$617,981.54				
9						
10						
11	CALCULATE FUTURE INVESTMENT					
12	Initial Investment	\$ (1,500.00)				
13	Annual Interest Rate	5%				
14	Monthly Contribution	\$ (300.00)				
15	Value After 25 Years					
16						

9. Inside the Formula Bar, type "=FV(B13/12":

	AutoSave 💽 🗗 🏷 🥆 🖑 🤜 🔍 🗢 🛛 Activity 2-5.xlsx 🗸								
F	ile <mark>Home</mark> Insert	t Page Layout Form	mulas Data	Review	View	Help			
Pa	Cut Cut Copy → Ster Ster Copy → Ster Copy → Copy →	- 11 B I <u>U</u> -   ⊞ -   ≤	→ A^ A <sup>×</sup> =	= =   *	> ~ eb ≣ →= 🖽	Wrap Text Merge & Ce	enter v		
	دا Clipboard	Font	F2		Alignment	t	E.		
IP	MT - X	✓ f <sub>x</sub> =FV(B13/	12 -						
		A FV(rate,	nper, pmt, [pv], [t	ype]) C	D	E	F		
1	CALCULATE NET	PRESENT VALUE							
2	Initial Investment		\$ (250,000.00)						
3	Discount Rate		3%						
4	Cash Flow Year 1		\$ 210,000.00						
5	Cash Flow Year 2		\$ 190,000.00						
6	Cash Flow Year 3		\$ 150,000.00						
7	Cash Flow Year 4		\$ 110,000.00						
8	Net Present Value		\$617,981.54						
9									
10									
11	CALCULATE FUT	URE INVESTMENT							
12	Initial Investment		\$ (1,500.00)						
13	Annual Interest Rate		5%						
14	Monthly Contribution		\$ (300.00)						
15	Value After 25 Years		=FV(B13/12						
16									

Now add the period that you wish to use to calculate the future value (nper). In this example it is 25 years, so in the Formula Bar add a comma and then type "25\*12":



 Next, you need to declare what the monthly contribution to this investment will be after the initial investment (pmt). In the Formula Bar, add a comma and type the "B14" cell reference:

AutoSave Off 🖫 り・ 🖓 🗸	Activity 2-5.xlsx 👻
File Home Insert Page Layout For	rmulas Data Review View Help
Cut VII	→ A^ A = = =   ≫ →   ab <sub>c</sub> Wrap Text
Paste B I U ~   ₩ ~	💁 ~ 🛕 ~ 📄 프 프 🗏 🖽 프 🗐 🖽 Merge & Center 💉
Clipboard 🕞 Font	Alignment 🕞
B15 ▼ : × ✓ f <sub>x</sub> =FV(B13/	/12,25*12,814
A FV(rate,	nper, pmt, [pv], [type]) C D E F
4 Cash Flow Year 1	\$ 210,000.00
5 Cash Flow Year 2	\$ 190,000.00
6 Cash Flow Year 3	\$ 150,000.00
7 Cash Flow Year 4	\$ 110,000.00
8 Net Present Value	\$617,981.54
9	
10	
11 CALCULATE FUTURE INVESTMENT	
12 Initial Investment	\$ (1,500.00)
13 Annual Interest Rate	5%
14 Monthly Contribution	\$ (300.00)
15 Value After 25 Years	*12,B14
16	
17	

12. Finally, you need to enter the present value of the investment (pv). In the Formula Bar, add a comma and then type B12 followed by a closing parenthesis:

FileHomeInsertPage LayoutFormulasDataReviewViewHelp $\bigcirc$ Cut $\checkmark$ II $\land$ A° $\equiv$ $\equiv$ $\equiv$ $  \gg \sim$ $\Rightarrow$ Wrap TextPaste $\bigcirc$ Copy $\sim$ $\blacksquare$ I $\bigcup$ $\sim$ $  \bigtriangleup \sim \bigtriangleup\blacksquare = \equiv \equiv \equiv \equiv \equiv \equiv \equiv \equiv \equiv \equiv$
$\begin{array}{c c c c c c c c c c c c c c c c c c c $
Clipboard         Font         Alignment           B15         Image: State Stat
B15 ▼ : × ✓ fx =FV(B13/12,25*12,B14,B12)
A B C D E F
4 Cash Flow Year 1 \$ 210,000.00
5 Cash Flow Year 2 \$ 190,000.00
6 Cash Flow Year 3 \$ 150,000.00
7 Cash Flow Year 4 \$ 110,000.00
8 Net Present Value \$617,981.54
9
10
11 CALCULATE FUTURE INVESTMENT
12 Initial Investment \$ (1,500.00)
13 Annual Interest Rate 5%
14 Monthly Contribution \$ (300.00)
15 Value After 25 Years *12,B14,B12)
16

13. Press Enter to apply the new formula. You will see that the value of this investment will be \$183,874.85 after 25 years of contributions and the initial investment of \$1,500:

10				
11	CALCULATE FUTURE INVESTMENT			
12	Initial Investment	\$ (1,500.00)		
13	Annual Interest Rate	5%		
14	Monthly Contribution	\$ (300.00)		
15	Value After 25 Years	\$183,874.85		
16				
17				
18				
10				

**14.** Save the current workbook as Activity 2-5 Complete and then close Microsoft 365 Excel to complete this exercise.

## Summary

In this lesson you learned about using text functions to manage and manipulate text, using logical functions to answer questions, as well as how to use lookup functions to find information. You have also learned how to use date functions to return date information. Additionally, you learned about the different financial functions that are available and how they operate.

## **Review Questions**

- 1. What is the TRIM function used for?
- 2. What is the TEXTJOIN function used for?
- 3. What are the only two possible outputs from a logical function?
- 4. What is the difference between the TODAY function and the NOW function?
- 5. What is the FV function used for?

# LESSON 3: ORGANIZING WORKSHEET DATA WITH TABLES

### **Lesson Objectives**

In this lesson you will learn how to:

- Create and format tables
- Modify tables
- Use table references

## **TOPIC A: Create and Format Tables**

While formulas and functions are great at analyzing data within your workbook, they are more apt at analyzing entire workbooks rather than specific sets of data. If you need to analyze smaller sets of data within a large workbook or break down large sets of data into smaller parts, then converting your data into tables is often the best solution. Tables allow you to use Excel's powerful organizational capabilities without modifying the data itself. Using tables, you can narrow down specific data, focus on only the important information, and more.

### **Topic Objectives**

In this session, you will learn:

- About tables
- About the components of a table
- How to use the Create Table dialog box
- About the Table Design contextual tab
- How to use and apply table styles, as well as Quick Styles
- How to customize row display

#### Tables

A **table** is a specially designated range of information that has added functionality. You can have multiple tables per worksheet, and tables can be as large or small as the amount of data you want to work with. Tables can be created from existing data ranges or from empty ranges and then populated afterwards. Once a table has been created, it will automatically be given a generic name such as "Table1" or "Table2" depending upon the number of tables present in the current workbook; however, these names can be changed at any time. Additionally, tables are flexible in that you can convert a table back to a normal range at any point without affecting the contents.

A table is made from adjacent columns of data, with a unique label or heading for each column. Columns and rows may be added to a table just as you would when working with a normal range.

Remember that each worksheet has a lot more rows than columns. This design is well suited for data organized in long, adjacent, list-like columns:

	A	В	С	D	E	
1	Weekly S					
2						
3	-					
4	First Name 🔻	Last Name 🔻	ID 💌	Weekly Sales 💌	Weekly Goal 💌	
5	Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$ 15,000.00	
6	Lucas	Bressan	Lucas_Bressan	\$ 14,687.50	\$ 15,000.00	
7	Stanley	Prestwick	Stanley_Prestwick	\$ 13,478.96	\$ 15,000.00	
8	Jerry	Harrison	Jerry_Harrison	\$ 21,689.47	\$ 15,000.00	
9	Leah	Thompson	Leah_Thompson	\$ 25,478.45	\$ 15,000.00	
10	Robyn	Fletcher	Robyn_Fletcher	\$ 7,600.00	\$ 15,000.00	
11	Lisa	McCain	Lisa_McCain	\$ 5,689.00	\$ 15,000.00	
12	Steven	Stone	Steven_Stone	\$ 12,346.87	\$ 15,000.00	
13	Devon	Lawrence	Devon_Lawrence	\$ 11,687.00	\$ 15,000.00	
14	George	Jackson	George _Jackson	\$ 9,874.45	\$ 15,000.00	
15						

### **Table Components**

A number of components come together to create a table. Here is an overview of each element.

	з							
	$\rightarrow$	First Name 🔻	Last Name 💌	ID 💌	Weekly Sales 💌	Weekly Goa 💌	-	2
	5	Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$ 15,000.00		
	6	Lucas	Bressan	Lucas_Bressan	\$ 14,687.50	\$ 15,000.00		
	7	Stanley	Prestwick	Stanley_Prestwick	\$ 13,478.96	\$ 15,000.00		
	8	Jerry	Harrison	Jerry_Harrison	\$ 21,689.47	\$ 15,000.00		
	9	Lea	Thompson	Leah_	\$ 25,478.45	\$ 5 0.00		
	10	Rob,	Fletcher	Robyn	\$ 7,600.00	\$ 0.00		
	11	Lisa	McCain	Lisa_McCain	\$ 5,689.00	\$ 15,000.00		
	12	Steven	Stone	Steven_Stone	\$ 12,346.87	\$ 15,000.00		
	13	Devon	Lawrence	Devon_Lawrence	\$ 11,687.00	\$ 15,000.00		
	14	George	Jackson	George Jackson	\$ 9,874.45	\$ 15,000.00		
3		Total				\$ 150,000.00	- <	- 70
	16							

The **Header Row (1)** displays the column headers (or names) for each column in the table. For each header within the Header row, you will see the **Header Row drop-down arrow (2)**. This is used to access filter and sort commands.

**Banded Rows (6)** allow you to easily differentiate between each row that appears within the table, while the **Total Row (3)** is used to display the results of calculations that are done on a column-by-column basis. When the Total row is selected it also includes the **Total Row drop-down arrow (7)**. This gives you quick access to functions that can perform calculations on the table data.

Finally, the **First Column (4)** option applies a bold effect to first column to the table to differentiate it from other columns. The **Last Column (5)** option, when applied, will do the same thing to the last column of data.

#### The Create Table Dialog Box

The **Create Table** dialog box is used to convert existing ranges of data into a table. To access this dialog box, select the cell range that you would like to convert into a table and then click **Insert**  $\rightarrow$  **Table**:



The Create Table dialog box will open. You will see the selected range (using absolute cell references) in the "Where is the data for your table?" text box. You can enter a different range into the provided field or, select one with your mouse by clicking the Cell Selector button:

Create Table	?	×									
Where is the data for your table?											
=\$A\$1:\$E\$14											
✓ My table has headers											
OK Cancel											

Checking the "**My table has headers**" checkbox indicates that the first row in the selected range contains column names. If your data does not have headers (or column names), Excel inserts a header row and give the columns generic names of "Column", followed by a sequential number. Clicking the OK button converts the selected cell range into a table.

### The Table Design Contextual Tab

Whenever you are working with a table, the **Table Design** contextual tab appears on the ribbon. Using the controls on this tab, you can modify just about any aspect of your table:

AutoSave 💽 🔿	● <b>⊟ ୬·</b> ୯·ଅ =	Book1.xlsx +	♀ Search	Jane Gibson 😼 📼 — D	) ×
File Home	Insert Page Layout Form	ulas Data Review View	Help Table Design	남 Share 🖓 Con	mments
Table Name: Table1 I® Resize Table	Summarize with PivotTable Remove Duplicates Convert to Range	Export Refresh	Header Row     First Column     Filter Button     Total Row     Last Column     Banded Rows     Banded Columns		
Properties	Tools	External Table Data	Table Style Options	Table Styles	~

Here is a brief description of the various groups that are situated on this tab and the commands and options that they contain.

Properties	This group allows you to view and edit the current table's name. You can also redefine the table size using the Resize Table command.
Tools	Within this group, the Remove Duplicates command allows you to remove duplicate values from the current table. The "Summarize with PivotTable" command will create a PivotTable out of the current table, and the "Convert to Range" command will convert it back to a regular range. You can also insert a slicer into the table using the Insert Slicer command.
External Table Data	The commands in this group are used to export table data to other applications, as well as manage data links to external resources.
Table Style Options	The checkbox controls in this group allow you to toggle on or off available table components.
Table Styles	This group displays a gallery of styles that you can apply to the current table.

#### **Styles and Quick Style Sets**

Similar to cell styles, **table styles** are preconfigured formatting options that can be applied to tables. They allow you to quickly apply a splash of color to your tables and in some cases enhance their readability. While you do have the option of configuring your own table style, you can also select from a variety of preconfigured quick styles. You can find all of these quick styles within the **Table Styles group** of the **Table Design tab**:

AutoSave 💽 01	D 🗄 🎾 🖓 • 🖓 •	Book1.xlsx -	𝒫 Search	Jane Gibson 🕫 —	o ×
File Home	Insert Page Layout	Formulas Data Review View	Help Table Design	남 Share 🖓 C	omments
Table Name:	Summarize with PivotTable	Properties	✓ Header Row ✓ First Column ✓ Filter But	ton	
Table1	Remove Duplicates	sert Export Refresh	🗹 Total Row 🗹 Last Column		
🖶 Resize Table	Genvert to Range	licer 👻 👻 🖓 Unlink	Banded Rows Banded Columns		
Properties	Tools	External Table Data	Table Style Options	Table Styles	~

Clicking the **More arrow** () within the Table Styles gallery expands it to show more options:

AutoSave 💽 🗒 🏷 ヤマイン マ	Book1.xlsx +	♀ Search		Jane Gibson 🕼 🖽 — 🗆 🗙
File Home Insert Page Layout Form	ulas Data Review View	Help Table Design		습 Share 🖓 Comments
Table Name:     Image: Summarize with PivotTable       Table1     Remove Duplicates       Properties     Convert to Range       Sticer     Tools	Export Refresh External Table Data	✓ Header Row     ✓ First Column     ✓ F     ✓ Total Row     ✓ Last Column     ✓ Banded Rows     ─ Banded Columns     Table Style Options	Light	₽ ■
			Dark	
			₩ww Table Style Clear	

AutoSave 💽 0ff	<b>8 9 °</b> C	~ () <del>-</del>	Book1.xlsx 👻	I	♀ Search							Jane Gibsor	JG	<b>•</b>	- 0	×
File Home	insert Page	Layout Formula	s Data Review	View H	elp Table Design									🖻 Share	🖵 Comme	ents
Table Name: Table1	🗊 Summarize with 🛃 Remove Duplica 📇 Convert to Rang	PivotTable tes Insert e Slicer	Export Refresh	erties E n in Browser E nk E	Header Row F Total Row Banded Rows B	rst Column ast Column anded Colum	Filter Button								• •	
Properties	Too	bls	External Table D	ata	Tabl	e Style Option	s				Table Style	s				~
E6 * : X 🗸 & 15000														٣		
A	В	С	D	E	F	G	н	1.00	J	к	L	м	N	0	Р	
1 Weekly	Sales & B	onus Payou	ut													
4 First Name	- Last Name -	ID 🔹	• Weekly Sales •	Weekly Go	al 👻											
5 Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$ 15,00	0.00											
7 Stanley	Prestwick	Stanley Prestwick	\$ 13,478.96	\$ 15,00	0.00											
8 Jerry		Jerry_Harrison			0.00											
9 Leah	Thompson	Leah_Thompson	\$ 25,478.45	\$ 15,00	0.00											
10 Robyn	Fletcher	Robyn_Fletcher	\$ 7,600.00	\$ 15,00	0.00											
11 Lisa	McCain	Lisa_McCain	\$ 5,689.00	\$ 15,00	0.00											
12 Steven	Lawronco	Dovon Lawronco	\$ 12,340.67 \$ 11,697.00	\$ 15,00	0.00											
14 George	lackson	George Jackson	\$ 9.874.45	\$ 15.00	0.00											ΞU
15																
16																
17																v
< → S	heet1 Sheet2	Sheet3 (+)														Þ
Ready 🐻												<b>H</b>	₽ -		+	100%

Clicking any style option inside the Table Styles gallery applies it to the current table:

To clear an applied style, click the **More arrow** () within the Table Styles gallery, and then click **Clear:** 

AutoSave 💽 🗄 ウ・ つ マ	Book1.xlsx 👻	<u>م</u>	) Search		Jane Gibson 🕫 — 🗆	×
File Home Insert Page Layout F	ormulas Data Review	View Help	Table Design		🖻 Share 🖓 Comme	nts
Table Name:     Image: State	ert cer Export Refresh Si Unlin External Table D	erties 🛛 🖓 He n in Browser 📄 To nk 🖓 Ba ata	eader Row First Col stal Row Last Col anded Rows Banded Table Style	umn 🗹 Filter Button umn Columns Options		~ *
A B C	D	E	F	GН		
1 Weekly Sales & Bonus Pa	ayout					
2 3 4 First Name v Last Name v ID	Weekly Sales	Weekly Goal 💌				
5 Jackie Williamson Jackie_Willi 6 Lucas Bressan Lucas Bress	amson \$ 16,785.14 an \$ 14,687.50	\$ 15,000.00 \$ 15.000.00			Medium	
7 Stanley Prestwick Stanley_Pre 8 Jerry Harrison Jerry_Harris	stwick \$ 13,478.96 on \$ 21,689.47	\$ 15,000.00 \$ 15,000.00				_
9 Leah Thompson Leah_Thom 10 Robyn Fletcher Robyn_Flet 11 Lisa McCain Lisa McCair	pson \$ 25,478.45 ther \$ 7,600.00 \$ 5,689.00	\$ 15,000.00 \$ 15,000.00 \$ 15,000.00				
12         Steven         Stone         Steven_Store           13         Devon         Lawrence         Devon_Law	ne \$ 12,346.87 rence \$ 11,687.00	\$ 15,000.00 \$ 15,000.00				
14 George Jackson George Jac 15	kson \$ 9,874.45	\$ 15,000.00				
17						
Sheet1 Sheet2 Sheet3	(+)				Dark	. <b>▶</b>
K6397 [20					Image: A state of the	A076
					E Clear	

4	AutoSave 💽 Off	) <b>= 9 ·</b> C	- Č =		Book1.xlsx +		<u>م</u>	Search								Jane Gibs	on JG	⊞ -		×
Fi	le Home	insert Page	Layout Formulas	. [	Data Review	\	/iew Help	Table Design									(	් Share	🖵 Comm	ents
Tab Tab	le Name: ble1 Resize Table	Summarize with Remove Duplicat	PivotTable tes Insert e Slicer	Export	Refresh	erties 1 in Br 1k	owser To Ba	tal Row Ei tal Row La nded Rows Bi	rst Column ist Column anded Colum	✓ Filte	r Button								<ul> <li>&gt;</li> </ul>	
	Properties	Too	ols		External Table D	ata		Table	Style Option	s					Table Style	s				~
A5	λ5 ▼ : × √ f <sub>*</sub> Jackie ✓																			
	А	В	с		D		E	F	G	н		1	J	к	L	м	N	0	Р	
1	Weekly	Sales & B	onus Pavou	ıt																
2			· · ·																	
3																				
4	First Name	<ul> <li>Last Name</li> </ul>	ID 💌	V	Veekly Sales 💌	V	Veekly Goal 💌													
5	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$	15,000.00													
6	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	\$	15,000.00													
7	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$	15,000.00													
8	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$	15,000.00													
9	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$	15,000.00													
10	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00													
11	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00													
12	Steven	Stone	Steven_Stone	\$	12,346.87	\$	15,000.00													
13	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	ş	15,000.00													
14	George	Jackson	George_Jackson	\$	9,874.45	Ş	15,000.00													+
15																				
10																				
		Sheet1 Sheet2	Sheet3 (+)								1	: 4							_	
Dee	- E	Sheetz	Janecco   (F)													HH (P)	i mi		-	1000/
Rea	uy 10																			10070

The table is then displayed with no style at all:

#### **Customizing Row Display**

Rows in a table can be customized through the enabling (or disabling) of banded rows and the inclusion of total rows. To toggle banded rows, first select the table that you would like to work with and then click the **Banded Rows** checkbox in the Table Style Options group:

AutoSave 💽 O	# 🛛 ५・୯・७ ፣		Book1.	xlsx <del>-</del>		2	Search	
File Home	Insert Page Layout	Formula	s Data	Review	View	Help	Table Design	
Table Name:	🗊 Summarize with PivotTable			E Proper	ies	🗹 Hea	ader Row First Column	✓ Filter Button
Table1	Remove Duplicates		Evnort Refrech	📑 Open i	n Browser	Tota	al Row Last Column	
🕀 Resize Table	🚰 Convert to Range	Slicer	× ×	ුප් Unlink	$\rightarrow$	Ban	ded Rows Banded Columns	
Properties	Tools		Extern	al Table Dat	3		Table Style Options	

While banded rows are enabled by default to make the data easier to read, disabling it is always an option:

3								3						
4	First Name 🔻	Last Name 💌	ID 🔻	W	/eekly Sales 👻	W	eekly Goal 👻	4	First Name 🔻	Last Name 🔻	ID 💌	Weekly Sales 🝷	١	Neekly Goal 💌
5	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$	15,000.00	5	Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$	15,000.00
6	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	\$	15,000.00	6	Lucas	Bressan	Lucas_Bressan	\$ 14,687.50	\$	15,000.00
7	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$	15,000.00	7	Stanley	Prestwick	Stanley_Prestwick	\$ 13,478.96	\$	15,000.00
8	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$	15,000.00	8	Jerry	Harrison	Jerry_Harrison	\$ 21,689.47	\$	15,000.00
9	Leah	Thompson	Leah Thompson	\$	25,478.45	\$	15,000.00	9	Leah	Thompson	Leah_Thompson	\$ 25,478.45	\$	15,000.00
10	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00	10	Robyn	Fletcher	Robyn_Fletcher	\$ 7,600.00	\$	15,000.00
11	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00	11	Lisa	McCain	Lisa_McCain	\$ 5,689.00	\$	15,000.00
12	Steven	Stone	Steven_Stone	\$	12,346.87	\$	15,000.00	12	Steven	Stone	Steven_Stone	\$ 12,346.87	\$	15,000.00
13	Devon	Lawrence	Devon Lawrence	\$	11,687.00	\$	15,000.00	13	Devon	Lawrence	Devon_Lawrence	\$ 11,687.00	\$	15,000.00
14	George	Jackson	George Jackson	\$	9,874.45	\$	15,000.00	14	George	Jackson	George _Jackson	\$ 9,874.45	\$	15,000.00
	-													

Clicking the **Total Row** checkbox in the Table Style Options group inserts a Total row at the bottom of the table:

AutoSave 💽 o	∄ 🗄 9° ୯° ଅ ⊽		Book1	xlsx <del>-</del>		Q	Search	
File Home	Insert Page Layout	Formulas	Data	Review	View	Help	Table Design	
Table Name: Table1 ⁺⊕+ Resize Table	Summarize with PivotTable Remove Duplicates	Insert Ex Slicer	port Refresh	E Proper E Open i 안 Unlink	ties n browser	✓ Hea Tota ✓ Bar	ader Row First Column al Row Last Column nded Rows Banded Column	✓ Filter Button Is
Properties	Tools		Exterr	nal Table Dat	a		Table Style Options	

When the Total Row is shown, you will see that it appears bold and one or more of the columns will display a total:

3						
4	First Name 💌	Last Name 💌	ID 💌	Weekly Sales 💌	Weekly Goal 💌	
5	Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$ 15,000.00	
6	Lucas	Bressan	Lucas_Bressan	\$ 14,687.50	\$ 15,000.00	
7	Stanley	Prestwick	Stanley_Prestwick	\$ 13,478.96	\$ 15,000.00	
8	Jerry	Harrison	Jerry_Harrison	\$ 21,689.47	\$ 15,000.00	
9	Leah	Thompson	Leah_Thompson	\$ 25,478.45	\$ 15,000.00	
10	Robyn	Fletcher	Robyn_Fletcher	\$ 7,600.00	\$ 15,000.00	
11	Lisa	McCain	Lisa_McCain	\$ 5,689.00	\$ 15,000.00	
12	Steven	Stone	Steven_Stone	\$ 12,346.87	\$ 15,000.00	
13	Devon	Lawrence	Devon_Lawrence	\$ 11,687.00	\$ 15,000.00	
14	George	Jackson	George Jackson	\$ 9,874.45	\$ 15,000.00	
1	Total				\$ 150,000.00	
16						

#### Activity 3-1: Creating and Modifying a Table

You have decided that because the Weekly Sales & Bonus Payout worksheet will become larger on a weekly basis, it is a good idea to convert the range into a table to facilitate data analysis. You would also like to apply a new table style to it.

**1.** To begin, open Activity 3-1 from your Exercise Files folder:



Activity 3-1.xlsx Microsoft Excel Worksheet 10.7 KB

eekl	v Sales										
	Weekly Sales & Bonus Payout										
eek	First Name	Last Name	ID	W	eekly Sales	We	eekly Goal	Bonus			
1	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$	15,000.00	\$500.00			
1	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	\$	15,000.00	\$ -			
1	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$	15,000.00	\$ -			
1	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$	15,000.00	\$500.00			
1	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$	15,000.00	\$500.00			
1	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00	\$ -			
1	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00	\$-			
1	Steven	Stone	Steven_Stone	\$	12,346.87	\$	15,000.00	\$ -			
1	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$	15,000.00	\$-			
1	George	Jackson	George _Jackson	\$	9,874.45	\$	15,000.00	\$ -			
1 1 1 1 1 1 1 1 1	2 <b>ek</b> L L L L L L L	eek First Name Jackie Lucas LStanley LStanley LJerry Leah Robyn Lisa Lisa Lisa Lovon LOevon George	First Name         Last Name           Jackie         Williamson           Lucas         Bressan           Stanley         Prestwick           Jerry         Harrison           Leah         Thompson           Robyn         Fletcher           Lisa         McCain           Steven         Stone           Devon         Lawrence           George         Jackson	First Name         Last Name         ID           Jackie         Williamson         Jackie_Williamson           Lucas         Bressan         Lucas_Bressan           Lucas         Prestwick         Stanley_Prestwick           L         Jerry         Harrison         Jerry_Harrison           L         Leah         Thompson         Leah_Thompson           L         Robyn         Fletcher         Robyn_Fletcher           L         Lisa         McCain         Lisa_McCain           L         Steven         Stone         Steven_Stone           L         Devon         Lawrence         Devon_Lawrence           L         George         Jackson         George_Jackson	Peek     First Name     Last Name     ID     Wulliamson       Jackie     Williamson     Jackie_Williamson     \$       Lucas     Bressan     Lucas_Bressan     \$       L     Stanley     Prestwick     Stanley_Prestwick     \$       L     Jerry     Harrison     Jerry_Harrison     \$       L     Leah     Thompson     Leah_Thompson     \$       L     Robyn     Fletcher     Robyn_Fletcher     \$       L     Lisa     McCain     Lisa_McCain     \$       L     Devon     Lawrence     Devon_Lawrence     \$       L     George     Jackson     George_Jackson     \$	First NameLast NameIDWeekly SalesJackieJackieWilliamsonJackie_Williamson\$ 16,785.14LucasBressanLucas_Bressan\$ 14,687.50LucasDerestwickStanley_Prestwick\$ 13,478.96LJerryHarrisonJerry_Harrison\$ 21,689.47LLeahThompsonLeah_Thompson\$ 25,478.45LRobynFletcherRobyn_Fletcher\$ 7,600.00LLisaMcCainLisa_McCain\$ 5,689.00StevenStoneSteven_Stone\$ 12,346.87LDevonLawrenceDevon_Lawrence\$ 11,687.00LGeorgeJacksonGeorge_Jackson\$ 9,874.45	PeekFirst NameLast NameIDWeekly SalesWeekly SalesJackieJackieWilliamsonJackie_Williamson\$ 16,785.14\$LucasBressanLucas_Bressan\$ 14,687.50\$LStanleyPrestwickStanley_Prestwick\$ 13,478.96\$JerryHarrisonJerry_Harrison\$ 21,689.47\$LLeahThompsonLeah_Thompson\$ 25,478.45\$LRobynFletcherRobyn_Fletcher\$ 7,600.00\$LLisaMcCainLisa_McCain\$ 5,689.00\$LStevenStoneSteven_Stone\$ 12,346.87\$LDevonLawrenceDevon_Lawrence\$ 11,687.00\$LGeorgeJacksonGeorge_Jackson\$ 9,874.45\$	Perk         First Name         Last Name         ID         Weekly Sales         Weekly Goal           L         Jackie         Williamson         Jackie_Williamson         \$ 16,785.14         \$ 15,000.00           L         Lucas         Bressan         Lucas_Bressan         \$ 14,687.50         \$ 15,000.00           L         Stanley         Prestwick         Stanley_Prestwick         \$ 13,478.96         \$ 15,000.00           L         Jerry         Harrison         Jerry_Harrison         \$ 21,689.47         \$ 15,000.00           L         Leah         Thompson         Leah_Thompson         \$ 25,478.45         \$ 15,000.00           L         Leah         Thompson         Leah_Thompson         \$ 25,478.45         \$ 15,000.00           L         Robyn         Fletcher         Robyn_Fletcher         \$ 7,600.00         \$ 15,000.00           L         Lisa         McCain         Lisa_McCain         \$ 5,689.00         \$ 15,000.00           L         Steven         Stone         Steven_Stone         \$ 12,346.87         \$ 15,000.00           L         Devon         Lawrence         Devon_Lawrence         \$ 11,687.00         \$ 15,000.00           L         George         Jackson         George_Jackson </th <th>Prist Name         Last Name         ID         Weekly Sales         Weekly Goal         Bonus           Jackie         Williamson         Jackie_Williamson         \$ 16,785.14         \$ 15,000.00         \$ 500.00           Lucas         Bressan         Lucas_Bressan         \$ 14,687.50         \$ 15,000.00         \$ -           L         Stanley         Prestwick         Stanley_Prestwick         \$ 13,478.96         \$ 15,000.00         \$ -           L         Jerry         Harrison         Jerry_Harrison         \$ 21,689.47         \$ 15,000.00         \$ 500.00           L         Leah         Thompson         Leah_Thompson         \$ 25,478.45         \$ 15,000.00         \$ 500.00           L         Robyn         Fletcher         Robyn_Fletcher         \$ 7,600.00         \$ 15,000.00         \$ -           L         Lisa         McCain         Lisa_McCain         \$ 5,689.00         \$ 15,000.00         \$ -           L         Steven         Stone         Steven_Stone         \$ 12,346.87         \$ 15,000.00         \$ -           L         Devon         Lawrence         Devon_Lawrence         \$ 11,687.00         \$ 15,000.00         \$ -           L         George         Jackson         George_Jackson</th>	Prist Name         Last Name         ID         Weekly Sales         Weekly Goal         Bonus           Jackie         Williamson         Jackie_Williamson         \$ 16,785.14         \$ 15,000.00         \$ 500.00           Lucas         Bressan         Lucas_Bressan         \$ 14,687.50         \$ 15,000.00         \$ -           L         Stanley         Prestwick         Stanley_Prestwick         \$ 13,478.96         \$ 15,000.00         \$ -           L         Jerry         Harrison         Jerry_Harrison         \$ 21,689.47         \$ 15,000.00         \$ 500.00           L         Leah         Thompson         Leah_Thompson         \$ 25,478.45         \$ 15,000.00         \$ 500.00           L         Robyn         Fletcher         Robyn_Fletcher         \$ 7,600.00         \$ 15,000.00         \$ -           L         Lisa         McCain         Lisa_McCain         \$ 5,689.00         \$ 15,000.00         \$ -           L         Steven         Stone         Steven_Stone         \$ 12,346.87         \$ 15,000.00         \$ -           L         Devon         Lawrence         Devon_Lawrence         \$ 11,687.00         \$ 15,000.00         \$ -           L         George         Jackson         George_Jackson		

#### 2. First, use your cursor to select the A4:G14 cell range:

#### 3. Next, click Insert → Table:



**4.** In the Create Table dialog box, you will see that the range you previously selected is listed inside the "Where is the data for your table?" text box:



5. Ensure that the "My table has headers" checkbox is checked and click OK:



**6.** You will see that the previously selected range has now been converted into a table:

	А	В	С	D		E		F		G	H
1	Week	ly Sales	& Bonus Pa	yout							
2											
3											
4	Week 🔻	First Nam 🔻	Last Name 💌	ID 💌	W	eekly Sale 👻	W	eekly Goa 🔻	Bo	nu 🔻	
5	1	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$	15,000.00	\$ 50	00.00	
6	1	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	\$	15,000.00	\$	-	
7	1	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$	15,000.00	\$	-	
8	1	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$	15,000.00	\$50	00.00	
9	1	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$	15,000.00	\$ 50	00.00	
10	1	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00	\$	-	
11	1	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00	\$	-	
12	1	Steven	Stone	Steven_Stone	\$	12,346.87	\$	15,000.00	\$	-	
13	1	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$	15,000.00	\$	-	
14	1	George	Jackson	George _Jackson	\$	9,874.45	\$	15,000.00	\$	÷.,	
15											

Now, you need to apply a new table style. With any of the cells inside the table selected, open the Table Design contextual tab. Within the Table Styles group, click the More arrow ():

Activity 3-1.xls	·• ۶	Search		
Ilas Data Review View	Help Table Design Header Row First Column Total Row Last Column Banded Rows Banded Columns	✓ Filter Button		
External Table Data	Table Style Options		Table Styles	

**8.** A variety of different quick styles to choose from is now displayed. For this example, click **Table Style Medium 8**:

,	lutoSave 🧿	■ 日 り、	· C · D =		Act	ivity 3-1.xls	x •			Ŗ	) Search								
FÌ	le Hom	ie Insert	Page Layout Fo	rmulas Data	Review	View	He	lp Table	Design										
Tab Tab	le Name: Ne1 Resize Table Properties	🔛 Summaris 🔜 Remove I 📇 Convert t	ze with PivotTable Duplicates o Range Slic Tools	Export Refresh	E Proper Open i S Unlink I Table Dat	rties in Browser : ta		Header Row Total Row Banded Row	First	Column Column ed Columns rie Options	Filter Button	Light							
AS		• : [ × -	√ fr 1																
	A	в	с	D		E		F	G	н	1								Q
1	Week	ly Sales	& Bonus Pa	vout							Weekly Bonus Ar								
2	Wook	First Name	Last Name		Week	ly Salar y	W	aakly Go: *	Bopu		\$ 5	5							
5	1	Jackie	Williamson	Jackie_Williamson	\$ 1	6,785.14	\$	15,000.00	\$500.00			Medium							
6	1	Lucas	Bressan	Lucas_Bressan	\$ 1	4,687.50	\$	15,000.00	\$ -			-							
7	1	Stanley	Prestwick	Stanley_Prestwick	\$ 1	3,478.96	\$	15,000.00	\$ -										
8	1	Jerry	Harrison	Jerry_Harrison	\$ 2	1,689.47	\$	15,000.00	\$500.00										
9	1	Leah	Thompson	Leah_Thompson	\$ 2	5,478.45	\$	15,000.00	\$500.00			88888		88888			88888	88888	
10	1	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00	\$ -				EEEE	22222	33333	33333	33333	33333	
11	1	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00	\$ -										
12	1	Steven	Stone	Steven_Stone	\$ 1	2,346.87	\$	15,000.00	\$ -		L								
13	1	Devon	Lawrence	Devon_Lawrence	\$ 1	1,687.00	\$	15,000.00	\$ -										
14	1	George	Jackson	George _Jackson	\$	9,874.45	\$	15,000.00	\$ - ,										
15																			
16																			
17																			
18												Dark							
19														_					
20																			
21																			
			-																_
		Sheet1	(+)																
Rea	dy 🔞																		
												i⊞ <u>N</u> ew T I <u>C</u> lear	able Style						

**9.** The new style is now applied to the current table:

	Α	В	С	D	E	F	G	Н
1	Week	ly Sales	& Bonus Pa	yout				
2								
3								
4	Week 🔻	First Nam 💌	Last Name 💌	ID 💌	Weekly Sale	Weekly Goa 🔻	Bonu 💌	
5	1	Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$ 15,000.00	\$500.00	
6	1	Lucas	Bressan	Lucas_Bressan	\$ 14,687.50	\$ 15,000.00	\$ -	
7	1	Stanley	Prestwick	Stanley_Prestwick	\$ 13,478.96	\$ 15,000.00	\$ -	
8	1	Jerry	Harrison	Jerry_Harrison	\$ 21,689.47	\$ 15,000.00	\$500.00	
9	1	Leah	Thompson	Leah_Thompson	\$ 25,478.45	\$ 15,000.00	\$500.00	
10	1	Robyn	Fletcher	Robyn_Fletcher	\$ 7,600.00	\$ 15,000.00	\$ -	
11	1	Lisa	McCain	Lisa_McCain	\$ 5,689.00	\$ 15,000.00	\$ -	
12	1	Steven	Stone	Steven_Stone	\$ 12,346.87	\$ 15,000.00	\$ -	
13	1	Devon	Lawrence	Devon_Lawrence	\$ 11,687.00	\$ 15,000.00	\$ -	
14	1	George	Jackson	George _Jackson	\$ 9,874.45	\$ 15,000.00	\$ - ,	
15								

**10.** Save the current workbook as Activity 3-1 Complete and then close Microsoft 365 Excel to complete this exercise.

## **TOPIC B: Modifying Tables**

Once you have created and formatted a table, you will have access to many tools that will allow you to quickly organize and manage your data. During this topic you will learn how to resize a table, and how to quickly summarize your data. You will also learn how to clean your data by removing duplicates.

#### **Topic Objectives**

In this session, you will learn:

- How to add and remove rows and columns
- About total row functions
- How to remove duplicate values

#### **Adding Rows and Columns**

Once you have created a table in Excel, there are many ways that you can easily add or remove table rows and columns.

To add rows at the bottom of the table, you can simply select any cell immediately below the table and type your data:

	А	В	С		D	E	F	
1	Weekly S	Sales & B	onus Payou	t				
2								
3								
4	First Name 🕫	Last Name 🖵	ID 🔻		Weekly Sales 💌	Weekly Goal 🔻		
5	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$ 15,000.00		
6	George	Jackson	George _Jackson	\$	9,874.45	\$ 15,000.00		
7	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$ 15,000.00		
8	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$ 15,000.00		
9	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$ 15,000.00		
10	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$ 15,000.00		
11	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	\$ 15,000.00		
12	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$ 15,000.00		
13	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$ 15,000.00		
14	Steven	Stone	Steven_Stone	\$	12,346.87	\$ 15,000.00		
15	Craig ]							
14								

When you press **Enter** (or Tab or select a cell outside of the table) Excel automatically expands the table to include the new row. The new row will include any formulas that are used in the table:

C	15 💌 :	×	CONCATENAT	=CONCATENATE(A15, "_", B15)								
	А	В	С		D		E	F				
1	Weekly S	Sales & Bo	onus Payou	t								
2												
3												
4	First Name 🕫	Last Name 🕫	ID 🔻		Weekly Sales 💌	١	Veekly Goal 🔻					
5	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$	15,000.00					
6	George	Jackson	George _Jackson	\$	9,874.45	\$	15,000.00					
7	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$	15,000.00					
8	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$	15,000.00					
9	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$	15,000.00					
10	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00					
11	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	\$	15,000.00					
12	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00					
13	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$	15,000.00					
14	Steven	Stone	Steven_Stone	\$	12,346.87	\$	15,000.00					
15	Craig		Craig_									
16		4										
47												

Similarly, if you select a cell immediately to the right of a table and enter data, Excel automatically expands the table to include the new column:

	Α	В	С		D		E	F	G
1	Weekly S	Sales & B	onus Payo	u	t				
2									
3									
4	First Name 🕫	Last Name 🚽	ID .	•	Weekly Sales	Ŧ	Weekly Goal 💌	Bonus 🔻	
5	Devon	Lawrence	Devon_Lawrence		\$ 11,687.0	0	\$ 15,000.00		7
6	George	Jackson	George _Jackson		\$ 9,874.4	5	\$ 15,000.00		
7	Jackie	Williamson	Jackie_Williamsor	n	\$ 16,785.14	4	\$ 15,000.00		
8	Jerry	Harrison	Jerry_Harrison		\$ 21,689.4	7	\$ 15,000.00		
9	Leah	Thompson	Leah_Thompson		\$ 25,478.4	5	\$ 15,000.00		
10	Lisa	McCain	Lisa_McCain		\$ 5,689.0	0	\$ 15,000.00		
11	Lucas	Bressan	Lucas_Bressan		\$ 14,687.5	0	\$ 15,000.00		
12	Robyn	Fletcher	Robyn_Fletcher		\$ 7,600.0	0	\$ 15,000.00		
13	Stanley	Prestwick	Stanley_Prestwick	¢	\$ 13,478.9	6	\$ 15,000.00		
14	Steven	Stone	Steven_Stone		\$ 12,346.8	7	\$ 15,000.00		
15	Craig		Craig_						
16									
17									

This functionality is called **Table AutoExpansion**. You can control this behavior by clicking on the Control AutoCorrect Options button that appears next to added row or column, and selecting the appropriate option:

	А	В	С		D		E		F			G	н	L. L.	
1	Weekly S	Sales & B	onus Payou	t											
2															
3															
4	First Name 🕫	Last Name 🚽	ID 💌		Weekly Sales 💌	١	Veekly Goal 💌	Bo	nus	•					
5	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$	15,000.00					-			
6	George	Jackson	George _Jackson	\$	9,874.45	\$	15,000.00				6	Undo	Table AutoExpa	nsion	
7	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$	15,000.00				-	Stop	Automatically Fx	nanding Tables	
8	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$	15,000.00				_	Stop	Automatically Ex	parioling tables	
9	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$	15,000.00				2	Cont	rol AutoCorrect (	Options	
10	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00								
11	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	\$	15,000.00								
12	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00								
13	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$	15,000.00								
14	Steven	Stone	Steven_Stone	\$	12,346.87	\$	15,000.00								
15	Craig		Craig_												
16															

Selecting **Undo Table AutoExpansion** removes the column or row from the table, but the data you entered remains, and the AutoCorrect Options button is still displayed, allowing you to select **Redo Table AutoExpansion**:

	Α	В	С	D	E	F	G	Н	I
1	Weekly S	Sales & B	onus Payou	t					
2									
3									
4	First Name 🚽	Last Name 🗐	ID 💌	Weekly Sales	Weekly Goal 🔻	Bonus			
5	Devon	Lawrence	Devon_Lawrence	\$ 11,687.00	\$ 15,000.00		7 -		
6	George	Jackson	George _Jackson	\$ 9,874.45	\$ 15,000.00		C Red	Table AutoExpa	nsion
7	Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$ 15,000.00		Chan	Automatically F	and an Table
8	Jerry	Harrison	Jerry_Harrison	\$ 21,689.47	\$ 15,000.00		Stop	Automatically D	cpanding Tables
9	Leah	Thompson	Leah_Thompson	\$ 25,478.45	\$ 15,000.00		<u>C</u> on	trol AutoCorrect	Options
10	Lisa	McCain	Lisa_McCain	\$ 5,689.00	\$ 15,000.00				
11	Lucas	Bressan	Lucas Bressan	\$ 14.687.50	Ś 15.000.00				

Selecting **Control Auto Correct Options** launches the **AutoCorrect** dialog box where, on the AutoFormat As You Type tab, you can set your preferences for automatically including new rows and columns in tables, and automatically filling formulas in tables:

AutoCorrect	?	×
AutoCorrect AutoFormat As You Type Actions Math AutoC	Correct	
Replace as you type         Internet and network paths with hyperlinks         Apply as you work         Include new rows and columns in table         Automatically as you work         Fill formulas in tables to create calculated columns		
ОК	Can	icel

If you select **Stop Automatically Expanding Tables** after clicking the Auto Correct Options button, the AutoCorrect Options button is no longer visible when working on your tables. To open the AutoCorrect dialog box, click **File**  $\rightarrow$  **Options**, then select the **Proofing** category in the Excel Options dialog box and click **AutoCorrect Options**:

Excel Options		?	×
General Formulas	abc Change how Excel corrects and formats your text.		
Data			
Proofing	Change how Excel corrects and formats text as you type:		
Save	When correcting spelling in Microsoft Office programs		
Language	Ignore words in UPPERCASE		
Ease of Access	✓ Ignore words that contain numbers		
Advanced	✓ Ignore Internet and <u>f</u> ile addresses		

You can also add rows and columns to a table by selecting a cell, row, or column in the table and clicking **Home**  $\rightarrow$  **Insert**, then selecting from the available options:

	Jane Gibson	JG	<b>T</b>	_		×
		Ŕ	Share	P	Comm	ients
Insert Delete Format	∑ AutoSum ~ ↓ Fill ~ ♦ Clear ~	A Z Sort & Filter ~	Find & Select		deas	^
Insert Table Rows Ab	ove	1				
Tinsert Table Column	s to the <u>L</u> eft					
¶↓ Insert Table Columns	s to the Righ <u>t</u>					
Insert Sheet						

Similarly, you can delete rows or columns by clicking **Home** → **Delete**, and selecting either **Delete Table Rows** or **Delete Table Columns**:

		Jane Gibson	JG	Ŧ	- 0	×
				ි Share	Com	ments
Insert	Delete Format	∑ AutoSum ▼ Fill ~ ♦ Clear ~	✓ A Z Sor Filte	t & Find &	k Ideas	
	Delete Cel	ls	diting		Ideas	~
	∃× Delete She	eet <u>R</u> ows				
	LUJ Delete She	eet <u>C</u> olumns				
	∃× De <u>l</u> ete Table Rows					
	LUJ Delete Tab	le Colu <u>m</u> ns				
	Delete She	et				

You can also adjust the size of your table by clicking **Table Design** → **Resize Table**:

AutoSave 💽 🗄 🏷 < 🖓 👻				Search		
File Home	Insert Page Layout	Formulas	Data	Review	View	Help Table Design
Table Name:	🗊 Summarize with PivotTable			🗄 Proper	ties	✓ Header Row  First Column
Table15	🛃 Remove Duplicates		ivport Refrect	📑 Open i	n Browser	Total Row
🖶 Resize Table	🚰 Convert to Range	Slicer	* *	් ප් Unlink		Banded Rows Banded Columns
Properties	Tools		Extern	nal Table Dat	a	Table Style Options

This opens the **Resize Table** dialog box, where you can define the new range of your table. Keep in mind that the headers must remain in the same row, and the resulting table range must overlap the original table range:

Resize	Table	?	×				
Select the new data range for your table:							
=	\$A\$4:\$E\$15		<b>1</b>				
Note:	Note: The headers must remain in the same row, and the resulting table range must overlap the original table range.						
	OK	(	Cancel				

Additionally, options to add or remove row and/or columns are available by right-clicking a cell in the table and selecting from the available options in the menu:

	А	В	С		D		E	F	G	н
1	Weekly S	Sales & Bo	onus Pay	γοι	ıt					
2				Calib	ri v 11 v A^ A* S	\$ ~ %	9 🛱			
3				В	I = 🖉 - A - 🖽	· ✓ ←0 .0	ng 🍕 📃			
4	First Name 🔻	Last Name 🔻	ID	_		.00 2	· · ·			
5	Jackie	Williamson	Jackie_Willia	v	Lé 40 705 44	<u>^</u>	15,000.00			
6	Lucas	Bressan	Lucas_Bressa	~	Cu <u>r</u>		15,000.00			
7	Stanley	Prestwick	Stanley_Pres	Ē	<u>C</u> opy		15,000.00			
8	Jerry	Harrison	Jerry_Harriso	ĥ	Paste Ontions:		15,000.00			
9	Leah	Thompson	Leah_Thomp:				15,000.00			
10	Robyn	Fletcher	Robyn_Fletch				15,000.00			
11	Lisa	McCain	Lisa_McCain		Dacte Special		15,000.00			
12	Steven	Stone	Steven_Stone		Paste <u>special</u>		15,000.00			
13	Devon	Lawrence	Devon_Lawre	ø	Smart <u>L</u> ookup		15,000.00			
14	George	Jackson	George _Jack		D-C		15,000.00			
15				lg	Kerresh					
16					Insert	>	Table	Columns to the <u>L</u> eft		
17					Delete	>	■→ T-1-1-1			
18					Delete			Kows <u>A</u> bove	_	
19					Select	>				
20					Clear Contents					
21				<b>#</b> =						
22				ł	Quick Analysis					
23					S <u>o</u> rt	>				
24					Filter	>				
26					Tabla	``				
	< → Sh	eet1 (+)			IdDIE					
					Get Data from Table/Ran	ige				
				ţϽ	New Co <u>m</u> ment					
				乜	<u>N</u> ew Note					
				- -	<u>F</u> ormat Cells					
					Pic <u>k</u> From Drop-down Li	ist				
				Q	L <u>i</u> nk	>				

#### **Total Row Functions**

As we discussed earlier in the lesson, you can add a **Total Row** to your tables by clicking the Total Row checkbox in the Table Style Options group of the Table Design contextual tab. Now we will explore some of the functions that are available in this row to help analyze and summarize your data.

