

Excel 2016: Up To Speed



R.M. Hyttinen

Excel 2016: Up To Speed

R.M. Hyttinen

Copyright & License Notes

Excel 2016: Up to Speed

By R.M. Hyttinen

Copyright © 2016 by R.M. Hyttinen. All rights reserved.

Published by PCM Courseware, Milwaukee, Wisconsin.

<http://pcmcourseware.com>

ISBN: 978-0-9915186-5-4

Examples used in this book are fictional. Any resemblance to actual persons living or dead, businesses, incidents, organization or events is purely coincidental.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, without the prior permission of the Publisher. Although every precaution has been taken in the preparation of this book, the publisher and author assume no responsibility for errors and omissions. Nor is any liability assumed for damages resulting from the use of information contained within.

If you found this book helpful, please consider leaving a review wherever you purchased this book. Also consider telling your friends about it to help me spread the word about my book.

Thank you so much for supporting my work!

License Notes

This e-book is licensed for your personal enjoyment only. This e-book may not be resold, given away to other people or used in any type of training classes. If you would like to share this book with another person, please purchase an additional copy for each recipient. If you're reading this book and did not purchase it, or it was not purchased for your use only, then please return to your favorite e-book retailer and purchase your own copy. Thank you for respecting the hard work of this author.

Trademark Acknowledgements

Microsoft, Windows and Excel are registered trademarks of the Microsoft Corporation. All other known trademarks have been appropriately capitalized and are the property of their respective owners.

TABLE OF CONTENTS

Copyright & License Notes

Introduction

Chapter 1 - Excel Basics

Creating an Excel Workbook

Examining the Excel Environment

Opening an Existing Workbook

Navigating a Worksheet

Creating a New Workbook

Saving a New Workbook

Moving Between Workbooks

Setting Excel Options

Switching between Views

Using Tell Me to Obtain Help

Closing a Workbook and Exiting Excel

Chapter 2 - Working with Data

Entering Text and Numbers

Entering Numbers as Text

Changing Column Width:

Entering Simple Formulas

Choosing Formula Cell References

Using AutoSum

Total rows and columns at the same time using AutoSum

Changing & Deleting Data

Using Undo/Redo

Using Find and Replace

Using Find and Replace to Remove Blank Spaces in Cells

Using the Go To Command

Spell Checking Your Worksheet

Inserting Symbols

Using Smart Lookup

Chapter 3 - Editing a Worksheet

Working with Ranges

Copying and Pasting Data

Using the Office Clipboard

[Cutting and Pasting Data](#)

[Copying and Moving Cells using Drag-And-Drop](#)

[Changing Column Width](#)

[Autofit](#)

[Changing Row Height](#)

[Inserting and Removing Rows and Columns](#)

[Copying Data and Formulas with AutoFill](#)

[Using AutoFill to Create a Series](#)

[Filling in Cells using Flash Fill](#)

[Chapter 4 – Formatting a Worksheet](#)

[Formatting Text](#)

[Using the Format Cells Dialog Box](#)

[Formatting Values from the Ribbon](#)

[Formatting Numbers](#)

[More about Fractions](#)

[Using the Format Painter Button](#)

[Alignment and Text Wrapping](#)

[Merging Cells and Centering Text](#)

[Adding Cell Borders](#)

[Applying Colors and Shading to Cells](#)

[Applying Cell Styles](#)

[Hiding and Unhiding Rows and Columns](#)

[Freezing and Unfreezing Rows and Columns](#)

[Inserting and Removing Page Breaks](#)

[Chapter 5 - Page Setup and Printing](#)

[Adjusting Margins](#)

[Setting Page Orientation](#)

[Setting Paper Size](#)

[Defining a Print Area](#)

[Printing Worksheet Titles](#)

[Forcing a Worksheet to Fit](#)

[Inserting Headers and Footers](#)

[Printing a Worksheet](#)

[Chapter 6 - Formulas and Functions](#)

[Copying Formulas](#)

[Relative References](#)

[Absolute References](#)

[Mixed References](#)

[The MIN, MAX, COUNT and AVERAGE Functions](#)

[Entering Functions Manually](#)

[The Insert Function Button](#)

[Chapter 7 - Using a Formula to Join the Contents of Multiple Cells](#)

[Combine Cells using the Ampersand](#)

[Combine cells using the CONCATENATE Function](#)

[Combine cells using the CONCAT Function](#)

[Joining Text with the TEXTJOIN Function](#)

[Pasting as Values](#)

[Chapter 8 - Modifying Workbooks](#)

[Adding and Deleting Worksheets](#)

[Copying Worksheets](#)

[Renaming Worksheets](#)

[Repositioning Worksheets](#)

[Grouping Worksheets](#)

[Changing Worksheet Tab Colors](#)

[Using 3-D Formulas & References](#)

[Chapter 9 - Working with Tables](#)

[Creating a Table](#)

[Enter Data into a Table](#)

[Deleting Rows and Columns](#)

[Formatting a Table](#)

[Totaling Data in a Table](#)

[Sorting Data in a Table](#)

[Sorting Multiple Columns](#)

[Filtering Data using AutoFilter](#)

[Creating Custom Filters](#)

[Chapter 10 - Working with Charts](#)

[Creating a Chart](#)

[Moving a Chart](#)

[Resizing a Chart](#)

[Changing the Layout and Style](#)

[Labeling Chart Elements](#)

[Formatting Chart Text](#)

[Formatting Chart Elements](#)

[Changing the Chart Type](#)

[Showing or Hiding Gridlines](#)

[Customizing Axes](#)

[Creating a Pie Chart](#)

[Changing a Chart's Source Data](#)

[Moving a Chart to a Different Worksheet](#)

[Saving a Chart Template](#)

[Filtering Chart Data](#)

[Using Sparklines](#)

[Customizing Sparklines](#)

[Chapter 11 - Working With Graphics](#)

[Adding Pictures](#)

[Inserting Online Images](#)

[Adding Shapes](#)

[Formatting Drawing Objects](#)

[Inserting WordArt](#)

[Inserting SmartArt](#)

[Inserting an Organization Chart](#)

[Modifying an Organizational Chart](#)

[Taking a Screenshot](#)

[Chapter 12 - Financial & Logical Functions](#)

[Using the IF Function](#)

[Using Nested Functions](#)

[The COUNTIF Function](#)

[Using the PMT Function](#)

[Using the FV Function](#)

[Using AutoCalculate](#)

[Chapter 13 - Date and Time Functions](#)

[Understanding Date/Time Functions](#)

[Adding a Date and a Date Interval](#)

[Adding Months & Years to a Date](#)

[Subtracting Dates](#)

[Calculating Time Intervals](#)

[Chapter 14 - Managing Workbooks](#)

[Creating a Workbook Using a Template](#)

[Creating a New Template](#)

[Editing a Template](#)

[Showing or Hiding Workbook Elements](#)

[Creating a Workspace](#)

[Comparing Two Workbooks Side by Side](#)

[Saving a Workbook in a Different File Format](#)

[Using Data Consolidation](#)

[Chapter 15 - Importing & Exporting Data](#)

[Importing External Data into Excel](#)

[Importing Text Data into Excel](#)

[Converting Text to Columns](#)

[Removing Duplicate Rows of Data](#)

[Importing Data from a Database](#)

[Linking to another File](#)

[Linking & Embedding Objects](#)

[Exporting Data from Excel](#)

[Publishing Worksheets & Workbooks to the Web](#)

[Creating Web Queries](#)

[Chapter 16 - Formatting Numbers](#)

[Creating Custom Number Formats](#)

[Using Conditional Formatting](#)

[Applying Conditional Formatting Based on Top/Bottom Rules](#)

[Applying Specialized Conditional Formatting](#)

[Creating your own Formatting Rules](#)

[Managing Conditional Formatting](#)

[Clearing Conditional Formatting](#)