Selecting any cell in the **Total Row** displays the Total Row drop-down arrow, which provides function options for calculating the total for that particular column:

3							
4	First Name 🔻	Last Name 💌	ID 💌		Weekly Sales 💌		Weekly Goal 🔻
5	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$	15,000.00
6	Lucas	Bressan	Lucas_Bressan		14,687.50	\$	15,000.00
7	Stanley	Prestwick	Stanley_Prestwick		13,478.96	\$	15,000.00
8	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$	15,000.00
9	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$	15,000.00
10	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00
11	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00
12	Steven	Stone	Steven_Stone	\$	12,346.87	\$	15,000.00
13	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$	15,000.00
14	George	Jackson	George Jackson	\$	9,874.45	\$	15,000.00
15	Total					-	150,000.00
16				No	ne		
17				Co	unt		
	< → Sh	eet1 (+)	·	Co	unt Numbers		
				Mi	n		
				Su	m		
				Sto	IDev 너		
				Mo	re Functions		

3						
4	First Name 💌	Last Name 💌	ID 💌		Weekly Sales 💌	Weekly Goal 💌
5	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$ 15,000.00
6	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	\$ 15,000.00
7	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$ 15,000.00
8	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$ 15,000.00
9	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$ 15,000.00
10	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$ 15,000.00
11	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$ 15,000.00
12	Steven	Stone	Steven_Stone	\$	12,346.87	\$ 15,000.00
13	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$ 15,000.00
14	George	Jackson	George Jackson	\$	9,874.45	\$ 15,000.00
15	Total		10	•	139,316.84	\$ 150,000.00
16						

#### In the below example

It is important to note, though, that the functions that you select are not necessarily the functions that are used to display the value. In this example, if we select cell E15, the sum of the Weekly Goal column, we will see in the Formula Bar that the function used is actually SUBTOTAL:

E1	5 -	× √ f:	SUBTOTAL(10	9,[V	Veekly Goal])					
	А	В	c		D		E	F	G	
1	Weekly S	Sales & Bo	onus Payou	t						
2				$\mathbf{N}$						
3										
4	First Name 🕫	Last Name 🕫	ID 💌		Weekly Sales 💌	١	Neekly Goal 🔻			
5	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$	15,000.00			
6	George	Jackson	George _Jackson	\$	9,874.45	\$	15,000.00			
7	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$	15,000.00			
8	Jerry	Harrison	Jerry_Harrison	\$	21,689,47	\$	15,000.00			
9	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$	15,000.00			
10	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00			
11	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	Ş	15,000.00			
12	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00			
13	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$	15,000.00			
14	Steven	Stone	Steven_Stone	\$	12,346.87	\$	15,000.00			
15	Total		10	\$	13,931.68	\$	150,000.00	<b>T</b>		
16										
17										

**SUBTOTAL** functions are used to perform calculations on only subsets of data within a range or table. In this case it is particularly useful to display the table total values when filters are applied to the table

In the below example, a filter has been applied to hide several of the sales representatives. Note that the results in the total row only reflect the data that is visible after the filter is applied:

E1	5 🔻 :	× ~ f	SUBTOTAL(10	9,[Weekly Goal])				
	А	В	с	D	E	F	G	F
1	Weekly S	Sales & B	onus Payou					
2								
3								
4	First Name 🍞	Last Name 🗐	ID 💌	Weekly Sales 🔻	Weekly Goal 🔻			
7	Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$ 15,000.00			
8	Jerry	Harrison	Jerry_Harrison	\$ 21,689.47	\$ 15,000.00			
9	Leah	Thompson	Leah_Thompson	\$ 25,478.45	\$ 15,000.00			
15	Total		3	\$ 21,317.69	\$ 45,000.00	-		
16								
17								

If you prefer, you can manually enter functions in the Total Row cells. In the below example the Weekly Goal column total is a true SUM function, showing the total for all rows, while the Weekly Sales column remains a SUBTOTAL function, only showing the total for the rows that are not hidden:

-								
E	.5 * :	_ ∧ _ ✓ _J	* =SUIVI(Sales[W	еекіў Goalj)				
	А	В	с 🥄	D	E	F	G	F
1	Weekly S	Sales & B	onus Payou					
2								
3								
4	First Name	Last Name 🚽	ID 💌	Weekly Sales 🔻	Weekly Goal 🔻			
7	Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$ 15,000.00			
8	Jerry	Harrison	Jerry_Harrison	\$ 21,689.47	\$ 15,000.00			
9	Leah	Thompson	Leah_Thompson	\$ 25,478.45	\$ 15,000.00			
15	Total		3	\$ 21,317.69	\$ 150,000.00	<b>v</b>		
16								
17								
	1							

#### **SUBTOTAL Function**

Now that you have seen how the **SUBTOTAL** function is used in the Total Row, here is some more detail on the function syntax and arguments.

```
=SUBTOTAL(function_num, ref1, [ref2], [...])
```

The **function\_num** argument is used to define other functions that you would like to use to calculate subtotals. Functions are called using numeric values of 1 to 11 when including

hidden values and 101 to 111 when excluding them. For example, if you want to subtotal using the SUM function and include hidden values in the calculation, you would type "9" as the argument. To exclude the hidden values, as in the example shown above, you would type "109."

Below is a table that tells you which value calls which function in the function\_num argument:

Function Argument Including Hidden Values	Function Argument Ignoring Hidden Values	Function
1	101	AVERAGE
2	102	COUNT
3	103	COUNTA
4	104	МАХ
5	105	MIN
6	106	PRODUCT
7	107	STDEV
8	108	STDEVP
9	109	SUM
10	110	VAR
11	111	VARP

The reference arguments (**ref1**, **ref2**, etc.) identify the ranges that you want to subtotal.

#### **Removing Duplicate Values**

**Duplicate values** in data can be a common occurrence, especially in larger datasets, where data has originated from multiple sources, and they can be difficult to identify, when dealing with many columns and rows. It is important, however, to identify and remove duplicates from your data to ensure accuracy and that your analyses are correct.

While there are many strategies for identifying and removing duplicate data, Excel has a built-in function to remove duplicate values from tables (or ranges) that can be very effective. To use this function, click anywhere inside of a table and then click **Table Design** → **Remove Duplicates**:



You can also access this function by clicking **Data**  $\rightarrow$  **Remove Duplicates**, when working with ranges.

This displays the **Remove Duplicates** dialog box. Here, you can select the columns that contain the duplicates that you would like to remove (By default all of the columns in the table will be selected).



Use caution when selecting only some of the columns, as it may create a situation where you can unintentionally delete data that is not a duplicate. In the below example there are

three instances of the name Ron in the dataset, but only two of the rows are identical across all of the columns. Extra care should be taken whenever you are removing duplicates and using only some of the columns to define them:

	А	В	С	D	E	F	G		
1	Name 🗾 💌	Heigh 💌	Weigh 💌	Age 💌					
2	Barney	76	155	19					
3	Ron 🔶	72	172	38					
4	Ariana	69	161	36					
5	Allegra	52	160	29					
6	Kitty	47	99	54					
7	Ron 🔶	72	172	38					
8	Tymon	68	191	52					
9	Carolyn	75	91	59					
10	Ron 🔶	72	172	26					
11	Areebah	59	94	61					
12	Terrence	64	159	33					
13	Cosmo	59	112	33					
14									
15									
16									

Once you have selected the columns, click **OK** in the Remove Duplicates dialog box. Any duplicate value that is found is then removed. An information box appears that informs you of the number of duplicate values found and how many unique values remain:



#### Activity 3-2: Modifying Tables

You would like to analyze the top sales associate data in the Weekly Sales & Bonus Payout worksheet that you have been working on.

**1.** To begin, open Activity 3-2 from your Exercise Files folder:



Activity 3-2.xlsx Microsoft Excel Worksheet 11.2 KB

2. To begin your analysis, you want to add a total row to your table. Click anywhere within the table then click Table Design → Total Row:

,	AutoSave	• 🖫 🕬	~ ~ V	÷	Activ	ity 3-2.	xlsx •		,∕⊃ Sei	arch									Jane Gibsor	JG	œ –		×
Fi	le H	ome Insert	Page Layout	Formula:	s Data	Re	view View	F	Ielp Table I	Design										l	Share	🖓 Comm	ents
Table Name: Table: Remore Upplicates Remore Upplicates				<ul> <li>✓ Header Row</li> <li>Total Row</li> <li>✓ Banded Row</li> </ul>	First Column     Filter Button     Last Column     Banded Columns     Table Style Options													~					
D5 * I × ✓ fr. Jackie Williamson												~											
1	A B C D E					F	G	н	1	J	к	L	м	N	0	Ρ	Q	R	s				
1 Weekly Sales & Bonus Pavout																							
2				· '																			
3	14/10/10	Clash Manual an	Look Manual -		- 10		a abba Calasian		a a bite of a set														
4	wee •	Jackie	Williamson	Jackie Will	liamson	s	16.785.14	Ś	15.000.00														
6	1	Lucas	Bressan	Lucas Bres	san	s	14,687.50	\$	15,000.00														
7	1	Stanley	Prestwick	Stanley Pr	estwick	\$	13,478.96	\$	15,000.00														
8	1	Jerry	Harrison	Jerry_Harri	son	\$	21,689.47	\$	15,000.00														
9	1	Leah	Thompson	Leah_Thom	npson	\$	25,478.45	\$	15,000.00														
10	1	Robyn	Fletcher	Robyn_Flet	tcher	\$	7,600.00	\$	15,000.00														
11	1	Lisa	McCain	Lisa_McCai	n	\$	5,689.00	\$	15,000.00														
12	1	Steven	Stone	Steven_Sto	one	\$	12,346.87	\$	15,000.00														
13	1	Lucas	Bressan	Lucas_Bres	san	\$	14,687.50	\$	15,000.00														
14	1	Devon	Lawrence	Devon_Law	vrence	\$	11,687.00	\$	15,000.00														
15	1	George	Jackson	George_Jac	ckson	\$	9,874.45	\$	15,000.00														
16																							
17																							
10																							
20																							
21																							
22																							
23																							
24																							
25																							
26																							
		Sheet1	+																				Þ
175																			III (II)	巴 -		+	100%
**3.** A Total Row is added to your table, with a total amount in the Weekly Goal column:

	А	В	С	D			E		F	G	Н	1
1	Wee	kly Sales	& Bonus	a Payout								
2												
3												
4	Wee 🔻	First Name 🔻	Last Name 🔻	Rep ID	•	V	Veekly Sales 🔻	W	/eekly Goa 🔻			
5	1	Jackie	Williamson	Jackie_Williamson		\$	16,785.14	\$	15,000.00			
6	1	Lucas	Bressan	Lucas_Bressan		\$	14,687.50	\$	15,000.00			
7	1	Stanley	Prestwick	Stanley_Prestwick		\$	13,478.96	\$	15,000.00			
8	1	Jerry	Harrison	Jerry_Harrison		\$	21,689.47	\$	15,000.00			
9	1	Leah	Thompson	Leah_Thompson		\$	25,478.45	\$	15,000.00			
10	1	Robyn	Fletcher	Robyn_Fletcher		\$	7,600.00	\$	15,000.00			
11	1	Lisa	McCain	Lisa_McCain		\$	5,689.00	\$	15,000.00			
12	1	Steven	Stone	Steven_Stone		\$	12,346.87	\$	15,000.00			
13	1	Lucas	Bressan	Lucas_Bressan		\$	14,687.50	\$	15,000.00			
14	1	Devon	Lawrence	Devon_Lawrence		\$	11,687.00	\$	15,000.00			
15	1	George	Jackson	George_Jackson		\$	9,874.45	\$	15,000.00			
16	Total							\$	165,000.00	-		
17												
18												

First, you want to add a count for the number of sales representatives. Select cellC16, then click the total row drop-down arrow and select Count:

	А	В	С	D			E		F	G	Н	- I
1	Wee	kly Sales	& Bonus	Payout								
2												
3					_							
4	Wee 🔻	First Name 🔻	Last Name 🔻	Rep ID	•	We	ekly Sales 🔻	W	/eekly Goa 🔻			
5	1	Jackie	Williamson	Jackie_Williamson		\$	16,785.14	\$	15,000.00			
6	1	Lucas	Bressan	Lucas_Bressan		\$	14,687.50	\$	15,000.00			
7	1	Stanley	Prestwick	Stanley_Prestwick		\$	13,478.96	\$	15,000.00			
8	1	Jerry	Harrison	Jerry_Harrison		\$	21,689.47	\$	15,000.00			
9	1	Leah	Thompson	Leah_Thompson		\$	25,478.45	\$	15,000.00			
10	1	Robyn	Fletcher	Robyn_Fletcher		\$	7,600.00	\$	15,000.00			
11	1	Lisa	McCain	Lisa_McCain		\$	5,689.00	\$	15,000.00			
12	1	Steven	Stone	Steven_Stone		\$	12,346.87	\$	15,000.00			
13	1	Lucas	Bressan	Lucas_Bressan		\$	14,687.50	\$	15,000.00			
14	1	Devon	Lawrence	Devon_Lawrence		\$	11,687.00	\$	15,000.00			
15	1	George	Jackson	George_Jackson		\$	9,874.45	\$	15,000.00			
16	Total							\$	165,000.00			
17			None									
18			Count									
19			Count Numbers									
20			Min									
21			Sum									
22			Var									
23			More Functions									
24												

 You see that the count of sales representatives is 11, but you know that there are only 10. You realize there must be duplicate data:

	Α	В	С	D			E		F	G	Н	1
1	Wee	kly Sales	& Bonus	a Payout								
2												
3												
4	Wee -	First Name 💌	Last Name 🔻	Rep ID	Ŧ	W	eekly Sales 🔻	W	eekly Goa 🔻			
5	1	Jackie	Williamson	Jackie_Williamson		\$	16,785.14	\$	15,000.00			
6	1	Lucas	Bressan	Lucas_Bressan		\$	14,687.50	\$	15,000.00			
7	1	Stanley	Prestwick	Stanley_Prestwick		\$	13,478.96	\$	15,000.00			
8	1	Jerry	Harrison	Jerry_Harrison		\$	21,689.47	\$	15,000.00			
9	1	Leah	Thompson	Leah_Thompson		\$	25,478.45	\$	15,000.00			
10	1	Robyn	Fletcher	Robyn_Fletcher		\$	7,600.00	\$	15,000.00			
11	1	Lisa	McCain	Lisa_McCain		\$	5,689.00	\$	15,000.00			
12	1	Steven	Stone	Steven_Stone		\$	12,346.87	\$	15,000.00			
13	1	Lucas	Bressan	Lucas_Bressan		\$	14,687.50	\$	15,000.00			
14	1	Devon	Lawrence	Devon_Lawrence		\$	11,687.00	\$	15,000.00			
15	1	George	Jackson	George_Jackson		\$	9,874.45	\$	15,000.00			
16	Total		11					\$	165,000.00			
17												

6. To remove the duplicate, click **Table Design** → **Remove Duplicates**:



**7.** The Remove Duplicates dialog box opens. Leave all of the columns selected and click **OK**:



**8.** An information window appears, indicating that one duplicate has been removed and there 10 unique values remaining. Click **OK**:



**9.** With the duplicate now removed you can now add a total to the Weekly Sales column. Select Cell **E15**, click the dropdown arrow, and select **Sum**:

	А	В	С	D			E		F	G	Н	I.
1	Wee	kly Sales	& Bonus	a Payout								
2												
3												
4	Wee 🔻	First Name 🔻	Last Name 🔻	Rep ID	•	Wee	kly Sales 🔻	W	'eekly Goa 🔻			
5	1	Jackie	Williamson	Jackie_Williamson		\$	16,785.14	\$	15,000.00			
6	1	Lucas	Bressan	Lucas_Bressan		\$	14,687.50	\$	15,000.00			
7	1	Stanley	Prestwick	Stanley_Prestwick		\$	13,478.96	\$	15,000.00			
8	1	Jerry	Harrison	Jerry_Harrison		\$	21,689.47	\$	15,000.00			
9	1	Leah	Thompson	Leah_Thompson		\$	25,478.45	\$	15,000.00			
10	1	Robyn	Fletcher	Robyn_Fletcher		\$	7,600.00	\$	15,000.00			
11	1	Lisa	McCain	Lisa_McCain		\$	5,689.00	\$	15,000.00			
12	1	Steven	Stone	Steven_Stone		\$	12,346.87	\$	15,000.00			
13	1	Devon	Lawrence	Devon_Lawrence		\$	11,687.00	\$	15,000.00			
14	1	George	Jackson	George_Jackson		\$	9,874.45	\$	15,000.00			
15	Total		10					-	150,000.00			
16						None						
17						Count	-					
18						Count I Max	Numbers					
19						Min						
20						Sum StdDev	6					
21						Var						
22						More Fi	unctions					
23												

You can now add a column to your table by selecting cell G4 and typing "% of Total Sales", then pressing Enter:

	Α	В	С	D			E		F	G	Н
1	Wee	kly Sales	& Bonus	Payout							
2											
3											
4	Wee 🔻	First Name 🔻	Last Name 🔻	Rep ID	-	We	ekly Sales 🔻	w	/eekly Goa 👻	% of Total Sales 🔻	
5	1	Jackie	Williamson	Jackie_Williamson		\$	16,785.14	\$	15,000.00		
6	1	Lucas	Bressan	Lucas_Bressan		\$	14,687.50	\$	15,000.00		
7	1	Stanley	Prestwick	Stanley_Prestwick		\$	13,478.96	\$	15,000.00		
8	1	Jerry	Harrison	Jerry_Harrison		\$	21,689.47	\$	15,000.00		
9	1	Leah	Thompson	Leah_Thompson		\$	25,478.45	\$	15,000.00		
10	1	Robyn	Fletcher	Robyn_Fletcher		\$	7,600.00	\$	15,000.00		
11	1	Lisa	McCain	Lisa_McCain		\$	5,689.00	\$	15,000.00		
12	1	Steven	Stone	Steven_Stone		\$	12,346.87	\$	15,000.00		
13	1	Devon	Lawrence	Devon_Lawrence		\$	11,687.00	\$	15,000.00		
14	1	George	Jackson	George_Jackson		\$	9,874.45	\$	15,000.00		
15	Total		10			\$	139,316.84	\$	150,000.00		
16											
17											

(Adjust your column width as required to view the text in the header.)

 In cell G5, type the formula "=E5/\$E\$15" and press Enter, then set the format of the column to percentage, and center the content:

IP	MT	- : ×	✓ f <sub>x</sub> =E	5/\$E\$15	-						
	А	В	С	D			E		F	G	н
1	Wee	kly Sales	& Bonus	s Payout							
2											
3											
4	Wee 🔻	First Name 🔻	Last Name 🔻	Rep ID	-	W	eekly Sales 👻	N	/eekly Goa 🔻	% of Total Sales 🔻	
5	1	Jackie	Williamson	Jackie_Williamson		\$	16,785.14	\$	15,000.00	=E5/\$E\$15	
6	1	Lucas	Bressan	Lucas_Bressan		\$	14,687.50	\$	15,000.00	11%	
7	1	Stanley	Prestwick	Stanley_Prestwick		\$	13,478.96	\$	15,000.00	10%	
8	1	Jerry	Harrison	Jerry_Harrison		\$	21,689.47	\$	15,000.00	16%	
9	1	Leah	Thompson	Leah_Thompson		\$	25,478.45	\$	15,000.00	18%	
10	1	Robyn	Fletcher	Robyn_Fletcher		\$	7,600.00	\$	15,000.00	5%	
11	1	Lisa	McCain	Lisa_McCain		\$	5,689.00	\$	15,000.00	4%	
12	1	Steven	Stone	Steven_Stone		\$	12,346.87	\$	15,000.00	9%	
13	1	Devon	Lawrence	Devon_Lawrence		\$	11,687.00	\$	15,000.00	8%	
14	1	George	Jackson	George_Jackson		\$	9,874.45	\$	15,000.00	7%	
15	Total		10			\$	139,316.84	\$	150,000.00		
16											
17											
18											

 You can now add sum of the % of Total Sales column by selecting cell G15, clicking the drop-down arrow, then selecting Sum:

	А	В	С	D			E		F	G	н
1	Wee	kly Sales	& Bonus	a Payout							
2											
3											
4	Wee 🔻	First Name 🔻	Last Name 🔻	Rep ID	-	W	/eekly Sales 🔻	W	/eekly Goa 🔻	% of Total Sales 🔻	
5	1	Jackie	Williamson	Jackie_Williamson		\$	16,785.14	\$	15,000.00	12%	
6	1	Lucas	Bressan	Lucas_Bressan		\$	14,687.50	\$	15,000.00	11%	
7	1	Stanley	Prestwick	Stanley_Prestwick		\$	13,478.96	\$	15,000.00	10%	
8	1	Jerry	Harrison	Jerry_Harrison		\$	21,689.47	\$	15,000.00	16%	
9	1	Leah	Thompson	Leah_Thompson		\$	25,478.45	\$	15,000.00	18%	
10	1	Robyn	Fletcher	Robyn_Fletcher		\$	7,600.00	\$	15,000.00	5%	
11	1	Lisa	McCain	Lisa_McCain		\$	5,689.00	\$	15,000.00	4%	
12	1	Steven	Stone	Steven_Stone		\$	12,346.87	\$	15,000.00	9%	
13	1	Devon	Lawrence	Devon_Lawrence		\$	11,687.00	\$	15,000.00	8%	
14	1	George	Jackson	George_Jackson		\$	9,874.45	\$	15,000.00	7%	
15	Total		10			\$	139,316.84	\$	150,000.00		-
16										None	
17										Count	
18										Count Numbers	
19										Min	
20										Sum	
21										Var	
22										More Functions	
22											

13. You can now filter the table to show only the sales representatives who reached their weekly goal by clicking the header row drop-down arrow of the Weekly Sales column, then selecting Number Filters, then Greater Than:

	А	В	С	D		E		F	G		н
1	Wee	kly Sales	& Bonus	s Payout							
2											
3											
4	Wee 🔻	First Name 🔻	Last Name 🔻	Rep ID	-	Weekly Sales 👻	W	eekly Goa 👻	% of Total Sa	les 🔻	
5	1	Jackie	Williamson	Z↓ Sort Smallest to Lar	gest		\$	15,000.00	12%		
6	1	Lucas	Bressan	Z   Cart   and the Court			\$	15,000.00	11%		
7	1	Stanley	Prestwick	AU Sort Largest to Sma	mest		\$	15,000.00	10%		
8	1	Jerry	Harrison	Sor <u>t</u> by Color		>	\$	15,000.00	16%		
9	1	Leah	Thompson	Sheet <u>V</u> iew		>	\$	15,000.00	18%		
10	1	Robyn	Fletcher	-			\$	15,000.00	5%		
11	1	Lisa	McCain	Y Clear Filter From "V	Veekly	y Sales"	\$	15,000.00	4%		
12	1	Steven	Stone	Filter by Color		>	\$	15,000.00	9%		
13	1	Devon	Lawrence	Number <u>F</u> ilters		>		Equals			
14	1	George	Jackson	-				Equaisin			
15	Total		1	Search		Q		Does <u>N</u> ot Equ	al		-
16				(Select All)		^		Greater Than.		+	_
17				✓ \$5,689.00				<u>o</u> .co.co.			
18								Greater Than	Or Equal To		
19								Less Than			
20				S11,007.00				-			
21				\$13,478.96				Less Than Or	Equal Io		
22				\$14,687,50				Between			
23				S16,785.14				<b>T</b> 40			
24				1		•		<u>1</u> op 10			
25				o	ж	Cancel		<u>A</u> bove Averag	je		
26								Relow Average			
-		Sheet1	<b>(</b> +)					Delow Averag	c		
			U					Custom Filter			

**14.** In the Custom AutoFilter dialog box, type **"15000**" next to the **"is greater than**" selection, then click **OK**:

Custom AutoFilter		?	×
Show rows where: Weekly Sales			
is greater than 💙 150	o 🔶		$\sim$
×			$\sim$
Use ? to represent any single character Use * to represent any series of characters			
	ок	Car	icel

15. You will now see the three sales representatives who reached their weekly goal, but the % of Total Sales column is showing percentages only for the total sales of the three. You want to see the percentages based on the total. To do this, select cell E15, then select the Subtotal formula in the formula bar and type "=SUM([[Weekly Sales]])" to replace it:

IP	MT	* : X	✓ f <sub>x</sub> =5	UM([[Weekly Sales ]])						
	А	В	С	D		E		F	G	н
1	Wee	kly Sales	& Bonus	s Payout						
2										
3										
4	Wee 🔻	First Name 🔻	Last Name 🔻	Rep ID	•	Weekly Sales 🗐	W	/eekly Goa 👻	% of Total Sales 🔻	
5	1	Jackie	Williamson	Jackie_Williamson		\$ 16,785.14	\$	15,000.00	26%	
8	1	Jerry	Harrison	Jerry_Harrison		\$ 21,689.47	\$	15,000.00	34%	
9	1	Leah	Thompson	Leah_Thompson		\$ 25,478.45	\$	15,000.00	40%	
15	Total		3			Sales ]])	-	45,000.00	100%	
16										
17										

**16.** Press **Enter** to apply the formula. You will see that the value in the Total Row of the Weekly Sales column is now the sum of all of the sales, not just the ones that are visible. You will also see that the values in the % of Total Sales column are now displaying correctly:

	Α	В	С	D		E		F	G	н
1	Wee	kly Sales	& Bonus	s Payout						
2										
3										
4	Wee 🔻	First Name 🔻	Last Name 🔻	Rep ID	Ŧ	Weekly Sales 🗐	V	Veekly Goa 🔻	% of Total Sales 🔻	
5	1	Jackie	Williamson	Jackie_Williamson		\$ 16,785.14	\$	15,000.00	12%	
8	1	Jerry	Harrison	Jerry_Harrison		\$ 21,689.47	\$	15,000.00	16%	
9	1	Leah	Thompson	Leah_Thompson		\$ 25,478.45	\$	15,000.00	18%	
15	Total		3			\$ 139,316.84	\$	45,000.00	46%	
16										
17										
18										

 Save the current workbook as Activity 3-2 Complete and then close Microsoft 365 Excel to complete this exercise.

## **TOPIC C: Table References**

Using tables is an excellent way to quickly define, organize, and analyze specific groups of data. By using table names and structured references you can simplify the process even more. In this topic you will learn how to name your tables and then use that information in structured references and database functions. You will also learn how to convert your table back to a range.

### **Topic Objectives**

In this session, you will learn:

- About naming tables
- How to use structured references
- How to use database functions
- How to convert a table to a range

### **Naming Tables**

As you learned earlier in this course, applying names to cells and ranges can help you create workbooks that are easy to understand and work with. Tables are automatically named by Excel as they are created, with a generic name of "Table" with a sequential number at the end, depending on how many existing tables you have in your workbook. Giving your table a unique name that clearly describes the purpose or use of the table will make the structure of your workbook, and the formulas you use, easier to understand.

As with ranges and cells, there are several ways to name your table. The simplest is to first select a cell anywhere in your table, then type the new name of the table in the **Table Name** text box in the Properties group of the Table Design contextual tab, then press **Enter**:



You can also open the Name Manager dialog box, to edit your table name, by clicking Formulas → Name Manager:



Name Manager				?	×
<u>N</u> ew	Edit Delet	e		<u>F</u> ilter	•
Name	Value	Refers To	Scope	Comment	
Table8	{"Devon","Lawren.	. =Sheet1!\$A\$5:\$E\$14	Workbo		
Refers to:					
× ✓ = Shee	t1!\$A\$5:\$E\$14				Ť
				Clos	e

In the Name Manager dialog box, you can select and edit your table name:

In the **Edit Name** dialog box, you can edit the table name, and also add comments that can help you and other users understand the use of the table. You will notice, though, that the **Refers to** field is grayed out, because, unlike a range, table size is dynamic, so it cannot be set using the Name Manager:

Edit Name		?	$\times$
<u>N</u> ame:	Sales		
Scope:	Workbook 🗸		
C <u>o</u> mment:	Weekly Sales used to calculat payout	e bonus	^
			$\sim$
Refers to:	=Sheet1!\$A\$5:\$E\$14		Ť
	ОК	Canc	el

### **Using Structured References**

A **structured reference**, also known as a table reference, is a unique way of referencing tables and their elements that uses a combination of table and column names, instead of cell addresses.

This special syntax is used in tables because they are dynamic, and normal cell references cannot adjust as tables are modified.

Some of the benefits of structured references are:

- They are easily created, by selecting the table elements you want to refer to.
- They update automatically when elements of the table are changed.
- They can be used inside and outside of the table, which can make your workbooks easier to understand.
- They take advantage of the auto-fill feature of AutoCorrect, filling the entire column of a table with a formula after entering it in just one cell.

As an example, in the following table, there is an open column that is used to calculate the dollar amount that a sales representative was over or under their weekly goal:

	Α	В	С		D		E	F	
1	Weekly S	Sales & B	onus Payou	ıt					
2	Bonus Amount:	\$ 500.00							
3									
4	First Name 🔻	Last Name 🔻	ID 🔻		Weekly Sales 💌	1	Weekly Goal 🔽	Over/Under 💌	
5	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	\$	15,000.00		
6	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00		
7	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$	15,000.00		
8	George	Jackson	George _Jackson	\$	9,874.45	\$	15,000.00		
9	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$	15,000.00		
10	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00		
11	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$	15,000.00		
12	Steven	Stone	Steven_Stone	\$	12,346.87	\$	15,000.00		
13	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$	15,000.00		
14	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$	15,000.00		
15									
16									

To calculate this column using structured references, first select cell F5, and type the equal sign (=) in the Formula Bar:

IP	MT 🝷 :	× 🗸 f		[					
	А	В	С		D		E	F	
1	Weekly S	Sales & B	onus Payou	t					
2	Bonus Amount:	\$ 500.00							
3									
4	First Name 🔻	Last Name 🔻	ID 🔻	1	Weekly Sales 💌	V	Veekly Goal 💌	Over/Under 💌	
5	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	\$	15,000.00	=	
6	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00		
7	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$	15,000.00		
8	George	Jackson	George _Jackson	\$	9,874.45	\$	15,000.00		
9	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$	15,000.00		
10	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00		
11	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$	15,000.00		
12	Steven	Stone	Steven_Stone	\$	12,346.87	\$	15,000.00		
13	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$	15,000.00		
14	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$	15,000.00		
15									
16									

Then click on cell D5 to automatically add the structured reference, using the column name. In this case "[@[Weekly Sales]]:"

D	5 * :	×	🖌 =[@[Weekly Sa	ales	1] 🔶			
	А	В	с		D	Е	F	(
1	Weekly S	Sales & B	onus Payou	t				
2	Bonus Amount:	\$ 500.00						
3								
4	First Name 🔻	Last Name 🔻	ID 🔻		Weekly Sales 💌	Weekly Goal 🔻	Over/Under 🔻	
5	Lucas	Bressan	Lucas_Bressan	\$	14, 7.50	\$ 15,000.00	=[@[Weekly Sales ]]	
6	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$ 15,000.00		
7	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$ 15,000.00		
8	George	Jackson	George _Jackson	\$	9,874.45	\$ 15,000.00		
9	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$ 15,000.00		
10	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$ 15,000.00		
11	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$ 15,000.00		
12	Steven	Stone	Steven_Stone	\$	12,346.87	\$ 15,000.00		
13	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$ 15,000.00		
14	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$ 15,000.00		
15								
16								

ES	· · · ·	×	=[@[Weekly Sa	les	; ]]-[@[Weekly Go	oal]]	I		
	А	В	с		D		E	F	
1	Weekly S	Sales & B	onus Payou	t					
2	Bonus Amount:	\$ 500.00							
3									
4	First Name 🔻	Last Name 🔻	ID 🔻		Weekly Sales 💌		Weekly Goal 🔫	Over/Under 💌	
5	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	\$	15,000.00	[@[Weekly Goal]]	
6	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00		
7	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$	15,000.00		
8	George	Jackson	George _Jackson	\$	9,874.45	\$	15,000.00		
9	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$	15,000.00		
10	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00		
11	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$	15,000.00		
12	Steven	Stone	Steven_Stone	\$	12,346.87	\$	15,000.00		
13	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$	15,000.00		
14	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$	15,000.00		
15									
16									

To complete the formula, type the minus sign (-), then click on cell E5:

Again, Excel adds the structured reference using the column name. Pressing **Enter** completes the formula. Not only do the formula results appear in cell F5, but it is auto-filled to all the cells in the Over/Under column:

F6	•	× ~ f	=[@[Weekly Sa	les	]]-[@[Weekly Go	al]	]		
	А	В	с		D		E	F	G
1	Weekly S	Sales & Bo	onus Payou	t					
2	Bonus Amount:	\$ 500.00							
3									
4	🔹 First Name 🔻	Last Name 🔻	ID 🔻		Weekly Sales 💌		Weekly Goal 🔻	Over/Under 💌	
5	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	\$	15,000.00	\$ (312.500)	
6	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00	\$ (7,400.000)	7
7	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$	15,000.00	\$ 6,689.470	
8	George	Jackson	George _Jackson	\$	9,874.45	\$	15,000.00	\$ (5,125.550)	
9	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$	15,000.00	\$ (3,313.000)	
10	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00	\$ (9,311.000)	
11	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$	15,000.00	\$ (1,521.040)	
12	Steven	Stone	Steven_Stone	\$	12,346.87	\$	15,000.00	\$ (2,653.130)	
13	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$	15,000.00	\$ 10,478.450	
14	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$	15,000.00	\$ 1,785.140	
15									

You can also use structured references in formulas outside of a table. In the example below, there is a field to show the number of sales representatives who have not reached their weekly goal. You could use normal cell references to create this formula, but if the table gets larger or changes, the formula may no longer refer to the correct cells. Using structured references ensure that the calculation is always correct.

To continue with the example, to create this structured reference outside of a formula, you would first select cell H5, then use the COUNTIF function by typing "=COUNTIF(" in the Formula Bar:

IP	TMT =	× 🗸 j	countif(								
	А	В	COUNTIF(rang	je, c	riteria) D		E	F	G	Н	
1	Weekly	Sales & B	onus Payou	t							
2	Bonus Amount:	\$ 500.00									
3											
4	First Name 🔻	Last Name 🔻	ID 🔻		Weekly Sales 💌		Weekly Goal 🔻	Over/Under 🔽		Reps Under \$10K	
5	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	\$	15,000.00	\$ (312.500)		=COUNTIF(	
6	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00	\$ (7,400.000)			
7	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$	15,000.00	\$ 6,689.470			
8	George	Jackson	George _Jackson	\$	9,874.45	\$	15,000.00	\$ (5,125.550)			
9	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$	15,000.00	\$ (3,313.000)			
10	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00	\$ (9,311.000)			
11	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$	15,000.00	\$ (1,521.040)			
12	Steven	Stone	Steven_Stone	\$	12,346.87	\$	15,000.00	\$ (2,653.130)			
13	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$	15,000.00	\$ 10,478.450			
14	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$	15,000.00	\$ 1,785.140			
15											

For the range argument, select the column with the values you want to count (if they match the criteria argument). In this case you select the range D5:D14:

D	5 ▼ : × ✓ f <sub>x</sub> =COUNTIF(Sales[[Weekly Sales]]]													
					veenity sures III		1							
	A	В	COUNTIF(rang	je, cr	iteria) D		E		F	G	Н			
1	Weekly	Sales & B	onus Payou	It										
2	Bonus Amount:	\$ 500.00												
3														
4	First Name 🔻	Last Name 🔻	ID 💌		Weekly Sales 🔽		Weekly Goal 💌		Over/Under 🔽		Reps Under \$10K			
5	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	\$	15,000.00	\$	(312.500)		11			
6	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00	\$	(7,400.000)					
7	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$	15,000.00	\$	6,689.470					
8	George	Jackson	George _Jackson	\$	9,874.45	\$	15,000.00	\$	(5,125.550)					
9	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$	15,000.00	\$	(3,313.000)					
10	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00	\$	(9,311.000)					
11	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$	15,000.00	\$	(1,521.040)					
12	Steven	Stone	Steven_Stone	\$	12,346.87	\$	15,000.00	\$	(2,653.130)					
13	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$	15,000.00	\$	10,478.450					
14	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$	15,000.00	\$	1,785.140					
15														

Because the formula is outside of the table, the reference contains not only the column name (Weekly Sales), but also the table name (Sales), or "Sales[[Weekly Sales]]." To complete the formula, you would type a comma (,) to move to the next argument, then type a less than symbol, in parentheses ("<"), then an ampersand (&), then click on cell E5, and finally type a closing bracket and press **Enter**:



The formula calculates that seven sales representatives did not meet their weekly goal:

H5 • : X v fx =COUNTIF(Sales[[Weekly Sales]],"<" & Sales[@[Weekly Goal]])													
	А	В	с		D		Е		F	G	Н	1	
1	Weekly S	Sales & B	onus Payou	t									
2	Bonus Amount:	\$ 500.00											
3													
4	First Name 🔻	Last Name 🔻	ID 💌		Weekly Sales 💌		Weekly Goal 🔻		Over/Under 💌		Reps Under \$10K		
5	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	\$	15,000.00	\$	(312.500)		7		
6	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00	\$	(7,400.000)				
7	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$	15,000.00	\$	6,689.470				
8	George	Jackson	George _Jackson	\$	9,874.45	\$	15,000.00	\$	(5,125.550)				
9	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$	15,000.00	\$	(3,313.000)				
10	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00	\$	(9,311.000)				
11	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$	15,000.00	\$	(1,521.040)				
12	Steven	Stone	Steven_Stone	\$	12,346.87	\$	15,000.00	\$	(2,653.130)				
13	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$	15,000.00	\$	10,478.450				
14	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$	15,000.00	\$	1,785.140				
15													

Letting Excel define the structured reference, by selecting cells and ranges, greatly simplifies the process of using these formulas. The syntax is complicated, and can be confusing at first, but as you become more familiar with tables and structured references you will come to understand them better and appreciate their value in complex workbooks.

#### **Database Functions**

**Database** functions are similar to subtotal functions, in that they allow you to perform common operations on a specified subset of data. Unlike the subtotal function though, where the criteria is whether the data is hidden or not, database functions allow you to use criteria for the data in each column of your data set.

The syntax of a typical database functions is:

=DCOUNT(database,field,criteria)

Before creating a database function, you must first define the criteria you will be using somewhere within your workbook, using column names that exactly match the column names of your database. In the example below, we have created a range with all of the column names, but have only added criteria for the Quantity and Order Price columns:

4	Α		B	C		D	E	F	G	н	- I	
1	SKU	U	nit Price	Quantity	0	rder Price	Count					
2				<10		>200						
3												
4	SKU 🖵	Uni	t Price 💌	Quantit 💌	Oro	der Price 💌						
5	22	\$	45.00	8	\$	360.00						
6	36	\$	254.05	69	\$	17,529.45						
7	44	\$	22.00	8	\$	176.00						
8	44	\$	33.00	12	\$	396.00						
9	89	\$	99.30	64	\$	6,355.20						
10	126	\$	313.32	47	\$	14,726.04						
11	322	\$	275.32	35	\$	9,636.20						
12	554	\$	282.21	66	\$	18,625.86						
13	555	\$	236.47	87	\$	20,572.89						
14	573	\$	174.99	83	\$	14,524.17						
15	791	\$	353.78	70	\$	24,764.60						

To count the number of orders in the database where the quantity is less than 10 and the order price is greater than 200, first select the cell where you want to enter the function, then type "=DCOUNT(" in the Formula Bar:

IP	MT	-	: ×	✓ f <sub>x</sub>	=	DCOUNT(	-	-			
	А		В	С		DCOUNT(da	tabase, field, crit	eria) F	G	н	T
1	SKU	U	nit Price	Quantity	0	rder Price	Count				
2				<10		>200	=DCOUNT(				
3								Ī			
4	SKU 🖵	Uni	t Price 💌	Quantit 💌	Or	der Price 💌					
5	22	\$	45.00	8	\$	360.00					
6	36	\$	254.05	69	\$	17,529.45					
7	44	\$	22.00	8	\$	176.00					
8	44	\$	33.00	12	\$	396.00					
9	89	\$	99.30	64	\$	6,355.20					
10	126	\$	313.32	47	\$	14,726.04					
11	322	\$	275.32	35	\$	9,636.20					
12	554	\$	282.21	66	\$	18,625.86					
13	555	\$	236.47	87	\$	20,572.89					
14	573	\$	174.99	83	\$	14,524.17					
15	791	\$	353.78	70	\$	24,764.60					

To define the database argument, select the full range or table of data, or, to better understand structured references, you can start typing the table name and the Excel AutoComplete function suggests available table names. You can use the arrow keys to select the table and press Tab to apply it:

IPI	ЛТ	-	: ×	$\checkmark f_x$	=	DCOUNT(or					
	А		в	с		DCOUNT(da	tabase, field, crite	eria) F	G	н	I.
1	SKU	Ur	nit Price	Quantity	0	rder Price 🖉	OR :				
2				<10		>200	Orders (or				
3											
4	SKU 🖵	Uni	t Price 💌	Quantit 🔻	Ore	der Price 💌					
5	22	\$	45.00	8	\$	360.00					
6	36	\$	254.05	69	\$	17,529.45					
7	44	\$	22.00	8	\$	176.00					
8	44	\$	33.00	12	\$	396.00					
9	89	\$	99.30	64	\$	6,355.20					
10	126	\$	313.32	47	\$	14,726.04					
11	322	\$	275.32	35	\$	9,636.20					
12	554	\$	282.21	66	\$	18,625.86					
13	555	\$	236.47	87	\$	20,572.89					
14	573	\$	174.99	83	\$	14,524.17					
15	791	\$	353.78	70	\$	24,764.60					

To continue defining the table, type an open square bracket ([), then use the arrow keys to select [#All], press Tab to apply it, then type a closed square bracket (]). In structured references, this describes the entire contents of the table, including headings, data, and total rows:

IP	MT	Ŧ	: ×	✓ f <sub>×</sub>	-	=DCOUNT(C	orders	1												
	А		в	с		DCOUNT(d	atabas	e, field, crite	ria) 📈	1	G	н	1	J	К	L	м	N	0	P
1	SKU	U	nit Price	Quantity	C	Order Price	(	() sku												
2				<10		>200	Orde	() Unit Pr	ice											
3								()Quanti	ty											
4	SKU -	t Uni	it Price 💌	Quantit 🔻	Or	der Price 🔽		() Order	Price	Ret	urns the enti	ire contents	of the table	or specified	table colum	ns including	column her	derc data a	nd total row	-
5	22	Ś	45.00	8	Ś	360.00		#All #Data		Ket	uns the ent	ire contents	of the table,	of specified	table colum	ins including	columnite	suers, uata a	lu total low	-
6	36	Ś	254.05	69	Ś	17.529.45		#Head	ers											
7	44	Ś	22.00	8	Ś	176.00		#Totals												
8	44	Ś	33.00	12	Ś	396.00														
9	89	Ś	99.30	64	Ś	6,355.20														
10	126	\$	313.32	47	\$	14,726.04														
11	322	\$	275.32	35	\$	9,636.20														
12	554	\$	282.21	66	\$	18,625.86														
13	555	\$	236.47	87	\$	20,572.89														
14	573	\$	174.99	83	\$	14,524.17														
15	791	¢	252 78	70	¢	24 764 60														

Once you have entered a comma to move to the next argument, define the field argument by selecting the full column that contains the items you want to count, or, in the case of a table, you can click the table header, and Excel inserts the structured reference in the function:

A4		-	×	$\checkmark f_x$	=	DCOUNT(O	rders[#All] <mark>,Ord</mark>	ers[[i	#Header	s],[SKU]]	-	
	А		в	с		DCOUNT(da	tabase, <b>field</b> , crit	eria)	F	G	н	I.
1	SKU	Uni	t Price	Quantity	0	rder Price	Count					
2				<10		>200	ders],[SKU]]					
3												
4	SKU 🖵	Unit	Price 💌	Quantit 💌	Ore	der Price 💌						
5	22	\$	45.00	8	\$	360.00						
6	36	\$	254.05	69	\$	17,529.45						
7	44	\$	22.00	8	\$	176.00						
8	44	\$	33.00	12	\$	396.00						
9	89	\$	99.30	64	\$	6,355.20						
10	126	\$	313.32	47	\$	14,726.04						
11	322	\$	275.32	35	\$	9,636.20						
12	554	\$	282.21	66	\$	18,625.86						
13	555	\$	236.47	87	\$	20,572.89						
14	573	\$	174.99	83	\$	14,524.17						
15	791	\$	353.78	70	\$	24,764.60						

You would define the final argument, criteria, by selecting the cells that contain all of the column names and related criteria. In this example, select the range A1:D2, and finally, type a closed bracket to complete the function, then press **Enter**:

E2		-	: ×	$\checkmark f_x$	=	DCOUNT(O	rders[#All] <mark>,Ord</mark>	ers[[#Header	s],[SKU]] <b>,</b> A	1:D2)	-
	А		В	С		D	E	F	G	н	1
1	SKU	Ur	nit Price	Quantity	0	rder Price	Count				
2				<10		>200	A1:D2)				
3											
4	SKU 🖵	Uni	t Price 💌	Quantit 💌	Ore	der Price 💌					
5	22	\$	45.00	8	\$	360.00					
6	36	\$	254.05	69	\$	17,529.45					
7	44	\$	22.00	8	\$	176.00					
8	44	\$	33.00	12	\$	396.00					
9	89	\$	99.30	64	\$	6,355.20					
10	126	\$	313.32	47	\$	14,726.04					
11	322	\$	275.32	35	\$	9,636.20					
12	554	\$	282.21	66	\$	18,625.86					
13	555	\$	236.47	87	\$	20,572.89					
14	573	\$	174.99	83	\$	14,524.17					
15	791	Ś	353 78	70	Ś	24 764 60					

The function counts one order where the quantity is less than 10 and the order price is greater than 200:

	Α		В	С		D	E	F	G	Н	I.	
1	SKU	U	nit Price	Quantity	0	rder Price	Count					
2				<10		>200	1					
3												
4	SKU 🚽	Uni	t Price 💌	Quantit 💌	Ore	ler Price 💌						
5	22	\$	45.00	8	\$	360.00						
6	36	\$	254.05	69	\$	17,529.45						
7	44	\$	22.00	8	\$	176.00						
8	44	\$	33.00	12	\$	396.00						
9	89	\$	99.30	64	\$	6,355.20						
10	126	\$	313.32	47	\$	14,726.04						
11	322	\$	275.32	35	\$	9,636.20						
12	554	\$	282.21	66	\$	18,625.86						
13	555	\$	236.47	87	\$	20,572.89						
14	573	\$	174.99	83	\$	14,524.17						
15	791	\$	353.78	70	\$	24,764.60						

Now that the function has been created, changing the criteria in the criteria range changes the criteria for the function. In this example, changing the quantity to less than 50 shows that there are 10 orders in the dataset where the quantity is less than 50 and the order price is greater than 200:

	Α		В	С		D	E	F	G	Н	1
1	SKU	Ur	nit Price	Quantity	0	rder Price	Count				
2				<50		>200	10				
3											
4	SKU 🖵	Uni	t Price 💌	Quantit 💌	Ore	der Price 💌					
5	22	\$	45.00	8	\$	360.00					
6	36	\$	254.05	69	\$	17,529.45					
7	44	\$	22.00	8	\$	176.00					
8	44	\$	33.00	12	\$	396.00					
9	89	\$	99.30	64	\$	6,355.20					
10	126	\$	313.32	47	\$	14,726.04					
11	322	\$	275.32	35	\$	9,636.20					
12	554	\$	282.21	66	\$	18,625.86					
13	555	\$	236.47	87	\$	20,572.89					
14	573	\$	174.99	83	\$	14,524.17					
15	791	\$	353.78	70	\$	24,764.60					

Because the function is built to include criteria for all of the columns, you can set the criteria any way you like. In the below example, there are seven orders with a unit price of less than 100 and an order price of greater than 200:

	А		В	С		D	E	F	G	н	1
1	SKU	U	nit Price	Quantity	0	rder Price	Count				
2			<100			>200	7				
3											
4	SKU 🚽	Uni	t Price 💌	Quantit 💌	Ore	der Price 💌					
5	22	\$	45.00	8	\$	360.00					
6	36	\$	254.05	69	\$	17,529.45					
7	44	\$	22.00	8	\$	176.00					
8	44	\$	33.00	12	\$	396.00					
9	89	\$	99.30	64	\$	6,355.20					
10	126	\$	313.32	47	\$	14,726.04					
11	322	\$	275.32	35	\$	9,636.20					
12	554	\$	282.21	66	\$	18,625.86					
13	555	\$	236.47	87	\$	20,572.89					
14	573	\$	174.99	83	\$	14,524.17					
15	791	Ś	353.78	70	Ś	24.764.60					

Below is a table of the available database functions, giving you the flexibility to perform many common operations on a specified subset of your data:

DAVERAGE	Calculates the average of values in a field of a list or database, that satisfy
	specified conditions
DCOUNT	Returns the number of cells containing numbers in a field of a list or
	database that satisfy specified conditions
DCOUNTA	Returns the number of non-blank cells in a field of a list or database, that
	satisfy specified conditions
DGET	Returns a single value from a field of a list or database, that satisfies
	specified conditions
DMAX	Returns the maximum value from a field of a list or database, that satisfy
	specified conditions
DMIN	Returns the minimum value from a field of a list or database, that satisfy
	specified conditions
DPRODUCT	Calculates the product of values in a field of a list or database, that satisfy
	specified conditions
DSTDEV	Calculates the standard deviation (based on a sample of a population) of
	values in a field of a list or database, that satisfy specified conditions
DSTDEVP	Calculates the standard deviation (based on an entire population) of
	values in a field of a list or database, that satisfy specified conditions
DSUM	Calculates the sum of values in a field of a list or database, that satisfy
	specified conditions
DVAR	Calculates the variance (based on a sample of a population) of values in a
	field of a list or database, that satisfy specified conditions
DVARP	Calculates the variance (based on an entire population) of values in a field
	of a list or database, that satisfy specified conditions

#### **Converting to Range**

There may be times when you decide that using a table for your data is not the best option for your purposes. In these cases, it is simple to remove the table structure from your data.