[Chapter 17 - Working with Ranges](#)

[Naming a Range](#)

[Using a Named Range](#)

[Managing Range Names](#)

[Using the VLOOKUP Function](#)

[Chapter 18 - Working with Macros](#)

[Creating a Macro](#)

[Running a Macro](#)

[Editing a Macro](#)

[Make a Backup of your Macros](#)

[Saving a Workbook with Macros](#)

[Opening a Workbook with Macros](#)

[Adding a Macro to the Quick Access Toolbar](#)

[Chapter 19 - Data Analysis Tools](#)

[Tracing Formula Precedents](#)

[Tracing Cell Dependents](#)

[Tracing and Fixing Errors](#)

[Error Checking a Worksheet](#)

[Creating a PivotTable](#)

[Rearranging a PivotTable](#)

[Setting PivotTable Options](#)

[Formatting a PivotTable](#)

[Filtering PivotTable Data with Slicers](#)

[Filtering A PivotTable Inline](#)

[Creating Custom Filters](#)

[Filtering PivotTable Data Using Timeline](#)

[Creating a PivotChart](#)

[Chapter 20 - Summarizing Data](#)

[Adding Subtotals to a List](#)

[Nesting Subtotals](#)

[Applying Advanced Filters](#)

[Adding Group and Outline Criteria to Ranges](#)

[Using Data Validation](#)

[Previewing Data using Quick Analysis](#)

[Chapter 21 - Analyzing Your Data](#)

[Using Goal Seek](#)

[Using Solver](#)

[Creating & Displaying Scenarios](#)

[Creating a Scenario Summary Report](#)

[Using Data Tables](#)

[Forecasting Future Values](#)

[Chapter 22 - Collaborating with Others](#)

[E-mailing a Workbook](#)

[Sharing a Workbook with Others](#)

[Web Page Preview](#)

[Converting Worksheets into Web Pages](#)

[Inserting Hyperlinks](#)

[Viewing and Editing Comments](#)

[Editing Comments](#)

[Locking/Unlocking Cells in a Worksheet](#)

[Protecting a Worksheet](#)

[Showing or Hiding Formulas](#)

[Protecting a Workbook](#)

[Creating a Shared Workbook](#)

[Tracking Changes to a Workbook](#)

[Accepting and Rejecting Changes to a Workbook](#)

[Encrypting a Workbook](#)

[Marking a Workbook as Final](#)

[Merging Copies of Shared Workbooks](#)

[Inspecting Workbooks](#)

[Checking Document Compatibility](#)

[Checking Document Accessibility](#)

Introduction

As the author and founder of PCM Courseware, I am delighted to bring you the first in our Up To Speed series of guides: Excel 2016. Since 2003, PCM Courseware has been publishing innovative “Print-On-Demand” electronic courseware for both the PC and the Macintosh and beginning with the Up to Speed series, we are now creating software guides for everyone, not just for software trainers.

My mission is to create guides to make learning technology concepts easy, no matter what kind of learner you are. The guides are simple to use yet comprehensive in their effectiveness. Many students find the “step-by-step” approach of our manuals to be a valuable self-study resource.

You do not need to read the book sequentially, although this can certainly be helpful if you are just starting out with Excel. I’ve written the book from scratch, starting with basic Excel topics and moving on to more advanced features of application, designed to help you to become more productive more quickly.

If you are looking to accomplish a specific task, be sure to take advantage of our handy Table of Contents.