To convert your table to a range, first select any cell within the table, then click **Table** Design → Convert to Range:



An information window appears asking you to confirm that you want to convert your table to a range. Click **Yes**:

Microsof	t Excel	Х
1	Do you want to convert the table to a normal ran	ge?
	Yes No	

The table features, such as the sort and filter arrows, are no longer available for this data, but the table style formatting, and the Total Row remain, and all structure references will be converted to cell references:

	A	В	С		D		E	F	G
1	Weekly S	Sales & B	onus Payou	t					
2									
3									
4	First Name	Last Name	ID	w	/eekly Sales	w	/eekly Goal		
5	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$	15,000.00		
6	George	Jackson	George _Jackson	\$	9,874.45	\$	15,000.00		
7	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$	15,000.00		
8	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$	15,000.00		
9	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$	15,000.00		
10	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00		
11	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	\$	15,000.00		
12	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00		
13	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$	15,000.00		
14	Steven	Stone	Steven_Stone	\$	12,346.87	\$	15,000.00		
15	Total		10	\$	13,931.68	\$	150,000.00		
16									
17									

### **Activity 3-3: Table References**

You have been asked to create a workbook to analyze the daily SKU sales, by SKU number, and by order type. To complete this task, you decide to use database functions with structured references.

**1.** To begin, open Activity 3-3 from your Exercise Files folder:



2. First select the table, then click **Table Design**, and type "**Daily\_Orders**" in the Table Name field:

	AutoSave 💽 🕅	<u> いくらく</u>		Activ	ity 3-3.xlsx 👻			O Search			
Fi	ile Home I	nsert Page Layo	out Form	ulas Data	Review \	/iew ⊢	lelp Ta	ble Design			
Tab Da ∙₽	Ie Name: illy_Orders Resize Table Properties	Summarize with Pivot Remove Duplicates Convert to Range Tools	Table Insert Slicer	Export Refresh	Properties Open in Br Unlink Mal Table Data	owser	<ul> <li>✓ Header I</li> <li>Total Ro</li> <li>✓ Banded</li> </ul>	Row Fi w Li Rows B Table	irst Column ast Column anded Colu e Style Optic	✓ Filmons	lter Button
C	•	$\times \checkmark f_x$	163								
	А	В	С	D	E		F	G	н	I.	J
1	<b>Daily SKU</b>	Sales									
2	-										
3	Order Type	SKU No.		Count	Total Sale						
4											
5	Ordor Numbo	Ordor Typo	SVII -		Quantity	Ordor D	rico 💌				
7	387124	Phone	2889	\$ 12.97	14	Ś	181.58				
8	387129	Phone	0163	\$ 14.16	17	\$	240.72				
9	387132	Online	0406	\$ 25.10	20	\$	502.00				
10	387137	Online	3364	\$ 47.39	14	\$	663.46				
11	387142	Phone	0671	\$ 20.74	11	Ś	228.14				

3. Press Enter to update the table name, then select cell D4 and type "=DCOUNT(" in the Formula Bar:

PN	TT T	X 🖌 f <sub>x</sub>	=DCOUNT(							
	А	В	DCOUNT	(databa	<b>ise</b> , field, crit	teria) E		F	G	н
1	<b>Daily SKU</b>	Sales								
2										
3	Order Type	SKU No.		(	Count	Total Sale				
4				=DCC	DUNT(					
5										
6	Order Numbe 💌	Order Type 💌	SKU 💌	Unit	Price 💌	Quantity 🔻	Ord	er Price 🛛 💌		
7	387124	Phone	2889	\$	12.97	14	\$	181.58		
8	387129	Phone	0163	\$	14.16	17	\$	240.72		
9	387132	Online	0406	\$	25.10	20	\$	502.00		
10	387137	Online	3364	\$	47.39	14	\$	663.46		
11	387142	Phone	0671	\$	20.74	11	\$	228.14		

4. Now begin typing the table name, "Daily\_Orders" to display table name suggestions:

P	: TN	$\times \checkmark f_x$	=DCOUNT	(da						
	А	В	DCOUNT	(datab	ase, field, crite	eria) E		F	G	н
1	<b>Daily SKU</b>	Sales			ailly_Orders ATE					
2				٥	ATEVALUE					
3	Order Type	SKU No.		<u>@</u> □	AVERAGE	Total Sale				
4				(B)D	AY					
5				G	AYS360					
6	Order Numbe 💌	Order Type 💌	SKU 🔽	Uni	t Price 💌	Quantity 💌	Ord	er Price 🛛 💌		
7	387124	Phone	2889	\$	12.97	14	\$	181.58		
8	387129	Phone	0163	\$	14.16	17	\$	240.72		
9	387132	Online	0406	\$	25.10	20	\$	502.00		
10	387137	Online	3364	\$	47.39	14	\$	663.46		
11	387142	Phone	0671	\$	20.74	11	\$	228.14		
				1 A		-	-			

5. With the Daily\_Orders table highlighted, press **Tab** to accept the suggestion:

PN	T T	$X \checkmark f_x$	=DCOUNT(	Dailly_Orders	←			
	А	В	DCOUNT	database, field, cri	teria) E	F	G	н
1	<b>Daily SKU</b>	Sales						
2								
3	Order Type	SKU No.		Count	Total Sale			
4				y_Orders				
5								
6	Order Numbe 💌	Order Type 💌	SKU 💌	Unit Price 🔽	Quantity 💌	Order Price 🛛 💌		
7	387124	Phone	2889	\$ 12.97	14	\$ 181.58		
8	387129	Phone	0163	\$ 14.16	17	\$ 240.72		
9	387132	Online	0406	\$ 25.10	20	\$ 502.00		
10	387137	Online	3364	\$ 47.39	14	\$ 663.46		
11	387142	Phone	0671	\$ 20.74	11	\$ 228.14		
4.5	207146	Dia ana	0775	ć 10.00	0	6 104.00		

6. Next, type an open square bracket ([) to show suggestions for table elements. Use the arrow key to select "#All" from the list, then press **Tab** to accept:

PN	/T * TN	$\times \checkmark f_{\rm X}$	=DCOUNT	[Dailly_Orders]	1										
	А	В	DCOUNT	(database, field, o	riteria) E	F	G	н	1.1	J.	к	L	м	N	0
1	<b>Daily SKU</b>	Sales			@ - This Row () Order Number										
2					() Order Type										
3	Order Type	SKU No.		Count	() SKU										
4				y_Orders[	() Unit Price										
5					( ) Quantity										
6	Order Numbe 💌	Order Type 💌	SKU 💌	Linit Drico	All	Returns the enti	re contents (	of the table, (	or specified	table colum	ns including	column hea	ders, data ar	nd total rows	1
7	387124	Phone	2889	\$ 12.97	#Data	181.58									
8	387129	Phone	0163	\$ 14.16	#Headers	240.72									
9	387132	Online	0406	\$ 25.10	#Totals	502.00									
10	387137	Online	3364	\$ 47.39	14 \$	663.46									
11	387142	Phone	0671	\$ 20.74	11 \$	228.14									
10	207146	Dhana	0775	ć 10.00	0 6	164.00									

7. You can now type a closed square bracket (]) and a comma (,) to complete the database argument:

PN	MT $\checkmark$ : $\checkmark$ $\checkmark$ $f_{\star}$ =DCOUNT(Dailly_Orders[#All],									
	А	В	DCOUNT	(datal	oase, <b>field</b> , crit	eria) E		F	G	н
1	<b>Daily SKU</b>	Sales								
2										
3	Order Type	SKU No.			Count	Total Sale				
4				,						
5										
6	Order Numbe 💌	Order Type 💌	SKU 💌	Un	it Price  💌	Quantity 💌	Order	Price 🔹		
7	387124	Phone	2889	\$	12.97	14	\$	181.58	:	
8	387129	Phone	0163	\$	14.16	17	\$	240.72	2	
9	387132	Online	0406	\$	25.10	20	\$	502.00	)	
10	387137	Online	3364	\$	47.39	14	\$	663.46	i .	
11	387142	Phone	0671	\$	20.74	11	\$	228.14	L .	
10	207146	Dia	0775	6	10.00	0	<i>è</i>	104.00		

**8.** To define the field argument, click the table header "**Order Number**." Excel enters the structured reference automatically:

A	A6 • : × • fx =DCOUNT(Dailly_Orders[#All],Dailly_Orders[[#Headers],[Order Number]]									
	А	В	DCOUNT	(datab	ase, <b>field</b> , crit	teria) E		F	G	н
1	<b>Daily SKU</b>	Sales								
2										
3	Order Type	SKU No.			Count	Total Sale				
4				der	Number]]					
5										
6	Order Numbe 💌	Order Type 💌	SKU 💌	Uni	it Price  💌	Quantity 💌	Orde	er Price 🔷 💌		
7	387124	Phone	2889	\$	12.97	14	\$	181.58		
8	387129	Phone	0163	\$	14.16	17	\$	240.72		
9	387132	Online	0406	\$	25.10	20	\$	502.00		
10	387137	Online	3364	\$	47.39	14	\$	663.46		
11	387142	Phone	0671	\$	20.74	11	\$	228.14		
12	387146	Phone	0775	Ś	18.32	9	Ś	164.88		

**9.** To define the criteria argument, and complete the formula, first type a comma (,) to move to the next argument, then select the range **A3:B4**:

A3	s → ÷	$\times \checkmark f_x$	=DCOUNT(	Dailly_	Orders[#	All],Dailly_Or	ders[	[#Headers],[O	rder Num	ber]],A3:B4		-
	А	В	DCOUNT(	databas	e, field, <b>cri</b> t	teria) E		F	G	н	1	
1	<b>Daily SKU</b>	Sales										
2												
3	Order Type	SKU No.		С	ount	Total Sale						
4				4								
5												
6	Order Numbe 💌	Order Type 💌	SKU 💌	Unit	Price 💌	Quantity 🔻	Ord	er Price 🛛 💌				
7	387124	Phone	2889	\$	12.97	14	\$	181.58				
8	387129	Phone	0163	\$	14.16	17	\$	240.72				
9	387132	Online	0406	\$	25.10	20	\$	502.00				
10	387137	Online	3364	\$	47.39	14	\$	663.46				
11	387142	Phone	0671	\$	20.74	11	\$	228.14				
12	387146	Phone	0775	Ś	18 32	9	Ś	164.88				

10. Press the F4 key to make this an absolute reference, then press Enter:

A3	•	$\times \checkmark f_x$	=DCOUNT(	Dailly_Orders[	#All],Dailly_Or	ders[[#Headers],[C	rder Numb	<b>per]],\$A\$</b> 3	:\$B\$4 🔫	
	А	В	DCOUNT(	database, field, c	riteria) E	F	G	н	- I	J
1	<b>Daily SKU</b>	Sales								
2										
3	Order Type	SKU No.		Count	Total Sale					
4				\$A\$3:\$B\$4						
5										
6	Order Numbe 🔻	Order Type 💌	SKU 💌	Unit Price	🔹 Quantity 💌	Order Price 🛛 💌				
7	387124	Phone	2889	\$ 12.97	14	\$ 181.58				
8	387129	Phone	0163	\$ 14.16	i 17	\$ 240.72				
9	387132	Online	0406	\$ 25.10	20	\$ 502.00				
10	387137	Online	3364	\$ 47.39	14	\$ 663.46				
11	387142	Phone	0671	\$ 20.74	11	\$ 228.14				

**11.** You will see that the formula returns the value 99, as there are 99 rows in the table, and no criteria have been entered:

	А	В	С	D	E	F	G	Н
1	<b>Daily SKU</b>	Sales						
2								
3	Order Type	SKU No.		Count	Total Sale			
4				99 🗲				
5								
6	Order Numbe 💌	Order Type 💌	SKU 💌	Unit Price 🔽	Quantity 🔻	Order Price 🛛 💌		
7	387124	Phone	2889	\$ 12.97	14	\$ 181.58		
8	387129	Phone	0163	\$ 14.16	17	\$ 240.72		
9	387132	Online	0406	\$ 25.10	20	\$ 502.00		
10	387137	Online	3364	\$ 47.39	14	\$ 663.46		
11	387142	Phone	0671	\$ 20.74	11	\$ 228.14		

- D G H в с Е **Daily SKU Sales** 1 2 3 **Total Sale** Order Tvr Count 4 Online 50 5 6 Order Numbe Order Type 💌 SKU 💌 Unit Price 💌 Quantity Order Price 387124 2889 181.58 7 Phone 12.97 14 Ś Ś 8 387129 Phone 0163 Ś 14.16 17 Ś 240.72 387132 502.00 9 Online 0406 Ś 25.10 20 \$ 10 387137 Online 3364 \$ 47.39 14 \$ 663.46 11 387142 Phone 0671 20.74 11 \$ 228.14 Ś
- **12.** Now type "**Online**" in cell **A4**. You will see that 50 of the order types were Online:

**13.** Type the SKU number "**0406**" in cell **B4**. While you would expect the count value to change, it has not:

	А	В	С	D	E	F	G	Н	
1	<b>Daily SKU</b>	Sales							
2									
3	Order Type	SKU No.		Count	Total Sale				
4	Online	0406		50 ┥					
5									
6	Order Numbe 💌	Order Type 💌	SKU 💌	Unit Price 💌	Quantity 💌	Order Price 🛛 💌			
7	387124	Phone	2889	\$ 12.97	14	\$ 181.58			
8	387129	Phone	0163	\$ 14.16	17	\$ 240.72			
9	387132	Online	0406	\$ 25.10	20	\$ 502.00			
10	387137	Online	3364	\$ 47.39	14	\$ 663.46			
11	387142	Phone	0671	\$ 20.74	11	\$ 228.14			

14. This is because the heading in cell B3, "SKU No.", does not match the column name in your table. Change the text in cell B3 to "SKU" to match the column name. Now you will see that the count value has changed:

	А	В	С	D	E	F	G	Н
1	<b>Daily SKU</b>	Sales						
2								
3	Order Type	SKU		Count	Total Sale			
4	Online	0406		2 ┥				
5								
6	Order Numbe 💌	Order Type 💌	SKU 💌	Unit Price 🔄	Quantity 💌	Order Price 🖉 💌		
7	387124	Phone	2889	\$ 12.97	14	\$ 181.58		
8	387129	Phone	0163	\$ 14.16	17	\$ 240.72		
9	387132	Online	0406	\$ 25.10	20	\$ 502.00		
10	387137	Online	3364	\$ 47.39	14	\$ 663.46		
11	387142	Phone	0671	\$ 20.74	11	\$ 228.14		

15. You can now select cell E4 and follow the same steps, but this time use the DSUM function and use the table header "Order Price" for the field argument:

=DSUM(Dailly\_Orders[#All],Dailly\_Orders[[#Headers],[Order Price]],\$A\$3:\$B\$4)

E4		$\times \checkmark f_x$	=DSUM(Da	=DSUM(Dailly_Orders[#All],Dailly_Orders[[#Headers],[Order Price]],\$A\$3:\$B\$4)						
	А	В	С	D	E	F	G	н	I.	
1	<b>Daily SKU</b>	Sales								
2										
3	Order Type	SKU		Count	Total Sale					
4	Online	0406		2	\$ 978.90					
5										
6	Order Numbe 🔻	Order Type 💌	SKU 💌	Unit Price 💌	Quantity 💌	Order Price 🛛 💌				
7	387124	Phone	2889	\$ 12.97	14	\$ 181.58				
8	387129	Phone	0163	\$ 14.16	17	\$ 240.72				
9	387132	Online	0406	\$ 25.10	20	\$ 502.00				
10	387137	Online	3364	\$ 47.39	14	\$ 663.46				
11	387142	Phone	0671	\$ 20.74	11	\$ 228.14				

**16.** You will now see the sum of orders where SKU 0406 had an order type of Online:

 Save the current workbook as Activity 3-3 Complete and then close Microsoft 365 Excel to complete this exercise.

# Summary

In this lesson you learned how to organize your worksheet data with tables. You can now create, format, and modify tables. You can also use structured references, as well as the subtotal and database functions. Taking advantage of all these tools will enable you to learn more about your data than ever before.

### **Review Questions**

- 1. What is the command sequence to add a table?
- 2. How do you add a Total Row to a table?
- 3. What type of functions do Total Rows use by default?
- 4. How can you remove duplicate values from a table?
- 5. When you convert a table to a range, what happens to the structured references?

# LESSON 4: VISUALIZING DATA WITH CHARTS

### **Lesson Objectives**

In this lesson you will learn how to:

- Create charts
- Modify and format existing charts
- Create a trendline
- Create advanced charts

## **TOPIC A: Create Charts**

Charts are an enormous help when people do not have time to study the data and only need a brief overview of the relevant information. In this topic, you will learn how to create charts of different types, using different methods in Excel 365.

### **Topic Objectives**

In this session, you will learn:

- About charts
- About chart types
- How to insert a chart
- How to resize and move a chart
- How to add additional data
- How to switch between rows and columns

#### Charts

**Charts** are graphical representations of data and relationships in a dataset. They are commonly used in situations where viewers need to be able to quickly interpret data, without having to take a close look at the worksheet itself.

For example, here you can immediately see on this chart that Division A generates the vast amount of sales within the organization, while Division D generates the least:



### **Chart Types**

There are many different chart types to choose from, each tailored to display specific types of data. To further customize their appearance, each chart type then has even more sub-types from which to choose. All of these chart types and sub-types are accessed using the **Insert Chart** or **Change Chart Type** dialog boxes. To open the Insert Chart dialog box, click the **Insert** tab and click the **option button** (<sup>III</sup>) in the Charts group while the dataset that you would like to represent is selected:



Alternatively, you can click Insert → [Any Chart Category] → All Chart Types.

The **Insert Chart** dialog box consists of two tabs – **Recommended Charts** and **All Charts**. The Recommended Charts tab are displayed by default and suggest a few chart types that best fit the data that you are trying to represent. Usually, there a few options to choose from with the top-most option being the most recommended one:

Insert Chart						?	×
Recommended Charts All Charts							
Chart Title	Clustered Co	olumn					
	\$900,000,000.00 \$800,000,000.00 \$700,000,000.00 \$600,000,000.00 \$500,000,000.00 \$400,000,000.00 \$300,000,000.00		Chart T	ītle			
+1 +1 +2 +0 +1	\$200,000,000.00 \$100,000,000.00						
	S- A clustered colur Use it when the	A nn chart is order of ca	B used to cor itegories is i	c mpare valu not import	D es across a fe ant.	e w categor	ies.
				[	OK	Car	ncel

The **All Charts** tab displays a list of primary chart types on the left, with a gallery of subtypes on the right:



Below is a breakdown of each chart type that is available and what data each type is best suited to display:

Column	Best suited to display data changes over time or to compare separate data points.
Line	Typically used to display data changes over a period of time.
Pie	Used to compare different data points in relation to a total. For example, you could use this chart type to show the total expenses of a company broken down by department.
Doughnut	Like a pie chart, doughnut charts show the relationship of parts to a whole, but unlike pie charts, they can show more than one data series, one within another.
Bar	Typically, this chart type is used to compare different data points. It is similar to the Column chart type, but instead has the X-axis as the vertical axis and the Y-axis as the horizontal axis.
Area	This chart type is typically used to illustrate rates of change over a period of time, as well as include the total value in a trend.
XY (Scatter)	Used to illustrate values from a variety of different trends and their relationship to one another.
Bubble	Similar to an xy (scatter) chart, a bubble chart offers an additional axis to define the size of a data point.
Stock	As the name implies, this chart type is designed to show data fluctuations in a stock market.
Surface	While more complex than other options, this chart type is used to find favorable patterns between two separate data sets.
Radar	This chart type is used to compare values from multiple data sets all on the same chart with each separate data (category) on a separate axis. Typically, this chart type is best suited to identify outliers and commonalities between data points.
Treemap	This chart type is designed to display hierarchical data through nested rectangles. Each branch of the tree is shown as a rectangle which is then tiled with smaller rectangles that show sub-branches.
Sunburst	Displays data hierarchy as a series of rings where each ring represents the children of the ring it encloses.
------------------	---
Histogram	A column chart that is designed to show frequency data.
Box & Whisker	Also known as a box plot, this chart type is designed to depict groups of numerical data as boxes on the chart. These boxes also have a line that extends from each end (whiskers) that are used to describe upper and lower quartiles.
Waterfall	Sometimes referred to as a flying bricks chart or a Mario chart, this chart type represents data through a series of columns that are suspended in mid-air. These are typically used to understand how an initial value (e.g. sales revenue) is affected by positive or negative values (e.g. staff costs).
Funnel	Displays the values over multiple stages in a process, where the values decrease between stages, allowing the bars to resemble a funnel.
Combo	This type of chart combines the features of the bar chart and the line chart. Typically, this type of chart is useful if you need to compare values in different categories.
Мар	Used to show categories and compare values across geographical regions, including countries, regions, states, counties, or postal codes.

### **Chart Insertion Methods**

When inserting a new chart into a worksheet, you should always select the dataset that you would like represented. If you select only one cell within the dataset in question, Excel automatically tries to guess the data range that you are trying to represent. While this is a good idea in theory, in practice this feature does not always work as intended.

Additionally, when you are inserting charts remember to include the row or column header when selecting the dataset. This ensures that categories that you want plotted along the X axis of the chart are your column labels from the dataset and the data series are row labels. Once the data set, including labels, is selected, you can then insert a chart using one of several options. The most direct way is to use the commands inside the Charts group of the Insert tab. However, you can also use the Insert Chart dialog box, or insert the most recommended chart type for the selected data using keyboard shortcuts.

If you would like the most recommended chart type to be inserted onto the same worksheet, you would press **Alt + F1.** If you want the default chart type to be inserted into a new worksheet, press **F11.** 

### **Resizing and Moving the Chart**

Once a chart has been added to a worksheet, you are able to **resize** and **move** the chart around as you wish. To move a chart, click to select the chart and then drag it to its new destination. Release your mouse button to place it there:



To resize the overall size of a chart, first click to select it. Next, click the **Format** contextual tab and examine the **Size** group. Inside of this group you are able to enter the exact height and width of the chart:

AutoSave 💽 🛱 🏷 Y - 🔿 🔻	Book1 - Excel			Jane Gibson 🧔 🖬	– 🗆 ×
File Home Insert Page Layout Formulas	Data Review View Help	Chart Design Format		년 Sha	are 🖓 Comments
Chart Area     ✓	Abc Abc Abc Abc	Abc Abc ♥ Abape Fill ♥ ♥ ♥ ♥ Abape Outline ♥ ♥ ♥ Abape Effects ♥	A Text Fill ~ A Text Outline ~ A Text Effects ~ Alt Text	Bring Forward V PAlign V Send Backward V Group V Selection Pane Rotate V	\$∏ 4.24°      \$
Current Selection Insert Shapes	Shape Styles	rs.	WordArt Styles Ts Accessibility	Arrange	Size 🗔 🔨

Alternatively, you can resize a chart using the **resize handles** that appear on each of its sides and corners while it is selected:



To use these handles, click and drag them in the direction in which you want the chart enlarged or made smaller. Using the handles on the sides you can modify the chart size in one direction (horizontal and vertical), while the corner resize handles allow you to resize the chart size in both directions at the same time. You can also find some resize options in the Format Chart Area task pane, in the Size and Properties section:

Format Chart Are Chart Options  Text Opt	a 🔻	×
▲ Size		
H <u>e</u> ight	4.24*	Ŷ
Wi <u>d</u> th	6.22*	Ŷ
Ro <u>t</u> ation		Û
Scale <u>H</u> eight	100%	Ŷ
Scale <u>W</u> idth	100%	ŷ
Lock <u>a</u> spect ratio		
Relative to original pict	ture size	
Properties		

Included are both the **Height** and **Width** increment boxes, as well as options to adjust the height and width scaling. You would use the scaling options if you would like to decrease the size of your chart by half (50%) or increase it by half (150%). You will also find the **Lock aspect ratio** check box. For example, when checked this prevents your chart from getting skewed when you try to change only the height but not the width.

### **Adding Additional Data**

Once a chart has been created, the data that it represents does not have to be static. You can add or remove information from the data range and have the chart represent these changes instantaneously. To do this, first click to select the chart. While the chart is selected, you will see that the associated data range appears outlined and shaded on the worksheet:



**Clicking and dragging the resize handles** for these outlines lets you choose which data you would like to include in the chart. For example, if you want to include the additional line of information shown in the example above, you would click and drag the resize handle downwards:

	Α	В	
1	A	\$786,000,000.00	
2	В	\$122,000,000.00	
3	С	\$ 56,000,000.00	
4	D	\$ 12,000,000.00	
5	E	\$ 49,000,000.00	
6	F	\$ 52,000,000.00	
7		ý l	

Once the range area has been successfully resized, the new data is immediately incorporated into the chart. In this case you can see that F is now represented:



### **Switching Between Rows and Columns**

Occasionally, with some chart types, you may find the need to switch between rows and columns so that your chart represents the data more clearly. In the example below, the chart is displaying SKU sales by month, but the columns are grouped by the SKU number, and each column in the group represents a month in the quarter. You would prefer to group the data by month, and have each column in the group represent a SKU. To quickly make this change, first select your chart, then click **Chart Design**  $\rightarrow$  **Select Data:** 



This action displays the **Select Data Source** dialog box. Click the **Switch Row/Column** button to make the month the horizontal axis:

Select Data Source	?	×
Chart data range: =Sheet2!SAS2:SDS5		Ţ
Legend Entries (Series) Horizonta Switch All Values Edit Kemove		
January 1285		
February 456		
March 🗹 1345		
Hidden and Empty Cells OK	Ca	ncel



### Clicking the **OK** button applies the new changes and they are represented in the chart:

### **Activity 4-1: Creating Charts**

You need to produce a chart that easily demonstrates to your supervisor which salesperson made the most sales in week 1.

**1.** To begin, open Activity 4-1 from your Exercise Files folder:



Activity 4-1.xlsx Microsoft Excel Worksheet 11.7 KB

First, you need to select the dataset with which you would like to work. Use your cursor to select cells C4:C14 and E4:E14. Remember to hold the Ctrl key down when selecting non-adjacent cell ranges:

	Α	В	С	D	E	F	G	Н
1	Week	ly Sales	& Bonus Pa	yout				
2								
3								
4	Week 🔻	First Nam 💌	Last Name 💌	ID 💌	Weekly Sales 🔻	Weekly Goa 🔻	Bonu 🔻	
5	1	Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$ 15,000.00	\$500.00	
6	1	Lucas	Bressan	Lucas_Bressan	\$ 14,687.50	\$ 15,000.00	\$ -	
7	1	Stanley	Prestwick	Stanley_Prestwick	\$ 13,478.96	\$ 15,000.00	\$-	
8	1	Jerry	Harrison	Jerry_Harrison	\$ 21,689.47	\$ 15,000.00	\$500.00	
9	1	Leah	Thompson	Leah_Thompson	\$ 25,478.45	\$ 15,000.00	\$ 500.00	
10	1	Robyn	Fletcher	Robyn_Fletcher	\$ 7,600.00	\$ 15,000.00	\$-	
11	1	Lisa	McCain	Lisa_McCain	\$ 5,689.00	\$ 15,000.00	\$-	
12	1	Steven	Stone	Steven_Stone	\$ 12,346.87	\$ 15,000.00	\$ -	
13	1	Devon	Lawrence	Devon_Lawrence	\$ 11,687.00	\$ 15,000.00	\$ -	
14	1	George	Jackson	George _Jackson	\$ 9,874.45	\$ 15,000.00	\$ -	
15								
8 9 10 11 12 13 14 15	1 1 1 1 1 1 1	Jerry Leah Robyn Lisa Steven Devon George	Harrison Thompson Fletcher McCain Stone Lawrence Jackson	Jerry_Harrison Leah_Thompson Robyn_Fletcher Lisa_McCain Steven_Stone Devon_Lawrence George_Jackson	\$ 21,689.47 \$ 25,478.45 \$ 7,600.00 \$ 5,689.00 \$ 12,346.87 \$ 11,687.00 \$ 9,874.45	\$ 15,000.00 \$ 15,000.00 \$ 15,000.00 \$ 15,000.00 \$ 15,000.00 \$ 15,000.00 \$ 15,000.00	\$ \$ \$ \$ \$ \$ \$	500.00 500.00 - - - - -

3. Next, click Insert → Insert Column or Bar Chart → Clustered Column:



**4.** The new chart now appears on the current worksheet, overlapping some of the data:

1	А	В	С	D	E	F	G	н	I.	J	K	L	М
1	Week	ly Sales	& Bonus Pa	yout					Weekly Bonus Amount				
2									\$ 500.00				
3													
4	Week 🔻	First Nam 💌	Last Name 💌	ID 🔻	Weekly Sales 🔻	Weekly Goa 🔻	Bonu 🔻						
5	1	Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$ 15,000.00	\$ 500.00						
6	1	Lucas	Bressan	Lucas_Bressan	\$ 14,687.50	\$ 15,000.0			0				9
7	1	Stanley	Prestwick	Stanley_Prestwick	\$ 13,478.96	\$ 15,000.00			Weekly Sales				
8	1	Jerry	Harrison	Jerry_Harrison	\$ 21,689.47	\$ 15,000.00	\$30,000.00						1
9	1	Leah	Thompson	Leah_Thompson	\$ 25,478.45	\$ 15,000.00							
10	1	Robyn	Fletcher	Robyn_Fletcher	\$ 7,600.00	\$ 15,000.00	\$25,000.00						$\nabla$
11	1	Lisa	McCain	Lisa_McCain	\$ 5,689.00	\$ 15,000.00	\$20,000.00						
12	1	Steven	Stone	Steven_Stone	\$ 12,346.87	\$ 15,000.00	CAE 000 00						
13	1	Devon	Lawrence	Devon_Lawrence	\$ 11,687.00	\$ 15,000.00	\$15,000.00				_		0
14	1	George	Jackson	George Jackson	\$ 9,874.45	\$ 15,000.00	\$10,000.00	_					
15							CE 000 00						
16							\$3,000.00						
17							S-						
18								1501 053	with son oson the	Carr	tone ence	HEOR	
19							A	lig. Buc	press Hat. Though the	the star	Bur 1	30	
20													-
21													

5. Click and drag this chart to a location on the worksheet where it is not overlapping anything:

	Α	В	С		E		F	G	3 H I			K	
1	Week	ly Sales	& Bonus Pa	yout							Weekly Bonus Amoun	t	
2		-		-							\$ 500.00	,	
3													
4	Week 🔻	First Nam 🔻	Last Name 🔻	ID 🝷	w	eekly Sale 👻	w	eekly Goa 🔻	Bonu 🔻				
5	1	Jackie	Williamson	Jackie_Williamson	\$	16,785.14	\$	15,000.00	\$ 500.00				
6	1	Lucas	Bressan	Lucas_Bressan	\$	14,687.50	\$	15,000.00	\$ -				
7	1	Stanley	Prestwick	Stanley_Prestwick	\$	13,478.96	\$	15,000.00	\$ -				
8	1	Jerry	Harrison	Jerry_Harrison	\$	21,689.47	\$	15,000.00	\$ 500.00				
9	1	Leah	Thompson	Leah_Thompson	\$	25,478.45	\$	15,000.00	\$500.00				
10	1	Robyn	Fletcher	Robyn_Fletcher	\$	7,600.00	\$	15,000.00	\$ -				
11	1	Lisa	McCain	Lisa_McCain	\$	5,689.00	\$	15,000.00	\$-				
12	1	Steven	Stone	Steven_Stone	\$	12,346.87	\$	15,000.00	\$ -				
13	1	Devon	Lawrence	Devon_Lawrence	\$	11,687.00	\$	15,000.00	\$ -				
14	1	George	Jackson	George _Jackson	\$	9,874.45	\$	15,000.00	\$ -				
15		0											
16								0					
17				Weekly Sale	S	+	4						
18		\$30,0	000.00				43						
19		\$25	000.00										
20		V2.5,	000.00						7				
21		\$20,	000.00										
22		\$15.0	000.00										
23		0.1						0					
24		\$10,0	000.00		_								
25		\$5,1	000.00										
26													
27				A & A	d.	S	,e	£					
28			uanso aresse as	with marrison ampson cletch		Car Stoll with	en	130 <sup>450</sup>					
29			MIL. Pro	4. 440. E.		\$°		,					
30		Ó		0				Ó					
31		Chart1		1						1			
		aneet1	Ū										

- 0 Weekly Sales \$30,000.00 \$25,000.00 \$20,000.00 \$15,000.00 \$10,000.00 \$5,000.00 S-Lawrence Williamson Prestwict Harrison Thompson Fletcher McCain Bressan Jackson Stone
- **6.** Examine the new chart. You will quickly see that Thompson made the most sales in week 1, with Harrison as the next runner up. McCain clearly has some work to do:

**7.** Save the current workbook as Activity 4-1 Complete and then close Microsoft 365 Excel to complete this exercise.

## **TOPIC B: Modify and Format Charts**

Charts can be added quickly and easily using the default chart configurations, but sometimes those configurations are not ideal for your requirements. In such cases, you will need to know how to modify your chart to include more or less data, display or hide elements, and apply formatting.

### **Topic Objectives**

In this session, you will learn:

- About modification vs. formatting
- About chart elements
- Guidelines for including chart elements
- About the Chart contextual tabs
- About formatting the chart with a style
- How to add a legend to the chart

### The Difference Between Modifying and Formatting

While modifying and formatting charts sound like the same thing, they are actually different in this context. When you choose to **modify** a chart, you are changing the various elements that are used to illustrate the data. For example, adding or removing chart elements or changing the chart type would be considering modifying a chart.

**Formatting** is the process of altering the overall appearance of the chart. This includes changing the chart's colors, fonts, and/or size. For example, if you need to change a chart to incorporate your organization's branding rules, you would be formatting it.

## **Chart Elements**

**Chart elements** are the individual pieces of the chart that come together to create it. There will always be at least one chart element present in a chart, but the combination of chart elements largely depends on the chart type. Here is a sample column chart:



The above chart contains six chart elements: Chart Title (1), Gridlines (2), Data series (3), Legend (4), Data table (5), and Axis Titles (6).

Note that elements differ for each individual chart.

### **Minimize Extraneous Chart Elements**

When modifying charts, you can have a significant impact on how and what information is conveyed. Because of this, it is best to keep your charts as simple as possible. This allows the data to speak for itself without cluttering it with extraneous information that the chart was trying to simplify in the first place. However, there are some instances where chart elements can help add meaning and context to the information being displayed. For example, the legend can be helpful when you are dealing with multiple sets of data, but less so when you are working with only one dataset.

### The Chart Contextual Tabs

When a chart is selected in the worksheet, the **Chart Design** and **Format** contextual tab sets will become available on the ribbon.

#### The Chart Design Tab



The Chart Design tab includes commands to change the overall appearance of the selected chart. This includes things such as adding and removing chart elements, changing the chart layout, colors, and applying chart styles. Additionally, this tab gives you access to commands to change the chart's dataset range and switch row and column data. The Type group contains a command to change the chart type, while the Location group contains a command that is used to move charts between worksheets in the current workbook.

#### The Format Tab



On the Format tab, the Current Selection controls allow you to select individual chart elements to edit, as well as access the Format Selection dialog box. Shape styles can be applied and configured using the commands in the Shape Styles group. The WordArt Styles group is used to configure and format chart text. Inside the Arrange group you will see controls to change the layered order of elements on a chart, as well as change the orientation of selected chart elements. Finally, the Size group is used to view and change the overall size of the currently selected chart.

### Formatting the Chart with a Style

**Chart styles** are used to slightly adjust how a chart is arranged without changing the primary color scheme. This is excellent for adding visual flair to your chart and on occasion a new chart style can also help a chart's readability.

To format a chart with a style, first click to select the chart and then click **Chart Design**. Examine the Chart Styles group and you will see a gallery of different chart styles that you can choose from:



Move your cursor over these chart styles and you will see a preview of how these styles look once applied to your chart. Clicking on a style applies it:



 $\cap$ 0 **Divisional Sales Figures** • A • B • C • D • E • F \$900.000.000.00 \$786,000,000.00 \$800,000,000.00 \$700,000,000.00 \$600,000,000.00 Sales \$500,000,000.00 otal \$400,000,000.00 \$300,000,000.00 \$200,000,000.00 \$122,000,000.00 \$100,000,000.00 \$56,000,000.00 \$52,000,000.00 \$49,000,000.00 \$12,000,000.00 S-А В

You can also find these styles by clicking the Chart Styles button that appears to the top right of a selected chart:

#### This button displays a scrolling menu of the same chart styles that you can select from:

С

Divisions

D

Ε

F



### Adding a Legend to the Chart

When working with charts, **legends** can be very important to the understanding of the data that a chart is trying to convey. While legends are usually displayed by default, you are able to toggle on or off this legend, as well as reposition it. To do this, select the chart by clicking **Chart Design**  $\rightarrow$  **Add Chart Element**  $\rightarrow$  **Legend**  $\rightarrow$  **[Position]**:

AutoSave 💽 🗄 りゃ 🖓				୯°ଅ <del>⊽</del>	B	ook1.xlsx 🝷		,∕⊃ Se	arch			
File	Home	Inser	t F	age Layout	Formulas	Data	Review	View	Help	Chart Design	Format	
Add Ch Elemer	hart Quick	Cha Colo	nge ors ~									
Į.	A <u>x</u> es	>						Chart Style	25			
민	<u>A</u> xis Titles	>										
6	<u>C</u> hart Title	>										
Ōī	<u>D</u> ata Labels	>										
ш	Data Ta <u>b</u> le	>										
Ď	Error Bars	>										
<b>₩</b>	<u>G</u> ridlines	>										
<b>b</b> <sup>⊞</sup>	Legend Lines	> } >	հեչ	<u>N</u> one								
J	<u>T</u> rendline	>	╓╟╘	<u>R</u> ight								
₫4	<u>U</u> p/Down Bar	5 >		Top								
			≣∐⊾	<u>L</u> eft								
			Līh.	<u>B</u> ottom								
			Mo	ore Legend Optio	ns							

Alternatively, you can use the Chart Elements buttons and submenu that appears near the top right-hand corner of a selected chart.

### **Activity 4-2: Modifying and Formatting Charts**

You have created a chart that illustrates the weekly sales made by your sales staff. You would like to improve the look of the chart. Additionally, it looks as though George Jackson's data has been accidentally left out of the chart.

**1.** To begin, open Activity 4-2 from your Exercise Files folder:



Activity 4-2.xlsx Microsoft Excel Worksheet 14.2 KB

**2.** Click to **select the chart** on the current worksheet. You will see the Chart Design and Format contextual tabs appear on the ribbon:

,	AutoSave 🧿	en 🖪 ۲۰	- C - D =		Activity 4-2.xlsx	•		2	Search						
Fi	le Horr	e Insert	Page Layout Fo	rmulas Data	Review View	Help Chart	Design	Format							
Pa	Cut	y ~ E	alibri (Body) - 10	▲ • ▲ • = =	=   *> 8 = =   = = = =	Wrap Text	Generation - Gener	⊪ % <b>9</b>   €	Conditional Format as	lormal leutral	Bad Calculat	tion	iood heck Cell	< > >	Insert Dele
	Clipboard	t B	Font	15	Alignmen	t		Number	Fy	s	tyles				Cel
Charte * : X V fr															
	Α	В	c	D	E	F	G	н		к	L	м	N	0	Р
1	Week	ly Sales	& Bonus Pa	vout					Weekly Bonus Amount						
2		,		,					\$ 500.00						
3									<i>y</i> 500.00						
4	Week -	First Nam -	Last Name 🔻	ID 🔻	Weekly Sale 👻	Weekly Goa 🔻	Bonu -	(	\$30.000.00 -					9 1 -	
5	1	Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$ 15,000.00	\$ 500.00								
6	1	Lucas	Bressan	Lucas_Bressan	\$ 14,687.50	\$ 15,000.00	\$ -		\$25,000.00						
7	1	Stanley	Prestwick	Stanley_Prestwick	\$ 13,478.96	\$ 15,000.00	\$ -		\$20,000,00						
8	1	Jerry	Harrison	Jerry_Harrison	\$ 21,689.47	\$ 15,000.00	\$500.00		320,000.00					Y	
9	1	Leah	Thompson	Leah_Thompson	\$ 25,478.45	\$ 15,000.00	\$500.00		\$15,000.00						
10	1	Robyn	Fletcher	Robyn_Fletcher	\$ 7,600.00	\$ 15,000.00	\$ -				1 <b>1</b> 1		oklu Salar	1	
11	1	Lisa	McCain	Lisa_McCain	\$ 5,689.00	\$ 15,000.00	\$ -		\$10,000.00			= we	eniy sales	ĭ	
12	1	Steven	Stone	Steven_Stone	\$ 12,346.87	\$ 15,000.00	\$ -		\$5,000,00					L	
13	1	Devon	Lawrence	Devon_Lawrence	\$ 11,687.00	\$ 15,000.00	ş -		***						
14	1	George	Jackson	George Jackson	\$ 9,874.45	\$ 15,000.00	ş - ,		\$- + <b>-</b>			-		-	
15									and which is a	non the c	in some and	6			
16									willian. Bre, break harrith	stor clean Man	Lawre				
1/															
18									-					~	
19															

First, you should add a title to this chart. Click Chart Design → Add Chart Element
 → Chart Title → Above Chart:





4. The chart title is now displayed above the data series on the chart:

5. Next, you should add gridlines to make this chart a little easier to read. Click to select the chart and then click the Chart Elements button that appears near the top right-hand corner:





6. From the menu that appears, check the **Gridlines** check box:



7. Major gridlines are now displayed on the chart:

8. Finally, you might as well remove the legend as it is fairly self-evident what this data represents. Click Chart Design → Legend → None:



**9.** Now you need to adjust the color of this chart. Click the **Chart Design** contextual tab. Within the **Chart Styles** gallery, **click any** of the chart styles presented:

AutoSave 💽 🕅					Activi	ty 4-2.xls											
File Home	Insert	Page Layout	Formulas	Data	Review	View	Help	Chart Design	Format								
Add Chart Quick Element ~ Layout ~	Change Colors				u jiji	ļ.,,,	<u>ml</u> ,		Uulluu		Switch Row/ Column	Select Data	Change Chart Type	Move Chart			
Chart Layouts						Chart Sty	les				Data		Type	Location			



**10.** The new style is now applied to the selected chart:

**11.** Finally, with the chart selected, **click and drag the handle** of the highlighted data selection, at the bottom right of cell **E13**, and **drag it down one row**:

1	Α	В	с	D	E		F	G	н	- I	J		к	L	M	N	0
1	Week	ly Sales	& Bonus Pa	yout						Weekly Bonus Am	ount						
2										\$ 50	0.00						
3													~				~
4	Week 💌	First Nam 💌	Last Name 💌	ID 💌	Weekly Sale	Wee	kly Goa 🔻	Bonu 💌	(		,		lu cala				1+
5	1	Jackie	Williamson	Jackie_Williamson	\$ 16,785.14	\$ 1	15,000.00	\$500.00			'	veek	ay sale	5			
6	1	Lucas	Bressan	Lucas_Bressan	\$ 14,687.50	\$ 1	15,000.00	\$ -		\$30,000.00							
7	1	Stanley	Prestwick	Stanley_Prestwick	\$ 13,478.96	\$ 1	15,000.00	\$ -		\$25,000,00			_				
8	1	Jerry	Harrison	Jerry_Harrison	\$ 21,689.47	\$ 1	15,000.00	\$500.00				_	_				Ϋ́
9	1	Leah	Thompson	Leah_Thompson	\$ 25,478.45	\$ 1	15,000.00	\$500.00		\$20,000.00			H				
10	1	Robyn	Fletcher	Robyn_Fletcher	\$ 7,600.00	\$ 1	15,000.00	\$ -		\$15.000.00	_						
11	1	Lisa	McCain	Lisa_McCain	\$ 5,689.00	\$ 1	15,000.00	\$ -	(								9
12	1	Steven	Stone	Steven_Stone	\$ 12,346.87	\$ 1	15,000.00	\$ -		\$10,000.00				_			
13	1	Devon	Lawrence	Devon_Lawrence	\$ 11,687.00	\$ 1	15,000.00	\$ -		\$5,000.00		-					
14	1	George	Jackson	George _Jackson	\$ 9,874.45	\$ 1	15,000.00	\$ -		e .							
15			[								\$ 14	ŝ		es.	s .e	S.	
16										diameter a	este state	. ariou	mpsi	cletchit and	3° 5101	Merce	
17							•			4000	640	·	400		`	P	
18									(	>			0				0
19																	
20																	

**12.** A column representing the weekly sales of George Jackson will be added to the chart:



**13.** Save your current workbook as Activity 4-2 Complete and close Microsoft 365 Excel to complete this exercise.

# **TOPIC C: Create a Trendline**

Trendlines are designed to help you better understand the data that a chart shows, as well as to try to predict future trends. In this topic, we will learn all about trendlines, the different types that are available, and how to add them.

### **Topic Objectives**

In this session, you will learn:

- About trendlines
- About the types of trendlines
- How to add a trendline
- About the Format Trendline task pane

### Trendlines

**Trendlines** are used to graphically depict trends that exist within your data or show a forecast of future data in a chart. For example, here you can see a trendline that forecasts two years ahead that shows a trend towards increasing revenue:



### **Types of Trendlines**

Excel includes six different trend types that you can add to a chart. The type of trendline that you add depends on the type of data that the chart represents. Let's breakdown each type of trendline and the type of data that they are best suited to represent:

**Exponential** – These types of trendlines are curved to illustrate data rising or falling at constant rates:



**Linear** – This trendline is typically used to represent simple linear data sets. It is a way to illustrate that something is increasing or decreasing over time:



**Logarithmic** – This trendline is best suited for data that changes quickly and then evens out over time:



**Polynomial** – This type of trendline is curved to help illustrate fluctuating data points. It is divided in three orders: Order 2, Order 3, and Order 4. Order 2 trendlines include one hill or valley. Order 3 trendlines have one or two hills or valleys, while Order 4 trendlines have up to three hills or valleys:



**Power** – This type of trendline is also curved but is used with data sets that compare measurements at a specific rate. For example, you could use this trendline to measure acceleration over time:



**Moving Average** – This type of trendline is intended to smooth out data that includes a lot of fluctuation. It does this by averaging a chosen number of data points. The number of data points is decided by setting the Period option. If this option is set to "2" then the first two points are used to create the trendline:



### Adding a Trendline

Trendlines can be added to charts in Excel through a number of different methods. The first method involves selecting the chart and then click **Chart Design**  $\rightarrow$  **Add Chart Element**  $\rightarrow$  **Trendline**]:



Alternatively, you can click to select the chart to display the **Chart Elements** button. Click this button and click the arrow icon that appears next to the **Trendline** listing. **Click the trendline** that you would like to add:



### The Format Trendline Task Pane

The Format Trendline task pane allows you to add and modify a trendline in a number of different ways. To open this task pane, click Chart Design  $\rightarrow$  Add Chart Element  $\rightarrow$  Trendline  $\rightarrow$  More Trendline Options:

Aut	oSave 💽 Off		5-	୯~୯ -		B	ook1.xlsx - S	Saved -		∠ S	earch	
File	Home	Insert	t P	age Layout	Formulas	Data	Review	View	Help	Chart Design	Format	
Add C Eleme	hart Quick nt ~ Layout ~	Char Color	nge rs v	and the second s				Reserve ther Tree Reserve				
<b>П</b> .	A <u>x</u> es	>	Chart Styles									
ഥ	<u>A</u> xis Titles	>										
G	<u>C</u> hart Title	>										
Ōi	<u>D</u> ata Labels	>										
Ŀ	Data Ta <u>b</u> le	>										
Ď.	Error Bars	>										
	<u>G</u> ridlines	>										
D <sup>⊞</sup>	<u>L</u> egend	>										
Ŵ	Lines	>										
./ ⊡^4	<u>Trendline</u> <u>Up/Down Bars</u>	>	/ <u>×</u>	<u>N</u> one								
			/	<u>L</u> inear								
			]	<u>E</u> xponential								
			;;/	Linear <u>F</u> oreca	st							
			$\checkmark$	Moving <u>A</u> vera	ge							
			Mo	ore Trendline Op	otions 🔓							

Alternatively, you can click **More Options** from the Trendline submenu when the Chart Elements button is clicked:



### Activity 4-3: Create a Trendline

You would like to add a moving average trendline to a chart that illustrates sales data over the period of several weeks.

**1.** To begin, open Activity 4-3 from your Exercise Files folder:



Activity 4-3.xlsx Microsoft Excel Worksheet 14.0 KB

2. Click to select the large chart that appears on Sheet1 of the current workbook:



3. Click Chart Design → Add Chart Element → Trendline → More Trendline Options:



**4.** The Format Trendline task pane now appears on the right side of the Excel window. Click the **Moving Average** radio button:

Format Trendlir	- ×								
Trendline Options 🗸									
Trendline Options									
Exponential									
ن L <u>o</u> garithmic									
<u>⊖</u> OPolynomial	Or <u>d</u> er	2 ()							
<u>M</u> oving	P <u>e</u> riod	2 ()							
Trendline Name									
• <u>A</u> utomatic	ekly								
○ <u>C</u> ustom									
Forecast									
<u>F</u> orward	0.0	period							
<u>B</u> ackward	0.0	period:							
Set Intercept		0.0							
Display Equation on chart									
Display <u>R</u> -squared value on chart									
5. Ensure that the Period setting is set to "2" and that the Trendline Name radio button is set to **Automatic**:



6. Close the Format Trendline task pane by clicking the Close button (X) in its upper right-hand corner:



**7.** Examine the graph and you will see that the trendline that has been added better illustrates the fluctuation in this data over time:



**8.** Save the current workbook as Activity 4-3 Complete and then close Microsoft 365 Excel to complete this exercise.

# **TOPIC D: Create Advanced Charts**

Beyond the basic chart types that are available and the simple modifications that you can make to them, Excel 365 offers more advanced charts that can be used to represent your data. During this topic you will learn how to create advanced charts.

## **Topic Objectives**

In this session, you will learn:

- About combination charts
- About dual axis charts
- How to create custom chart templates

#### **Combination Charts**

When you are working with more than one kind of information in a data set it can be challenging to represent it clearly in one chart. It can also be confusing for the audience who need to understand the information. **Combination charts** provide an effective way of presenting different, but related, data series in a single graphic.

As an example, if you want to compare your company's sales results over time against the number of outgoing sales calls, over the same period, it is difficult to see how a single chart could represent this data. Using two different chart types in the same graphic, though, could provide a clear comparison that is simple and easy to understand.

To create a combination chart, you must first have your data in an existing chart of a single type. You would then select one of the data series by clicking on one of the elements:



You would then click **Chart Design** → **Change Chart Type**:



The **Change Chart Type** dialog box opens, and the **Combo** category should be selected automatically:

Change	e Chart Type		? ×	
Recom	mended Charts Al	Charts		
5	Recent			
	Templates			
In	Column			
<b>*</b>	Line	Custom Combination		
$\bigcirc$	Pie	Chart Title		
	Bar	\$200,000		
	Area	\$160,000		
• •	X Y (Scatter)	\$120,000 \$100,000		
٩	Map	\$80,000		
1 1 1 1 1	Stock	\$40,000		
<i>µ</i> ₽-	Surface	5- 		
⊗	Radar	inter care was a to be added t		
Ē	Treemap	Revenue     Outgoing Sales Calls		
٢	Sunburst	Choose the chart type and axis for your data series:		
dh.	Histogram	Series Name Chart Type	Secondary Axis	
₽	Box & Whisker	Revenue Clustered Column 🗸		
r.	Waterfall	Outgoing Sales Calls		
<b>.</b>	Funnel			
R	Combo			
		ОК	Cancel	

In the "Choose the chart type and axis for your data series" window, you can now select a different chart type for either of the data series by clicking on the "Chart Type" drop-down menu for the chosen "Series Name":

Change	e Chart Type		?	×
Recom	mended Charts All	Charts Column	^	
り ロ	Recent Templates			
<u>∎</u> ⊮	Column Line	Custom Combination		
	Pie Bar	Chart 5200,000		
×	Area X Y (Scatter)	\$160,000 \$140,000 \$120,000		
© http://www.com/com/com/com/com/com/com/com/com/com/	Map Stock	\$80,000 \$60,000 \$40,000 \$20,000	$\sim$	
j⊊ ⊗a	Surface Radar	5. Intradict and the start that have been seen and the start start the start the start start the start		
	Treemap Sunburst	Revenue Out Area		
۰ ۹۹	Histogram Box & Whisker	Series Name Cha		xis
	Waterfall Funnel	Outgoing Sales Calls Clustered Column V		
	Combo			
		ОК	Cano	el

Once you have selected the desired chart type, clicking **OK** closes the Change Chart Type dialog box and your chart now contains a different chart type for each data series, as indicated in the legend:



#### **Dual Axis Charts**

When using combination charts, it is often helpful to use a unique axis for each of the data series, so it is easier to compare, and understand. In our previous example, the number of outgoing sales calls is significantly less than the revenue values, resulting in a chart that does not clearly show the relationship between the two values. By adding another axis for the sales call volume, we can make the comparison clearer for the viewer.

To add a secondary axis to your chart, first select the data series you want to use, then click **Format**  $\rightarrow$  **Format Selection**:



This opens the **Format Data Series** task pane, where you can click the **Secondary Axis** radio button:





A second axis now appears for the chosen data series, opposite to the primary axis:

To adjust the positioning of the data points, relative to the other axis, first click to select the secondary axis on your chart, or, with your chart selected, you can click on the Chart Elements drop down menu in the Current Selection group of the Format contextual tab, and select the **Secondary Vertical (Value) Axis**:

AutoSa	ave Off	日 り	• C · D =			Воо	k1.xlsx 👻			𝒫 Search	
File	Home	Insert	Page Layout	Formulas	Data	Review	View	Help	Chart Design	Format	
Chart Are Chart A Chart T	ea Area Title	¥ <b>[</b> <u>A</u>	I ↓ Chang Shape	) ge	Abc	Abc	Abc	Abc	Abc Abc	<ul> <li>△ Shape Fill ~</li> <li>✓ ✓ Shape Outline ~</li> <li>✓ Ø Shape Effects ~</li> </ul>	
Horizor	ntal (Categor	y) Axis	rt Shapes				S	hape Styles		5	Ā
Legend	ł										
Plot Ar	ea										
Second	lary Vertical (	Value) Axis									
Vertica	l (Value) Axis		~								
Vertica	l (Value) Axis	Major Grid	lines								
Series "	'Revenue"										
Series "	'Outgoing Sa	les Calls"									

This launches the **Format Axis** task pane, where you can click the **Axis Options** icon and adjust the bounds of the axis to determine how the data is displayed. In this example, increasing the maximum bounds widens the axis and move the stacked line lower, compared to the revenue axis. As you can see, there are many options in the Format Axis task pane that you can explore and experiment with, to achieve your desired result:

Format Axis	~	×
Axis Options 🗸 Text Options		
۵ 🖒 🖄		
Axis Options		
Bounds		
Mi <u>n</u> imum 0.0	Auto	
Ma <u>x</u> imum 12000.0 ]	Reset	
Units		
Major 2000.0	Auto	
M <u>i</u> nor 400.0	Auto	
Horizontal axis crosses		
<ul> <li>Aut<u>o</u>matic</li> </ul>		
○ Axis valu <u>e</u>	0.0	
<ul> <li><u>M</u>aximum axis value</li> </ul>		
Display <u>u</u> nits None		
Show display units label of	on chart	
Logarithmic scale Base	10	
<u>V</u> alues in reverse order		
> Tick Marks		
Labels		
Number		



The chart now more clearly shows how the volume of sales calls compares to the revenue:

#### **Creating Custom Chart Templates**

As you have seen in the previous example, it can take a long time to create a fully customized chart to suit your exact needs. Excel includes the ability to save an existing chart as a **chart template** (.crtx). This allows you to quickly recreate this type of chart again, using a different data set.

To create a custom chart template, first click to select the chart that you want to work with. Next, right-click this chart and then click **Save as Template**:



This action displays the **Save Chart Template** dialog box, with the Charts folder already open. In the **File name** text box, enter a name for this new template and then click **Save**:

Save Chart Template						×
$\leftarrow \rightarrow \ \  \   $ $\land$ (Users $\rightarrow$ Jane Gibson $\rightarrow$ AppData $\rightarrow$ Roaming	> Microsoft > Templates > 0	Charts 🗸 🗸	Ū J	Search Char	ts	
Organize 🔻 New folder					== - (	?
OneDrive     Name	Date modified	Туре	Size			
💻 This PC	Working on	it				
🧊 3D Objects						
Desktop						
Documents						
Music						
E Pictures						
Videos						
Network						
File name: SalesCalls.crtx						~
Save as type: Chart Template Files(*.crtx)						~
∧ Hide Folders		То	ols 🔻	Save 🔓	Cancel	

Now, with the new custom chart template saved, you can create new charts using this template by selecting the **Templates** category of the **All Charts** tab in the **Change Chart Type** dialog box, then clicking on the desired template, and clicking **OK**:

Change Chart Type		?	×
Recommended Charts A	II Charts		
Y       Recent         Y       Recent         Im       Column         Im       Area         Im       Area         Im       Stock         Im       Stock         Im       Stock         Im       Treemap         Im       Histogram         Im       Box & Whisker         Im       Waterfall         Im       Funnel         Im       Combo	My Templates		
Manage Templates	ОК	Can	icel

#### **Activity 4-4: Creating Advanced Charts**

Using weekly sales data, you would like to create a dual axis chart to compare sales and expenses, and then save the finished chart as a template.

**1.** To begin, open Activity 4-4 from your Exercise Files folder:



Activity 4-4.xlsx Microsoft Excel Worksheet 9.99 KB

- Α В С D **Weekly Sales** 1 2 3 4 Weekly Sales Expenses First Name 5 1 \$ 16,785.14 \$ 419.63 Jackie 6 2 \$ 14,687.50 \$ 232.14 Jackie 7 3 \$ 13,478.96 \$ 419.63 Jackie 8 4 \$ 21,689.47 \$ 367.19 Jackie \$ 9 5 18,267.85 \$ 336.97 Jackie \$ 10 6 7,600.00 \$ 542.24 Jackie 11 7 \$ 5,689.00 \$ 456.70 Jackie \$ 12,346.87 \$ 190.00 Jackie 12 8 \$ 13 9 \$ 142.23 Jackie 11,687.00 14 10 \$ 9,874.45 \$ 306 57 Jackie 15
- 2. Use your cursor to select cells A4:C14 on the current worksheet:

	AutoSave	<b>O</b> #			A	ctivity 4-4.xlsx 👻		_ ∕⊃ Se	earch
1	ile H	ome	Insert	Page Layout For	mulas Data Revi	ew View	Help		
Pi	votTable Re	ecommer PivotTab Tables	nded Table les	Pictures 🖓 JD Mor	→ 7 SmartArt	Get Add-ins	i Ding Maps V Transformer People Graph Add-ins	Recommende Charts	ad 2-D Column ad 2-D Column Difference of the second sec
-						_		- 1	3-D Column
1	Wee	kly :	sales	C	D	t	F	G H	
2									2-D Bar
4		W	eekly Sales	Expenses	First Name				
5	1	\$	16,785.14	\$ 419.63	Jackie				
6	2	\$	14,687.50	\$ 232.14	Jackie				
7	3	\$	13,478.96	\$ 419.63	Jackie				
8	4	\$	21,689.47	\$ 367.19	Jackie		•		3-D BarO
9	5	\$	18,267.85	\$ 336.97	Jackie				
10	6	\$	7,600.00	\$ 542.24	Jackie		\$25	00.00	
11	7	Ş	5,689.00	\$ 456.70	Jackie				
12	8	\$	12,346.87	\$ 190.00	Jackie		\$20,	000.00	In More Column Charts
13	9	\$	11,687.00	\$ 142.23	Jackie				
14	10	>	9,874.45	\$ 308.67	Jackle		\$15,	000.00	
10							Ý 510	00.00	
17							310,	000.00	
18	-						\$5,	000.00	
10									
20								ş- <b>-</b>	
21								1	2 3 4 5 6 7 8 9 10
22									Weekly Sales Expenses
22	-						Ó		0

3. Click Insert → Insert Column or Bar Chart → Clustered Column:

With the chart now added, you need to select the second data series. Click Format
 → Chart Elements → Series "Expenses":

AutoSave 💽 🗄 🏷 🗧	- Ū - Ľ		Activit	y 4-4.xlsx	-		🔎 Search	
File Home Insert Pa	ge Layout Formulas	Data	Review	View	Help	Chart Design	Format	
Chart Area v 🖾 🔨 Chart Area Chart Title	Change Shape →	Abc	Abc	Abc	Abc	Abc Abc	<ul> <li>△ Shape Fill ~</li> <li>✓ ✓ Shape Outline ~</li> <li>✓ ✓ Shape Effects ~</li> </ul>	
Horizontal (Category) Axis	rt Shapes			S	hape Style	s	F	
Legend								
Plot Area								
Vertical (Value) Axis								
Vertical (Value) Axis Major Gridlines								
Series "Weekly Sales "								
Series "Expenses"								

5. Next, click Chart Design → Change Chart Type:

AutoSave 💽 🕅 📙	୨·୯·ଧ <del>-</del>			Activity	4-4.xlsx -			✓ Search
File Home Inser	t Page Layout Fo	ormulas [	Data	Review	View	Help	Chart Design	Format
Series "Expenses" Format Selection Reset to Match Style	A Change Change Shape →	Abc	Abc	Abc	Abc	Abc	Abc Abc	<ul> <li>△ Shape Fill ~</li> <li>✓ ✓ Shape Outline ~</li> <li>✓ ✓ Shape Effects ~</li> </ul>
Current Selection	Insert Shapes				Sh	ape Styles		آيا الا

6. In the Change Chart Type dialog box, click the "Chart Type" drop-down menu for the "Expenses" series and select "Stacked Line with Markers" from the Line category:



- Change Chart Type ?  $\times$ Recommended Charts All Charts Recent k M  $\square$ Templates Пп Column Custom Combination 🚧 Line  $\bigcirc$ Pie Chart Title Bar \$25,000.00 \$600.00 Area \$500.00 \$20,000.00 X Y (Scatter) \$400.00 \$15,000.00 \$300.00 ٩ Map \$10,000.00 \$200.00 h Stock \$5,000.00 \$100.00 ☐ Surface ŝ. Ś-肏 Radar 1 2 3 4 5 6 7 8 9 10 -F Treemap Weekly Sales - Expenses Sunburst ٢ Choose the chart type and axis for your data series: Ոհ Histogram Secondary Axis Series Name Chart Type ₫₽ Box & Whisker Weekly Sales **Clustered** Column  $\sim$ гЛ Waterfall  $\sim$ ▶ 🖸 Expenses Stacked Line with Ma... 🖶 Funnel Combo OK Cancel
- 7. Now click to select the "Secondary Axis" checkbox for the "Expenses" series, then click OK:



#### 8. Right-click on the secondary axis of your chart and then click Format Axis:

**9.** In the Format Axis task pane, type "**1000**" in the Maximum window of the of the Axis Options Bounds, then press **Enter**:

Format Axis	*	×							
Axis Options 🗸	Axis Options 🗸 Text Options								
	6								
Axis Options									
Bounds									
Mi <u>n</u> imum	0.0	Auto							
Ma <u>x</u> imum	h000.0	Reset							
Units									
Major	100.0	Auto							
Minor	20.0	Auto							



**10.** The chart is complete, showing the comparison of weekly sales to expenses:



 Now, to save your chart as a template, right-click the chart, then click Save as Template: 12. The Save Chart Template dialog box is now displayed. Type "Activity 4-4 Complete" into the File name text box and then click Save:



**13.** Save the current workbook as Activity 4-4 Complete and then close Microsoft 365 Excel to complete this exercise.

## Summary

This lesson taught you how to insert charts into worksheets as well as the best way to format charts to meet your specific needs and those of your audience. Additionally, you learned about the wide variety of charts that are available to you depending upon the data with which you are working. You should now feel comfortable modifying as well as formatting existing charts. You should also understand how to work with dual axis charts and create custom chart templates.

## **Review Questions**

- 1. What are charts?
- 2. What is a line chart typically used for?
- 3. What is the difference between modification and formatting?
- 4. When is the Chart contextual tab displayed?
- 5. What is the command sequence to add a trendline using the ribbon?

# LESSON 5: ANALYZING DATA WITH PIVOTTABLES, SLICERS, AND PIVOTCHARTS

## **Lesson Objectives**

In this lesson you will learn how to:

- Create a PivotTable
- Filter data using slicers
- Analyze data using PivotCharts

# TOPIC A: Create a PivotTable

One of the most powerful tools that you have at your disposal when analyzing data in Excel is the PivotTable. While extremely useful and interactive, they can be somewhat cumbersome to use properly and are often misused. For this reason, it is important to understand how they work and gain some fundamental understanding of their purpose before creating PivotTables of your own data.

#### **Topic Objectives**

In this session, you will learn:

- About PivotTables
- How to start with questions and end with structure
- About the Create PivotTable dialog box
- About the PivotTable Fields task pane
- How to summarize data in a PivotTable
- About the "Show value as" functionality
- How to format a PivotTable
- About using external data with PivotTables
- About PowerPivot
- About PowerPivot functions

## **PivotTables**

Why are **PivotTables** called PivotTables? Because they let you move data around easily (by dragging and dropping fields) to perform a sort of rotation on the structure of your table and at the same time, change your view of the data. With PivotTables, columns can become rows and rows can become columns, all without altering the original data.

When a PivotTable is created, you are given the option to place it on the worksheet that you currently have open or on a new one. In either case, once the PivotTable is created you can pivot, re-pivot, sort, and summarize your data without affecting it directly. You are able to choose the level of detail that you want to view depending on your needs. Additionally, you have access to all of the summary functions in Excel to complete your data analysis.

<b>Row Labels</b>	۳	Sum of Quantity	Sum of Value
47		178	1,600.22
147		1,305	169,636.95
235		110	62,698.90
354		50	37,500.00
1358		90	449.10
1459		178	3,024.22
1478		8,191	4,013.59
1547		20	2,691.60
1567		70	10,331.30
1574		135	403.65
2358		292	116,797.08
5167		90	3,825.00
Grand Total		10,709	412,971.61

Below you can see an example of a very simple PivotTable:

In this case, the SKU (first column), Quantity, and Value columns have been pivoted to appear as rows. A summary of each numerical column in this PivotTable is displayed by default.

#### Start with Questions, End with Structure

Before you even create a PivotTable, you need to think of the **questions** that you are trying to answer by using it. Just like when you are working with functions or formulas, half of the work in data analysis is finding the right questions. This process is especially important for PivotTables because how you construct them depends on the question that you are asking. Once you know the question that you would like the PivotTable to answer, you can start constructing the PivotTable. While there are no hard and fast rules to constructing a PivotTable, there are some ways to make it easier.

Here are a few tips to keep in mind when constructing your PivotTable.

- First, it is usually best to create rows and columns using fields that have a relatively low set number of entries. Using entries that span a huge swath of data (such as five years of transaction numbers) to create rows and columns can only cause confusion rather than answer any specific questions.
- Next, it is almost always a good idea to create a row out of a field that you need an answer from and then create a column out of that criterion to narrow down the answer.

Examine the worksheet below. You will see a range that contains 34 rows of data about product SKUs, their warehouse location, their quantities, and their value:

1	Α	В	C	D	E		
1	Warehouse 💌	SKU 🔽	Unit Price 💌	Quantity 💌		Value 💌	
2	Warehouse A	1574	\$ 2.99	5	\$	14.95	
3	Warehouse B	2358	\$ 399.99	5	\$	1,999.95	
4	Warehouse B	1478	\$ 0.49	1587	\$	777.63	
5	Warehouse A	2358	\$ 399.99	54	\$	21,599.46	
6	Warehouse B	147	\$ 129.99	214	\$	27,817.86	
7	Warehouse A	1358	\$ 4.99	45	\$	224.55	
8	Warehouse C	1574	\$ 2.99	65	\$	194.35	
9	Warehouse A	5167	\$ 42.50	45	\$	1,912.50	
10	Warehouse C	2358	\$ 399.99	89	\$	35,599.11	
11	Warehouse A	1547	\$ 134.58	8	\$	1,076.64	
12	Warehouse B	235	\$ 569.99	55	\$	31,349.45	
13	Warehouse A	1567	\$ 147.59	35	\$	5,165.65	
14	Warehouse B	1459	\$ 16.99	89	\$	1,512.11	
15	Warehouse A	1478	\$ 0.49	854	\$	418.46	
16	Warehouse A	147	\$ 129.99	475	\$	61,745.25	
17	Warehouse A	47	\$ 8.99	89	\$	800.11	
18	Warehouse A	354	\$ 750.00	25	\$	18,750.00	
19	Warehouse B	1547	\$ 134.58	2	\$	269.16	
20	Warehouse B	1478	\$ 0.49	4876	\$	2,389.24	
21	Warehouse A	2358	\$ 399.99	54	\$	21,599.46	
22	Warehouse B	147	\$ 129.99	145	\$	18,848.55	
23	Warehouse A	1358	\$ 4.99	45	\$	224.55	
24	Warehouse C	1574	\$ 2.99	65	\$	194.35	
25	Warehouse A	5167	\$ 42.50	45	\$	1,912.50	
26	Warehouse C	2358	\$ 399.99	90	\$	35,999.10	
27	Warehouse A	1547	\$ 134.58	8	\$	1,076.64	
28	Warehouse B	235	\$ 569.99	55	\$	31,349.45	
29	Warehouse A	1567	\$ 147.59	35	\$	5,165.65	
30	Warehouse B	1459	\$ 16.99	89	\$	1,512.11	
31	Warehouse A	1478	\$ 0.49	874	\$	428.26	
32	Warehouse A	147	\$ 129.99	471	\$	61,225.29	
33	Warehouse A	47	\$ 8.99	89	\$	800.11	
34	Warehouse A	354	\$ 750.00	25	\$	18,750.00	
35	Warehouse B	1547	\$ 134.58	2	\$	269.16	
36							

A PivotTable created from this dataset answers the question, "What is the total value of the products stored in each warehouse?"

Row Labels 💌 Sum	n of Value
Warehouse A	222,890.03
Warehouse B	118,094.67
Warehouse C	71,986.91
Grand Total	412,971.61

As you can see, the warehouses are listed by row and the value (the criterion) is listed as a column. A SUM function automatically totals the value of each SKU stored by each warehouse.

To answer a question, you can change the function that is used by the PivotTable. For example, suppose you want to see how many different products each warehouse has, not a total count. You could do this by adding the SKU field as a column and applying the COUNT function:

Row Labels 💌	Count of SKU
Warehouse A	19
Warehouse B	11
Warehouse C	4
Grand Total	34

#### The Create PivotTable Dialog Box

The first step to creating a PivotTable is to open the Create PivotTable dialog box by clicking **Insert** → **PivotTable**:



The controls in the Create PivotTable dialog box are used to choose the dataset (or data source) for the new PivotTable that you are creating, and where you want it to be placed. By default, new PivotTables are placed on new worksheets, but you do have the option of adding them to existing worksheets in your workbook:

Create PivotTable			?	$\times$					
Choose the data that you want to analyze									
Select a table or ra	nge								
<u>T</u> able/Range:	Table1			Ť					
○ <u>U</u> se an external da	ta source								
Choose Conr	nection								
Connection na	ime:								
O Use this workbool	c's Data Model								
Choose where you wan	t the PivotTable r	eport to be placed	I —						
New Worksheet									
<u>Existing</u> Workshee	t								
Location:				Ť					
Choose whether you w	ant to analyze mu	ltiple tables							
🗌 Add this data to th	ne Data <u>M</u> odel								
		ОК	Car	ncel					

Once you have set your options, click **OK** to create the PivotTable.

#### The PivotTable Fields Task Pane

When you insert a PivotTable into your workbook, the **PivotTable Fields** task pane is automatically displayed on the right hand-side of the Excel 365 window:

AutoSave 💽 🖪 🍤 🗸 🖓 🗸	Book1.xkx +	,⊅ Search	Jane Gibson	
File Home Insert Page Layout Formulas Dat	a Review View Help PivotTable Analyz	ze Design		🖻 Share 🛛 🖓 Comments
PixotTable         Active Field:         ↓         += Expand Field           PixotTable         Drill         Drill         Drill         Tell           Options ~         PixotTable         Active Field         -= Collapse Field	→ Group Selection	Refresh Change Data Data Data Data Data Data Data Data	CALP Relationships Tools ~ Statisticns Statisticns Tools ~ Statisticns Tools ~ Statisticns Tools ~ Statisticns Tools ~ Statisticns Tools ~ Statisticns Tools ~ Statisticns	^
A3 * : × ✓ fr				v
A B C D E P	6 H I J K	L M N O P Q	R S T U V  PivotTable I Choose fields to add Earch U Watehouse Una Pice Una	Fields • × dto report
18			Drag fields between	n areas below:
20 21			T Filters	II Columns
22 23 24 25 25 26 27 28 29 20 20 30 31 32 33 34 34			E Rons	Σ Values
Sheet4 Sheet1 Sheet2 Sheet3 (	Ð		Defer Layout Up	pdate Update
Ready 10	-		III (1)	······································

The PivotTable Field task pane is the primary tool that you will use to configure PivotTables. (Note that it is hidden when the PivotTable is not selected.) The **top portion of this pane (1)** lists all of the fields from the dataset that you can add to the PivotTable. To add or remove a field from the PivotTable, toggle the corresponding checkbox. Alternatively, to give you more control over field placement on the PivotTable, you can click and drag these fields to the PivotTable itself. Note that field names are derived from the column header in the dataset:

PivotTable Fields	▼ ×
Search	يت م
<ul> <li>✓ Warehouse</li> <li>SKU</li> <li>Unit Price</li> <li>✓ Quantity</li> <li>Value</li> <li>More Tables</li> </ul>	
Drag fields between areas belo	w:
▼ Filters	III Columns
Rows	$\Sigma$ Values
Warehouse 💌	Sum of Quantity
Defer Layout Update	Update

The bottom half of this pane is comprised of **four areas (2)**: Filters, Columns, Rows, and Values. If you drag fields between these areas, you are able to change the structure of the PivotTable and choose the values that will be used to make calculations.

Here is an overview of these four areas.

- Adding fields to the **Filters area** will include those field values as filter criteria.
- The **Columns area** will create columns out of unique field entries.
- Similarly, the **Rows area** will create rows out of unique field entries.

- Finally, fields that are dragged to the **Values area** will have calculations performed on them or their values summarized.
- Note that any fields that appear in these four areas will include a **pull-down arrow (3)** that gives you access to a number of different settings, and the Field Settings dialog box, which you can use to further customize your PivotTable.

Remember that any changes that you make in the PivotTable Field task pane are applied dynamically.

#### Summarize Data in a PivotTable

Combining options from the **Summarize Values By** and the **Show Values As** tabs on the Value Field Settings dialog box will provide further insight into your data. For example, suppose that you want to calculate the total unit price of all the products that each warehouse is storing. You can do this by dragging the Unit Price field to the Values area of the PivotTable Field task pane. Next, you click the drop-down arrow for this field and click the Field Settings option to open the Value Field Settings dialog box. Inside the Value Field Settings dialog box, ensure that the Sum function was selected:

Value Field Settings		?	$\times$
Source Name: Unit Price	e		
Custom Name: Sum of	Unit Price		
Summarize Values By	Show Values As		
Summarize value field	by		
Choose the type of cal data from the selected	culation that you want to us field	se to summ	narize
Sum Count Average Max Min Product	~		
<u>N</u> umber Format	ОК	Car	ncel

The PivotTable then displays the sum of the unit prices found in each warehouse:

Row Labels 💌 Sum	of Unit Price
Warehouse A	3241.23
Warehouse B	2104.07
Warehouse C	805.96
Grand Total	6151.26

As you can see, Pivot Tables are an excellent tool to quickly summarize large amounts of data, but because they are dynamic, it may seem difficult to use the PivotTable results in other parts of your workbook. Fortunately, Excel has a function to do just that. You can retrieve results from PivotTables in other parts of your workbook using the **GETPIVOTDATA** function. The syntax is as follows:

#### GETPIVOTDATA(data\_field, pivot\_table, [field1, item1, field2, item2], ...)

While this syntax seems complicated, Excel simplifies the process of building the function by automatically inserting it. When you select a cell outside of the pivot table, even in another worksheet, or workbook, and type the equal sign (=), then click on the field in the Pivot Table that contains the value you want to retrieve, Excel automatically inserts the GETPIVOTDATA function, with the correct syntax.

In the following example, selecting cell D2, typing "=", then clicking on cell B9 (which contains the sum of the value of the SKU 1567), will create the GETPIVOTDATA function automatically:

D	2 -	E X 🗸	$f_{\mathcal{K}}$	=GETPIVOTDATA("Value",\$A\$1,"SKU",1567)						
	А	В	С	D	E	F	G	н		
1	Row Labels 🗐	Sum of Value		Value of 1567						
2	1574	403.65		10331.3						
3	1358	449.10								
4	47	1,600.22								
5	1547	2,691.60								
6	1459	3,024.22								
7	5167	3,825.00								
8	1478	4,013.59								
9	1567	10,331.30								
10	354	37,500.00								
11	235	62,698.90								
12	2358	116,797.08								
13	147	169,636.95								
14	Grand Total	412,971.61								

The value of this function is that it will return the correct value, as long as it remains visible in the Pivot Table.

#### The "Show Values As" Functionality of a PivotTable

Now that we have seen how to use the Summarize Values By tab or the Value Field Settings dialog box, let's use the same example and suppose that you want to see the percentage of the total inventory value that each warehouse holds. While you could do this calculation manually, it would be easier to change how the values are shown. Within the **Show Values As** tab of the Value Field Settings dialog box, you would click the **% of Grand Total** option from the **Show values as** drop-down menu:

Value Field Settings	?	×
Source Name: Unit Price		
Custom Name: Sum of Unit Price		
Summarize Values By Show Values As		
Show values as		
% of Grand Total		$\sim$
No Calculation		~
% of Grand Total % of Column Total	3	
% of Row Total % Of		
% of Parent Row Total		~
Value		$\sim$
		_
Number Format OK	Ca	ancel

You will now see what percentage of the grand total each warehouse holds. In this case you can see that Warehouse A contains products with a larger value, while Warehouse C has the lowest value:

Row Labels 💌 Sum	of Unit Price
Warehouse A	52.69%
Warehouse B	34.21%
Warehouse C	13.10%
Grand Total	100.00%

#### Format a PivotTable

When you are working with PivotTables, you will see two contextual tabs. One of these is the **Design** tab:

AutoSa	ave Off	89					B	ook1.xlsx 👻			2	Search		
File	Home	Insert	Page	Layout	Formulas	Data	Review	View	Help	PivotTable Analyze	De	sign		
Subtotals	Grand	Report B	lank	✓ Row H	Headers nn Headers	Banded Ro Banded Co	ows							< > I>
	Layou	ut			PivotTable St	yle Options				PivotT	able Style:	s		

This tab allows you to add layout elements to your PivotTable, customize style options, and apply a style (in the same way that you would with a regular table). You can modify these options at any time.

#### **External Data**

If the data that you would like to analyze exists outside of Excel, such as in a Microsoft Access database, you can still use PivotTables to summarize it. To do this, you need to create a connection to that external data by opening the Create PivotTable dialog box and then clicking the **Use an external data source** radio button. Next, click the **Choose Connection** button:

Create PivotTable	?	×
Choose the data that you want to analyze		
○ Select a table or range		
Table/Range: Table1		Ť
Use an external data source		
Choose <u>C</u> onnection		
Connection name:		
<ul> <li>Use this workbook's Data Model</li> </ul>		
Choose where you want the PivotTable report to be placed	i ——	
New Worksheet		
<u>Existing Worksheet</u>		
Location:		Ť
Choose whether you want to analyze multiple tables		
Add this data to the Data Model		
ОК	Can	icel

The **Existing Connections** dialog box then allows you to choose from existing connections that exist, as well as browse for more connections:

Existing Connections	?	×
Select a Connection or Table		
<u>C</u> onnections <u>T</u> ables		
Show: All Connections		
Connections in this Workbook <no connections="" found=""></no>		
Connection files on the Network <no connections="" found=""></no>		
Connection files on this computer <no connections="" found=""></no>		
Browse for More	Can	cel
#### **PowerPivot**

**PowerPivot** is an add-in that is available for Excel 365. It is additional software that is included with some editions of Excel 365, but by default, it is not enabled. In cases where it is not included, it can be added later if required. Once installed, this additional software extends the functionality of Excel to allow for greater data analysis.

What makes PowerPivot special is that is uses compression and processing algorithms that allow you to work efficiently with large amounts of data. This facilitates analysis with data that would otherwise be too cumbersome to work with. Additionally, PowerPivot also facilitates the integration of data from multiple sources and has been designed with extra features and flexibility for environments that rely on Microsoft SharePoint and/or Microsoft SQL servers.

#### **PowerPivot Functions**

**DAX** (Data Analysis Expression) is a type of formula language that is used to create custom calculations inside calculated columns in a PowerPivot table. It is also used to create measures inside a PivotTable. This means that PowerPivot provides you with additional functions using DAX that can be used to work with relational data in a much more powerful manner.

Arguments in a DAX function commonly use tables and columns. For example, below you can see a DAX function that uses the Totals and Date columns from the Employee Sales table as arguments:

#### =TOTALQTD(SUM('Employee Sales'[Totals]), 'Employee Sales'[Date])

While there are lots of DAX functions that you can choose from, each is classified under one of the following categories:

- **Data and Time functions**: Functions of this type are used to manipulate date and time values. As such, they are similar to the data and time functions that can be used in Excel.
- **Filter functions**: These functions are used to manipulate data and filter it dynamically.

- **Information functions**: This type of function is used to scan the values inside a cell range and match them against an expected data type.
- **Logical functions**: Typically, these functions are used to validate expressions and values, and then work with other data that is based upon the evaluation.
- Math and Trigonometric functions: Functions of this type are used to perform mathematical calculations.
- **Statistical functions**: These functions are used to generate statistical data such as minimum and maximum values, as well as averages.
- **Time Intelligence functions**: This type of function is used to manipulate data using time periods. It can be used to compare data of one time period against another.

#### Activity 5-1: Creating PivotTables

You have been given the raw transactional data for the daily sales numbers of your sales staff. To determine the total sales numbers for each sales associate, you would like to create a PivotTable using this data.