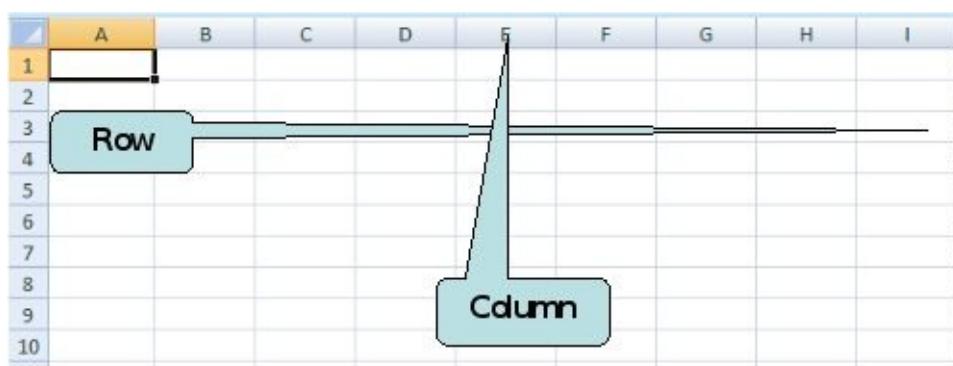
So let’s get started with Excel 2016 – Up to Speed.

Chapter 1 - Excel Basics

Creating an Excel Workbook

Welcome to Microsoft Excel 2016! Microsoft Excel is a powerful and user-friendly spreadsheet application that allows you to enter, calculate, organize and analyze data. You can use Excel for a variety of tasks, such as preparing a budget, creating invoices, tracking inventory, and preparing financial forms, just to name a few. Excel has powerful calculating and charting capabilities as well as formatting features that allow you to really jazz up your documents.

The *cell* is the most basic part of Excel – it is in the cell where data is entered. In Excel, data is organized in rows (the horizontal divisions) and columns (the vertical divisions) which make up an Excel *Worksheet*. Worksheets are stored in an Excel file called a *workbook*.



A workbook can consist of several worksheets. When Excel first launches, a blank worksheet appears and you can begin entering your data and formatting the look of your document.

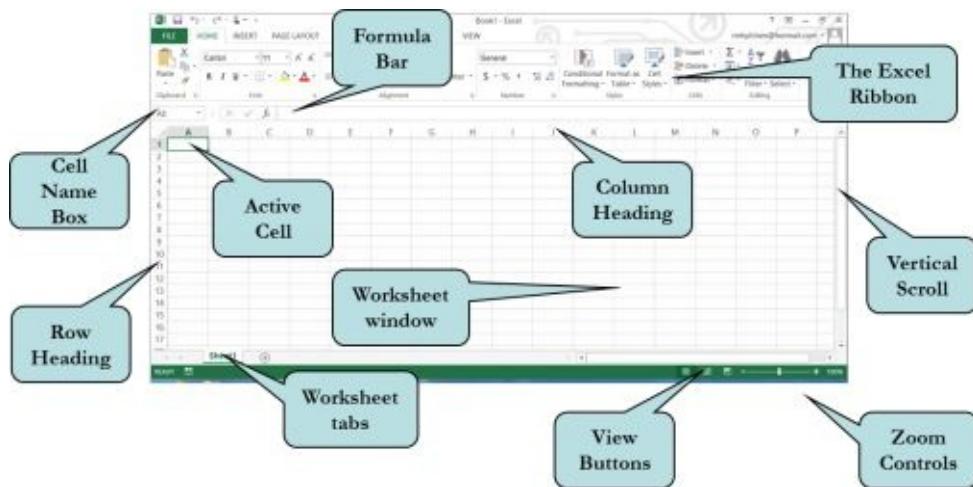
Let's begin by creating a new workbook and examining the Excel environment.

1. If you are using Windows 8 or Windows 10, click the Excel tile on the Start screen (if you don't see an Excel tile, type: Excel until the application is highlighted).
2. If using Windows 7 or before, click the Start button on the lower-left corner of your screen to display the Start menu, select All Programs > Microsoft Office > Microsoft Excel 2016 from the Start Menu to launch the application (this may vary, depending on your installation).
3. Click Blank Workbook in the right pane of the Welcome screen.