**1.** To begin, open Activity 5-1 from your Exercise Files folder:



Activity 5-1.xlsx Microsoft Excel Worksheet 11.5 KB

#### 2. Use your cursor to select cells A4:E40:

	AutoSave 🧿	₩ 🛛 ୨	• C · D =			Act	tivity 5-1.xl	sx 🔻		Ŗ	) Search		
F	ile Hom	e Insert	Page Layout For	rmula	as Data	Review	w Viev	v Help					
ſ	Cut	C	Calibri ~ 11	~	A^ A	= = =	≫~~	ab Wrap Te	ext	General	~		
Pa	aste	y ~	B I U ~   [] ~	<u>م</u> ،	<u>A</u> ~ =		<del>€</del> = <del>→</del> =	🖽 Merge	& Center ∽	\$ ~ %	00. 0;→ 0	Conditiona	I Format a
	- 💛 Form	nat Painter								+		Formatting	∽ Table ∽
	Clipboard	1 5	Font		Γ <u>α</u>		Alignr	nent	L7	i Numb	er 🗔		
	• : $\times \checkmark f_x$ First Name												
	А	В	С		D	E	F	G		н	1	J	к
12	Stanley	Prestwick	Stanley_Prestwick	\$	2,346.87	\$ -							
13	Jerry	Harrison	Jerry_Harrison	\$	1,687.00	\$ -							
14	Leah	Thompson	Leah_Thompson	\$	9,874.45	\$ 50.00							
15	Jackie	Williamson	Jackie_Williamson	\$	8,773.68	\$ 50.00							
16	Lucas	Bressan	Lucas_Bressan	\$	7,835.87	\$ 50.00							
17	Stanley	Prestwick	Stanley_Prestwick	\$	6,898.05	\$ 50.00							
18	Jerry	Harrison	Jerry_Harrison	\$	5,960.23	\$ 50.00							
19	Leah	Thompson	Leah_Thompson	\$	5,022.41	\$ 50.00							
20	Jackie	Williamson	Jackie_Williamson	\$	4,084.59	\$ 50.00							
21	Lucas	Bressan	Lucas_Bressan	\$	3,146.77	\$ 50.00							
22	Stanley	Prestwick	Stanley_Prestwick	\$	2,208.96	\$-							
23	Jerry	Harrison	Jerry_Harrison	\$	1,271.14	\$ -							
24	Leah	Thompson	Leah_Thompson	\$	333.32	\$ -							
25	Jackie	Williamson	Jackie_Williamson	\$	5,022.41	\$ 50.00							
26	Lucas	Bressan	Lucas_Bressan	\$	4,084.59	\$ 50.00							
27	Stanley	Prestwick	Stanley_Prestwick	\$	3,146.77	\$ 50.00							
28	Jerry	Harrison	Jerry_Harrison	\$	2,208.96	\$ -							
29	Leah	Thompson	Leah_Thompson	\$	1,271.14	\$ -							
30	Jackie	Williamson	Jackie_Williamson	\$	7,478.96	\$ 50.00							
31	Lucas	Bressan	Lucas_Bressan	\$	1,689.47	\$ -							
32	Stanley	Prestwick	Stanley_Prestwick	\$	5,478.45	\$ 50.00							
33	Jerry	Harrison	Jerry_Harrison	\$	7,600.00	\$ 50.00							
34	Leah	Thompson	Leah_Thompson	\$	6,599.75	\$ 50.00							
35	Jackie	Williamson	Jackie_Williamson	\$	7,014.96	\$ 50.00							
36	Lucas	Bressan	Lucas_Bressan	\$	7,430.17	\$ 50.00							
37	Stanley	Prestwick	Stanley_Prestwick	\$	7,845.38	\$ 50.00							
38	Jerry	Harrison	Jerry_Harrison	\$	8,260.59	\$ 50.00							
39	Leah	Thompson	Leah_Thompson	\$	8,675.80	\$ 50.00							
40	Jackie	Williamson	Jackie_Williamson	\$	9,091.01	\$ 50.00							
41							37R x 5C						
42													
	<	Sheet1	+										
10													

#### 3. Next, click Insert → PivotTable:



**4.** The Create PivotTable dialog box is now displayed. The data range that you previously selected is shown within the Table/Range text box:

Create PivotTable		?	×					
Choose the data that yo	ou want to analyze							
Select a table or ra	nge							
<u>T</u> able/Range:	Sheet1!SAS4:SES40		Ť					
○ <u>U</u> se an external da	ta source							
Choose Connection								
Connection name:								
Use this workbook	c's Data Model							
Choose where you wan	t the PivotTable report to be plac	ced						
New Worksheet								
<u>Existing</u> Workshee	t							
Location:			Ť					
Choose whether you wa	ant to analyze multiple tables —							
🗌 Add this data to th	ne Data <u>M</u> odel							
	ОК	Ca	ncel					

5. You want this new PivotTable to be inserted into the current worksheet, so click the Existing Worksheet radio button:

Create PivotTable	?	×							
Choose the data that yo	u want to analyze								
Select a table or ra	nge								
<u>T</u> able/Range:		<u>↑</u>							
🔘 <u>U</u> se an external da	ta source								
Choose Conn	ection								
Connection na	Connection name:								
Use this workbook	's Data Model								
Choose where you wan	t the PivotTable report to be pla	ced							
New Worksheet									
<u>Existing</u> Workshee	t								
Location:			Ť						
Choose whether you wa	ant to analyze multiple tables —								
Add this data to th	e Data <u>M</u> odel								
	ОК	Can	cel						

6. Inside the Location text box, click the range picker button:



7. Use your cursor to select cell H4:

	Α	В	С	D	E	F	G	Н	1	J	K	L
1	Daily Sales & Bonus Payout						Daily Bonus Amount	Daily Goals				
2								\$ 50.00	\$ 2,500.00			
3												
4	First Name	Last Name	ID	Daily Sales	Bonus							
5	Jackie	Williamson	Jackie_Williamson	\$ 6,785.14	\$ 50.00							
6	Lucas	Bressan	Lucas_Bressan	\$ 4,687.50	\$ 50.00							
7	Stanley	Prestwick	Stanley_Prestwick	\$ 7,478.96	\$ 50.00							
8	Jerry	Harrison	Jerry_Harrison	\$ 1,689.47	\$ -		Create Pi	votTable		2	×	
9	Leah	Thompson	Leah_Thompson	\$ 5,478.45	\$ 50.00		creatern	voriable		•	~	
10	Jackie	Williamson	Jackie_Williamson	\$ 7,600.00	\$ 50.00		Sheet1!\$	H\$4			•	
11	Lucas	Bressan	Lucas_Bressan	\$ 5,689.00	\$ 50.00							
12	Stanley	Prestwick	Stanley_Prestwick	\$ 2,346.87	\$ -							
13	Jerry	Harrison	Jerry_Harrison	\$ 1,687.00	\$ -							
14	Leah	Thompson	Leah_Thompson	\$ 9,874.45	\$ 50.00							

8. Press Enter to apply the new location. Back at the Create PivotTable dialog box, click OK to apply the new settings:



**9.** The PivotTable is now added to the current worksheet in the location that you previously set:

AutoSave	<u>س</u> 8 ک	• @ ~ Ö =		Activity 5-1.xlsx +		₽ Search								Jane Gibson 🛛 🙆	œ – □	n ×
File Hor	ne Insert	Page Layout Fo	rmulas Data	Review V	iew Help	PivotTable Analyze	Design								් Share 🛛 🖓 Co	mments
PivotTable Nam PivotTable4	e: Active Field	tings Down Up - Active Field	역 Expand Field 역 Collapse Field	→ Group Selecti 네 Ungroup ⑦ Group Field Group	Insert Slicer	Insert Filter Filter	fresh Change D Source Data	uta Clea	r Select M Physics Actions	ove F tTable	Tields, Items, 1 & Sets ~ T	OLAP Relationships ools -	Piv	otChart Recommended PivotTables Tools	ld +/- Field Buttons Headers Show	
H4	• I ×	√ fx														*
A	в	c	D	E F	G	н	1	1	к	L	м	N O				
Daily	Sales &	Bonus Pavo	ut			Daily Bonus Amount	- Daily Coale						רר	PivotTable Fields		* ×
2	Juics of	Donasrayo				\$ 50.00	\$ 2 500.00						- 1	Choose fields to add to report		@ v
3						0 0000	92,000,00						- 1			
4 First Name	e Last Name	ID	Daily Sales	Bonus			1							Search		2
5 Jackie	Williamson	Jackie_Williamson	\$ 6,785.14	\$ 50.00		Divert	Tables							First Name		
6 Lucas	Bressan	Lucas_Bressan	\$ 4,687.50	\$ 50.00		PIVOL	190164							Last Name		
7 Stanley	Prestwick	Stanley_Prestwick	\$ 7,478.96	\$ 50.00		To build a report, ch	oose fields fr	om the								
8 Jerry	Harrison	Jerry_Harrison	\$ 1,689.47	\$ -		PivotTabl	e Field List							Daily Sales		
9 Leah	Thompson	Leah_Thompson	\$ 5,478.45	\$ 50.00										Bonus		
10 Jackie	Williamson	Jackie_Williamson	\$ 7,600.00	\$ 50.00										More Tables		
11 Lucas	Bressan	Lucas_Bressan	\$ 5,689.00	\$ 50.00												
12 Stanley	Prestwick	Stanley_Prestwick	\$ 2,346.87	\$ -		<b>E E E E E</b>		-								
13 Jerry	Harrison	Jerry_Harrison	\$ 1,687.00	\$ -												
14 Leah	Thompson	Leah_Thompson	\$ 9,874.45	\$ 50.00												
15 Jackie	Williamson	Jackie_Williamson	\$ 8,773.68	\$ 50.00			×							Drag fields between areas bel	owe	
16 Lucas	Bressan	Lucas_Bressan	\$ 7,835.87	\$ 50.00												
17 Stanley	Prestwick	Stanley_Prestwick	\$ 6,898.05	\$ 50.00										T Filters	Columns	
18 Jerry	Harrison	Jerry_Harrison	\$ 5,960.23	\$ 50.00												
19 Leah	Thompson	Leah_Thompson	\$ 5,022.41	\$ 50.00												
20 Jackie	Williamson	Jackie_Williamson	\$ 4,084.59	\$ 50.00												
21 Lucas	Bressan	Lucas_Bressan	\$ 3,146.77	\$ 50.00												
22 Stanley	Prestwick	Stanley_Prestwick	\$ 2,208.96	\$ -										E Rows	Σ Values	
23 Jerry	Harrison	Jerry_Harrison	\$ 1,271.14	\$ -												
24 Leah	Thompson	Leah_Thompson	\$ 333.32	\$ -												
25 Jackie	Williamson	Jackie_Williamson	\$ 5,022.41	\$ 50.00												
26 Lucas	Bressan	Lucas_Bressan	\$ 4,084.59	\$ 50.00												
27 Stanley	Prestwick	Stanley_Prestwick	\$ 3,146.77	\$ 50.00												
	Sheet1	۲											F	Defer Layout Update		Update
Ready 🔞														# 0 U		+ 100%

**10.** In the Pivot Table Fields task pane, click the **Last Name**, **Daily Sales** and **Bonus** field checkboxes:

PivotTable Fields	Ψ	×
Choose fields to add to report:	Ę	> -
Search		ρ
<ul> <li>First Name</li> <li>✓ Last Name</li> <li>ID</li> <li>✓ Daily Sales</li> <li>✓ Bonus</li> <li>✓ More Tables</li> </ul>		•

**11.** You will see that the daily sales and bonuses have been summarized by Sales Representative:

Row Labels 💌 S	um of Daily Sales	Sum of Bonus
Bressan	34563.36536	300
Harrison	28677.37555	150
Prestwick	35403.43045	250
Thompson	37255.30564	250
Williamson	55850.74527	400
Grand Total	191750.2223	1350

**12.** To improve the number formatting, click the **Sum of Daily Sales** drop-down arrow in the Values area and select **Value Field Settings**:

Drag fields between areas below	w:				
<b>T</b> Filters	III Columns				
	∑ Values 👻				
Rows	Σ Values				
Last Wallie	Move Up				
	Move <u>D</u> own				
	Move to Beginning				
Defer Layout Update	Move to <u>E</u> nd				
	Move to Report Filter				
	Move to Row Labels				
	Move to Column Labels				
	Σ Move to Values				
	🗙 Remove Field				
	🐻 Value Field Setti <u>ng</u> s 📐				

13. Now click Number Format:



14. In the Format Cells dialog box, click **Currency**, then click **OK**:

Format Cells		?	×
Number			
Number <u>Category:</u> General         Number <u>Currency</u> Accounting         Date         Time         Percentage         Fraction         Scientific         Text         Special         Custom         Custom	Sample Row Labels Decimal places: 2 Symbol: S Negative numbers: -51,234.10 (\$1,234.10) (\$1,234.10) (\$1,234.10) (\$1,234.10) (\$1,234.10) (\$1,234.10) (\$1,234.10) (\$1,234.10)	lign de	▼
	ОК	Can	cel

**15.** Click **OK** in the Value Field Settings dialog box:



**16.** Repeat the steps for the **Bonus** column. Once complete, the daily sales and bonus values should be formatted correctly:

Row Labels 💌	Sum of Daily Sales	Sum of Bonus
Bressan	\$34,563.37	\$300.00
Harrison	\$28,677.38	\$150.00
Prestwick	\$35,403.43	\$250.00
Thompson	\$37,255.31	\$250.00
Williamson	\$55,850.75	\$400.00
Grand Total	\$191,750.22	\$1,350.00

© 2005-2022 Velsoft Training Materials Inc.

 Save the current workbook as Activity 5-1 Complete and then close Microsoft 365 Excel to complete this exercise.

### **TOPIC B: Filter Data Using Slicers**

While regular filters can be effective in obtaining more detail from your data, they can quickly become a chore to manage. Between having to clear existing filters before applying new ones and trying to determine which data is actively being filtered out, filters definitely have some downsides. To give you more control over filtering capabilities, Excel provides slicers. These are easy-to-use filters that can be applied multiple times without negative effects on the data's readability. Throughout this topic you will learn about slicers and how to use them to filter data in a PivotTable.

#### **Topic Objectives**

In this session, you will learn:

- About slicers
- About the Insert Slicer dialog box

#### Slicers

**Slicers** can be a great help when working with PivotTable data. While the main purpose of PivotTables is to help you analyze information and find patterns or trends that might be difficult to spot in a large volume of raw data, the Slicer tool takes this idea to the next level.

Slicers can be created out of any field that exists within the dataset for the PivotTable. These slicers can then be used to filter each field by its unique entries. For example, if you wanted to filter out data from one of the three warehouses in a worksheet that tracks inventory, a slicer would be able to do that for you easily. Slicers can also be linked to more than one PivotTable. Typically, this occurs when using raw transactional data as a dataset and multiple PivotTables exist for that data.

Slicers are displayed graphically as a small pane that contains a series of buttons that represent each unique value from the field that the slicer is associated with. To toggle between filtering and not filtering unique values from the field, you can simply click these buttons:

SKU	žΞ	$\mathbb{R}$
47		^
147		
235		
354		
1358	63	
1459		
1478		
1547		~

Filters in a slicer that are not applied appear blue, while those that are white are active. Should a filter button appear grayed out, this indicates that an already active filter has removed the values represented by this filter from view. Multiple filters that exist in the same slicer can be applied at once by holding down the Ctrl key and clicking on each filter that you would like to apply. Additionally, the Clear Filter button in the top right-hand corner of a slicer will deactivate all of its filters.

#### The Insert Slicers Dialog Box

To create a slicer, first click anywhere in the PivotTable to display the PivotTable Tools tabs. Next, click Insert  $\rightarrow$  Slicer:

AutoSave 💽 🗄 り~	୯∗ଧ ⊽		Book1.xlsx -	₽ Search				
File Home Insert F	Page Layout Formulas	Data Revie	w View Help PivotTable A	nalyze Design				
PivotTable Recommended Table PivotTables	Pictures ♥ 3D Models ▼	SmartArt Screenshot ∽	☐ Get Add-ins → Bing Maps → My Add-ins → People Graph	Recommended Charts	Maps PivotChart	3D Lin Map ~	e Column Win/ Loss	Slicer Timeline
Tables	Illustrations		Add-ins	Charts	r <sub>N</sub>	Tours	Sparklines	Filters

This action displays the Insert Slicers dialog box:

Insert Slicers	?	×
<ul> <li>Warehouse</li> <li>SKU</li> <li>Unit Price</li> <li>Quantity</li> <li>Value</li> </ul>		
ОК	Ca	ncel

This dialog box lists each field in the PivotTable with a checkbox. To create a slicer from a field, check its associated checkbox. Once you have finished choosing the fields that you would like to appear as filters, click OK to apply your settings.

Returning to the worksheet, you will now see the slicer(s) placed there:



#### **Activity 5-2: Filtering Data Using Slicers**

You have constructed a PivotTable that displays the total sales made by each sales associate, as well as the total amount of bonuses they each received. Jerry Harrison and Leah Thompson are going to form their own sales department that sells a specialty product. In an effort to estimate bonus payouts and sales goals you would like to use slicers to display only their data in the PivotTable.

1. To begin, open Activity 5-2 from your Exercise Files folder:



Activity 5-2.xlsx Microsoft Excel Worksheet 15.5 KB

 Click inside the PivotTable to display the PivotTable Tools contextual tabs. Next, click PivotTable Analyze → Insert Slicer:



3. The Insert Slicer dialog box is now displayed:

AutoSav		- C - D =		,	Activity 5-2x	sx +		2	Search							Jane Gibson 🛛 🚺	) 🗊 -	- 0	×
File	Home Insert	Page Layout Fo	ormula	s Data	Review	View	v Help	PivotTal	ble Analyze	Design							🖻 Share	🖓 Comr	ments
PivotTable I PivotTable Option PivotTab	Active Fiel Sum of D V Te Field S	t ily Sale Drill Drill Down Up Active Field	역 Expa	and Field apse Field	→ Group 11 Ungro 17 Group Gro	Selection up Field	Insert Inse Slicer Time	ert dine Cor Filter	Filter Refe	Change Data Source ~ Data	Clear	Select N Pive Actions	love stTable	Fields, Items, & Sets ~ Ci	OLAP Relationshi Tools ~	PivotChart Recommendee PivotTables Tools	Field + List But	/- Field tons Heade	
H7	• I ×	√ <i>f</i> <sub>x</sub> 35403.4	30454	5454															
A	В	с		D	E	F	G		н	1	1	к	L	м	N				
1 Dai	lv Sales 8	Bonus Pavo	out					Daily	Ronus Amount	Daily Goals						PivotTable Field	S	· ·	~
2	,							s	50.00	\$ 2,500.00						Choose fields to add to rep	orts		(i) -
3															1				~
4 First N	ame Last Nam	ID	Dai	ily Sales	Bonus		Row Labels	• Sum	of Daily Sales	Sum of Bonus	Insi	ert Slicers		? X		Search			
5 Jackie	Williamson	Jackie_Williamson	\$	6,785.14	\$ 50.00		Bressan	\$	34,563.37	\$ 300.00						First Name			
6 Lucas	Bressan	Lucas_Bressan	\$	4,687.50	\$ 50.00		Harrison	\$	28,677.38	\$ 150.00		First Name				✓ Last Name			
7 Stanle	Prestwick	Stanley_Prestwick	\$	7,478.96	\$ 50.00		Prestwick	\$	35,403.43	\$ 250.00		Last Name							
8 Jerry	Harrison	Jerry_Harrison	\$	1,689.47	\$ -		Thompson	\$	37,255.31	\$ 250.00		ID ID				Daily Sales			
9 Leah	Thompson	Leah_Thompson	\$	5,478.45	\$ 50.00		Williamson	\$	55,850.75	\$ 400.00		Daily Sales				✓ Bonus			
10 Jackie	Williamson	Jackie_Williamson	\$	7,600.00	\$ 50.00		Grand Total	\$	191,750.22	\$ 1,350.00		Bonus				More Tabler			
11 Lucas	Bressan	Lucas_Bressan	\$	5,689.00	\$ 50.00											more represent			
12 Stanle	Prestwick	Stanley_Prestwick	\$	2,346.87	\$ -														
13 Jerry	Harrison	Jerry_Harrison	\$	1,687.00	\$ -														
14 Leah	Thompson	Leah_Thompson	\$	9,874.45	\$ 50.00														
15 Jackie	Williamson	Jackie_Williamson	\$	8,773.68	\$ 50.00											Drag fields between areas h	elow		
16 Lucas	Bressan	Lucas_Bressan	\$	7,835.87	\$ 50.00														
17 Stanle	/ Prestwick	Stanley_Prestwick	\$	6,898.05	\$ 50.00											T Filters	III Colum	ns	
18 Jerry	Harrison	Jerry_Harrison	\$	5,960.23	\$ 50.00												Σ Values		
19 Leah	Thompson	Leah_Thompson	\$	5,022.41	\$ 50.00												-		
20 Jackie	Williamson	Jackie_Williamson	\$	4,084.59	\$ 50.00														
21 Lucas	Bressan	Lucas_Bressan	\$	3,146.77	\$ 50.00												_		
22 Stanle	Prestwick	Stanley_Prestwick	\$	2,208.96	\$ -											E Rows	Σ Values		
23 Jerry	Harrison	Jerry_Harrison	\$	1,271.14	\$ -											Last Name	Sum of D	ally Caller	
24 Leah	Thompson	Leah_Thompson	\$	333.32	\$ -								OK	Cancel		Cost result	Sum of Di	my Jales	
25 Jackie	Williamson	Jackie_Williamson	\$	5,022.41	\$ 50.00						_		_	-	<u> </u>		sum of Bo	anus	<u> </u>
26 Lucas	Bressan	Lucas_Bressan	\$	4,084.59	\$ 50.00														
27 Stanle	Prestwick	Stanley_Prestwick	\$	3,146.77	\$ 50.00											-			
F	Sheet1	•								(			1	1	•	Defer Layout Update			Update
Ready 1	3															# C !!		+	100%

4. Check the Last Name checkbox and then click OK:

Insert Slicers			?	×
<ul> <li>First Name</li> <li>Last Name</li> <li>ID</li> <li>Daily Sales</li> <li>Bonus</li> </ul>	•			
	OK	D.	Cano	el

5. A slicer for the Last Name field now appears on your worksheet:

Last Name	¥∃ ∏≍
Bressan	
Harrison	
Prestwick	
Thompson	
Williamson	
1	

6. For this exercise you want to filter out everyone except for Jerry Harrison and Leah Thompson. While holding down the Ctrl key, click the Bressan, Prestwick, and Williamson buttons:

Last Name	%≡ 🔽
Bressan	
Harrison	
Prestwick	
Thompson	
Williamson	

7. The entries that you clicked on in the slicer are now filtered out of the PivotTable:

Row Labels 🚽	Sum o	of Daily Sales	Sum	of Bonus
Harrison	\$	28,677.38	\$	150.00
Thompson	\$	37,255.31	\$	250.00
Grand Total	\$	65,932.68	\$	400.00
Las	t Name	≥ š≡	$\mathbf{N}$	]
В	ressan			
н	arrison			
P	restwic	:k		
T	homps	on		
V	Villiams	son		

**8.** Save the current workbook as Activity 5-2 Complete and then close Microsoft 365 Excel to complete this exercise.

# **TOPIC C: Analyze Data with PivotCharts**

PivotTables are fantastic at helping you analyze your data, but they are not so great at being able to quickly convey it. To solve this problem, PivotTable data can quickly be converted into charts in the same way as regular datasets. In this topic you will learn how to use PivotCharts to present PivotTable data visually.

### **Topic Objectives**

In this session, you will learn:

- About PivotCharts
- How to create PivotCharts
- How to apply a style to a PivotChart

#### **PivotCharts**

**PivotCharts** are just like regular charts in that they are designed to convey data analysis in a visual form. The primary difference is simply that PivotCharts are linked to PivotTables, while charts are linked to data ranges or tables. Despite this difference, both PivotCharts and regular charts share many of the same features, such as dynamic updating, lots of chart types to choose from, and easy creation.

#### **Creating PivotCharts**

To insert a PivotChart into your worksheet, first click to select the PivotTable that you would like to work with. Next, click **PivotTable Analyze**  $\rightarrow$  **PivotChart**:



This action displays the **Insert Chart** dialog box. Just like when you are working with regular charts, you need to consider what chart type best suits your data. For this example, the Clustered Column chart type has been selected:

Insert Chart		?	×
All Charts			
P       Recent         □       Templates         □       Column         ▷       Line         ○       Pie         □       Bar         ▷       Area         ○       Map         □       Stock         ↓       Radar         □       Treemap         ③       Sunburst         □       Histogram         ↓       Box & Whisker         □       Waterfall         □       Funnel         ↓       Combo			
	ОК	Can	cel

Once you click OK, the PivotChart is added to the current worksheet, displaying data from the selected PivotTable:

	А	В	С	D	E	F	G	Н	- I	J	ŀ
1	Row Labels 🕫	Sum of Value	0							-0	
2	1574	403.65	Sum o	fValue		0				Ĭ +	
3	1358	449.10				Tetel					
4	47	1,600.22				Iotal					
5	1547	2,691.60	180,000	0.00							
6	1459	3,024.22	160,000	0.00		DL + A			-		
7	5167	3,825.00	140,000	0.00		Plot Area			-		
8	1478	4,013.59		0.00							
9	1567	10,331.30	80,000	0.00				_	— ■Tota	ы <u>Г</u>	
10	354	37,500.00	60,000	0.00					-		
11	235	62,698.90	40,000	0.00					-		
12	2358	116,797.08	20,000	0.00					-		
13	147	169,636.95		1574 1358	47 1547 14	59 5167 1478	1567 354	235 2358 1	47		
14	Grand Total	412,971.61						200 2000 2			
15			sku •			~					
16			0			0				_0	
17											

#### Applying a Style to a PivotChart

**PivotChart styles** are used to slightly adjust how a chart is laid out without changing the primary color scheme. This is excellent for adding visual flair to your chart and on occasion, a new chart style can also help a chart's readability.

To format a PivotChart with a style, first click to select the PivotChart and then click the Pivot Chart **Design** contextual tab. Examine the Chart Styles group and you will see a gallery of different chart styles that you can choose from:



Move your cursor over these chart styles and you will see a preview of how these styles will look once applied to your chart. Clicking on a style applies it:



You can also find these styles by clicking the Chart Styles button that appears to the top right of a selected chart.

### Activity 5-3: Analyzing Data with PivotCharts

Now that you have completed a PivotTable, you would like to visualize its results using a PivotChart.

**1.** To begin, open Activity 5-3 from your Exercise Files folder:



Activity 5-3.xlsx Microsoft Excel Worksheet 15.4 KB

 Click inside the PivotTable to select it and then click PivotTable Analyze → PivotChart:

	AutoSave 💽	<b></b>	- C - D <del>-</del>		Activity !	-3.xisx +										
Fi	le Hom	e Insert	Page Layout For	rmulas Data	Review Vie	w Help	vivotTable Analyze	Design								
Piv Piv	otTable Name otTable1 Options ~	Active Field: Last Name	brill Drill	Expand Field	→ Group Selectio Ingroup Group Field	Insert Inse Slicer Time	ert Filter line Connections	Refresh Change Dat Source *	a Clear Selec	t Move PivotTable	Fields, Iten & Sets ~	ns, OLAP R Tools ~	elationships	PivotCha	irt Recomm PivotTa	i) ? iended ables
	PivotTable		Active Field		Group	1 1	Filter	Data	Acti	ns		Calculations			Tools	1
65 • : × √ fe Bressan																
	А	В	С	D	E F	G	н	1	J K	L	M	N	0	P	Q	R
1	Daily S	Sales &	Bonus Payo	ut			Daily Bonus Am	ount Daily Goals								
2							\$ 50	.00 \$2,500.00								
3																
4	First Name	Last Name	ID	Daily Sales	Bonus	Row Labels	Sum of Daily Sa	les								
5	Jackie	Williamson	Jackie_Williamson	\$ 6,785.14	\$ 50.00	Bressan	18.	03%								
6	Lucas	Bressan	Lucas_Bressan	\$ 4,687.50	\$ 50.00	Harrison	14.	96%								
7	Stanley	Prestwick	Stanley_Prestwick	\$ 7,478.96	\$ 50.00	Prestwick	18.	46%								
8	Jerry	Harrison	Jerry_Harrison	\$ 1,689.47	\$ -	Thompson	19.	43%								
9	Leah	Thompson	Leah_Thompson	\$ 5,478.45	\$ 50.00	Williamson	29.	13%								
10	Jackie	Williamson	Jackie_Williamson	\$ 7,600.00	\$ 50.00	Grand Total	100.	00%								
11	Lucas	Bressan	Lucas_Bressan	\$ 5,689.00	\$ 50.00											

**3.** The Insert Chart dialog box is now displayed. For this exercise, click the **Pie** category:





**4.** With the default pie chart selected, click **OK** to apply the new settings:

5. The new PivotChart now appears on your worksheet:



6. As you can see, Williamson generated most of the total sales, so you should filter his results out to focus on the remaining associates. On the PivotChart, click the Last Name drop-down list:





7. On the menu that appears, deselect the **Williamson** checkbox and then click **OK**:

**8.** The results for Williamson are no longer displayed on the PivotChart or the PivotTable:



**9.** Save the current workbook as Activity 5-3 Complete and then close Microsoft 365 Excel to complete this exercise.

## Summary

In this lesson you learned what PivotTables are and how they can be best used to answer different types of questions related to your data. You now know how to insert a PivotTable, as well as how to add and remove fields from it. Additionally, you are able to generate PivotCharts from a PivotTable, and use slicers to selectively filter out unique field entries.

## **Review Questions**

- 1. What is pivoting in Excel?
- 2. Where do the field names come from in the Choose fields to add to report section of the PivotTable Fields task pane?
- 3. What happens to fields that are dragged to the Values area on the PivotTable Field task pane?
- 4. What is the command sequence to insert a PivotChart?
- 5. What do the buttons on a slicer represent?

# LESSON 6: WORKING WITH GRAPHICAL OBJECTS

#### **Lesson Objectives**

In this lesson you will learn how to:

- Insert and modify graphical objects
- Layer and group graphical objects
- Incorporate SmartArt into your workbooks

## **TOPIC A: Insert and Modify Graphic Objects**

While the default appearance of your worksheets can be quite plain, Excel offers you access to a variety of graphical objects that you can use to enhance their visual appeal. In this topic, you will learn all about the various types of graphical objects that you can add to your worksheets, as well as the contextual tabs that are used to work with them.

#### **Topic Objectives**

In this session, you will learn:

- About graphical objects
- How to insert shapes
- How to insert WordArt
- How to insert text boxes
- How to insert images
- About the Picture Format contextual tab
- About the Shape Format contextual tab
- About the SmartArt contextual tabs

### **Graphical Objects**

In Excel there are six types of **graphical objects** that can be inserted into a workbook: pictures, shapes, icons, 3D models, SmartArt, and screenshots. While each graphical object type is mostly tailored to a specific purpose, all of them behave in the same way once they are placed on a worksheet. For example, they are all able to be resized, changed, and moved using the same techniques.

The commands to insert graphical objects are located in the **Illustrations** group on the Insert tab:



Here is an overview of these commands:

- The **Pictures** drop-down command allows you to insert image files from outside of Excel into your worksheet. These can be pictures on your device, from a stock library, or from online. Most common image formats are supported.
- The **Shapes** drop-down command inserts basic shapes, including circles, squares, rectangles, text callouts, and arrows. You can customize all of these objects in a variety of ways.
- The **Icons** command allows you to select from a wide array of available icons, searchable by category.
- The **3D Models** drop-down command allows you to insert 3D models from your own device or from a Microsoft online library, searchable by category.
- The **SmartArt** command allows you to choose and insert a SmartArt graphic. These types of graphics are pre-configured and are typically used to graphically represent text-based content, such as flowcharts and lists.
- Finally, the **Screenshot** drop-down command allows you to take a screenshot of any open window or your desktop. This screenshot is then inserted into the current worksheet.

#### **Inserting Shapes**

To insert a shape into the current worksheet, first click **Insert**  $\rightarrow$  **Shapes**:



This dropdown command reveals that there are nine major categories in the Shapes menu:

- Recently Used Shapes: Contains the most recently used shapes (up to the last 24).
- Lines: Create a variety of lines and plain arrows.
- **Rectangles:** Create a variety of rectangular shapes.
- **Basic Shapes:** Create basic shapes, such as circles and triangles. Fun shapes such as smiley faces are also included here.
- Block Arrows: Create block-style arrows and lines.
- Equation Shapes: Create mathematical shapes.

- Flowchart: Create shapes used in flowcharts, such as decision points and terminators.
- Stars and Banners: Offers 20 different types of these shapes.
- **Callouts:** Annotate other drawings and images.

Once you decide on the shape that you would like to insert, click on its listing in the dropdown menu. This action causes your cursor to change into a crosshair. You can then click once to add the shape using its default dimensions or click and drag over the worksheet area to add it using custom dimensions of your own selection:



Upon releasing your mouse button, the shape now appears on the worksheet. You can then manipulate and work with it as you would any other object in Excel:



#### **Inserting WordArt**

WordArt is special text that you can add to your workbook that includes decorative flair such as drop-shadows and other accents. To insert WordArt into the current worksheet, click Insert → WordArt → [WordArt Style]:



The WordArt is then added in its own text box using the style that you selected:



Click inside of this text box and type the content that you would like to appear inside of it:



You can then move this text around on the current worksheet in the same manner as you would move any other object in Excel.

#### **Inserting Text Boxes**

As the name suggests, **text boxes** are simply boxes that you can add to a worksheet that are used to display text without having to embed that text directly within a cell. This provides some added flexibility when designing your worksheets and it is commonly used to add additional information without interfering with the data.

To insert a text box into a worksheet, click **Insert → Text Box**:



This action changes the shape of your cursor. Use your cursor to draw the text box on the current worksheet through the click and drag method:



Upon releasing your mouse button, the new text box is added and selected. Inside this text box, you can immediately begin adding any text that you want included:



#### **Inserting Images**

**Images** are able to be inserted into your workbooks from your computer or from online sources. To insert images from your computer, first click **Insert**  $\rightarrow$  **Pictures**  $\rightarrow$  **This Device**:



This action displays the **Insert Picture** dialog box. Use its controls to browse to the location on your computer where the image that you would like to insert is located. Click to select the image and then click **Insert**:


The picture is then inserted into your worksheet where you can move and resize it like any other object in Excel:



To insert an online picture, click **Insert** → **Pictures** → **Online Pictures**:





To use the Bing image search functionality, type keywords into the provided text box and press Enter. Results from you search are displayed. Click to select the result that you would like to add to the current worksheet and then click **Insert**:



The selected image is then inserted into the current worksheet. You can then work with this image in the same way you would work with any other graphical object in Excel:



#### The Picture Format Contextual Tab

The **Picture Format** contextual tab is displayed whenever a graphical object that is considered a picture is selected. This tab displays many of the tools and commands that you will need to format and edit a picture in Excel:



This tab contains the following groups:

- The **Adjust group** contains image editing tools, including options to remove the background and touch up the picture.
- The **Picture Styles group** contains pre-configured styles that you can apply to an image, as well as menus to customize the border, layout, and effects applied to the image.
- The Arrange group allows you to manage the position of images.
- The **Size group** gives you control over the height and width of the image.

#### The Shape Format Contextual Tab

The **Shape Format** contextual tab is displayed whenever a graphical object that is considered a drawing (such as a shape) is selected. This tab displays many of the tools and commands that you will need to format and edit a drawing in Excel:



This tab contains five groups with commands that can be used to edit drawings in some way:

- The **Insert Shapes group** allows you to insert more shapes into the current worksheet, as well as insert text boxes and change the type of shape.
- The **Shape Styles group** includes a gallery that contains a variety of pre-configured styles from which you can choose. You can also customize the fill, outline, and effects of a selected shape.
- The **WordArt Styles group** also contains a gallery, but this one includes a variety of WordArt styles that can be added to drawings. You can also customize the fill, outline, and effects of the WordArt.
- The **Arrange group** allows you to adjust how objects are placed on a worksheet and the order in which they appear if they overlap.
- Finally, the **Size group** includes two increment boxes that are used to change the width and height of a selected object.

#### The SmartArt Contextual Tabs

The **SmartArt** contextual tab set is displayed whenever a SmartArt graphic is selected. This contextual tab set consists of two tabs: SmartArt Design and Format.

#### The SmartArt Design Tab

The **SmartArt Design** tab is comprised of four groups that contain commands to change the structure of SmartArt graphics, apply styles, and more:

AutoSave 💽 🖫 🍤 ° 🖓 °	Book1 - Excel	₽ Search		Jane Gibson 🥵 🖽 — 🗆 🗙
File Home Insert Page Layout F	ormulas Data Review View Help SmartArt Des	sign Format		🖒 Share 🖓 Comments
Add Shape ▼ ← Promote ↑ Move Up     Add Bullet → Demote ↓ Move Down     Text Pane ♂ Right to Left 器 Layout ∨		Change Colors -		Reset Convert Graphic to Shapes
Create Graphic	Layouts		SmartArt Styles	Reset

Let's look at each of these groups:

- The first group on the SmartArt Design tab is the **Create Graphic group**. This is where you will find commands to add SmartArt shapes and text to the selected SmartArt graphic. Additionally, this group also contains commands to position the selected SmartArt graphic in the hierarchy of other SmartArt graphics.
- The **Layouts group** contains a gallery of possible layout options from which you can choose and then apply.
- The **SmartArt Styles group** contains a gallery with styles to change the color scheme and effects of the selected SmartArt graphic. You can also change the overall color scheme from this group.
- Finally, the commands inside the **Reset group** are used to remove customization from the selected graphic, as well as convert SmartArt graphics into basic Excel shapes.

#### The Format Tab

The **Format** tab is comprised of five groups. Most of the commands on this tab are used to customize individual shapes within a SmartArt graphic:

Let's look at each of these groups:

- The **Shapes group** contains commands to change the shape and size of individual SmartArt shapes.
- The **Shape Styles group** includes a gallery of styles that can be applied to a selected SmartArt shape.
- The **WordArt Styles group** also contains a gallery, but this is used to apply formatting to text inside a SmartArt shape.
- The **Arrange group** includes commands for customizing how shapes are arranged and placed on the worksheet.
- The **Size group** contains increment controls to change the size of the selected SmartArt shape.

### **Activity 6-1: Inserting Graphical Objects**

To add visual flair to one of your workbooks, you would like to insert a few graphical objects.

**1.** To begin, open Activity 6-1 from your Exercise Files folder:



Activity 6-1.xlsx Microsoft Excel Worksheet 15.5 KB

Let's start by inserting some online pictures. Click Insert → Pictures → Online Pictures:



**3.** The Insert Pictures dialog box is now displayed:

Online Pictures							© ©
Airplane	Animals	O Apple	р Autumn	رم Background	Balloons	Baseball	р Beach
Birds	Birthday Cake	Books	Pare	Cats	Celebration	Coffee	Dance
р Dog	Eamily	Fire	Fireworks	Fish View All	Flower	yo Flowers	Food
Friends CheDrive	Graduation	House	lce cieam	e Mán	Uncoll 1	D Money	

4. Click inside the search text box and type "Calculator." Execute the search by pressing Enter:



5. The results from the search are now displayed. Click any result that you like, then click Insert:



- AutoSave 👓 日 り~ Home Insert Page Layout Formulas Data Review View Help Picture Format Shape Forma 🔆 💽 🔚 👘 Trick Compress Pictures 5 7 🐼 Change Picture ~ 2 Corrections Color Artistic Transparency Adjust Pictu fx • : ×  $\checkmark$ DEFGHIJKLMHOPQRSTUV
- **6.** The selected Clip Art is placed on the current worksheet:

**7.** If necessary, click and drag the top right-hand corner handle of the image to make the image about the same size as the example shown below:

	A	В	C	D	E	F	G		н			J	
1	Daily	Sales & I	Bonus Payo	ut			Da	aily	Bonus Amou	Dai	ly Goals		
2								\$	50.00	\$ ;	2,500.00		
3													
4	<sup>-</sup> irst Nam	e Last Name	ID	Daily Sales	Bonus		Rov Lab 🖛	Su	m of Daily Sa	Su	m of Bon		
5	Jackie	Williamson	Jackie_Williamson	\$ 6,785.14	\$50.00		Bressan	\$	34,563.37	\$	300.00		
6	Lucas	Bressan	Lucas_Bressan	\$ 4,687.50	\$50.00		Harrison	\$	28,677.38	\$	150.00		
7	Stanley	Prestwick	Stanley_Prestwick	\$ 7,478.96	\$50.00		Prestwick	\$	35,403.43	\$	250.00		
8	Jerry	Harrison	Jerry_Harrison	\$ 1,689.47	\$ -		Thompson	\$	37,255.31	\$	250.00		
9	Leah	Thompson	Leah_Thompson	\$ 5,478.45	\$50.00		Williamson	\$	55,850.75	\$	400.00		
10	Jackie	Williamson	Jackie_Williamson	\$ 7,600.00	\$50.00	R	Grand Tota	\$	191,750.22	. *	******		
11	Lucas	Bressan	Lucas_Bressan	\$ 5,689.00	\$50.00	9.							
12	Stanley	Prestwick	Stanley_Prestwick	\$ 2,346.87	\$ -	_			do la				
13	Jerry	Harrison	Jerry_Harrison			-			C)				
14	Leah	Thompson	Leah_Thompsor			C.Le.							
15	Jackie	Williamson	Jackie_Williamsc			~ 4							
16	Lucas	Bressan	Lucas_Bressan			37110							
17	Stanley	Prestwick	Stanley_Prestwic			19560	In Is						
18	Jerry	Harrison	Jerry_Harrison				9111						
19	Leah	Thompson	Leah_Thompsor		20	-	SIL I						
20	Jackie	Williamson	Jackie_Williamsc		200	6	1000						
21	Lucas	Bressan	Lucas_Bressan			22	~		9				
22	Stanley	Prestwick	Stanley_Prestwic	1 and 1	1 8								
23	Jerry	Harrison	Jerry_Harrison		75	20							
24	Leah	Thompson	Leah_Thompsor	00	127	22	/						
25	Jackie	Williamson	Jackie_Williamsc		08								
26	Lucas	Bressan	Lucas_Bressan		0	*							
27	Stanley	Prestwick	Stanley_Prestwic										
28	Jerry	Harrison	Jerry_Harrison		9								
29	Leah	Thompson	Leah_ThompsoQ	¥ 1,271,14	¥ -		-	_	-0				
30	Jackie	Williamson	Jackie_Williamson	n\$7.478.96.	\$50.00	is licensed ur	der CC BY-SA	~					
31	Lucas	Bressan	Lucas_Bressan	\$ 1,689.47	\$ - C	)		)					
32	Stanley	Prestwick	Stanley_Prestwick	\$ 5,478.45	\$50.00								
		Shee	t1 (+)										

(You may be able to skip this step if you picked a small image.)

	A	В	C	D	E	F	G	Н	1	J
1	Daily	Sales & B	Bonus Payo	ut			Da	aily Bonus Amou	Daily Goals	
2								\$ 50.00	\$ 2,500.00	
3										
4	First Nam	Last Name	ID	Daily Sales	Bonus		Rov Lab 🖛	Sum of Daily S	Sum of Bon	
5	Jackie	Williamson	Jackie_Williamson	\$ 6,785.14	\$50.00		Bressan	\$ 34,563.37	\$ 300.00	
6	Lucas	Bressan	Lucas_Bressan	\$ 4,687.50	\$50.00		Harrison	\$ 28,677.38	\$ 150.00	
7	Stanley	Prestwick	Stanley_Prestwick	\$ 7,478.96	\$50.00		Prestwick	\$ 35,403.43	\$ 250.00	
8	Jerry	Harrison	Jerry_Harrison	\$ 1,689.47	\$ -		Thompson	\$ 37,255.31	\$ 250.00	
9	Leah	Thompson	Leah_Thompson	\$ 5,478.45	\$50.00		Williamson	\$ 5(78)9.75	\$ 400.00	
10	Jackie	Williamson	Jackie_Williamson	\$ 7,600.00	\$50.00		Grand Tota	\$ 191,750.22	******	
11	Lucas	Bressan	Lucas_Bressan	\$ 5,689.00	\$50.00	0				0
12	Stanley	Prestwick	Stanley_Prestwick	\$ 2,346.87	\$ -	- Y				
13	Jerry	Harrison	Jerry_Harrison	\$ 1,687.00	\$ -			Cale		
14	Leah	Thompson	Leah_Thompson	\$ 9,874.45	\$50.00					
15	Jackie	Williamson	Jackie_Williamson	\$ 8,773.68	\$50.00			Pane	1	
16	Lucas	Bressan	Lucas_Bressan	\$ 7,835.87	\$50.00			19560	IS IS	
17	Stanley	Prestwick	Stanley_Prestwick	\$ 6,898.05	\$50.00				91715	
18	Jerry	Harrison	Jerry_Harrison	\$ 5,960.23	\$50.00			100 13		
19	Leah	Thompson	Leah_Thompson	\$ 5,022.41	\$50.00			2692	and a	
20	Jackie	Williamson	Jackie_Williamson	\$ 4,084.59	\$50.00	- 0		592	0	9
21	Lucas	Bressan	Lucas_Bressan	\$ 3,146.77	\$50.00			0000	5/	
22	Stanley	Prestwick	Stanley_Prestwick	\$ 2,208.96	\$ -			NO A		
23	Jerry	Harrison	Jerry_Harrison	\$ 1,271.14	\$ -		00	280	/	
24	Leah	Thompson	Leah_Thompson	\$ 333.32	\$ -			ONN		
25	Jackie	Williamson	Jackie_Williamson	\$ 5,022.41	\$50.00					
26	Lucas	Bressan	Lucas_Bressan	\$ 4,084.59	\$50.00					
27	Stanley	Prestwick	Stanley_Prestwick	\$ 3,146.77	\$50.00					
28	Jerry	Harrison	Jerry_Harrison	\$ 2,208.96	\$ -	8		O		_0_
29	Leah	Thompson	Leah_Thompson	\$ 1,271.14	\$ -	Y	his Photo by Unkn	own Author is licensed ur	der CC BY-SA	Í.
30	Jackie	Williamson	Jackie_Williamson	\$ 7,478.96	\$50.00	0		0		)
31	Lucas	Bressan	Lucas_Bressan	\$ 1,689.47	\$ -					
32	Stanley	Prestwick	Stanley_Prestwick	\$ 5,478.45	\$50.00					
	<	Shee	t1 (+							

8. Now, click and drag the image so that it appears just under the existing PivotTable:

9. Now, you just need to add a small shape to the title. Click Insert →
 Shapes → 5-Point Star:

AutoSave 💽 🗄 りょ ᢗょ 🤆	l <del>↓</del> Acti	vity 6-1.xlsx 👻	₽ Search
File Home Insert Page Lay	out Formulas Data Review	View Help Shape Format	Picture Format
PivotTable Recommended Table PivotTables	Shapes V Models v	Get Add-ins     Image: Constraint of the second secon	Recommended Charts
Tables	Recently Used Shapes	Add-ins	Charts
	⊠\\□0□∆lı¢\$G &\\{}☆		
Daily Sales & Bonus Payout	liner		
Daily Sales & Bonus Payout           2           3           4         First Name Last Name         Doald           5         Jackie Willamson Jackie, Villamson \$           6         Lucas Dressan         Louas Dressan \$           7         Stanley Prestivick Stanley, Prestrivic \$           8         Jerry Harrison         Jerry Harrison \$           9         Leah Thompson Leah, Thompson \$           10         Jackie Willamson Jackie, Villamson \$           11         Lucas Dressan Lucas, Dressan \$           12         Stanley Prestrivick \$           13         Jerry Harrison Jerry, Harrison \$           14         Leah Thompson Leah, Thompson \$           15         Jackie Willamson Jerry, Harrison \$           16         Jerry Harrison Jerry, Harrison \$           17         Jackie Willamson Jackie, Villamson \$           18         Jerry Harrison Jerry, Harrison \$           19         Jerry Harrison Jerry, Harrison \$           19         Jerry Prestrivick Stanley, Prestrivick \$           19         Jackie Willamson Jackie, Villamson \$           20         Jackie Willamson Jackie, Prestrivick \$           21         Lucas Dressan \$           22         Jackie Willamson \$      2	Lines Lines Rectangles Basic Shapes Basic Shapes D 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	iou Daily Goals           D1 \$ 2,500.00           S2 Sum of Bor           37 \$ 300.00           38 \$ 550.00           43 \$ 250.00           75 \$ 400.00           22	
27 Stanley Prestwick Stanley_Prestwick \$	╋┍╳╬═┲		
20 Jeeny namon Jeffy_Talfiston 3 - 23 Leah Thompson Lack_Thompson \$ 30 Jackie Williamson 3- 31 Lucas Bressan Lucas_Bressan \$ 32 Stanley Prestvick Stanley_Prestvick \$ 5 heet1 ⊕		d under <u>CC BY SA</u>	
	Stars and Banners		
	##++++++++++++++++++++++++++++++++++++		
	Callouts ロック ロット ロ ロ ロ ロ ロ ロ ロ ロ ロ ロ ロ ロ ロ ロ ロ ロ ロ ロ ロ		

**10.** Your cursor turns into a crosshair. Just to the right of the title, click and drag until the star shape is roughly the same height as row 1:

	А	В	С	D	E
1	Daily S	ales & E	Bonus Payo	ut 📩	
2				I	
3					
4	First Name	Last Name	ID	Daily Sales	Bonus

**11. Release your mouse** button to add the shape. **Click on a blank area** of the worksheet to deselect the new shape. The worksheet now looks similar to this:



**12.** Save the current workbook as Activity 6-1 Complete and then close Microsoft 365 Excel to complete this exercise.

# **TOPIC B: Layer and Group Graphical Objects**

Once you have added graphical objects to a worksheet, it is important to know how to organize their positioning in relation to one another. Using layers, you can choose which object overlaps another, while grouping allows you to group multiple graphical objects together so that you can adjust their properties all at the same time. In this topic, you will learn all about layering and grouping graphical objects in Microsoft 365 Excel.

#### **Topic Objectives**

In this session, you will learn:

- About layering objects
- About grouping objects
- About positioning objects

#### **Layering Objects**

When a graphical object is added to a worksheet, it is added to its own layer so that it can overlap any existing objects. You can manipulate a layer and how it interacts with others by moving it forward or backward in the stack of layers – just like moving the top-most card in a deck below the next and vice-versa. To do this, first click to select the object that you would like to work with and then click **Picture Format (or Drawing Format)** → **Bring Forward or Send Backward**:



If you would instead like to move a selected graphical object to the bottom or top of the stack of layers, the **Bring Forward**  $\rightarrow$  **Bring to Front**, or **Send Backward**  $\rightarrow$  **Send to Back** commands can be used:



Alternatively, you can view and interact with the various graphical objects that exist on layers within the worksheet by opening the Selection task pane. To do this, click **Picture** Format (or Shape Format) → Selection Pane:



This **Selection** task pane lists all of the graphical objects that exist on the current worksheet and how they are currently arranged:

Selection	- ×
Show All Hide All	$\land$ $\lor$
Picture 4	0
Rectangle: Rounded Corners 1	0

If you would like to change how these objects are arranged, click and drag them around in this list to shift their location:



#### **Grouping Objects**

If you would like to work with multiple objects as a **group**, such as moving them all at the same time, you can group them together. To do this, select each graphical object that you would like to group (hold the Ctrl key while clicking on each object). Next, click **Picture** Format (or Shape Format)  $\rightarrow$  Group  $\rightarrow$  Group:

AutoSave 👓 🗄 🍤 - 🖓 -	÷	Book1.xlsx +	₽ Search		Jane Gib:	son Ja
File Home Insert Page Layout	Formulas Data	a Review View Help	Shape Format Graphics Format			
A  □ ○ □ ^ (	Abc Abc Ab	bc Abc Abc Abc	Abc	A A Text Fill * A Text Outline * A Text Effects *	t Bring Send Selection Coup Width:	0
Insert Shapes		Shape Styles	ra.	WordArt Styles Ta Accessit	bility Arrange Size	F <sub>N</sub>
					III Ungroup	

Once two or more graphical objects are grouped together, any changes made to the group are applied to all of its members – including size, position, and more:

	Α		В	С	D	E	F
1			, 0	ſ			
2							
3							
4				Ĭ			
5							
6		d	)	-0			
7		Acm	e Widgets Co. Glo	bal Sales			
8							
9	Quarter		Global Sales	Outside of USA			
10	Q1	\$	75,000,000.00	32%			
11	Q2	\$	61,000,000.00	28%			
12	Q3	\$	56,000,000.00	21%			
13	Q4	\$	83,000,000.00	35%			
14							

To ungroup any objects that have been grouped together, first click to select the group and then click **Picture Format (or Shape Format)**  $\rightarrow$  **Group**  $\rightarrow$  **Ungroup**:



After ungrouping a group, you can quickly reform it by selecting one of the objects that was a member of the previous group and clicking **Picture Format (or Shape Format)**  $\rightarrow$  **Group**  $\rightarrow$  **Regroup.** 

#### **Positioning Objects**

Objects can be **positioned** in relation to the grid of the worksheet, as well as in relation to other shapes that appear on it. You can enable either of these options by clicking **Picture Format**  $\rightarrow$  **Align**  $\rightarrow$  **Snap to Grid (or Snap to Shape)** while the object that you would like to work with is selected:



To align objects in relation to themselves, select the objects you wish to align, then click **Shape Format**  $\rightarrow$  **Align**, then select from the available options:

) =		Book				, Р s	earch									Jane Gibson 🦸
out Formula	as Data	Review	View Hel	p Shape	Format	Graphics F	ormat									
Abc	Abc Abc	Abc	Abc Abc	Abc	<ul> <li>→ Shap</li> <li>→ I → Shap</li> <li>→ I → Shap</li> <li>→ I → Shap</li> </ul>	oe Fill ~ oe Outline ~ oe Effects ~	Α	Α	A	A Text Fi	ill ~ Iutline ~ ffects ~	Alt Text	Bring Forward ~	Send Backward ~	Selection Pane	PAlign ↓ ↑ Heinht: ↓
		Sha	pe Styles			5	<u>.</u>	Wo	ordArt Styles		IS A	ccessibility		Arra	inge	니 Align Right
																T Align Iop
с	D	E F	G	н	1	J	K ((ミケ	L	М	N	0	Р	Q	R	S	⊕ Align <u>M</u> iddle W
								6	۶.							Align Bottom
						0	0		y 							Distribute Horizontally
										0						금 Distribute Vertically
						1										Snap to Grid
Sales						0				b						□ <sup>4</sup> Snap to Shape
utside of USA																Uiew Gridlines
32%																
28%						0	00		,	Ó						
35%																

In this example, selecting Align Center aligns the two shapes horizontally, then repeating the process and selecting Align Middle, aligns the shapes vertically, centering one over the other:



### Activity 6-2: Layering and Grouping Shapes

The workbook that you have been working on includes multiple shapes. You would like to arrange how these objects are layered, as well as group them together.

**1.** To begin, open Activity 6-2 from your Exercise Files folder:



2. First, you need to move the star shape so that it appears in front of the calculator drawing. Click to select the calculator image and then click Picture Format → Send Backward → Send to Back:





**3.** The star shape layer now appears above the calculator drawing:

- i reservice. 30,400.40 Ŷ 200.00 ų \$ 250.00 Thompson 37,255.31 \$ Williamson \$ 400.00 55,850.75 \$ Grand Total \$ 19 50.22 \$ 1,350.00
- 4. While holding down the Ctrl key, click to select both the calculator drawing and the star shape:

5. Click **Picture Format** → **Group** → **Group**:



6. The two graphical objects are now grouped together. Click and drag this group so that it is placed to the right of the table:

1	A	8	c	D	E	F G	H		1	1	K	L.	M	N	0	P Q	R	S	T	U	v	W	X =
i	Daily S	Sales & I	Bonus Payo	ut			Daily Bonu	Amount	Daily Goals						C	\$r							
2							\$	50.00	\$ 2,500.00				(C)	Q									
3													0.0										
4	First Name	Last Name	ID	Daily Sales	Bonus	Row Labels	Sum of Dai	ly Sales S	um of Bonus		¢		0			9							
5	Jackie	Williamson	Jackie_Williamson	\$ 6,785.14	\$ 50.00	Bressan	\$ 3	4,563.37	\$ 300.00														
6	Lucas	Bressan	Lucas_Bressan	\$ 4,687.50	\$ 50.00	Harrison	\$ Z	8,677.38	\$ 150.00								-						
7	Stanley	Prestwick	Stanley_Prestwick	\$ 7,478.96	\$ 50.00	Prestwick	\$ 3	5,403.43	\$ 250.00				155										
8	Jerry	Harrison	Jerry_Harrison	\$ 1,689.47	s -	Thompson	\$ 3	7,255.31	\$ 250.00				15 145				Ĭ						
9	Leah	Thompson	Leah_Thompson	\$ 5,478.45	\$ 50.00	Williamson	\$ 5	5,850.75	\$ 400.00					1Hgn	•								
10	Jackie	Williamson	Jackie_Williamson	\$ 7,600.00	\$ 50.00	Grand Total	\$ 19	1,750.22	\$ 1,350.00				a state	Sup P									
11	Lucas	Bressan	Lucas_Bressan	\$ 5,689.00	\$ 50.00							53	200	50									
12	Stanley	Prestwick	Stanley_Prestwick	\$ 2,346.87	S -						ò	19	2000	591		0							
13	Jerry	Harrison	Jerry_Harrison	\$ 1,687.00	s -							9	1 m (m)	21	C		-0						
14	Leah	Thompson	Leah_Thompson	\$ 9,874.45	\$ 50.00						1 4	92	1200										
15	Jackie	Williamson	Jackie_Williamson	\$ 8,773.68	\$ 50.00						- 4	0	200										
16	Lucas	Bressan	Lucas_Bressan	\$ 7,835.87	\$ 50.00								100	//									
17	Stanley	Prestwick	Stanley_Prestwick	\$ 6,898.05	\$ 50.00							~	0/11	/									
18	Jerry	Harrison	Jerry_Harrison	\$ 5,960.23	\$ 50.00							-		·									
19	Leah	Thompson	Leah_Thompson	\$ 5,022.41	\$ 50.00																		
20	Jackie	Williamson	Jackie_Williamson	\$ 4,084.59	\$ 50.00						ò		0			-0							
21	Lucas	Bressan	Lucas_Bressan	\$ 3,146.77	\$ 50.00																		
22	Stanley	Prestwick	Stanley_Prestwick	\$ 2,208.96	S -																		
23	Jerry	Harrison	Jerry_Harrison	\$ 1,271.14	S -																		
24	Leah	Thompson	Leah_Thompson	\$ 333.32	s -																		
25	Jackie	Williamson	Jackie_Williamson	\$ 5,022.41	\$ 50.00																		
26	Lucas	Bressan	Lucas_Bressan	\$ 4,084.59	\$ 50.00																		
27	Stanley	Prestwick	Stanley_Prestwick	\$ 3,146.77	\$ 50.00																		
28	Jerry	Harrison	Jerry_Harrison	\$ 2,208.96	s -																		
29	Leah	Thompson	Leah_Thompson	\$ 1,271.14	s -	This Photo by Unk	rown Author is	licensed unde	CC BY-SA														
20	tackia	Milliameon	tackia Milliameon	C 7 478 96	\$ 50.00																		
		Charact 1	00																				

**7.** Save the current workbook as Activity 6-2 Complete and then close Microsoft 365 Excel to complete this exercise.

### TOPIC C: Incorporate SmartArt

SmartArt combines text-based information with graphics to create a more appearancedriven look. Using Excel's tools, you will be able to create SmartArt that can be used enhance the presentation of your text-based information. During this topic, you will learn how to insert SmartArt into your workbooks, and how to customize it.

#### **Topic Objectives**

In this session, you will learn:

- About SmartArt graphics
- About the Choose a SmartArt Graphic dialog box
- About the Text pane

#### About SmartArt

**SmartArt** graphics are used to visually represent text-based content. A great example of this is a flowchart or hierarchy diagram. While you can describe these things, it is much more intuitive to the reader to see a graphic that describes and separates each step. Just like other graphical objects, SmartArt graphics are individual objects on a worksheet that can be moved and modified as group when needed. Some of these changes are made using the **sizing handles (1)**. The **Text Pane (3)** allows you to quickly add text. This pane is toggled by clicking the **arrow button (2)** that appears on the left side of a SmartArt object:



### The Choose a SmartArt Graphic Dialog Box

To insert SmartArt into a worksheet, click Insert → SmartArt:



This action displays the Choose a SmartArt Graphic dialog box:



The Choose a SmartArt Graphic dialog box is divided into several categories of graphics, each of which is displayed in a panel on the left. Here is an overview of each of these categories.

- The List category is used to create bulleted lists with some visual flair
- The **Process category** is used to illustrate information in sequential order, such as a series of steps to complete a task
- The Cycle category is intended to illustrate continuous processes
- The **Hierarchy category** will display the steps in a process or the people in an organizational chart

- The Relationship category is used to show how elements can connect to each other
- The Matrix category is used to show how elements in a system relate to it
- The **Pyramid category** is used to create diagrams that display how elements of varying importance, size, or power relate proportionally to each other
- The **Picture category** is used to create diagrams that display content using a combination of text and graphics
- The **Office.com category** displays additional layouts that are available on Office.com.

Clicking on these categories changes which type of SmartArt layouts are displayed in the middle pane. Clicking the thumbnail for a SmartArt graphic displays a preview for that graphic as well as a brief description for it. With the thumbnail still selected, click **OK** to insert this graphic.

#### About the Text Pane



When you first insert SmartArt into a worksheet, the **Text** pane is displayed beside it:

Using this pane, you are able to enter text into the SmartArt graphic. While you are still able to enter text directly into the graphic by clicking on the placeholder text and typing over it, the Text pane offers broader control.

For example, if you are working with bulleted lists, the Text pane gives you a clear indication where you are inserting text in relation to the other bullet points. Additionally, because each bullet point represents a graphic, adding new graphics is usually as simple as adding

another bullet point inside the Text pane. (However, note that not all SmartArt graphics work this way. Depending upon exactly which SmartArt graphic that you are working with, adding new bullet points may just add a bullet point to the text within the shape.)

#### Activity 6-3: Incorporating SmartArt

You need to create a simple SmartArt graphic that lists all of the sales associates in your department.

1. To begin, open Activity 6-3 from your Exercise Files folder:



Microsoft Excel Worksheet

#### Click Insert -> SmartArt: 2.



3. The Choose a SmartArt Graphic dialog box is now displayed. Ensure that either the All or List category has been chosen and then ensure that the Basic Block List graphic has been selected. Click OK:





4. The SmartArt graphic is now placed on the current worksheet:

#### 5. Inside the Text pane, type "Williamson":

Type your text here	×	¢+	0		
• Williamson	-	0			
• [Text]					
• [Text]	d Willi	amson 🗖	[Text]		[Text]
• [Text]			[10/10]		[rent]
• [Text]	>	• •	i		
		[Text]		[Text]	
		_			
Basic Block List					
	0		0		(

(If you do not see the Text pane, click **SmartArt Design** → **Text Pane.**)

6. Click to select the next bullet point in the list. This time type "Bressan":





7. Repeat the above steps until the Text pane looks like the example shown here:

8. With the SmartArt still selected, click **SmartArt Design** contextual tab, then hover your mouse over the various styles in the SmartArt Styles group. Click the **Polished** style:

xlsx +			9	D Search												Jane Gibson
Help	SmartA	rt Design	Format													
-			ange lors v					SmartArt	Styles	6					Reset Graphic t Res	Convert o Shapes set
1	J	К	L	М	N	0	р	Q	R	S	т	U	v	w	x	Y
		Type your	text here		×	·			0				-0			
	Williamson     Bressan     Prestwick     Harrison     Tramson			Williamson Bressan Prestwick						:k						
						На	arriso	'n	Thom	npson						
		Basic Bloo	ck List						0				0			



9. Now click SmartArt Design → Change Colors → Colorful – Accent Colors:

**10.** Save the current workbook as Activity 6-3 Complete and then close Microsoft 365 Excel to complete this exercise.

# Summary

This lesson showed how graphical objects can be used to enhance the appearance of your workbooks. You learned how to insert different types of graphical objects into worksheets as well as how to modify them to suit your needs. Additionally, you learned about SmartArt, how it works, and how to add it to a worksheet.

### **Review Questions**

- 1. What are the six types of graphical objects that can be inserted into Excel workbooks?
- 2. Are shapes considered pictures or drawings?
- 3. How do you open the Selection pane?
- 4. What are SmartArt graphics used for?
- 5. How do you open the Choose a SmartArt Graphic dialog box?

# LESSON 7: ENHANCING WORKBOOKS

### **Lesson Objectives**

In this lesson you will learn how to:

- Customize workbooks
- Manage themes
- Protect files
- Prepare a workbook for audiences

# **TOPIC A: Customize Workbooks**

Your workbooks can be customized in a number of different ways. In this topic, we will focus on customization through the addition of notes, comments, watermarks, and background pictures.

### **Topic Objectives**

In this session, you will learn:

- About notes and comments
- About watermarks
- About background pictures

#### **Notes and Comments**

The information and analysis contained in Excel workbooks is often meant to be shared with and used by individuals other than the author. Making sure that the information is clear and easily understood by other users can often be challenging, especially when you are dealing with large amounts of data and often complex analysis. Fortunately, Excel 365 provides two ways to communicate additional information related to a specific cell in a spreadsheet, helping you collaborate and eliminating confusion. **Comments** allow for a threaded conversation about the data with multiple users, and **Notes** allow for making annotations, which are typically used to add additional context to a cell.

#### Comments

To add a comment, first select the cell to which you would like to add the comment. Next, click **Review**  $\rightarrow$  **New Comment**:



This action creates a new comment dialog box and a violet comment indicator appears in the upper right-hand corner of the currently selected cell. The new comment is labeled with the current user's name and the cell reference. To add text to the comment, type inside the provided text area, then press the **Post** ( $\triangleright$ ) icon:

	А	В	С	D	E	F
1						
2	Acme W	Vidgets Co. Glob				
3						
4	Quarter	Global Sales	Outside of USA			
5	Q1	\$ 75,000,000.00			DE	~
6	Q2	\$ 61,000,000.00	Jane Gibson		BD	^
7	Q3	\$ 56,000,000.00	)			_
8	Q4	\$ 83,000,000.00	Is this US dollars?			
9						
10						
11						
12						

Once you are done, click anywhere outside of the comment dialog box to hide it. The violet comment indicator remains visible:

	A B		С	D	E	F	
1							
2	Acme W	/id	gets Co. Glob <mark>a</mark>				
3							
4	Quarter	Quarter Global Sales		Outside of USA			
5	Q1	\$	75,000,000.00	32%			
6	Q2 \$ 61,000,000.00		28%				
7	Q3	\$	56,000,000.00	21%			
8	Q4	\$	83,000,000.00	35%			
9							
10							
11							
4.0							

Other users can now respond to the comment by hovering the cursor over the commented cell, selecting the reply field, then typing the comment, and pressing **Post**:

	Α		В	С	D	E	F
1							
2	Acme V	/id	gets Co. Globa				
3							
4	Quarter	Global Sales		Outside of USA			
5	Q1	\$	75,000,000.00				DC
6	Q2	\$	61,000,000.00	Jane Gibson	llare?		
7	Q3	\$	56,000,000.00	7/20/2020 11/	28 AM		
8	Q4	\$	83,000,000.00	7/25/2020 11	.20 AM		_
9				Yes it is.			
10							
11							
12				0			
13							

The comment now contains the response, including the user name, and the date and time of the reply:

	Α		В	С	D	E	F			
1										
2	Acme W	/id	gets Co. Globa							
3										
4	Quarter		Global Sales	Outside of USA						
5	Q1	\$	75,000,000.00			DE .				
6	Q2	\$	61,000,000.00	Jane Gibson	llare?					
7	Q3	\$	56,000,000.00	7/29/2020 11	·28 AM	28 AM				
8	Q4	\$	83,000,000.00	7/23/2020 11	.20 AIVI		_			
9				John Smith						
10				Yes it is.						
11				7/29/2020 12	:14 PM					
12										
13										
14				Reply						
15										
16										

Clicking **Review**  $\rightarrow$  **Show Comments** opens the Comments task pane on the right side of the worksheet. It displays all of the comment threads in the worksheet. If a cell with a comment is selected, that comment is highlighted by a violet bar to the left of the comment:

	AutoSave 🤅	Off	D 🛛 🖓 · 🤆	- \) -	Book1.xlsx +		,∕⊂ Sear	rch						Jane 🚺 🖬 — 🗆 🗙
Fi	le Ho	me	Insert Page	e Layout 🛛 Formu	las Data	Revie	w View	/ Help						🖻 Share 🛛 🖓 Comments
Sp	bc E Iling Thesa Pro	 iurus ofing	Workbook Ch Statistics Acces	sibility Insights	Translate Language	New Comment	Delete Pre Con	vious Ne nment Com omments	ext Sh	now Ne	otes Pro	otect Protect neet Workboo	Allow E ok Range Protect	dit Unshare s Workbook Ink + Ink
BS	B5 • i × √ fx 7500000 •													
	А		В	с	D	Е	F	G	н	1	J	к	*	
1														Comments 👻 🗙
2	Acme V	Vid	gets Co. Globa	al Sales										lana Gibran P5 +++
3				a										Is this US dollars?
4	Quarter 01	s	75 000 000 00	Outside of USA										7/29/2020 11:28 AM
6	Q2	\$	61,000,000.00	28%										
7	Q3	\$	56,000,000.00	21%										John Smith
8	Q4	\$	83,000,000.00	35%										Yes it is.
9														7/29/2020 12:14 PM
11														
12														Reply
13														
14														Jane Gibson C7 •••
16														This seems low. Has it been checked?
17														
18														Reply
19														
20													_	
	( )		Sheet1 Sheet3	+				: •					•	
ĒŌ														III II + 100%

To close a conversation, hover over the commented cell, select more actions (...), then click **Resolve thread**:

	А		В	С		D	E	F				
1												
2	Acme W	Vid	gets Co. Globa									
3												
4	Quarter		Global Sales	Outs	ide of USA							
5	Q1	\$	75,000,000.00		L		DE					
6	Q2	\$	61,000,000.00	JG	Jane Gibson Is this US doll							
7	Q3	\$	56,000,000.00			Dele						
8	Q4	\$	83,000,000.00		1/25/2020 11	Reso	<					
9							5					
10				IS	John Smith							
11					Yes it is.							
12					7/29/2020 12:	14 PM						
13												
14								_				
15		Reply										
16												
17												
Now, the violet indicator, and all of the comments in the thread, are grayed. You still have the option to either reopen the thread, or delete the thread:

	Α		В	С	D	E	F	1
1								
2	Acme V	Vidg	gets Co. Globa	l Sales				
3								
4	Quarter		Global Sales	Outside of USA				
5	Q1	\$	75,000,000.00				DE	
6	Q2	\$	61,000,000.00	JG Jane Gibson	lare?		RD	
7	Q3	\$	56,000,000.00	7/29/2020 11-	28 AM			
8	Q4	\$	83,000,000.00	7/25/2020 11.	20 AM			
9								
10				John Smith				
11				Yes it is.				
12				7/29/2020 12:	14 PM			
13								
14								
15				Reopen thread	[	Delete thread	d	
16								
17								

You can also delete a comment by clicking **Review** → **Delete**, clicking **Delete thread** in the Comments task pane, or by right-clicking the commented cell and selecting Delete Comment.

#### Notes

To add a note to a cell, first select the cell, then click **Review**  $\rightarrow$  **Notes**  $\rightarrow$  **New Note**:

	AutoSave	0#	) 🛛 🖓 · 🤇	-7 -	Book1.xlsx	-	₽ Searce	zh			Jane 🬒 🖬 — 🗆 >	<
F	le ł	lome	Insert Pa	ge Layout 🛛 Formi	ılas Da	ata Revie	ew View	Help			남 Share 모 Comments	;
Sp	bc [ elling The	saurus	Workbook Acc Statistics Acc	check Smart essibility Lookup essibility Insights	Translate	New Comment	Delete Prev Com	rious Next ment Comme mments	Show Show	ts	Notes Protect Protect Allow Edit Unshare Sheet Workbook Ranges Workbook New Note t Ink	~
C		Ŧ	: × <	<i>f</i> <sub>x</sub> 32%							Previous Note	¥
	А		В	С	D	E	F	G	н	Т	Next Note M N O P	
1 2	Acme	Wid	gets Co. Glob	al Sales							Shgw/Hide Note  Show All Notes	
3 4	Quarte	er	Global Sales	Outside of USA							Sonvert to Comments	
5	Q1	\$	75,000,000.00	32%								
6	Q2 03	Ş Ş	61,000,000.00 56.000.000.00	28%								
8	Q4	\$	83,000,000.00	35%								
9												

A new note is created, and a red note indicator appears in the upper right-hand corner of the currently selected cell. The note is labeled with the current user's name:

	Α		В	С	D	E	F	
1								
2	Acme V	Vid	gets Co. Globa	l Sales				
3								
4	Quarter		Global Sales	Outside of USA	lane G	ibson:		
5	Q1	\$	75,000,000.00	32%				
6	Q2	\$	61,000,000.00	28%				
7	Q3	\$	56,000,000.00	21%				
8	Q4	\$	83,000,000.00	35%				
9								
10								

To complete the note, type the desired information, then click outside of the cell. The note is hidden but the red note indicator remains:

	А		В	С	D	E	F
1							
2	Acme V	Vid	gets Co. Globa				
3							
4	Quarter		Global Sales	Outside of USA	×		
5	Q1	\$	75,000,000.00	32%			
6	Q2	\$	61,000,000.00	28%			
7	Q3	\$	56,000,000.00	21%			
8	Q4	\$	83,000,000.00	35%			
9							
10							

To show all notes on a worksheet, click **Review**  $\rightarrow$  **Notes**  $\rightarrow$  **Show all Notes**:



#### All notes on the worksheet are displayed:

	А		В	С	D	E	F	
1								
2	Acme V	/id	gets Co. Globa	l Sales				
3								
4	Quarter		Global Sales	Outside of USA	lane Gil	son.		
5	Q1	\$	75,000,000.00	32%	These in	clude US		
6	Q2	\$	61,000,000.00	lane Gibson:	territorie	S		
7	Q3	\$	56,000,000.00	This was impacted	by			
8	Q4	\$	83,000,000.00	inventory write do	wns			
9								
10								
11								
12								

Clicking **Review**  $\rightarrow$  **Notes**  $\rightarrow$  **Show all Notes** again hides all notes on the worksheet.

Finally, you can convert all notes to comments by clicking **Review**  $\rightarrow$  **Notes**  $\rightarrow$  **Convert to Comments**:



You will receive a warning that converting notes to comments will remove any formatting or images within the notes:

Microsoft	t Excel			×
	When converting notes to com Do you want to convert all not Convert all notes	ments, any images and es to comments? Cancel	formatting inside them Help	will be removed.

### Watermarks

While Excel 365 does not include a direct way to create **watermarks**, there is a way that you can add them, using WordArt. To do this, first insert WordArt by clicking **Insert** → **WordArt** → **[WordArt Style]**:

AutoSave 💽 🖫 🍤 -		Book1.xisx -	P Search								
File Home Insert F	Page Layout Formulas Data Review	View Help							🖻 Share	P Cor	mments
PivotTable Recommended Table PivotTables	Pictures Shapes Icons 3D Models ~	Get Add-ins My Add-ins - Bing People Maps Graph	Recommended Charts	Maps PivotChart 3D Map ·	Line Column Win/ Loss	Slicer Timeline Link Co	mment Text Header W Box & Footer	ordArt Signature	Dbject E	TT ( quation Sym	nbol
Tables	Illustrations	Add-Ins	Charts	rs Tours	Sparklines	Filters Links Co	mments	Ă A	A	A	Α
								AA	A	A	A
								A A	Α	A	A
								AA	A	A	A

Next, type the text for the watermark:





#### With the WordArt selected, right-click and then click Format Shape:

The **Format Shape** task pane opens to the right of the worksheet. In the Text Fill & Text Outline category of the Text Options section, adjust the Transparency slider:

Format Shape	*	×
Shape Options Text Options		
▲ Text Fill		
○ <u>N</u> o fill		
Solid fill		
<ul> <li><u>G</u>radient fill</li> </ul>		
O <u>P</u> icture or texture fill		
○ P <u>a</u> ttern fill		
<u>C</u> olor	<u></u>	·
Transparency	, î	,
Text Outline		

You can also rotate the WordArt Shape by clicking and holding the rotation handle at the top of the shape. Holding Ctrl while doing so will limit the adjustment to preset increments:



AutoSave 💽 🖽 🏷 🥆 🔿 🔻	Bookladsz +	₽ Search		Jane 🚺 🗖 — 🗆 🗙
File Home Insert Page Layout Formula:	s Data Review View Help Shape	Format		🖻 Share 🖓 Comments
PrvotTable Recommended Table PivotTables Tables	3D     Image: Screenshot ×       3D     Image: Screenshot ×       Models ×     Image: Screenshot ×       rations     Add-ins	People Graph Charts	PivotChart S0 Tours Sparklines Pitters	Image: Second
Rectangle 1 👻 🗄 📈 🧹 🍂				×
A         B         C         D           2         3         Acme Widgets Co. Global Sales         Global Sales           4         Acme Widgets Co. Global Sales         Outside of US, S           6         Guarter         Global Sales         Outside of US, S           7         QL         S 0.000,000,00         26%           9         QL         S 0.000,000,00         25%           10         QL         S 0.000,000,00         25%           12         QL         S 0.000,000,00         25%           13         QL         S 0.000,000,00         35%           14         S 0.000,000,00         25%         35%           16         QL         S 0.000,000,00         35%           18         QL         S 0.000,000,00         35%		J K L M	N 0 P Q R 5	T U V W Format Shape → × Shape Options Test Options C Test ## Shape Options Test Options C Shape Options Test Options D Shape Options C Shape Opt
21 Sheet1 Sheet2 Sheet3 (+)				The second secon
Ready 🐻				III III - → + 100%

The watermark is now ready, and you can reposition it as needed:

### **Background Pictures**

To add design elements to your workbooks, you have the option to add **background pictures**. These pictures appear entirely in the background of a worksheet without interfering with the contents of the cells.

To insert a background picture, click **Page Layout** → **Background**:



This action displays the **Insert Pictures** dialog box. Using the options provided here, you can insert a picture that resides on your computer or local network, or a picture from a web search, your OneDrive storage, or even Facebook and Flickr if you are using a Microsoft account:

	ert Pictures		٢
1	From a file	Browse ►	
٢	Bing Image Search	Search Bing D	
<b>(</b>	OneDrive - Personal	Browse ►	

Once you find and select a background picture, it is added to the current worksheet. If the image does not span the entire dimensions of the worksheet, it is tiled automatically:

AutoSave (	<u>)</u>	ם א <b>י</b> פי נ	) <del>⊽</del> Book'	1.xlsx -	𝒫 Search				I	Jane	J 🖬	- 0	×
File Ho	ome l	nsert Page Lay	out Formulas	Data Rev	ew View	Help					🖻 Share	e 🖓 Comn	nents
Themes	Colors ~ onts ~ ffects ~ s	Margins Orientation	Size Print Bre Area ~	eaks Delete Background	Print Titles	Vidth: Auto Height: Auto Scale: 100 Scale to Fit	omatic ~ omatic ~ )% _	Gridlines Hea	adings View Bring Print Forward V	Send Selec Backward ~ Par Arrai	tion Align Gro	up Rotate	~
C9	•	$\times \checkmark f_x$	5600000										~
A	В	С	D	E F	G	н	1	J	K L	M	N O	Р	Q 🔺
1				-									
2													
3	A		Inhal Calas										
4	Acme	widgets co. G	Iobal Sales							120			
5	Quarte	r Global Sales	Outside of USA			$\mathbf{X}$	$\mathcal{N}$				X	X	
7	Q1	\$ 75,000,000.00	32%							1124			
8	Q2	\$ 61,000,000.00	28%										
9	Q3	\$56,000,000.00	21%										
10	Q4	\$83,000,000.00	35%			$\overline{l}$			//				
11				$\langle \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$			<u> </u>		_// 入				
12							1	-M					
13										1	K		
15				X					ľA		$\overline{1}$		XII
16							+77						
17							X						
18							$\mathbf{X}$						
19					1/				NX				
20	$ \rightarrow $												
21	Cha	41 (1)											<b>v</b>
	Snee	+						: •			m		1000/
EO										<b>HH</b>	8	+	100%

To remove a background image, click **Page Layout → Delete Background**:

AutoSave 💽 🗄 りょ	େ ୍ ଠି ≈ Book1.xlsx •	₽ Search		Jane 🤨 🖻 — 🗆	×
File Home Insert	Page Layout Formulas Data	a Review View Help		🖻 Share 🖓 Comr	nents
Aa     Colors ~       Aa     Fonts ~       Themes     Effects ~	Orientation Size Print Breaks	Delete Print ckground Titles	Y         Gridlines         Headings           ✓         ✓         View         ✓           Print         Print         Print         Forward	Send Selection Align Group Rotate	
Themes	Page Setup	Scale to Fit	Sheet Options	Arrange	~

# **Activity 7-1: Customizing Workbooks**

Your supervisor has sent you a workbook with notes indicating his requests.

**1.** To begin, open Activity 7-1 from your Exercise Files folder:



Activity 7-1.xlsx Microsoft Excel Worksheet 17.4 KB

First, you would like to view all the notes on the worksheet. Click Review → Notes
 → Show All Notes:

,	AutoSave 💽	• B	~ C ~ D =	А	ctivity 7-1.xls	a <del>-</del>	∕∕ Sei	arch							Jan	e Gibson	JG	<b>2</b>	-		×
Fi	ile Hom	e Insert	Page Layout For	rmul	as Data	Revie	w View	Help										ය Share	90	Comme	nt Save
a Spr	elling Thesaur	us Workbook Statistics	Check Accessibility Accessibility		Translate	New Comment	Delete Prev Com	vious Next	Sho Comm	) w ients	Notes	Protect Sheet V	Protect Vorkbook	Allow Ec Ranges	lit Unshare Workboo	Hide k Ink *					
												New Note									_
HS	5 *	· · · · ×	√ f <sub>x</sub> =SUMIF(	\$B\$	5:\$B\$40,G5,	\$D\$5:\$D\$	10)					Previous Note	e								×
	Α	В	с		D	E	F	G		н	101	Nex <u>t</u> Note			К	L		N	N	0	-
1	Daily 9	Sales &	Bonus Pavo	ut					Daily	Ronus		Sh <u>o</u> w/Hide N	lote								
2	ABC Widge	s Inc		_					S	Donas		Show All Note	es 📐								
3	ine mage								Ť		50 0	Convert to Co	omments	-							
4	First Name	Last Name	ID	Da	aily Sales	Bonus		Sales Rep	1	fotal Sa	iles -	DUIIU	5								
5	Jackie	Williamson	Jackie Williamson	\$	6,785.14	\$ 50.00		Bressan	\$	34	,563.37	\$ 300	0.00								
6	Lucas	Bressan	Lucas_Bressan	\$	4,687.50	\$ 50.00		Harrison	\$	28	,677.38	\$ 150	0.00								
7	Stanley	Prestwick	Stanley_Prestwick	\$	7,478.96	\$ 50.00		Prestwick	\$	35	,403.43	\$ 250	0.00								
8	Jerry	Harrison	Jerry Harrison	\$	1,689.47	\$ -		Thompson	\$	37	,255.31	\$ 250	0.00								
9	Leah	Thompson	Leah_Thompson	\$	5,478.45	\$ 50.00		Williamson	\$	55	,850.75	\$ 400	0.00								
10	Jackie	Williamson	Jackie Williamson	\$	7,600.00	\$ 50.00		Total	\$	191	,750.22	\$ 1,350	0.00								
11	Lucas	Bressan	Lucas Bressan	\$	5,689.00	\$ 50.00															
12	Stanley	Prestwick	Stanley_Prestwick	\$	2,346.87	\$ -															
13	Jerry	Harrison	Jerry_Harrison	\$	1,687.00	\$ -															
14	Leah	Thompson	Leah_Thompson	\$	9,874.45	\$ 50.00															
15	Jackie	Williamson	Jackie_Williamson	\$	8,773.68	\$ 50.00															
16	Lucas	Bressan	Lucas_Bressan	\$	7,835.87	\$ 50.00															
17	Stanley	Prestwick	Stanley_Prestwick	\$	6,898.05	\$ 50.00															
18	Jerry	Harrison	Jerry_Harrison	\$	5,960.23	\$ 50.00															
19	Leah	Thompson	Leah_Thompson	\$	5,022.41	\$ 50.00															
20	Jackie	Williamson	Jackie_Williamson	\$	4,084.59	\$ 50.00															
21	Lucas	Bressan	Lucas_Bressan	\$	3,146.77	\$ 50.00															
22	Stanley	Prestwick	Stanley_Prestwick	\$	2,208.96	\$ -															
		Sheet1	(+)																		Þ
10															Ħ	E			1	+ 1	00%

**3.** There are two notes from John Smith. The first, in cell A2, asks you to add a background to the worksheet:

1	Α	В	C			D	E	F	G		Н		1	J	К	L	N	4	Ν	0	-
1	Daily S	les 8	Bonus	ayo	ut					Daily	Bonus Amount	D	aily Goals	John Sr	aith:						
2	ABC Widge	S Please add a	background							\$	50.00	\$	2,500.00	How mu	ch would it	cost					
3		image to thi	s worksheet											to lower	the daily go	al to					
4	First Name				Dail	y Sales	Bonus		Sales Rep		Fotal Sales		Bonus	\$2,000							
5	Jackie	v		amson	\$	6,785.14	\$ 50.00		Bressan	\$	34,563.37	\$	300.00								
6	Lucas	Bressan	Lucas Bress	an	\$	4,687.50	\$ 50.00		Harrison	\$	28,677.38	\$	150.00								
7	Stanley	Prestwick	Stanley_Pre	stwick	\$	7,478.96	\$ 50.00		Prestwick	\$	35,403.43	\$	250.00								
8	Jerry	Harrison	Jerry Harris	on	\$	1,689.47	\$ -		Thompson	\$	37,255.31	\$	250.00								
9	Leah	Thompson	Leah_Thom	pson	\$	5,478.45	\$ 50.00		Williamson	\$	55,850.75	\$	400.00								
10	Jackie	Williamson	Jackie Will	amson	\$	7,600.00	\$ 50.00		Total	\$	191,750.22	\$	1,350.00								
11	Lucas	Bressan	Lucas Bress	an	\$	5,689.00	\$ 50.00														
12	Stanley	Prestwick	Stanley Pre	stwick	\$	2,346.87	\$ -														
13	Jerry	Harrison	Jerry Harris	on	\$	1,687.00	s -														-1-
14	Leah	Thompson	Leah Thom	pson	Ś	9.874.45	\$ 50.00														
15	Jackie	Williamson	Jackie Will	amson	\$	8,773.68	\$ 50.00														-
16	Lucas	Bressan	Lucas Bress	an	\$	7,835.87	\$ 50.00														-
17	Stanley	Prestwick	Stanley Pre	stwick	\$	6,898.05	\$ 50.00														-
18	Jerry	Harrison	Jerry_Harris	on	\$	5,960.23	\$ 50.00														-
19	Leah	Thompson	Leah Thom	pson	\$	5,022.41	\$ 50.00														
20	Jackie	Williamson	Jackie Will	amson	\$	4,084.59	\$ 50.00														-
21	Lucas	Bressan	Lucas Bress	an	\$	3,146.77	\$ 50.00														-1
22	Stanley	Prestwick	Stanley Pre	stwick	\$	2,208.96	\$ -														
	< →	Sheet1	+										•				i				Þ

4. Click Page Layout →Background:

AutoSave 💽 🕅	ヨックマン マ Activity 7-1.xlsx・	𝒫 Search	Jane Gibson JG	œ –	o x
File Home I	nsert Page Layout Formulas Data Re	iew View Help		🖻 Share 🛛 🖓 🕻	Comments
Themes Colors ~	Margins Orientation Size Print Breaks Background	Width:         Automatic         Gridlines         Heading           Height:         Automatic         View         View         View           Titles         Scale         100% C         Print         Print	as v Bring Send Selection Align t Forward ∽ Backward ∽ Pane ~	Group Rotate	
Themes	Page Setup	Scale to Fit Sheet Options	Arrange		~

5. The Insert Pictures dialog box opens. Click From a file:

💐 🛛 From a file	Browse ► 🖑
Bing Image Search	Search Bing
CneDrive - Personal	Browse >

6. Browse to your exercise folder and select **Activity 7-1.png**, then click **Insert**:

Sheet Background					×
← → 🕆 📥 « Exerc	ise Files > Lesson 7	~	Ō		
Organize 👻 New folder					2
<ul> <li>&gt; A Quick access</li> <li>&gt; A Microsoft Excel</li> <li>&gt; OneDrive</li> <li>&gt; This PC</li> <li>&gt; Network</li> </ul>	Activity 7-1.png				
File nam	e: Activity 7-1.png		~	All Pictures (*.emf;*.wmf;*.jpg;* \	-
		То	ols 🔻	Insert Cancel	

AutoSave 🤇	e 🛛 🗩	- C、D =	A	ctivity 7-1.xls	ax •	,∕⊃ Se	arch						Ja	ne Gibson	JG				
File Ho	me insert	Page Layout Fo	rmul	as Data	Review	Viev	r Help									🖻 Shar	e 🖓	Comn	nents
Themes H5	olors ~ onts ~ fects ~	ns Orientation Size A Page :	Print rea ~ Setup	Breaks ( Bac 5:\$B\$40,G5,	Delete Pri kground Tit		Width: Autom Height: Autom Scale: 100% Scale to Fit	atic v atic v Ç	Gridlines He View P Print Sheet Optio	eadin Vie Prin ns	gs Bring w Bring nt Forwar	] Sen d ~ Backwa	d Select ard Y Pan Arran	ion Align e v	Group	Rotate			
A	В	с		D	E	F	G		н		1	j.	к	L	1.1	м	N	0	5
1 Daily	Sales &	Bonus Pavo	ut					Daily B	onus Amount	Da	uly Goals								
2 ARC Wide	John Smit	h:						ć	50.00	ć	2 500 00	John S	mith:						_
2 ABC WINg	image to th	is worksheet						2	50.00	2	2,300.00	to lower	r the daily g	oal to					
4 First Nam	e		Di	ailv Sales	Bonus		Sales Rep	Te	tal Sales		Bonus	\$2,000							
5 Jackie	Winnamson	Jackie williamson	s	6.785.14	\$ 50.00		Bressan	\$	34,563.37	s	300.00								
6 Lucas	Bressan	Lucas_Bressan	\$	4,687.50	\$ 50.00		Harrison	\$	28,677.38	\$	150.00								
7 Stanley	Prestwick	Stanley_Prestwick	\$	7,478.96	\$ 50.00		Prestwick	\$	35,403.43	\$	250.00								
8 Jerry	Harrison	Jerry_Harrison	\$	1,689.47	\$ -		Thompson	\$	37,255.31	\$	250.00								
9 Leah	Thompson	Leah_Thompson	\$	5,478.45	\$ 50.00		Williamson	\$	55,850.75	\$	400.00								
10 Jackie	Williamson	Jackie_Williamson	\$	7,600.00	\$ 50.00		Total	\$	191,750.22	\$	1,350.00								
11 Lucas	Bressan	Lucas_Bressan	\$	5,689.00	\$ 50.00														
12 Stanley	Prestwick	Stanley_Prestwick	\$	2,346.87	\$ -														
13 Jerry	Harrison	Jerry_Harrison	\$	1,687.00	\$ -														
14 Leah	Thompson	Leah_Thompson	\$	9,874.45	\$ 50.00														
15 Jackie	Williamson	Jackie_Williamson	\$	8,773.68	\$ 50.00														
16 Lucas	Bressan	Lucas_Bressan	\$	7,835.87	\$ 50.00														
17 Stanley	Prestwick	Stanley_Prestwick	\$	6,898.05	\$ 50.00														
18 Jerry	Harrison	Jerry_Harrison	\$	5,960.23	\$ 50.00														
19 Leah	Thompson	Leah_Thompson	\$	5,022.41	\$ 50.00														
20 Jackie	Williamson	Jackie_Williamson	\$	4,084.59	\$ 50.00														
21 Lucas	Bressan	Lucas_Bressan	\$	3,146.77	\$ 50.00														
22 Stanley	Prestwick	Stanley_Prestwick	\$	2,208.96	\$ -														
	Sheet1	+									1					1	_		Þ
100													Ħ	E	巴	-	1	+	100%

7. The background picture is added to the worksheet:

**8.** The second note asks how much it would cost to lower the daily sales goal to \$2,000:

1	A	В	С		D	E	F	G		Н		1.0	J	К	L	М	N	0	)	1
1	Daily	Sales &	Bonus Payo	ut					Daily	Bonus Amount	D	aily Goals	1 John S	mith	_					
2	ABC Widge	ts Please add	a background						\$	50.00	\$	2,500.00	How mu	ich would it	cost					
3		image to th	is worksheet										to lowe	r the daily g	poal to					
4	First Name			D	aily Sales	Bonus		Sales Rep	1	Fotal Sales		Bonus	\$2,000							
5	Jackie	Winnamson	Jackie_winliamson	\$	6,785.14	\$ 50.00		Bressan	\$	34,563.37	\$	300.00			_					
6	Lucas	Bressan	Lucas_Bressan	\$	4,687.50	\$ 50.00		Harrison	\$	28,677.38	\$	150.00								
7	Stanley	Prestwick	Stanley_Prestwick	\$	7,478.96	\$ 50.00		Prestwick	\$	35,403.43	\$	250.00								
8	Jerry	Harrison	Jerry_Harrison	\$	1,689.47	\$ -		Thompson	\$	37,255.31	\$	250.00								
9	Leah	Thompson	Leah_Thompson	\$	5,478.45	\$ 50.00		Williamson	\$	55,850.75	\$	400.00								
10	Jackie	Williamson	Jackie_Williamson	\$	7,600.00	\$ 50.00		Total	\$	191,750.22	\$	1,350.00								
11	Lucas	Bressan	Lucas Bressan	\$	5,689.00	\$ 50.00														
12	Stanley	Prestwick	Stanley_Prestwick	\$	2,346.87	\$ -														
13	Jerry	Harrison	Jerry Harrison	\$	1,687.00	\$ -														
14	Leah	Thompson	Leah_Thompson	\$	9,874.45	\$ 50.00														
15	Jackie	Williamson	Jackie_Williamson	\$	8,773.68	\$ 50.00														
16	Lucas	Bressan	Lucas_Bressan	\$	7,835.87	\$ 50.00														
17	Stanley	Prestwick	Stanley_Prestwick	\$	6,898.05	\$ 50.00														
18	Jerry	Harrison	Jerry_Harrison	\$	5,960.23	\$ 50.00														
19	Leah	Thompson	Leah_Thompson	\$	5,022.41	\$ 50.00														
20	Jackie	Williamson	Jackie_Williamson	\$	4,084.59	\$ 50.00														
21	Lucas	Bressan	Lucas_Bressan	\$	3,146.77	\$ 50.00														
22	Stanley	Prestwick	Stanley_Prestwick	\$	2,208.96	\$ -														
		Sheet1	(+)									<u>.</u>						-	•	-

9. First note that the total of bonuses in cell I10 are \$1,350. Now click cell I2 and type "2000" to change the daily goals value, then press Enter:

F	G		Н		1	J	K	L
		Daily B	onus Amount	Da	aily Goals	lohn Si	nith:	
		\$	50.00	\$	2,000.00	How mu	ch would it	cost
- C.						to lower	the daily g	pal to
	Sales Rep	То	tal Sales		Bonus	\$2,000		
	Bressan	\$	34,563.37	\$	300.00			
	Harrison	\$	28,677.38	\$	200.00			
	Prestwick	\$	35,403.43	\$	350.00			
	Thompson	\$	37,255.31	\$	250.00			
	Williamson	\$	55,850.75	\$	400.00			
	Total	\$	191,750.22	\$	1,500.00			

10. The calculated total bonuses in cell 110 is now \$1,500. It would cost \$150 to lower the daily sales goal. Press Ctrl + Z to undo the change made to cell 12, then click Review → Notes → Convert to Comments so you can add your comments to the notes:

AutoSave 💽 🛱 🥱	~ (? ~ (? ÷	Activity 7-1a	llsx • 🔎 Search					Jane Gibs	on JG	æ	-		×
File Home Insert	Page Layout Fo	rmulas Da	ta Review View	Help						ය Share	ç	⊐ Comme	ents
abc Spelling Thesaurus Workbook Statistics	Check Accessibility	Translate	New Delete Previous Comment Commen	Next Show t Comment Comments	Notes	Protect Protect Sheet Workbook	Allow Edit Ranges	Unshare Workbook	Hide Ink ~				
Proofing	Accessibility Insight	s Language	Comme	nts	🗌 💋 Ed	lit Note	t		Ink				^
					🗇 🗗	evious Note							
					🖒 N	ex <u>t</u> Note							
					🕞 Sł	ow/Hide Note							
					Ds	now All Notes							
					5 C	onvert to Comments							

11. In the Excel alert dialog box, click **Convert all notes**:



**12.** Now click **Review** → **Show Comments**:



13. In the Comments task pane, in the first comment, in the reply text box, type "Done", then click Post:

Comments	Ŧ	×
Author John Smith: Please add a background image worksheet	to this	A2
Done X		
A Author John Smith: How much would it cost to low goal to \$2,000	er the da	12 iily
Another comment is already in progre	255,	

14. In the second comment type "An extra \$150." Again, click Post:



**15. Close** the Comment task pane, then hover your cursor over cell **I2**. Note that only your comment has a date and time, as the previous comment was converted from a note:

G		Н		1	J	К	L	М	N
	Daily	Bonus Amount	Da	aily Goals					
	\$	50.00	\$	2,500.00	A Au	ithor		12 ••	• 3
Sales Rep	1	Fotal Sales		Bonus	Joi	hn Smith: ow much wo	uld it cost to	o lower the	
Bressan	\$	34,563.37	\$	300.00	da	ily goal to \$	2,000		
Harrison	\$	28,677.38	\$	150.00					
Prestwick	\$	35,403.43	\$	250.00					-
Thompson	\$	37,255.31	\$	250.00	JG Jai	ne Gibson			
Williamson	\$	55,850.75	\$	400.00	An	n extra \$150.			
Total	\$	191,750.22	\$	1,350.00	7/2	29/2020 3:23	PM		
1 A L Z									
					Reply				

**16.** Save the current workbook as Activity 7-1 Complete and then close Microsoft 365 Excel to complete this exercise.

# **TOPIC B: Manage Themes**

Excel offers themes to control and change the look of your workbook with the simple click of a button. Each theme consists of different colors, fonts (for headings and body), and effects for shapes and SmartArt. Changing a theme, or customizing one, can quickly and dramatically change the look and feel of your workbook. During this topic you will learn about themes in Excel 365 and how you can change and customize them.

# **Topic Objectives**

In this session, you will learn:

- About themes
- How to customize themes

#### **About Themes**

**Themes** are a combination of preset colors, fonts, and effects. Each theme includes 12 colors, two fonts (Header and Body), and colors and effects for shapes and SmartArt. Much of the formatting that you apply to elements of your workbook can be changed, simply by changing the theme of the workbook.