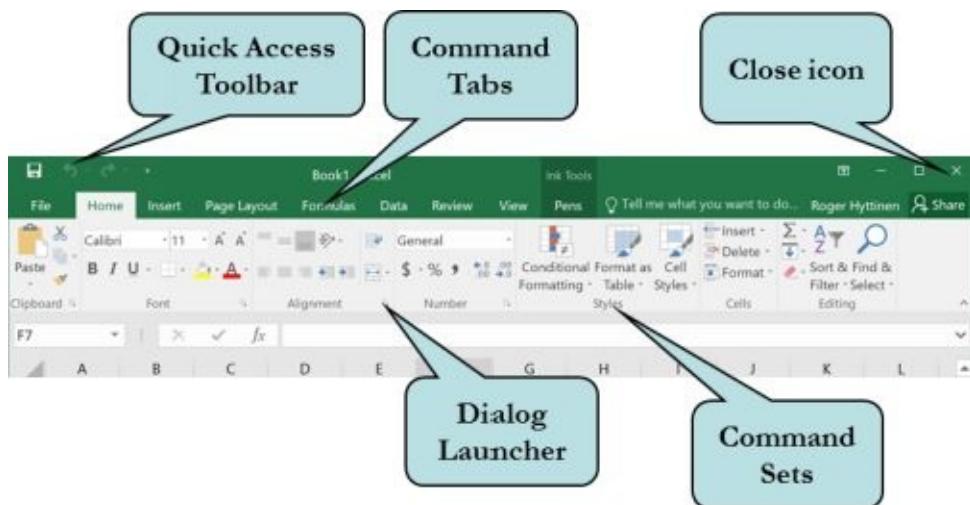
Examining the Excel Environment

When you first start Microsoft Excel, the application opens to a blank worksheet along with the parts of the Microsoft Excel screen as shown in the screen shot above. If you have worked with versions of Excel prior to Excel 2007, you will immediately notice that the user interface has been completely redesigned.



The Excel Working Environment

The menu and toolbar system of older Excel versions are replaced by the Ribbon. The Ribbon is designed to help you quickly find the commands you need in order to complete a task. On the Ribbon, the menu bar has been replaced by Command Tabs that relate to the tasks you wish to accomplish. The default Command Tabs in Excel are: File, Home, Insert, Page Layout, Formulas, Data, Review and View.



Different command icons, called Command Sets appear under each Command Tab. The commands that appear depend on the Command Tab that is selected. Each command set is grouped by its function. For example, the Insert tab contains commands to add tables, charts, illustrations, links and text objects into your spreadsheet. Contextual Commands only appear when a specific object is selected. This helps in keeping the screen uncluttered.

Under the File tab on the Ribbon is what Microsoft refers to as Backstage view. The view allows for quick access to permissions, meta-data, and common document management tasks such as opening, closing, printing and saving files. If you have worked at all with Windows 8 or Windows 10, you may notice that Backstage view is similar to many

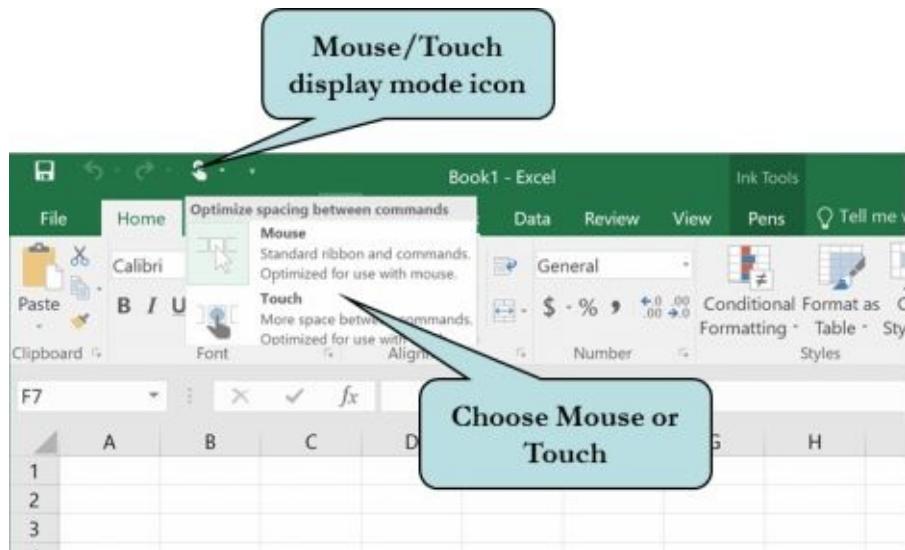
screens in these versions of Windows.