On the Home tab, in the Font group, you can see the **Theme Fonts** of the currently selected theme:



You can also see the Theme Colors:



A	utoSave (		3 り・ C・ と	) <del>~</del> Boo	k1.xlsx +		𝒫 Search	1				I		Jane Gib	son JG	团	- 0	ı x
File A Ther	e Ho a C A Fi D El Inemes	ome In folors ~ onts ~ ffects ~	sert Page Layo Margins Orientation	Pout Formulas Size Print Brei Area ~ ~ Page Setup	Data	Review	View Wi	Help dth: Auton ight: Auton ile: 1009 Scale to Fit	natic v natic v 6 0 Fs	Gridlines    View Print Sheet Opt	Headings ✓ View Print ions S	Bring Forward Y	Send Backward ~	Selection A Pane Arrange	lign Grou	A Share	Col	nments
D12		•	$\times$ $\checkmark$ $f_x$															~
1	A	В	с	D	E	F	G	н	1	J	к	L	м	N	0	Р	Q	R
2																		
4		Acme	Widgets Co. G	lobal Sales														
6		Quarter	Global Sales	Outside of USA														
8		Q1 Q2	\$ 75,000,000.00	28%			Sa	les	Fulfilm	ent								
9 10		Q3 Q4	\$ 56,000,000.00 \$ 83,000,000.00	21% 35%														
11 12								Inuci	oina									
13 14									cing									
15 16																		
17 18																		
19 20																		
21																		
22		Charl																
50	P	Snee	•								: [4]			<b>#</b>	] []			+ 100%

To change a workbook's theme, click **Page Layout** -> **Themes**:

This shows a gallery of themes. As you move you mouse over each thumbnail in this gallery, you will see a preview applied to your workbook (if it has theme elements such as SmartArt, headers, or body text). Click the new theme to apply it:

AutoSave (		<b>१ -</b> २ - ८	") <del>-</del>	Boo	ik1.xisx 👻	٩	Search				I		Jane Gibsor	n JG	<b>m</b> –		×
File Ho	me Insert	Page Lay	yout Fo	rmulas	Data F	Review	View Help	)						é	Share	🖓 Comr	nents
Themes A Fo	olors ~ onts ~ Ma fects ~	rgins Orientatio	on Size I	Print Bre Irea ~ ~	aks Backgrour	nd Print Titles	↓       Width:         ↓       Height:         ↓       Scale:	Automatic ~ Automatic ~ 100% 🗘	Gridlines	Headings View Print	Bring Forward ~	Send S Backward <del>v</del>	election Alig Pane ~	n Group F	Rotate		
Office				<b>^</b>		l5₁	Scale t	o Fit	r₃ Sheet C	Options 🖓		4	Arrange				^
Aa Office	Aa Facet	Gallery	Ac		E	F	G	Н	I	J	К	L	м	N	0		• P
		Aa	Aa														
	Aa Wisn	Aa	Aa Banded	. S	<u>с</u> А		Sales	- - - -	Ifilment								
Aa Basis	Aa Berlin	Aa Circuit	Aa				Juics										
Aa Damask	Aa Dividend	Aa Droplet	Aa					Invoicing									
Browse	for Themes																
🗄 S <u>a</u> ve Cu	urrent Theme																
18																	
19																	U
20																	
21	Sheet1	+			1	1					1	1	1				•
F0													E	<u> </u>		+	100%

You can now see that the Theme Fonts, and the Theme Colors, have changed in the Font group on the Home tab:



### **Customizing Themes**

The default theme for new workbooks in Microsoft 365 Excel is Office. You can **customize** elements of this theme or any other theme that is currently applied, by choosing new style options from the Colors, Fonts, and Effects drop-down commands that are found inside the Themes group of the Page Layout tab.



Choosing a different Color, Font, or Effects element creates a customized theme that maintains the elements of the original theme that were not changed. In the example below, selecting the Blue Green color theme changes the color elements but does not change the font and effect elements:

AutoS	Save 💽 Off	<b>8 9 ~</b> C ~ i	י נ'			Book1.xls				🔎 Sea	rch			
File	Home	Insert Page La	yout	Formulas Data	a Review	View	Help							
Themes	Colors ~ Office	Office	R	Print Breaks Ba	kground Pri Titl	nt es Sc	idth: Autom eight: Autom ale: 100%	atic ~ G	ridlines Hea	dings View B Print Forv	ring Sen vard ~ Backwa	d Selection ard ~ Pane	Align Gro	up Rotate
т		Office 2007	- 2010	e Setup		L2	Scale to Fit	5	Sheet Option	s Fa		Arrange		
D12		Grayscale												
		Blue Warm		D	F	F	G	н	1	L J	к	L 1	м	N
1		Blue Blue II												
2		Blue Green	N											
4		Green	10	obal Sales										
5		Green Yello	N					-						
6		Yellow		outside of USA			7		-					
7		Yellow Oran	ige	32%			Sc	les	Fulfilme	ent				
8		Orange		28%										
9		Orange Red		21%										
10		Red Orange		35%										
11		Red												
12		Red Violet						Invoi	cina					
13		Violet												
14		Violet II												
16		Median												
17		Paper												
18		Marquee												
19	Custo	mize Colors												
20														
21														
	> SI	neet1 (+												
E0														



To save a customized theme, click **Theme** → **Save Current Theme**:

In the **Save Current Theme** dialog box, give the custom theme a unique name, then click **Save**:



The custom theme is now available in the Custom category of the Themes command dropdown gallery:

AutoSave 💽 🖪 りゃ 🖓 🏷		Book1.xlsx 👻	♀ Search	
File Home Insert Page Layou	ut Formulas Data Revie	w View Help		
Themes Colors × Margins Orientation Colors × Margins Orientation Colors × Margins Orientation	Size Print Breaks Background P Area ~ ~ T	↓↓     ↓↓    <	Gridlines Headings View View Bring Sen Print Print Forward ~ Backwa	d Selection Align Group Rotate
Custom		تي Scale to Fit	Sheet Options 🛛	Arrange
Aa Ion Blue				
Office				
Aa     Aa     Aa       Office     Facet     Gallery	Ac Integral			
Ion Board	Aa Retrospect			
Aa   Aa     Slice   Wisp     Badge	Aa Banded			
Aa   Aa     Basis   Berlin	Aa Crop			
Browse for Themes				
🖫 Save Current Theme	.:			

## Activity 7-2: Managing Themes

You would like to apply a new theme to a workbook that you have been working on and then customize its colors.

**1.** To begin, open Activity 7-2 from your Exercise Files folder:



Activity 7-2.xlsx Microsoft Excel Worksheet 23.7 KB

2. First, apply a new theme to this workbook by clicking Page Layout → Themes → Badge:

AutoSave 🧿	- - - - - - - - - - - - - - - - - - -	) ~ Q ~ Z	) ण		Activity 7-2.xls	x •		D s	earch					I				Jane Gib	ison 🕫		- 0	×
File Hon	ne Insert	Page Layo	out Formu	las	Data Revi	ew \	view Help	Pi	votTable Analyze	e	Design								[	ය Share	Com	ments
Themes	lors * Ints * Marg ects * *	ins Orientation	Size Print	Break	Background	Print Titles	Width: Au Height: Au Scale: 1	tomat tomat 00%	ic - Gridlines ic - View D Print	s   H / S t   C	Headings View Print F	Bring orward ~ Bac	Send kward ~	Selection A Pane	Lign Gro	Dup Rotate						
Custom			P	•		F <sub>N</sub>	Scale to F	it	5 Sheet	Optic	ons Fa			Arrange								^
Ag				5364																		۷
Ion Blue					E	F	G		н		1.1	J	к	L		м	N	o	Р	Q	R	
				but	:		0	aily	Bonus Amou	Da	aily Goals											
Office			10000					\$	50.00	\$	2,500.00											
Aa _	Aa	Aa	Aa 🔤																			_
Office	Eacet	Gallery	Integral	iales	Bonus		Row Label	Sun	n of Daily Sale	Sur	m of Bonu											
				****	\$ 50.00		Bressan	\$	34,563.37	\$	300.00					on	Bres		E Pr		<sup>ск</sup>	
Aa	Aa	Aa_	Aa	****	\$ 50.00		Harrison	\$	28,677.38	\$	150.00											
lon	Ion Board	Organic	Retrospect	****	\$ 50.00		Prestwick	\$	35,403.43	\$	250.00											
	A	A. 1		****	\$ -		Inompson	2	37,255.31	2	250.00									_		
AG _	Ad _	Ma 👌	Aa		\$ 50.00		Grand Total	•	191 750 22	•	400.00						on -	Tho		n		
Slice	Wisp	Badge	Banded		\$ 50.00	-	or and Total	÷	171,730.22	÷	1,330.00											
	A- 1	A ]	An II		\$ .													_				
Ad	Ad	Ad	<u>na</u>	####	ş -																	
Basis	Berlin	Circuit	Crop		\$ 50.00																	
		· · · · ·			\$ 50.00																	
LES Browset	or inemes				\$ 50.00																	
Save Cur	rrent Theme				\$ 50.00																	
18 Jerry	Harrison	Jerry_Harris	son ##		\$ 50.00																	
19 Leah	Thompson	Leah_Thom	pson ##	****	\$ 50.00																	
< >	Sheet1	+											E 4									Þ
50	·																	<b>=</b>	1 E		+	100%

3. With the new theme applied, you will see that the primary colors and text have all been modified. While you like the font change, you would prefer a different color scheme. Customize this theme by clicking Page Layout → Colors → Green:

A	utoSave (	•••• E %	× @ × D ₹	,	ctivity 7-2.xls	•	R	Search									Jane Gibso	n 16	▣ -	۵	×
File	e Ho	ome Insert	Page Layout	Formulas Data	Review	View Help	p PivotTa	ble Analy:	e Design										암 Share	Commer	its
The	mes Of	iolors ¥	Office	Print Breaks Back Area ~ ~	ground Print Titles	Width:	Automatic ~ Automatic ~ 100% 0	Gridline Vie Prit Shee	s Headings w View t Print Options S	B	Bring Send ward ~ Backward	Selection V Pane Arrange	Align (	iroup Rotate							~
us.	12		Gravscale	2652626264																	
			Blue Warm	D	E	F	G		н		1	J	к	L	м	N	o	Р	Q	R	
T.	D		Blue II	ayout				Daily B	onus Amount	D	aily Goals										
2	1.5		Blue Green					\$	50.00	\$	2,500.00										
3	irst 📕		Green Velow	Daily Sales	Bonus	Re	w Labels 🔽	Sum of	Daily Sales	Sur	m of Bonus										
5	Jack 🔳		Yellow	\$ 6,785.14	\$ 50.00	Bre	ssan	\$	34,563.37	\$	300.00			A /111					<b>D</b>		
6	Luc 🔳		Yellow Orange	\$ 4,687.50	\$ 50.00	Har	rrison	\$	28,677.38	\$	150.00			vviillan	nson	В	ressan		Presi	WICK	
7	Star 🔳		Orange	\$ 7,478.96	\$ 50.00	Pre	stwick	\$	35,403.43	\$	250.00										
8	Jerr 🔳		Orange Red	\$ 1,689.47	s -	The	ompson	\$	37,255.31	\$	250.00										-
9	Leal 🔳		Red Orange	\$ 5,478.45	\$ 50.00	Wi	lliamson	\$	55,850.75	\$	400.00										
10	Jack 🔳		Red	\$ 7,600.00	\$ 50.00	Gr	and Total	\$	191,750.22	\$	1,350.00										
11	Luc		Red Violet	\$ 5,689.00	\$ 50.00										Hari	rison	l h	om	oson		
12	Star 💼		Violet	\$ 2,346.87	\$ -																
13	Jerr 冒		Violet II	\$ 1,687.00	\$ -																
14	Leal		Median	\$ 9,874.45	\$ 50.00																- 14
15	ack		Dener	\$ 8,773.68	\$ 50.00																
16	Luc		Paper	\$ 7,835.87	\$ 50.00																
17	Star		marquee v	\$ 6,898.05	\$ 50.00																
18	Jerr	<u>Customize</u> Color	rs	\$ 5,960.23	\$ 50.00																
19	Leah	Thompson	Leah Thompson	\$ 5,022.41	\$ 50.00																
20	ackie	Williamson	Jackie Williamson	n \$ 4,084.59	\$ 50.00																
21	Lucas	Bressan	Lucas Bressan	\$ 3,146.77	\$ 50.00																
22	Stanley	Prestwick	Stanley_Prestwick	k \$ 2,208.96	s -																
23	Jerry	Harrison	Jerry_Harrison	\$ 1,271.14	<b>\$</b> -																
24	Leah	Thompson	Leah_Thompson	\$ 333.32	ş -																
		Sheet1	+									1.4									•
13																	<b>#</b> 0	巴		+ 10	0%

4. Examine the workbook and you will see that its colors have been updated. Now that you are satisfied with the colors, fonts, and effects, save the customized theme by clicking Themes → Save Current Theme:

AutoSave 💽 🗑 🏷 🤆 🖑 🗢	Activity 7-2.xlsx • 🔎 Search	
File Home Insert Page Layout Formula	Data Review View Help PivotTable Analyze	Design
■ Colors ~ ■ Fonts ~ ● Effects ~ ↓ Gargins Orientation Size Print ↓ Gargins Orientation Size Area ~	Breaks Background Print Titles B Scale: 100% C	Headings View Drint Bring Send Selection Align Group Rotate Forward ~ Backward ~ Pane
Custom	F₃ Scale to Fit F₃ Sheet Opti	ions 🕞 Arrange
Aa Ion Blue		
Office		
Aa     Aa     Aa       Office     Facet     Gallery		
Ion Ion Board In Board		
Ag     Ag       Slice     Wisp   Badge Badge		
Aa     Aa       Basis     Berlin		
Browse for Themes		
Save Current Theme		

 In the Save Current Theme dialog box, give your customized theme a file name of "Badge Green.thmx" and click Save:

X Save Current Then	me					×
$\leftrightarrow$ $\rightarrow$ $\land$ $\uparrow$	« Microsoft » Templates » Docun	nent Themes 🗸 🗸	Ō		ument Themes	
Organize 🔻 Ne	ew folder				== -	?
<ul> <li>Quick access</li> <li>Microsoft Excel</li> <li>OneDrive</li> <li>This PC</li> <li>Network</li> </ul>	Name A Theme Colors Theme Effects Theme Fonts	Date modified 7/23/2020 11:12 AN 7/23/2020 11:12 AN 7/23/2020 11:12 AN	л л л	Type File folder File folder File folder	Size	
File name: Save as type:	Badge Green.thmx Office Theme (*.thmx)					~
<ul> <li>Hide Folders</li> </ul>		То	ols 🔻	Save 🔓	Cancel	

6. Confirm your customized theme has been saved by clicking the **Themes command** drop-down and looking under custom:



 Save the current workbook as Activity 7-2 Complete and then close Microsoft 365 Excel to complete this exercise.

# **TOPIC C: Protect Files**

One of the more important aspects that you need to understand while working with your data in Excel is how to protect Excel files from data loss, as well as unauthorized access. In this topic you will learn about the various ways that Excel 365 can protect your workbooks.

# **Topic Objectives**

In this session, you will learn:

- How to recover lost data
- About the Protect group on the Review tab
- About worksheet and workbook protection
- About marking a workbook as final
- How to encrypt a workbook
- About digital signatures

#### **Recovering Lost Data**

Excel 365 has an **AutoRecover** feature that works in the background to automatically save the workbook that you are working on. This saved copy of the file is called a version and it can be recovered if Excel or your computer experiences an error. If you have automatically saved versions of your workbook, you can find them by clicking **File**  $\rightarrow$  **Info**, and then examining the **Manage Workbook** section:

	Book1.xlsx	Jane Gibson 📧 🙂 🙁 ? — 🗆 🗙
e	Info	*
	IIIIO	
	Book1	
🗋 New	Documents » MOS6001_Excel365_Part 1 » MOS6002_Excel365_Part 2 » Working Files » Lesson 7	
▷ Open	다 Upload ⓒ Share ⓒ Copy path	
Info	Protect Workbook	Properties ~
Save	Control what types of changes people can make to this workbook.	Size 591KB
	Workbook ~	Title Add a title
Save As		Tags Add a tag
Print	Inspect Workbook	Categories Add a category
	Before publishing this file, be aware that it contains:	Related Dates
Share	Check for Comments	Last Modified Today, 4:36 PM
Export	Document properties, printer path, author's name and absolute path     Hidden worksheets	Created Today, 11:18 AM
· ·	<ul> <li>Invisible objects</li> </ul>	Last Printed
Publish	<ul> <li>Content that people with disabilities find difficult to read</li> </ul>	Related People
Close		Author
	Version History	JG Jane Gibson
	View and restore previous versions.	Add an author
	History	Last Modified By JG Jane Gibson
	Managa Workbook	Related Documents
	Indinage WOIKDOOK	
	Manage Warkhook v	Open File Location
	TORBOOK	Show All Properties
Account		
	Browser View Options	
Feedback	Pick what users can see when this workbook is viewed on the Web. Browser View	
Options	Options	·

Each version listed here includes the date and time that it was saved, as well as the circumstances in which it was saved (such as closing Excel without saving the changes). Clicking on any version that is listed here opens it and you will be asked to overwrite any previously saved versions of this file by clicking the **Restore** button on the message bar:



If you experience an error and have not previously saved the workbook that you have been working on at all, you may still be able to acquire a saved version of it by clicking File  $\rightarrow$  Info  $\rightarrow$  Manage Workbook  $\rightarrow$  Recover Unsaved Workbooks:



This action displays the **Open** dialog box, in which you can select an unsaved version and then click **Open**:

🚺 Open				×
$\leftarrow \rightarrow \cdot \uparrow$ h ane (	Gibson > AppData > Local > Microsoft > Office >	UnsavedFiles	<b>∨</b> 0 ∨ s	earch UnsavedFiles
Organize 👻 New folder				EE 🕶 🔟 ?
	Name	Date modified	Туре	Size
> A Quick access	Book1((Unsaved-308279253229274654)).xlsb	7/29/2020 10:48 AM	Microsoft Excel Bi	10 KB
> 🚺 Microsoft Excel	Book1((Unsaved-308279682266131183)).xlsb	7/29/2020 3:54 PM	Microsoft Excel Bi	9 KB
> 📥 OneDrive				
> 💻 This PC				
> 💣 Network				
File nam	e: Book1((Unsaved-308279682266131183)).xlsb		~ All Exc	el Files (*.xl*;*.xlsx;*.xlsm ∨
			Tools 🔻 Op	en 🗸 🔽 Cancel

Once the version is open, you can save it to another location by clicking the **Save As** button on the message bar:

AutoSave 💽 🗄 🏷 - 🖓 - 🐨 Book1.xists: 7/29/2020 3:54 PM (Unsaved File)	- Read-Only - D Search												
File Home Insert Page Layout Formulas Data Review View Help													
Calibri ↓ 14 ↓ A^ A <sup>×</sup> ≡ ≡ ≫ × 8 <sup>b</sup> / <sub>2</sub> Wrap Text	t General - Normal Bad Good Neutral												
Lalien vila v A A − = ≡ ♥ V E2Wap lext General v ste v Format Painter B I U v ⊞ v A v E ≡ ≡ ⊡ E ⊞ Merge & Center v \$ v % 9 % % % format grant as Calculation Check Cell Explanatory Input v													
Clipboard Fa Font Fa Alignment	Ts Number Ts Styles												
COVERED UNSAVED FILE This is a recovered file that is temporarily stored on your computer. Save As													

# **The Protect Group**

Most of the commands that you need to protect your files can be found within the **Protect** group on the Review tab:

AutoSave 💽 🛱 🏷	~ (? ~ ひ	≂ Book1.	lsx - 🔎 Search			Jane Gibson 🥡	æ ·	- 0	×
File Home Insert	Page Layout	Formulas	Data <u>Review</u> View Help				🖻 Share	Commen	ts
abc	D.	<u>)</u>			FB FB FF				
Spelling Thesaurus Workbook Statistics	Check Accessibility	Smart Translat Lookup	e New Delete Previous No Comment Comment Com	ext Show Notes	Protect Protect Allow Edit Sheet Workbook Ranges	Unshare Hide Workbook Ink 🗸			
Proofing	Accessibility	Insights Languag	e Comments	Notes	Protect	Ink			~

Let's look at the purpose of these commands:

- **Protect Sheet** This command prevents others from making unwanted changes to the current worksheet by limiting their editing options.
- **Protect Workbook** Clicking this command prevents others from making structural changes to the current workbook, such as adding or deleting worksheets.
- Allow Users to Edit Ranges Clicking this command allows users to protect specific ranges with a password.

**Unshare Workbook** is part of a legacy feature that has been replaced by Co-authoring and is typically grayed out.

### **The Protect Worksheet Option**

We know that workbooks (individual Excel files) are composed of one or more worksheets. Complex workbooks might make use of several worksheets, each of which might contain important data that is used by the rest of the workbook. To help protect your data, using the File menu you can choose to **protect individual worksheets** in a workbook. To begin, make sure you are viewing the worksheet you want to protect and then click **Review** → **Protect Sheet**:

AutoSave 💽 🗭 🛱 🏷 🤉 🏷 🔻						Book1.xls	k - Save	ed 🕶		2	Search						
File	File Home Insert Page Layout Formulas Data Review View Help																
								$\square$			<b>F</b>		B	K			
Spelling	Thesaurus \	Workbook	Check	Smart	Translate	New	Delete	Previous	Next	Show	Notes	Protect	Protect	Allow Edit	Unshare	Hide	
Statistics Accessibility Lookup Com					Comment		Comment	Comment	Comments	~	Sheet	Workbook	Ranges	Workbook	lnk ~		
Proofing Accessibility Insights Language Comments						its		Notes	L.	δ Pr	otect		Ink				

The **Protect Sheet** dialog box appears and prompts you to specify what sort of editing actions are permitted and not permitted after a worksheet has been protected.

There are 15 types of editing restrictions that you can apply:

-	-	
Protect Sheet	?	X
Password to unprotect sheet:		
Protect worksheet and <u>c</u> ontents	of lock	ed cells
All <u>o</u> w all users of this worksheet to		
Select locked cells		~
Select unlocked cells		
Format cells		
Format columns		
Format rows		
Insert hyperlinks		
Delete columns		
Delete rows		×
ОК	Ca	ncel

You can use this dialog box in two ways: **with or without a password**. You can simply check to allow items in the **Allow all users of the worksheet to** box and click **OK** to apply the restrictions without a password. For example, here we have checked Insert columns:



If this protection is applied, users can still insert columns, but the command to insert sheet rows are grayed out:

AutoSave 💽 🖁 🐇	୨੶୯-୯ ∓	Book1.xisx +	♀ Search		Jane Gibson 🕫 📼 —	n x
File Home Insert	Page Layout Formulas Da	ta Review View Help			🖻 Share 🖓 C	omments
Cut Paste Sorpy ~ Sormat Painter	Calibri     11 $A^{\wedge} A^{\vee}$ B     I $\bigcup$ $\bigcup$ $\square$ $\bigcup$ $\bigcup$	= = =   ♥ ~   ₺₺ Wrap Text = = =   = = =   = = =   ■ Merge & Center	General Conditional Formatting	Format as Table ~	A y y x y x x y x x y x x y x x x x x x x x x x x x x	4 Ideas
Clipboard Fs	Font 15	Alignment	S Number S	Styles	Insert Cells Editing	Ideas 🔨
					≣← Insert Sheet <u>R</u> ows	
					내 Insert Sheet <u>C</u> olumns	
					Ingert Sheet	

Also, if a user attempts to edit a locked cell, a warning message appears, indicating that the cell is protected and to make a change the sheet must be unprotected, and a password might be required:



By default, all cells on a worksheet are locked when a worksheet is protected. To allow specific cells to be edited when a sheet is protected, first unprotect the sheet, then select those cells and press **Ctrl + 1.** The **Format Cells** dialog box opens:

Format Cel	ls							?	×
Number	Alignme	nt	Font	Border	Fill	Protection			
<u>C</u> ategory: General		~	Sample						
Number			32%						
Accountin Date Time	ng		<u>D</u> ecimal	places: 0	-				
Percentage Fraction Scientific	je	I							
Text Special Custom									
		$\lor$							
Percentag	e formats	mul	tiply the c	ell value by	100 and c	isplays the re	esult with a p	ercent sym	bol.
							ОК	Ca	ncel

Click the Protection tab, uncheck the Locked checkbox, then click OK:



When the sheet is again protected, users are now allowed to edit those cells that have been unlocked, but the protection remains for all others.

To remove the restrictions simply click Unprotect Sheet:

AutoS	ave Off	) 🖽 🤈	v G • D	÷		Book	1.xlsx 👻			Search					1
File	Home	Insert	Page Layout	Form	ulas Da	ta Revi	iew View	Help							
abc	ΞΞ	123		Ĵ	aa			$\rightarrow$	$\square$					E	Z
Spelling	Thesaurus	Workbook	Check	Smart	Translate	New	Delete Previo	is Next	Show	Notes	Unprotect	Protect	Allow Edit	Unshare	Hide
	Proofing	Statistics	Accessibility	Lookup	Language	Comment	t Comme Comm	nt Comment ients	t Comments	Notes	Sheet	VVorkbook	tect	Workbook	Ink ~

Now suppose that you would like to better protect the worksheet by assigning it a password in the **Protect Sheet** dialog box. In this case you would add a password to the **Password to unprotect sheet** text box:



When the **OK** button is clicked, a dialog box appears in which you are asked to confirm the password that you supplied:

Confirm Password		7	?	×
Reenter password to proce	ed.			
Caution: If you lose or forg be recovered. It is advisable and their corresponding w a safe place. (Remember th case-sensitive.)	et the pas e to keep a orkbook a at passwo	sword, list of nd she ords are	it cann passwo et nam	iot ords es in
	OK		Cance	2l

The sheet has the same restrictions as when it was protected without a password, only now, users are prompted to enter the password after clicking **Unprotect Sheet**:

Unprotect	heet ? X	
Password:	•••••	
	OK Cancel	

### **The Protect Workbook Option**

To prevent other users from viewing hidden worksheets, adding, moving, hiding, or deleting worksheets, or renaming worksheets, you can **protect your workbook structure** with a password.

To protect your workbook, click **Review** → **Protect Workbook**:



You can also complete this action by clicking File  $\rightarrow$  Info  $\rightarrow$  Protect Workbook  $\rightarrow$  Protect Workbook Structure.

This action displays the **Protect Structure and Windows** dialog box. Here, you can apply a password to help prevent unauthorized changes. Enter your password and click **OK** to activate the protection:

Protect Structure and Windows	?	×							
Password (optional):									
•••••									
Protect workbook for									
✓ <u>S</u> tructure									
Windows									
ок Д	C	ancel							

Note that the Windows option is only available for earlier versions of Excel and some Mac OS versions.

As with protecting worksheets, you will be asked to confirm your password. Reenter your password and click **OK**:

Confirm Password	?	$\times$
Reenter password to proceed.		
Caution: If you lose or forget the passy be recovered. It is advisable to keep a l and their corresponding workbook an a safe place. (Remember that password case-sensitive.)	vord, it ca ist of pass d sheet na ds are	innot swords ames in
ок	Car	ncel

Unlike the Protect Sheet process, where the command changes to Unprotect Sheet when the sheet is protected, the **Protect Workbook** command acts as a toggle: the command remains highlighted, but the name of the command does not change, when the workbook is protected:

AutoSa	ave Off	) E 9	~ C ~ D	÷		Book1.	dsx 👻			₽ Sea	rch					
File	Home	Insert	Page Layout	Form	ulas Da	ta Revi	ew	View H	Help							
abc		123	<b>P</b>	<u>(</u> )	<u>د م</u>	ţ	$\gtrsim$	$\sum$	$\overline{\mathbf{c}}$	$\square$			B		B	Z
Spelling	Thesaurus	Workbook	Check	Smart	Translate	New	Delete	Previous	Next	Show	Notes	Protec	Protect	llow Edit	Unshare	Hide
		Statistics	Accessibility	Lookup		Comment		Comment	Comment	Comments	~	Sheet	Workbook	Ranges	Workbook	lnk ∽
	Proofing		Accessibility	Insights	Language			Commen	ts		Notes		Pro	tect		Ink

Clicking Protect Workbook when it is highlighted opens the **Unprotect Workbook** dialog box, where you can enter the password and click **OK** to unprotect the workbook:

Unprotect	?	×	
Password:	•••••		
	ОК		Cancel
#### Mark Workbooks as Final

When you finish working with your workbook, and do not plan to make any further changes, you should consider marking it as **final**. This alerts others who may use your data that the work is complete, and it helps jog your memory if you have not touched the workbook in a long time. To mark your work as final, click **File**  $\rightarrow$  **Info**  $\rightarrow$  **Protect Workbook**  $\rightarrow$  **Mark as Final**:



Click **OK** to confirm your choice and save the file:

Microsof	't Excel	Х
	This workbook will be marked as final and then save	d.
	OK Cancel	

Your will receive a final notification explaining the document has been marked as final to indicate that editing is complete and that this is the final version of the document:



The Backstage menu now displays a visual warning stating the file has been marked as final:



A similar warning is shown in the message bar, and the title bar shows that the file has been marked as **Read-Only**.



You can click the **Edit Anyway** button on the message bar to release the read-only lock and return the files normal status.

There is also a small notification in the status bar:



You can mark a document as final as many times as you want but keep in mind that any changes will remove this notification and status.

#### **Encrypting a Workbook**

**Encrypting** a document with Excel 365 is very easy, despite the complexity of the underlying encryption operation. In fact, encrypting a workbook using a password is one of the easiest ways to protect sensitive information. To lock a workbook using a password, click **File**  $\rightarrow$  **Info**  $\rightarrow$  **Protect Workbook**  $\rightarrow$  **Encrypt with Password**:



#### Enter a password and click OK:

Encrypt Document	?	$\times$							
Encrypt the contents of this file Passwo <u>r</u> d:									
Caution: If you lose of cannot be recovered. passwords and their of names in a safe place. (Remember that passw	r forget the pass It is advisable to corresponding d vords are case-se	word, it keep a li ocument ensitive.)	ist of						
	ОК	Ca	ncel						

You will be asked to confirm the password:

Confirm Password	?	×	
Encrypt the contents of <u>R</u> eenter password:	of this file		
•••••			
Caution: If you lose o cannot be recovered. passwords and their o names in a safe place. (Remember that passo	r forget the pass It is advisable to corresponding d words are case-s	word, it keep a li ocument ensitive.)	ist of
	ОК	Ca	ncel

Once encrypted, the Backstage menu indicates to you that the workbook has been password-protected:



When it comes time to open the file, you (and anyone else) will be prompted for the password before you can even see the data. Enter the password and click **OK**:

Password		?	×					
'Book1.xlsx' is protected.								
<u>P</u> assword:	•••••							
	ок	Ca	incel					

To remove a password, click **File** → **Info** → **Protect Workbook** → **Encrypt with Password**:



All you have to do is clear the Password field and click OK:

Encrypt Document		?	$\times$						
Encrypt the contents of the	is file								
Passwo <u>r</u> d:									
Caution: If you lose or for cannot be recovered. It is passwords and their corre names in a safe place.	get the pas advisable t sponding	ssword, it o keep a li document	st of						
(Remember that password	(Remember that passwords are case-sensitive.)								
	OK	Car	ncel						

Encryption works by using the password as a way to jumble up the contents of a file. Anyone who intercepts the encrypted file and examines the contents would only see a garbled mess. When the proper recipient enters the password, the "jumbling" process is performed backwards, and the result is a perfectly readable and usable file.

### **Digitally Signing a Workbook**

Another way of protecting your workbook is to **digitally sign** it. A digital signature is an electronic, encrypted, certificate of authenticity. It provides reassurance to the recipient that the workbook really came from you. The actual makeup of the digital signature is directly linked to the structure of the file. If something in the file changes, the digital signature becomes corrupted. If the signature is corrupted, that means the data has somehow been intercepted and changed.

To create a digital signature, you must have a signing certificate. Certificates are issued by a certification authority, similar to a notary public. Like other types of identification, digital signatures can be revoked.

If your document requires this level of security, speak with your IT department, or contact a digital security company to determine what type of digital signature will be best for your needs.

### Activity 7-3: Protecting a Worksheet and a Workbook

You want to protect a worksheet from unauthorized changes.

**1.** To begin, open Activity 7-3 from your Exercise Files folder:



Activity 7-3.xlsx Microsoft Excel Worksheet 12.1 KB

2. With the workbook open, select cells H2 and I2. Press Ctrl + 1:



3. This opens the Format Cells dialog box. Click the **Protection** tab:

Format Cells			+	?	×
Number Alignment Category: General Number Currency Accounting Date Time Percentage Fraction Scientific Text Special Custom	FontBorderSample \$50.00Decimal places:2Symbol:\$	Fill	Protection		V

4. Click to uncheck the "Locked" checkbox, then click OK:

Format Cel	ls						?	×
Number	Alignment	Font	Border	Fill	Protection			
	ij n							
Locking of Protect gr	ells or hiding f oup, Protect S	formulas ha heet butto	as no effec on).	t until you	protect the w	orksheet (Revie	w tab,	
					-			
						ОК	Can	cel

5. Now click **Review** → **Protect Sheet**:

AutoSave 💽 🖫 りょ	୧∽ <b>ଅ ≈</b>	Activity 7-3.xlsx 👻		
File Home Insert	Page Layout Formulas	is Data <u>Review</u> View Help		
abc				
Spelling Thesaurus Workbook Statistics A	Check Smart Tr Accessibility Lookup	Translate New Delete Previous Next Show Comment Comment Comments	Notes         Protect         Protect         Allow Edit         Unshare         Hide           *         Sheet         Workbook         Ranges         Workbook         Ink *	
Proofing	Accessibility Insights La	anguage Comments	Notes Protect Ink	

6. This action displays the Protect Sheet dialog box. Type a memorable password into the Password to unprotect sheet text box:



7. Check the "Format Cells" checkbox and then click OK:



8. Next, you will be required to **re-enter the password** that you selected. Do so and then click **OK**:



**9.** Back on the worksheet, right-click on cell **D5**, then click the **Bold** button on format menu:

	Α	В	С	D	E	F	G		н		1	J	
1	Daily S	Sales & I	Bonus Payo	ut				Daily	Bonus Amount	Dail	ly Goals		
2	ABC Widge	ts Inc.			Calibri ~	11 ~ A^	A" \$ ~ % •		50.00	\$	2,500.00		
3				$\rightarrow$			······································						
4	First Name	Last Name	ID	Daily Sales	P 1 =	<u> </u>	0 € 100 → 0	<b>∀</b>	fotal Sales	B	Bonus		
5	Jackie	Williamson	Jackie_Williamson	\$ 6,785.14	C 50.00		Brosson	\$	34,563.37	\$	300.00		
6	Lucas	Bressan	Lucas_Bressan	\$ 4,687.50	🔏 Cut			\$	28,677.38	\$	150.00		
7	Stanley	Prestwick	Stanley_Prestwick	\$ 7,478.9	Copy			\$	35,403.43	\$	250.00		
8	Jerry	Harrison	Jerry_Harrison	\$ 1,689.4	<u></u>			\$	37,255.31	\$	250.00		
9	Leah	Thompson	Leah_Thompson	\$ 5,478.4	Paste	Options:		\$	55,850.75	\$	400.00		
10	Jackie	Williamson	Jackie_Williamson	\$ 7,600.00	ŕ'n.			\$	191,750.22	\$	1,350.00		
11	Lucas	Bressan	Lucas_Bressan	\$ 5,689.00									
12	Stanley	Prestwick	Stanley_Prestwick	\$ 2,346.8	Paste	Special							
13	Jerry	Harrison	Jerry_Harrison	\$ 1,687.00	Smart	Lookup							
14	Leah	Thompson	Leah_Thompson	\$ 9,874.4	·								
15	Jackie	Williamson	Jackie_Williamson	\$ 8,773.6	Insert.								
16	Lucas	Bressan	Lucas_Bressan	\$ 7,835.8	Delete								
17	Stanley	Prestwick	Stanley_Prestwick	\$ 6,898.0									
18	Jerry	Harrison	Jerry_Harrison	\$ 5,960.2	Clear	ontents							
19	Leah	Thompson	Leah_Thompson	\$ 5,022.4		Analysis							
20	Jackie	Williamson	Jackie_Williamson	\$ 4,084.5	Cite								
21	Lucas	Bressan	Lucas_Bressan	\$ 3,146.7	riit <u>e</u> r		/						
22	Stanley	Prestwick	Stanley_Prestwick	\$ 2,208.9	S <u>o</u> rt		>						
23	Jerry	Harrison	Jerry_Harrison	\$ 1,271.14	🖽 Got D	ta from Tabl	o/Papero						
24	Leah	Thompson	Leah_Thompson	\$ 333.33	EB Gerba		e/Range						
25	Jackie	Williamson	Jackie_Williamson	\$ 5,022.4	🏳 New 🤇	o <u>m</u> ment							
26	Lucas	Bressan	Lucas_Bressan	\$ 4,084.5	0- <b>F</b>	+ C-II-							
27	Stanley	Prestwick	Stanley_Prestwick	\$ 3,146.7	e- rorma	it Cells							
28	lerry	Harrison	lerry Harrison	\$ 2,208.9	Pic <u>k</u> F	rom Drop-do	wn List						
	4	Sheet1	(+)		Define	N <u>a</u> me							
					© Link		>						

**10.** The contents of cell D5 are now bold: Now **try to change the value of cell D5** by typing a new value into it:

	Α	В	С	D		E	F					
1	Daily Sales & Bonus Payout											
2	ABC Widge											
3												
4	First Name	Last Name	ID	Da	ily Sales	Bonus						
5	Jackie	Williamson	Jackie_Williamson	\$	6,785.14	\$ 50.00						
6	Lucas	Bressan	Lucas_Bressan	\$	4,687.50	\$ 50.00						
7	Stanley	Prestwick	Stanley_Prestwick	\$	7,478.96	\$ 50.00						
8	Jerry	Harrison	Jerry_Harrison	\$	1,689.47	\$-						
0	Loob	Thomason	Look Thompson	ć	5 479 45	¢ 50.00						

**11.** A warning message appears, informing you that the cell you are trying to change is protected. Click **OK**:

Microsoft	Excel	×
	The cell or chart you're trying to change is on a protected sheet. To make a change, unprotect the sheet. You might be requested to enter a passw	ord.
	СК	

**12.** Now select cell **I2**. Type the value "**2000**" and press **Enter**:

	Α	В	С	D	E	F	G		н		1	J
1	Daily Sales & Bonus Payout			ut				Dail	y Bonus Amount	Dai	ily Goals	
2	ABC Widge	ts Inc.						\$	50.00		2000	
3												
4	First Name	Last Name	ID	Daily Sales	Bonus		Sales Rep		Total Sales	1	Bonus	
5	Jackie	Williamson	Jackie_Williamson	\$ 6,785.14	\$ 50.00		Bressan	\$	34,563.37	\$	300.00	
6	Lucas	Bressan	Lucas_Bressan	\$ 4,687.50	\$ 50.00		Harrison	\$	28,677.38	\$	150.00	
7	Stanley	Prestwick	Stanley_Prestwick	\$ 7,478.96	\$ 50.00		Prestwick	\$	35,403.43	\$	250.00	
8	Jerry	Harrison	Jerry_Harrison	\$ 1,689.47	\$ -		Thompson	\$	37,255.31	\$	250.00	
9	Leah	Thompson	Leah_Thompson	\$ 5,478.45	\$ 50.00		Williamson	\$	55,850.75	\$	400.00	
10	Jackie	Williamson	Jackie_Williamson	\$ 7,600.00	\$ 50.00		Total	\$	191,750.22	\$	1,350.00	
11	Lucas	Bressan	Lucas_Bressan	\$ 5,689.00	\$ 50.00							
12	Stanley	Prestwick	Stanley_Prestwick	\$ 2,346.87	\$ -							
12	lorry	Harrison	lerny Harrison	\$ 1.687.00	¢ _							

**13.** Because the cell has been unlocked, you are able to change the value in the cell. All the formulas that reference that cell have updated results:

	Α	В	С		D	E	F	G		Н		1	J
1	Daily S	Sales & I	Bonus Payo	ut					Dail	y Bonus Amount	Da	aily Goals	
2	ABC Widge	ts Inc.							\$	50.00	\$	2,000.00	
3													
4	First Name	Last Name	ID	Da	ily Sales	Bonus		Sales Rep		Total Sales	Bonus		
5	Jackie	Williamson	Jackie_Williamson	\$	6,785.14	\$ 50.00		Bressan	\$	34,563.37	\$	300.00	
6	Lucas	Bressan	Lucas_Bressan	\$	4,687.50	\$ 50.00		Harrison	\$	28,677.38	\$	200.00	
7	Stanley	Prestwick	Stanley_Prestwick	\$	7,478.96	\$ 50.00		Prestwick	\$	35,403.43	\$	350.00	
8	Jerry	Harrison	Jerry_Harrison	\$	1,689.47	\$-		Thompson	\$	37,255.31	\$	250.00	
9	Leah	Thompson	Leah_Thompson	\$	5,478.45	\$ 50.00		Williamson	\$	55,850.75	\$	400.00	
10	Jackie	Williamson	Jackie_Williamson	\$	7,600.00	\$ 50.00		Total	\$	191,750.22	\$	1,500.00	
11	Lucas	Bressan	Lucas_Bressan	\$	5,689.00	\$ 50.00							
12	Stanley	Prestwick	Stanley_Prestwick	\$	2,346.87	\$ 50.00							
13	Jerry	Harrison	Jerry_Harrison	\$	1,687.00	\$-							
14	Leah	Thompson	Leah_Thompson	\$	9,874.45	\$ 50.00							
15	Jackie	Williamson	Jackie Williamson	\$	8,773.68	\$ 50.00							

**14.** Now click **Review** → **Unprotect Sheet**, to remove the protection:

AutoSave 💽 🖁	୨୯୯୯୦ ⊽	Activity 7-3.xlsx 👻	R	Search					Jane	e Gibson	JG 🗄	-		×
File Home Inser	Page Layout Fi	ormulas Data	Review	View	Help						년 Sh	are 🖓	Comme	ents
abc	L .	े 🚮 🛛		$\overline{\overline{}}$		$\Box$			<b>F</b>		E	K		
Spelling Thesaurus Workboo Statistic	c Check Sma Accessibility Look	rt Translate Co	New Delete mment	Previous	Next t Comment	Show Comments	Notes	Unprotect Sheet	Protect Workbook	Allow Edit Ranges	Unshare Workbook	Hide Ink ~		
Proofing	Accessibility Insigh	nts Language		Commer	nts		Notes	G	Pro	tect		Ink		~

**15.** Enter your password and click **OK**:

Unprotect	?	×		
Password:	•••••			
		ок	Ca	ncel

**16.** Save the current workbook as Activity 7-3 Complete and then close Microsoft 365 Excel to complete this exercise.

# TOPIC D: Preparing a Workbook for Multiple Audiences

One thing to keep in mind when working with and managing workbooks created by Excel 365, is that multiple audiences from other regions of the world, or with different abilities, may be required to use and understand them. For this reason, it is important to understand how you can adapt your workbooks for different audiences, when required.

### **Topic Objectives**

In this session, you will learn:

- How to display data in multiple international formats
- How to utilize international symbols
- How to add alternative text to objects

### **Displaying Data in Multiple International Formats**

If you encounter data that appears in a different language or unit of measurement, Excel can accommodate this information and modify it to suit your own preferences.

When working with other languages, you have the option to change the interface and the languages that are used for editing. You can find these settings within the Excel Options dialog box, in the **Language category**:

Excel Options		?	×
General Formulas	Set the Office Language Preferences		
Data	Office display language		
Proofing	Buttons, menus, and other controls will show in the first available language on this list. 🕕		
Save Language Ease of Access Advanced	<ol> <li>English <preferred></preferred></li> <li>Match Microsoft Windows [English]</li> </ol>	Move U Move Dov Set as Prefe	p wn erred
Customize Ribbon	Install additional display languages from Office.com		
Quick Access Toolbar	Office authoring languages and proofing		
Add-ins	Manage languages used for creating and editing documents, including proofing tools such as spel check.	lling and gramm	nar 🛈
Trust Center	English (United States) <preferred> Proofing installed</preferred>		
	English (Canada) Proofing installed	<u>A</u> dd a Langua	ge
		<u>R</u> emove	
		Set as <u>P</u> refer	red
	Install additional keyboards from Windows Settings		
	C	)K Ca	ncel

Within the **Office display language** section, you can choose the language for buttons, menus, and other controls. Select your preferred language and then click **Set as Preferred**. If the language you prefer is not displayed, you can click **Install additional display languages from Office.com**.

In the **Office authoring languages and proofing** section you can similarly choose languages for creating and editing documents, including proofing tools such as spelling and grammar check.

The **Proofing** category of the Excel Options dialog box includes settings for customizing dictionaries and setting modes for the French and Spanish language. You can also select the dictionary language here:

Excel Options		?	×
General Formulas	abc Change how Excel corrects and formats your text.		
Data	AutoCorrect options		
Proofing	Change how Excel corrects and formats text as you type: <u>AutoCorrect Options</u>		
Save	When correcting spelling in Microsoft Office programs		
Language Ease of Access Advanced Customize Ribbon Quick Access Toolbar Add-ins Trust Center	Ignore words in UPPERCASE         ✓ Ignore words that contain numbers         ✓ Ignore Internet and file addresses         ✓ Flag repeated words         Enforce accented uppercase in French         Suggest from main dictionary only         Custom Dictionaries         French modes:         Traditional and new spellings ▼         Spanish modes:         Tuteo verb forms only         Dictionary language:         English (United States)		
	ОК	Car	ncel

#### Translation

If you are dealing with other languages, Excel also has a **translation** function available, in the Review tab, allowing you to select text within your spreadsheet and translate between more than 60 languages. To launch the Translator task pane, click **Review** → **Translate**:

AutoSave 💽 🗍 🏷 🗸	- C - D =	Book1.xls	sx ▼		Jar	ne Gibson <mark>J</mark> G	E	- 🗆 ×
File Home Insert			🖻 Share	Comments				
abc		5 A			🖪 🖪 🔛 🛒	Z		
Spelling Thesaurus Workbook	Check Smart	Translate	New Delete Previous Next Show	Notes P	Protect Protect Allow Edit Unshare	Hide		
Statistics	Accessibility Lookup		Comment Comment Comments	~ 3	Sheet Workbook Ranges Workbook	lnk ~		
Proofing	Accessibility Insights	Language	Comments	Notes	Protect	Ink		^

The **Translator** task pane opens on the right side of your worksheet, where you can set the **From** and **To** languages, then select cells on your worksheet that contain text to see the translation:

Au	toSave (	€ €	3 り・ C · C	) <del>⊽</del> Book'	1.xlsx 👻		Jane Gibson 🚺 🖻 — 🗆 🛛	×					
File	Но	ome Ir	isert Page Layo	out Formulas	Data	Review	View	Help				🖻 Share 🖓 Comment	3
abo Spelli	ng Thesa Pro	aurus Work Stat	cbook istics Accessibility Accessibility	Smart Lookup Insights Lang	nslate guage	New Dele	ete Previo Commo	us Next ent Commer	Show t Comments	Notes Notes	Protect Sheet W	Protect Allow Edit Unshare forkbook Ranges Workbook Protect Ink	~
C6		-	$\times  \checkmark  f_x$	Global Sales									٧
	A	В	С	D	E	F	G	н	I.	J	K		
1												Translator 🔹 💈	<
2												From English 🗸 🖛	
4		Acme	Widgets Co. G	lobal Sales									
5			_									Global Sales	
6		Quarte	Global Sales	Outside of USA									
7		Q1	\$ 75,000,000.00	32%									
8		Q2	\$ 61,000,000.00	28%									
9		Q3	\$ 56,000,000.00	21%									
10		Q4	\$ 83,000,000.00	35%								Î↓	
11												To Spanish 👻 🔶	
12													
13												Ventas globales	
14												-	
16													
17													
18												Was the translation helpful? 🖒 🖓	
19													
20													
21													
22													
23													
24													
25													
26											L		
27													
20	•	Shee	t1 (+)								•	Translated by Tr	
5												Ⅲ Ⅲ − − + 100	6

You can also type directly into either field to see a translation in the other field:

Translator 🔹	×
From English -	^
Yearly X	
Ĵ↓ To Spanish →	1
Anual	
Was the translation helpful? 🖒 $\zeta$	7
other annual anual	~
Translated by Microsoft Privacy stater	ment

Finally, you can copy text from either field to use in your worksheet, by right-clicking the selected text, then clicking **Copy**:

To Sp	anish 👻	
Anua	1	
	Сору	
	Attach Debugger	
	Reload	4 5
	Security Info	C7 64
-		

#### **Date and Numerical Formats**

**Date and numerical formats** can also be adjusted to international units. To do this, select the data that you would like to adjust and then click the Option button (<sup>56</sup>) within the Number group on the Home tab:



This action displays the **Format Cells** dialog box. From the list of categories on the left side of this dialog box, select the data that you are working with and you will see either the Symbol drop-down or the Locale (location) drop-down that you can use to choose a different regional option:

Format Cel	ls						?	$\times$			
Number	Alignment	Font	Border	Fill	Protection						
<u>Category:</u> General Number Currency Accountin Date Time Percentag Fraction Scientific Text Special Custom	ng^	Sample 7/30/20 Type: *3/14/20 *Wedne 2012-03 3/14 3/14/12 03/14/12 03/14/12 14-Mar Locale (In English Spanish	Sample         Protection           7/30/2020         Type:           *3/14/2012         *Wednesday, March 14, 2012           2012-03-14         3/14           3/14         3/14/12           03/14/12         14-Mar           Locale (location):         English (United States)           Spanish (Puerto Rico)         Spanish (Puerto Rico)								
Date form an asterisl operating	ats display da k (*) respond f system. Form	Spanish Spanish Spanish Spanish te and tim to changes ats withou	(Spain, Tra (United St (Uruguay) (Venezuel e serial nur in regiona t an asteris	aditional S ates) a) mbers as d al date and sk are not a	ort) ate values. Da I time settings affected by op	ate formats tha that are specif perating system	t begin ied for t setting:	with the s.			
						OK	Car	ncel			

### **Utilize International Symbols**

Many languages can be entered using a standard keyboard, but some do require special **international** characters. To find and insert one of the symbols, click **Insert** → **Symbol**:

This action opens the **Symbol** dialog box to the **Symbols** tab. First, from the Font drop-down menu select the font that you would like to use. Next, double-click the symbol that you would like to insert into the last location that was selected on the current worksheet. The Symbol dialog box remains open, allowing you to enter more than one symbol in your selected cell. When you are finished adding symbols, click **Close**:

Symbol ? ×														$\times$				
2	Symbols Special Characters																	
E	Font: (normal text) V Subset: Latin-1 Supplement V														$\sim$			
	u	v	w	x	у	z	{		}	~		i	¢	£	¤	¥	I	^
	§		©	₫	«	٦	-	®	-	0	±	2	3	1	μ	P	•	
	•	1	ō	»	1⁄4	1/2	3∕4	Ś	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	
	É	Ê	Ë	Ì	Í	Î	Ϊ	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	<b>~</b>
E	lecen	tly use	ed sym	bols:														
$\begin{vmatrix} \hat{A} & \mathbf{\xi} & \mathbf{f} \end{vmatrix} \mathbf{\hat{C}} & \mathbf{\hat{S}} & \mathbf{M} & \mathbf{f} \end{vmatrix} \neq  \mathbf{\xi}  \geq  \mathbf{\hat{S}}  \times  \mathbf{\infty}  \mu \mid \alpha \mid \beta \end{vmatrix}$																		
Unicode name: Latin Capital Letter A With Grave																		
	Insert Close																	

### **Adding Alternative Text to Objects**

You can create alternative text (**Alt Text**) for shapes, pictures, charts, or other objects in your Excel workbooks. This helps people with visual impairments, who use screen readers, to better understand your graphical content. When you add Alt Text to an object, a screen reader reads out the Alt Text when it encounters the object. Without Alt Text, the screen reader user only knows they have reached an object without knowing what it shows.

To add Alt Text to an object, first select the object, then click **Format**  $\rightarrow$  **Alt Text**:

AutoSave 🤇		<b>9-</b> 9-0	÷		Book1.xlsx + 🦻 Search														
File Hor	ne Inse	ert Page Layou	t Formulas	Data R	eview	View	Help C	hart Desigr	Forn	nat									
Chart Area	ction tch Style		hange hape *	Abc	Abc	Abc	Abc A	bc Ab		Shape Fill Shape Out Shape Effe	line ~	4 A			Text Fill ~ Text Outline ~ Text Effects ~	Alt Text	Brir Forwa	ig Seno rd ~ Backwa	d ard >
Current Se	lection	I Insert Shape	15			Sha	pe Styles				E I		WordArt	Styles		G Accessibi	lity		
Chart 8	* E _ 3	× √ fx																	
A	В	С	D	E	F	G	н	1.1	J	К	L	м	N	0	Р	Q	R	S	
1 2020-07-3	D																		
2	-																		
3																			
4	Acme	Widgets Co. G	lobal Sales		9-				0				9						
5								Glo	obal Sale	es									
6	Quarter	Global Sales	Outside of USA		55	90,000,000						100%							
7	Q1	\$ 75,000,000	32%		SI	80,000,000	_					90%							
8	Q2	\$ 61,000,000	28%		S	70,000,000						70%	Y						
9	Q3	\$ 56,000,000	21%		SE	50,000,000						60%							
10	Q4	\$ 83,000,000	35%			50,000,000						50%							
11					~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	40,000,000						40%	ĭ						
12						20,000,000	-					30%							
13					- 5	10 000 000						20%							
14					Ű.	5- S-						0%							
15							Q1	c	12	Q3	Q4								
16								Global Sa	es	Outside of U	SA								
17																			
18					-				-				-						
20																			
20																			

The **Alt Text** task pane opens, where you can type a description of the object (typically one or two sentences), to help communicate the information it presents:



If you instead check the **Mark as decorative** checkbox, the object will not expose a description to screen readers. This allows you to identify to the user objects as decorative, rather than informational:



### Activity 7-4: Preparing a Workbook for Multiple Audiences

The workbook that you have been working on needs to be sent to customers in Quebec, a French speaking Canadian province. You have been asked to prepare it for them.

**1.** To begin, open Activity 7-4 from your Exercise Files folder:



Activity 7-4.xlsx Microsoft Excel Worksheet 16.2 KB

#### 2. Use your cursor to select cells C8 to D22:



**3.** Next, press **Ctrl + 1.** The Format Cells dialog box opens. Click the **Number** tab if it is not already displayed:

Format Cells						?	×
Number Alignment	Font	Border	Fill	Protection			
Category: General Number Currency Accounting Date Time Percentage Fraction Scientific Text Special Custom	Sample S13,44 Decimal Symbol:	places: 2 S English	h (United St	tates) ecimal point:	s in a column.		Y
					OK	Ca	ncel

4. Ensure that the Accounting category is selected from the Category list on the left, then click the Symbol drop-down menu and click the French (Canada) option:

lls						?	×
Alignment	Font	Border	Fill	Protection			
Alignment	Font Sample \$13,44 Decimal Symbol:	Border places: 2 S English S Inuktitu S Inuktitu S Inuktitu S Maayi (i	Fill (United S (Australia (Belize) (Canada) (Hong Ko (Jamaica) (New Zea (Singapo) (Trinidad (United S (Canada) in it (Latin) it (Syllabic 3runei Dau	Protection tates) ) ng SAR) land) re) and Tobago) tates) s) ussalam)		ß	×
ng formats line	up the cu	r S Mapuch S Mohaw S Papiam	ne k ento				J
	Alignment	Alignment Font Sample S13,44 Decimal Symbol:	Alignment Font Border	Alignment     Font     Border     Fill       ng     Sample     \$13.44       Decimal places:     2       Symbol:     S English (United S       Symbol:     S English (Australia       S English (Belize)     S English (Canada)       S English (Jamaica)     S English (Jamaica)       S English (Jamaica)     S English (Mong Ko       S English (Jamaica)     S English (Singapoi       S English (Vinited S     S English (Vinited S)       S English (Vinited S)     S English (Vinited S)       S English (Jamaica)     S English (Jamaica)       S English (Jamaica)     S English (Vinited S)       S English (Vinited S)     S English (Vinited S)       S English (Jamaica)     S English (Vinited S)       S English (Vinited S)     S English (Vinited S)       S Inuktitut (Silsh (United S)     S Inuktitut (Silabic       S Malay (Brunei Dar     S Maori       S Mapuche     S Mohawk       S Papiamento     S Mohawk	Alignment     Font     Border     Fill     Protection       ng     Sample     \$13.44	Alignment       Font       Border       Fill       Protection         ng       Sample       \$13.44	Alignment       Font       Border       Fill       Protection         ng       Sample       \$13.44

5. With the new currency symbol selected, click **OK** to apply your changes:

Format Cel	ls					?	×
Number	Alignment	Font	Border	Fill	Protection		
Category: General Number Currency Accounti Date Time Percentag Fraction Scientific Text Special Custom	ng ge	Sample 13.44 <u>D</u> ecimal Symbol:	S places: 2 S French	(Canada)	lecimal points in a col	umn.	
					01	· 6	Cancel

**6.** Back at the worksheet, you will see that the cells have been updated with the new currency format:

	Α	В	С	D	E	F	G	Н	I.	J	К	
1	Produ	uct Sale	s									
2												
3	From:	1/1/2020										
4												
5	To:	6/30/2020										
6												
7	SKU	Quantity	Price	Total				Product Sale	as by SKU			
8	520	844	13.44 \$	11,343.36 \$				FIGURE Sal	25 DY 3RU			
9	612	846	29.33 \$	24,813.18 \$		30,000.0	0 \$					
10	3398	970	19.74 \$	19,147.80 \$		25,000,0	10 S					
11	3649	670	11.39 \$	7,631.30 \$								
12	7688	308	15.52 \$	4,780.16 \$		20,000.0	0 \$					
13	1573	813	23.93 \$	19,455.09 \$								
14	3328	733	31.45 \$	23,052.85 \$		15,000.0	0 5					
15	9137	853	14.30 \$	12,197.90 \$		10.000.0	0 S -					
16	4158	354	16.96 \$	6,003.84 \$		_						
17	7448	913	20.37 \$	18,597.81 \$		5,000.0	0 \$ -					
18	793	344	24.33 \$	8,369.52 \$								
19	2417	362	15.97 \$	5,781.14 \$				1 & 9 & A A	1 4 4	3 1 3	ನ ನೇ	
20	4348	114	38.47 \$	4,385.58 \$			51 6	1 33 36 160 51 33V	912 A12 1A4 1	5. 5m B3m	420. GL	
21	4103	264	19.19 \$	5,066.16 \$								
22	6722	701	11.38 \$	7,977.38 \$								
23												

Now select cell B3, then hold Ctrl and also select cell B5. Once both cells are selected, press Ctrl + 1, to again open the Format Cells dialog box:

Format Cells						?	×
Number Alignment	Font	Border	Fill	Protection			
Category: General Number Currency Accounting Date Time Percentage Fraction Scientific Text Special Custom	Sample 6/30/20 <b>1ype:</b> <b>*3/14/20</b> 3/14/ 3/14/12 03/14/11 14-Mar Locale (Id English	020 esday, Mare-14 2 ocation): (United St	ch 14, 2012 ates)	2			~
Date formats display da an asterisk (*) respond t operating system. Form	te and time to changes ats withou	e serial nu in regiona t an asteri	mbers as d al date anc sk are not	ate values. Da I time settings affected by op	ate formats thi that are speci erating syster	at begin ified for t n setting	with :he s.
					OK	Ca	ncel

8. Ensure that the **Date** category is selected from the Category list on the left, then click the **Locale** (location) drop-down menu and select the **French (Canada)** option:

Number	Alignment	Font	Border	Fill	Protection	1														
Category:																				
General	~	Sample																		
Number Currency		6/30/2	020																	
Accounti	ng	Type:																		
Date		*3/14/2	012					~												
Percenta Fraction Scientific Text Special	ge	*Wedne 2012-03 3/14 3/14/12 03/14/1	esday, Mari -14 2	th 14, 201	2															
Custom	Sustom	14-Mar						~												
		Locale (location):																		
		English (United States)						$\sim$												
															Filipino Filipino Finnish French (Belgium) French (Cameroon)					^
	$\sim$	French	(Canada)			N														
		French	Caribbean	)		45		~												
Date form an asteris operating	iats display da k (*) respond t i system. Forma	te and tim o changes ats withou	e serial nui in regiona t an asteri	mbers as c al date ano sk are not	late values. d time setting affected by	Date formats i gs that are sp operating syst	that begin v ecified for t tem settings	vith he 5.												

9. With the new date locale selected, click **OK** to apply your changes:

Number	Alignment	Font	Border	Fill	Protection			
Category: General Number Currency Accounti Date Time Percenta; Fraction Scientific Text Special Custom	ng ge	Sample 6/30/20 12-03-12 12-03-12 14-03-12 12 03 14 14/03/12 14 mars, 14 mars Locale (Ic French (	-14 4 2 2 2012 2012 2012 2012 cotion): Canada)					
	~							
Date form an asteris operating	ats display dat k (*) respond t system. Forma	e and time o changes its withou	e serial num in regional t an asterisl	ibers as d date and k are not i	ate values. D I time setting: affected by o	ate formats t s that are spe perating syst	hat begin :cified for t em setting	with the s.

**10.** The date formats have now been updated:

	А	В	С	D	E
1	Produ	uct Sale	s		
2					
3	From:	2020-01-01			
4					
5	To:	2020-06-30			
6					

**11.** Now, to translate the title and the date labels, click **Review** → **Translate**:



**12.** In the Translator task pane, leave the **From** language selector set to Auto-detect and click on the **To** drop-down menu and scroll to find, then select, **French**:



Now click on cell A1. You will see that the translation is, likely, "Ventes de produits." Type this into cell A1, then press Enter:



A	В	с	D	E F	G	н	1	J.	К	L A	
1 Vent	es de pr	oduits									I ranslator
2											From English (detected) -
3 De:	2020-01-01										
4											From: X
5 To:	2020-06-30										
6											
7 SKU	Quantity	Price	Total								
8 520	844	13.44 \$	11,343.36 \$			Product Sa	es by SKU				
9 612	846	29.33 \$	24,813.18 \$	30,000	.00 5						
10 3398	970	19.74 \$	19,147.80 \$	25.000	00 C						Ţ↓
11 3649	670	11.39 \$	7,631.30 \$	25,000	.00 5						To French -
12 7688	308	15.52 \$	4,780.16 \$	20,000	.00 \$						
13 1573	813	23.93 \$	19,455.09 \$								De:
14 3328	733	31.45 \$	23,052.85 \$	15,000	.00 \$						
15 9137	853	14.30 \$	12,197.90 \$	10.000	00 S -						
16 4158	354	16.96 \$	6,003.84 \$	20,000							
17 7448	913	20.37 \$	18,597.81 \$	5,000	.00 S -						
18 793	344	24.33 \$	8,369.52 \$								Was the translation helpful? 🖒 🖓
19 2417	362	15.97 \$	5,781.14 \$		- 5 -0		10 10 10 10	2.1.8	00		
20 4348	114	38.47 \$	4,385.58 \$		50 0	or 35° 36° 46° 45° 39	012 Alt 1AP 1	10. Jur. 13m	MID. CL		
21 4103	264	19.19 \$	5,066.16 \$								
22 6722	701	11.38 \$	7,977.38 \$								
23											verb
24											partir
25											from, leave, go, start, set out, get off
26										-	Translated by
	Sheet1	+				E (4)				Þ	

14. Now, click on cell A3. Type the translation, "De:", in cell A3, and press Enter:

15. Now select cell A5. You will see that the translation for "To:" is "À:" (A with an accent grave). To enter this in the cell, first delete the contents of cell A5, then click Insert → Symbol:



**16.** The Symbol dialog box will open to the Symbols tab. Select the capital letter A with grave, then click **Insert**, then click **Close**:

Symbo	I														?		×
<u>S</u> ymbo	ols	S <u>p</u> ecia	l Chai	racters	;												
<u>F</u> ont: (normal text)								S <u>u</u> bs	et: La	tin-1	Suppl	ement	:				$\sim$
§		C	a	«	-	-	®	-	٥	±	2	3	1	μ	¶	•	^
	1	ō	»	1⁄4	1/2	3∕4	ż	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	
É	Ê	Ë	Ì	Í	Î	Ϊ	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	
Ú	Û	Ü	Ý	Þ	ß	à	á	â	ĩa	ä	å	æ	ç	è	é	ê	
ë	ì	í	î	ï	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	~
<u>R</u> ecen	tly use	ed sym	ibols:														
À	€	£	¥	©	8	тм	±	≠	≤	≥	÷	×	~	μ	α	β	
Unico Latin (	de na Capita	me: I Lette	r A W	ith Gra	ave •	-		<u>C</u> h	aracte	er cod	e: 000	50	fro <u>m</u> :	Unic	ode (h	ex)	~
													<u>I</u> nse	rt L		Canc	el

**17.** Add the **colon** to complete the entry on cell A5, then press **Enter**:

	А	В	С	D	E
1	Vente	es de pi	r <b>oduits</b>		
2					
3	De:	2020-01-01			
4					
5	À:	2020-06-30			
6					
7	SKU	Quantity	Price	Total	

**18.** Save the current workbook as Activity 7-4 Complete and then close Microsoft 365 Excel to complete this exercise.

## Summary

During this lesson you learned about the various ways that you can enhance your workbooks in Excel 365. You should now be familiar with the customization options that are available, including notes and comments, as well as how to manage themes to control the appearance of your workbooks. At this point, you should also be comfortable with protecting your workbooks against data loss and unauthorized access. Finally, you now know how to prepare your workbooks when working with multiple audiences.

## **Review Questions**

- 1. What is the command sequence to insert a comment?
- 2. What are themes?
- 3. How do you add a background image to your worksheet?
- 4. In which group on the Review tab can you find the Protect Sheet command?
- 5. What is the command sequence to open the Alt Text task pane?

## LESSON LABS

## Lesson 1

#### Lesson Lab 1-1

Objective	To understand how to apply and use range names, as well as apply and use specialized functions.
Briefing	You have a workbook that lists the total sales for every branch of your company. You need to calculate the average sales for each region, for stores with sales under \$1,000,000.
Task	<ul> <li>Apply the following range names to the indicated cells:</li> <li>A4:A27: Store</li> <li>B4:B9: Region_1</li> <li>B10:B14: Region_2</li> <li>B15:B17: Region_3</li> <li>B18:B22: Region_4</li> <li>B23:B27: Region_5</li> </ul> In the designated cells, use the AVERAGEIF function to calculate the average of the stores by region only where the stores earned under \$1,000,000 in sales.
Hints	Remember that logical operators need to be enclosed in double quotations when constructing this function.
Sample Data	Lesson Lab 1-1.xlsx

### Lesson 2

### Lesson Lab 2-1

Objective	To understand how to analyze data using functions.
Briefing	You have been tasked with finishing a sales worksheet that lists the actual sales and sales goals for each store in your company.
Task	Use an IF function to determine if each store in every region has met their sales goal outlined in the worksheet.
Hints	Remember that the IF function syntax is as follows: IF(logical_test, value_if_true, value_if_false).
Sample Data	Lesson Lab 2-1.xlsx
Follow-Up Questions	Use the UPPER function to convert the text found in cell A1 entirely to uppercase.

### Lesson Lab 2-2

Objective	To understand how to use lookup functions.
Briefing	You need to use a LOOKUP function to find specific information from the provided worksheet.
Task	Add a LOOKUP function to cell G2 to find out if store 358 met its sales goal.
Hints	Remember that the syntax for a LOOKUP function is as follows: =LOOKUP(lookup_value, lookup_area, results_area).
Sample Data	Lesson Lab 2-2.xlsx
Follow-Up Questions	Add the current date to cell E1 using the TODAY function.

### Lesson 3

### Lesson Lab 3-1

Objective	To understand how to create and customize tables, as well as sort table data.
Briefing	A worksheet that you have been working on requires a table. Additionally, you need to sort this data to better see which stores have not met their sales goal.
Task	Create a new table from the data in the A3:D27 range in the sample workbook. Apply any one of the table styles that are available.
	Sort the data in the table by the Sales Goal Met column from A to Z.
Hints	You can find the table styles in the Table Styles gallery on the Table Tools – Design tab.
Sample Data	Lesson Lab 3-1.xlsx
Follow-Up Questions	Add a Total Row to the table and calculate the sum of total sales, the sum of the sales goals, and a count of the stores that met their sales goals.

### Lesson 4

### Lesson Lab 4-1

Objective	To understand how to create and modify charts based on existing data.
Briefing	For an upcoming presentation, you would like to create a chart based upon sales data with which you have been working.
Task	Using the B3:C15 range in the provided Sample Data file, create a new chart that will best illustrate actual sales numbers against sales goals for the store.
	Once you have chosen and inserted a new chart, remove the title.
Hints	Remember that each chart type is best suited to a specific type of data, so if one chart does not look right, try another type. There might be a number of different solutions.
Sample Data	Lesson Lab 4-1.xlsx
Follow-Up Questions	Apply a new style to the chart that you just created.
## Lesson Lab 4-2

Objective	To understand how to utilize trendlines while working with charts.
Briefing	To get a better picture of the order value by age group that has been collected over a period of time, you would like to add a trendline to a chart.
Task	Add a polynomial trendline to the chart that appears on the supplied worksheet, then format the trendline in red to stand out from the data plots.
Hints	Ensure that the polynomial trendline is set to an order of 2.
Sample Data	Lesson Lab 4-2.xlsx
Follow-Up Questions	Experiment with the other trendline types to see how they represent the data.

# Lesson 5

## Lesson Lab 5-1

Objective	To understand how to create and use PivotTables to analyze data.
Briefing	Using a PivotTable, you would like to see the total amount of sales made by stores that reached their sales goal and stores that did not.
Task	Using the provided data (A3:D27) in the Sample Data file, create a new PivotTable on the current worksheet (Sheet1) that starts in cell F3.
	Add data to the PivotTable by adding the Sales Goals Met field as a column. Next, add the Sales field to the Values area. Ensure that the Sales field uses the SUM function.
	Apply the appropriate data formats to the resulting table and adjust the column widths as necessary.
Hints	Remember that you can click and drag fields from the field list in the top half of the PivotTable Field task pane to the four areas on the bottom half.
Sample Data	😰 Lesson Lab 5-1.xlsx

## Lesson Lab 5-2

Objective	To understand how to present data using PivotCharts, as well as filter data using slicers.
Briefing	Using a PivotTable that you previously created, you would like to create a PivotChart that best illustrates the data that it presents.
Task	Create a PivotChart on the worksheet of the Sample Data file that uses the Column chart type.
	Insert a slicer that filters out data from store 122 as this location recently closed.
Hints	You can insert a slicer by clicking <b>PivotTable Analyze</b> → <b>Insert</b> <b>Slicer.</b> Additionally, by holding down the Ctrl key and clicking on a button in the slicer you can choose to filter out that option.
Sample Data	Lesson Lab 5-2.xlsx
Follow-Up Questions	On the PivotChart, add data labels to the outside end position.

# Lesson 6

## Lesson Lab 6-1

Objective	To understand how to work with graphical objects.
Briefing	You are going to be presenting the results of a customer survey. To improve the visual elements of this worksheet, you would like to add some graphical objects.
Task	Align, order, and group the happy and unhappy face shapes with the colored circles to create icons for satisfactory and unsatisfactory results, then size the grouped shapes to fit next to the average score and the scores for each CSR. Copy and paste as required to add an icon to each score. Scores above 6 get a happy face and scores below 6 get an unhappy face.
	Next, search stock art and online to find and add an image below the title that is related to customer satisfaction.
Hints	Remember that clicking <b>Shape Format</b> → <b>Selection Pane</b> will open the Selection task pane, where you can arrange the layers of the shapes.
Sample Data	Lesson Lab 6-1.xlsx
Follow-Up Questions	Add a SmartArt graphic to show the CSR results, from highest to lowest. Use colors in the individual shapes that match the icons.

# Lesson 7

## Lesson Lab 7-1

Objective	To understand how to manage themes, add backgrounds, and protect a workbook.
Briefing	You need to send a confidential workbook to an international branch to confirm the inventory value.
Task	Change the theme of the document to "Feathered," then use the Lesson Lab 7.1.png image to add a background to the workbook. Unlock the cells in the range C5:C34, to allow for editing, then protect the worksheet, making sure you select "Edit objects" in the "Allow all users of this workbook to" field. (Allowing "Edit objects" lets users add notes to a worksheet even when it is protected.) Use the password "1234" (without the quotation marks). Finally, encrypt the document, again with the password "1234".
Hints	When choosing a background, ensure that you choose the Browse button that appears in the From a file section. Also remember that you click File $\rightarrow$ Info $\rightarrow$ Protect Workbook to encrypt with a password.
Sample Data	Lesson Lab 7-1.xlsx
Follow-Up Questions	Try editing the values in column C, then column B.

## Lesson Lab 7-2

Objective	To understand unprotecting workbooks, marking them as final, using comments and notes, and using translation.
Briefing	An international branch has returned a confidential workbook in response to your request. You must finalize it.
Task	Open the workbook using the password "1234" (without the quotation marks). Also unprotect the sheet with the same password. You can now remove the background and change the theme back to <b>Office</b> . Find any notes on the worksheet and translate them to English. Convert the note to a comment and add the translation in a new thread.
Hints	You can copy the text from the note and paste it into the translator. You can use the Auto-detect feature if you are not sure what the language is. Also, remember to clear the password from the document encryption.
Sample Data	Lesson Lab 7-2.xlsx

# COURSE WRAP-UP

# Post-Course Assessment

#### 1. Where can you search for different types of functions?

- a. In the Microsoft Search box
- b. In the Insert Function dialog box
- c. In the Formulas tab
- d. All of the above

#### 2. What is the LEN function used for?

- a. It returns a set number of characters from a string
- b. It counts the number of cells in a row
- c. It returns the number of characters in a string
- d. It counts the number of rows in a column

#### 3. When does the AND function return a TRUE value?

- a. When one of the arguments is true
- b. When all the arguments are true
- c. When all the arguments are false
- d. When there is only one argument.

#### 4. What is the last argument in all of the database functions?

- a. criteria
- b. database
- c. lookup\_value
- d. row\_num

#### 5. What are the two contextual tabs available when you have a chart selected?

- a. Chart Task Pane
- b. Chart Design
- c. Format
- d. Add Chart

#### 6. What do dual axis charts display?

- a. A unique axis for both data series in a combination chart
- b. Two different axis titles
- c. Values above and below zero
- d. Two charts beside each other

#### 7. What does a slicer do, in relation to PivotTables?

- a. Adds columns to the table
- b. Filter fields by unique entries
- c. Adds rows to the table
- d. Separates column data

#### 8. How can you see the layers of all shapes and pictures on a worksheet?

- a. Click Shape Format  $\rightarrow$  Group  $\rightarrow$  Group
- b. Click Picture Format  $\rightarrow$  Selection Pane
- c. Click Picture Format  $\rightarrow$  Bring Forward  $\rightarrow$  Bring to Front
- d. Click Shape Format  $\rightarrow$  Selection Pane

#### 9. What is a digital signature?

- a. A scan of your signature
- b. A link to your company website
- c. A fingerprint scanner
- d. An electronic, encrypted, certificate of authenticity

#### 10. What is Alt Text used for?

- a. To add translations to objects in your workbook
- b. As a programming language
- c. To give context to objects in your workbook for users with screen readers
- d. To add animations to your workbook objects

# **Course Summary**

Congratulations on completing the second part of Microsoft 365 Excel training. During this course, you learned how to:

- Create advanced formulas
- Analyze data with logical and lookup functions
- Organize worksheet data with tables
- Visualize data with charts
- Analyze data with PivotTables, slicers, and PivotCharts
- Work with graphical objects
- Enhance workbooks

You should now know which formulas and functions are used to complete which tasks, as well as how to use those formulas and functions for data analysis. You should be comfortable with the variety of data visualization tools that are available in Excel, as well as the use of graphics and the many ways that you can enhance your workbooks.

# ANSWER KEYS

# Lesson 1 Review Questions

1. For a selected range, where do you type in a new range name?

You type a new range name for a selected range into the Name Box.

2. How many function categories are there in Microsoft 365 Excel?

In Excel 365, there are 12 function categories.

3. What is the command sequence to show formulas rather than calculated values in cells?

The command sequence to show formulas rather than calculated values in cells is Formulas  $\rightarrow$  Show Formulas.

#### 4. What is a nested function?

A nested function is a function within the arguments of another function.

5. What is the command sequence to change workbook calculations to manual?

The command sequence to change workbook calculations to manual is **Formulas**  $\rightarrow$  **Calculate Options**  $\rightarrow$  **Manual.** 

# Lesson 2 Review Questions

#### 1. What is the TRIM function used for?

The TRIM function is used to remove empty spaces from a string, excluding those that appear between two words.

#### 2. What is the TEXTJOIN function used for?

The TEXTJOIN function is used to combine (concatenate) text strings together, with or without delimiters, from multiple cells into one single cell.

#### 3. What are the only two possible outputs from a logical function?

The output from a logical function is either TRUE or FALSE.

#### 4. What is the difference between the TODAY function and the NOW function?

The difference between the TODAY function and the NOW function is that the TODAY function will only print the current date, while the NOW function prints both the date and time.

#### 5. What is the FV function used for?

The FV function is used to calculate the future value of an investment that has a fixed interest rate, as well as a fixed or periodic payment schedule.

# Lesson 3 Review Questions

#### 1. What is the command sequence to add a table?

To add a table, click **Insert**  $\rightarrow$  **Table**.

#### 2. How do you add a Total Row to a table?

To add a Total Row, click **Table Design → Total Row.** 

#### 3. What type of functions do Total Rows use by default?

Total Row formulas use the subtotal function to display the results of common operations. This means the formulas will display totals only for rows that are not hidden.

#### 4. How can you remove duplicate values from a table?

To remove duplicate values from a table, first select a cell within the table and click **Table Design**  $\rightarrow$  **Remove Duplicates.** 

#### 5. When you convert a table to a range, what happens to the structured references?

Structured references are replaced with cell references when you convert a table to a range.

# Lesson 4 Review Questions

#### 1. What are charts?

Charts are graphical representations of data and its relationships.

#### 2. What is a line chart typically used for?

Line charts are typically used to display data changes over a period of time.

#### 3. What is the difference between modification and formatting?

When you choose to modify a chart, you are changing the various elements that are used to illustrate the data. Formatting, on the other hand, is the process of altering the overall appearance of the chart.

#### 4. When are the Chart contextual tabs displayed?

The Chart contextual tab set is displayed whenever a chart is selected.

#### 5. What is the command sequence to add a trendline using the ribbon?

The command sequence to add a trendline using the ribbon is **Chart Design**  $\rightarrow$  **Add Chart Element**  $\rightarrow$  **Trendline**  $\rightarrow$  **[Trendline]**.

# **Lesson 5 Review Questions**

#### 1. What is pivoting in Excel?

Pivoting is the act of moving data around to change the table's structure.

# 2. Where do the field names come from in the Choose fields to add to report section of the PivotTable Fields task pane?

The field names are derived from the column headers in the table or range used to create the PivotTable.

3. What happens to fields that are dragged to the Values area on the PivotTable Field task pane?

Fields that are dragged to the Values area of the PivotTable Field task pane will have calculations performed on them or their values summarized.

#### 4. What is the command sequence to insert a PivotChart?

The sequence to insert a PivotChart is **PivotTable Analyze**  $\rightarrow$  **PivotChart**.

#### 5. What do the buttons on a slicer represent?

The buttons on a slicer represent unique entries that exist within the field that is associated with the slicer.

# Lesson 6 Review Questions

#### 1. What are the six types of graphical objects that can be inserted into Excel workbooks?

The six types of graphical objects that can be inserted into Excel workbooks are Pictures, Shapes, Icons, 3D Models, SmartArt, and screenshots.

#### 2. Are shapes considered pictures or drawings?

Shapes are considered drawings.

#### 3. How do you open the Selection pane?

To open the Selection pane, click **Picture Format (or Shape Format)** → **Selection Pane.** 

#### 4. What are SmartArt graphics used for?

SmartArt graphics are used to visually represent text-based content in a chart or diagram.

#### 5. How do you open the Choose a SmartArt Graphic dialog box?

To open the Choose a SmartArt Graphic dialog box, click Insert → SmartArt.

# Lesson 7 Review Questions

1. What is the command sequence to insert a comment?

To insert a comment, click **Review** → **New Comment.** 

#### 2. What are themes?

Themes are combinations of preset colors, fonts, and effects

3. How do you add a background image to your worksheet?

To add a background image, click **Page Layout → Background**.

- In what group on the Review tab can you find the Protect Sheet command?You can find this command in the Protect group on the Review tab.
- 5. What is the command sequence to open the Alt Text task pane?
   To open the Alt Text task pane, click Format → Alt Text.

# **Post-Course Assessment**

#### 1. Where can you search for different types of functions?

- a. In the Microsoft Search box
- b. In the Insert Function dialog box
- c. In the Formulas tab

#### d. All of the above

All of these methods can help you find and use functions.

#### 2. What is the LEN function used for?

- a. It returns a set number of characters from a string
- b. It counts the number of cells in a row
- c. It returns the number of characters in a string
- d. It counts the number of rows in a column

The LEN function returns the numbers of characters in a cell that contains text, or in a text string, and is often used to ensure text strings are the correct length.

#### 3. When does the AND function return a TRUE value?

a. When one of the arguments is true

b. When all the arguments are true

- c. When all the arguments are false
- d. When there is only one argument.

The AND function only returns TRUE when all of the arguments are true.

#### 4. What is the last argument in all of the database functions?

#### <mark>a. criteria</mark>

- b. database
- c. lookup\_value
- d. row\_num

The last argument in a database function is criteria, where the criteria is defined withing the workbook, directly below a column name that exactly matches a column name in the database.

#### 5. What are the two contextual tabs available when you have a chart selected?

- a. Chart Task Pane
- b. Chart Design
- <mark>c. Format</mark>
- d. Add Chart

When a chart is selected in a worksheet, the Chart Design and Format contextual tabs will become available on the Ribbon.

#### 6. What do dual axis charts display?

- a. A unique axis for both data series in a combination chart
- b. Two different axis titles
- c. Values above and below zero
- d. Two charts beside each other

A dual axis chart allows you to display a unique axis for both data series in a combination chart. This makes it easier to compare different but related values.

#### 7. What does a slicer do, in relation to Pivot Tables?

- a. Adds columns to the table
- b. Filter fields by unique entries
- c. Adds rows to the table
- d. Separates column data

A slicer allows you to quickly filter fields in your pivot table using unique values in that field.

#### 8. How can you see the layers of all shapes and pictures on a worksheet?

- a. Click Shape Format  $\rightarrow$  Group  $\rightarrow$  Group
- b. Click Picture Format → Selection Pane
- c. Click Picture Format  $\rightarrow$  Bring Forward  $\rightarrow$  Bring to Front
- d. Click Shape Format → Selection Pane

You can see the layers of all the shapes and pictures on a worksheet by first selecting a picture or a shape, then clicking **Shape Format**  $\rightarrow$  **Selection Pane**, or **Picture Format**  $\rightarrow$  **Selection Pane**.

#### 9. What is a digital signature?

- a. A scan of your signature
- b. A link to your company website
- c. A fingerprint scanner

#### d. An electronic, encrypted, certificate of authenticity

A digital signature is an electronic, encrypted, certificate of authenticity. It provides assurance to the recipient of a file that it really came from you and has not been altered.

#### 10. What is Alt Text used for?

- a. To add translations to objects in your workbook
- b. As a programming language
- c. To give context to objects in your workbook for users with screen readers
- d. To add animations to your workbook objects

Alt Text allows you to give context to shapes, pictures, charts, and other objects in your workbook to assist users with visual impairments, who use screen readers to view your files.

# APPENDICES

# Keyboard Shortcut Quick Reference Sheet

	Open a new workbook	Ctrl + N
File Management	Save a file	Ctrl + S
	Open a file	Ctrl + O
	Print worksheet	Ctrl + P
	Close Microsoft Excel	Alt + F4
Worksheet	Switch between worksheet tabs (left to right)	Ctrl + Page Up
	Switch between worksheet tabs (right to left)	Ctrl + Page Down
	Insert cells	Ctrl + Shift + +
	Delete cells	Ctrl + -
Text Editing	Select all items in current worksheet	Ctrl + A
	Copy text	Ctrl + C
	Cut text	Ctrl + X
	Paste text	Ctrl + V

Dialogs	Open Find tab of Find and Replace dialog	Ctrl + F
	Open Replace tab of Find and Replace dialog	Ctrl + H
	Open Go To dialog	Ctrl + G
Oper	Open Font tab of Format Cells dialog	Ctrl + Shift + F
	Check spelling	F7
	Get Help	F1
Text Formatting Tools	Apply bold formatting	Ctrl + B
	Apply underlining	Ctrl + U
	Apply italic formatting	Ctrl + I
	Align text to center	Ctrl + E
	Align text to left	Ctrl + L
	Align text to right	Ctrl + R
	Justify text	Ctrl + J
	Increase font size	Ctrl + Shift + .
	Decrease font size	Ctrl + Shift + ,
	Undo last action	Ctrl + Z
	Redo last action	Ctrl + Y

# Glossary

#### absolute reference

A type of reference that will not change even if it is moved or copied to another location.

#### add-in

Small components that can be added to Excel to add features and functionality.

#### array

Any grouping of two or more adjacent cells.

#### arguments

Data used by functions to complete calculations.

#### AutoFill

A feature that is used to automatically fill sequential data into a range of cells.

#### **AutoFilters**

Preconfigured filters that can be quickly applied or removed.

#### Anova

Short for Analysis of Variance. Used to examine if the averages of samples are different in a significant way.

#### cell

The intersection of a row and column on a worksheet.

#### charts

Visual representations of numeric data in a dataset.

#### conditional formatting

A formatting type that will highlight cells whose data satisfies certain criteria.

#### consolidation

The process of combining, condensing, and summarizing data from multiple sources into one destination.

#### correlation

Indicates if data sets trend or change with each other.

#### criteria range

Used in database functions or advanced filters, this refers to the range that contains criteria needed to perform an operation.

#### database functions

Functions that allow you to perform operations on multiple fields in an Excel database.

#### delimited text

Data that is entered with one row equaling one line of text.

#### dependent cells

Cells that are affected by the contents of another cell.

#### exporting

The process of sending data from one application to another.

#### external reference

A link to the contents of one or more cells within the worksheet of another workbook.

#### fields

Columns that appear in a dataset that is used for a PivotTable.

#### fill

Formatting that adds background color to cell(s).

#### fill handle

The small black box that appears in the bottom right-hand corner of a selected cell or cell range. Used to activate the AutoFill feature.

#### filtering

Removing data from view based upon set criteria.

#### Flash Fill

Feature that will automatically extract or combine data based on a pattern.

#### font

A design for a set of characters, combining typeface and other qualities such as size, pitch, and spacing.

#### form

An interface element of a workbook that is used to collect data or execute an action.

#### **Format Painter**

A tool that is used to copy formatting from one selection of text to another.

#### formula

A mathematical relationship expressed through symbols.

#### Formula Bar

A part of the Excel interface that displays the cell name, as well as values and formulas in the selected cell.

#### function

A preconfigured formula that is used for a specific purpose.

#### HTML

A programming language that describes how to display data.

#### importing

The process of opening data in one application that was saved in another application.

#### logical operators

A type of operator that is used to compare values and determine if those values meet specified criteria.

#### logical values

A type of value that expresses whether data is TRUE or FALSE based on specified criteria.

#### macros

Small programs that are created to complete a specific task or set of tasks.

#### mixed references

Cell references that include both relative and absolute references.

#### multi-cell array formula

A type of array formula that performs multiple calculations on one or more arrays and then displays the results.

#### outline

A feature in Excel that allows you to organize datasets in a worksheet into hierarchical groups.

#### **PivotChart**

Similar to regular Excel charts, a PivotChart is a visual representation of data that is being displayed in a PivotTable.

#### PivotTable

A data analysis tool that dynamically allows you to pivot columns and rows of raw data without altering it.

#### precedent cells

Cells within a worksheet that provide data for a formula.

#### range names

Meaningful names that can be added to cell ranges so that they can be easily referred to and understood later.

#### relative reference

A cell reference that will change relative to its positioning in a worksheet.

#### scenario

A set of cell values that are saved and substituted into your worksheet at your convenience.

#### single-cell array formula

A type of array formula that performs multiple calculations on arrays and then displays the results in a single cell.

#### slicers

A type of data analysis tool that works in conjunction with PivotTables to sort data based on unique data entries.

#### Sparklines

Small graphs contained within a single cell that are used to summarize data and display trends.

#### spreadsheet

Either a paper or electronic file that is used to store and work with data (mostly numbers) in a tabular fashion.

#### **SUBTOTAL** functions

A type of Excel function that is used to perform calculations on subsets of data.

#### subtotals feature

A feature that is used to quickly perform the SUBTOTAL function on a subset of data within a dataset.

#### summary functions

A feature that uses SUBTOTAL functions on subsets of data within a table.

#### table

A dataset that is comprised of rows and columns but is treated as one object (unlike regular data ranges).

#### Tell Me

Natural language help feature accessed directly on the ribbon interface.

#### Text pane

Part of the interface when SmartArt is added or selected in Excel. Typically used to add text to SmartArt.

#### tracer arrows

Colored arrows used to indicate the direction of the data flow to and from cells and formulas.

#### transactional data

Data that represents each transaction (or event) in a series. It is not summarized in any way and is considered raw data without row labels.

#### VBA

Visual Basics for Applications, a programming language that can be used to automate procedures in Microsoft Office

#### workbook

An Excel file that stores multiple worksheets.

#### worksheet

An electronic spreadsheet.

#### workspace

Saved set of Excel files.

#### XML

A commonly used programming language that is frequently used to describe data. Stands for Extensible Markup Language

# Index

Α	
Alt Text	
What is?	
AutoComplete	
And formulas	24
AutoFill	
Automatic Workbook Calculations	
AutoRecover	

## В

# Backgrounds

Adding	
BEDMAS	

# С

## Charts

Adding a legend	
Adding alternative text to	
Adding data	
Adding gridlines to	
Adding title to	
Applying style to	
Chart Design tab	
Creating	
Dual axis	
Editing legend	
Elements of	
Format tab	

Formatting	
Formatting with styles	
Inserting	
Modifying	195
Moving	
Resizing	
Switch Row/Column	
Types of	
What are?	
Combination Charts	
Comments	
Adding	
Deleting	
Posting	
Showing	
Custom Chart Templates	
Creating	
D	
Database Functions	
List of	
Date formats	
DAX Functions	
DAX language	
Types of	
	254
What are?	

## File management

Digital signature	368
Encrypt with password	365
Entering password	366

Mark as Final	
Read-Only	
Removing password	
Formulas	
Showing and Hiding	
Functions	
Arguments	41
AVERAGEIF	
AVERAGEIFS	
Categories of	
CONCATENATE	63
COUNTA	
COUNTIF	
COUNTIFS	
Database	
DAVERAGE	
DAY	
Entering	
Finding	
Function Arguments dialog box	45
FV (Future Value)	
GETPIVOTDATA	
HLOOKUP	
HOUR	
INDEX	
Insert Function dialog box	
IPMT	
LEFT	
LEN	60
LOOKUP	
LOWER	
MATCH	
MID	
MINUTE	
MONTH	

Nested	46
NOW	
NPV	
PMT	
PPMT	
PROPER	62
RIGHT	
SECOND	
Serializing Dates and Times	
SUMIF	
SUMIFS	
Text	
TODAY	
TRANSPOSE	65
TRIM	61
UPPER	62
VLOOKUP	86
YEAR	

## G

aphical Objects
-----------------

## Η

## Headers and Footers

And themes
------------

## 1

## Images

I	Inserting	289
I	Picture Format tab	292
Int	ternational symbols	
lte	erative Calculations	
I	Enabling	48

## L

Language Preferances	
Logical Functions	
AND function	74
IF function	70, 76, 81, 82
Operators	73
OR function	75
What are?	73
Lookup Functions	
What are?	84
Μ	
Microsoft PowerPivot for Excel	
What is?	254
Ν	

Name Manager	22
Nested Functions	
Notes	
Adding	
Converting to comments	
Showing	
Numerical formats	380

## 0

## Objects

Grouping	
Layering	
Positioning	306

## Ρ

#### PivotChart

	Apply a style	
	Creating	272, 275
	Filtering	
	What is?	272
P	ivotTable	123, 248
	And PivotCharts	
	And slicers	
	Creating	245, 257
	Designing	
	External data source	
	Field task pane	
	Formatting	252
	Modifying fields displayed	
	Value Field Settings dialog box	
	What is?	

## R

## Range Name

Creating from selection	29
Creating with Name Box	20
Creating with New Name dialog box	21, 22, 28
Deleting	23
Editing	23
Filtering	24
Parameters for	
Selecting	20
Using in formulas	24, 30
What is?	

# S

## Shapes

Inserting	285
Shape Format tab	293
Types of	285

#### Slicers

Inserting	
Using	
What are?	
SmartArt	

# Format tab 294 Inserting 313 SmartArt Design tab 293 Using Text pane 314 What is? 312 Structured References 156

#### T

#### Tables

	Adding Rows and Columns	
	Applying style to	
	Banded Rows	
	Components	
	Control Auto Correct Options	
	Convert to Range	
	Creating	
	Customizing Row Display	
	Modifying	132
	Naming	154
	Removing Duplicate Values	
	Table Design tab	
	Total Row	
	Total Row Functions	139
	Total Row Subtotal functions	141
	Using Structured References	156
	What are?	
Te	endlines	
	Adding	212
Te	ext Boxes	
Inserting	288	
-------------	-----	
Themes		
Changing	345	
Colors	344	
Customizing	346	
What are?	344	
Translation	377	
Trendlines	208	
Types of	209	

## W

## Watermarks

Adding	
WordArt	197, 293, 294
Inserting	
Workbook protection	
Current worksheet	
Editing restrictions	
Password	
Protect workbook structure	