On the bottom of many of the Command Sets is a Dialog Launcher, which when clicked, launches a dialog box for that set of commands.

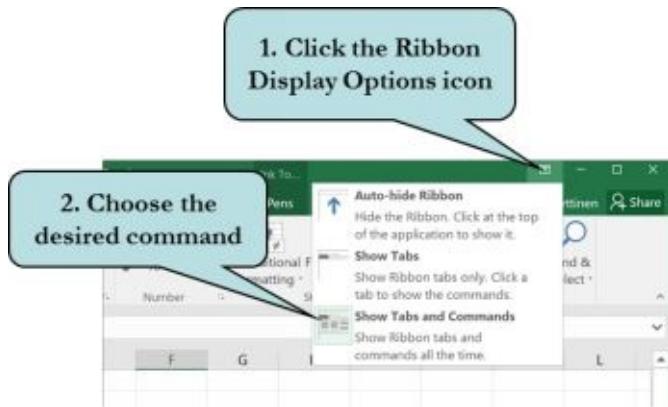
To the right of the Excel button (from where you access basic window options), is the Quick Access Toolbar. This toolbar contains by default the Save, Undo and Redo and Touch/Mouse commands. In addition, clicking the drop-down arrow to the right allows you to customize the Quick Access Toolbar and to add other tools that you use regularly. You can choose from the list which tools to display on the Quick Access Toolbar or select More Commands to add commands that are not in the list.



If you are using Excel on a touch device such as a tablet or smartphone, the handy Touch display mode makes it easier to view your data. Located by default on the Quick Access Toolbar, this view displays extra space between commands making it easier to select via touch. To display your Excel workbooks in Touch mode, click the Touch/Mouse mode icon on the Quick Access toolbar and choose Touch from the menu (if the icon isn't visible, click the arrow on the Quick Access Toolbar and choose Touch/Mouse mode from the menu). To switch back to standard mode, click the Touch/Mouse mode icon again and choose Mouse from the menu.



You can also customize the display of the Ribbon by clicking the Ribbon Display Options button on the top right of your screen and choosing the desired option. The Auto-hide Ribbon command completely hides the Ribbon from view. However, when you move your mouse to the top of the screen, it will temporarily appear. The Show Tabs command will only display the Ribbon tabs and not the commands. Click on any of the tabs to temporarily display its commands. The Show Tab and Commands setting shows the Ribbon in its full state, with both tabs and commands displayed.



As you can see on the worksheet window, the columns are labeled with letters of the alphabet while the rows are numbered. These numbers and letters are very important when working with formulas as they provide a means of referring to a particular cell. This is called a *cell reference*. For example, if you wanted to refer to the cell in the first row and the first column, the cell reference would be A1. You will work much more with cell references later.

The list below provides a summary of the objects that make up the Excel environment.

Active Cell: The currently selected cell in which you enter or edit data. The active cell is highlighted by a black box.

Backstage View: Located under the File tab, Backstage View allows for quick access to file commands such as opening, closing, saving and printing files.

Cell Name Box: The cell address of the active cell (i.e. A5 = Column A, Row 5)

Column Headings: Sequential letters in gray boxes at the top of your worksheet. Clicking on the column heading selects the entire column.

Command Sets: Command icons, grouped by category, under each command tab.

Dialog Launcher: Launches dialog boxes or task panes for a particular set of commands.

Excel Button: Click to access basic window commands.

Formula Bar: Displays the contents (labels, values or formula) of the active cell.

Horizontal Scroll Bar: Allows you to move horizontally in your document. To navigate horizontally, click the scroll bar with your left mouse button and drag to the left or to the right until the desired portion of the document is in view.

Quick Access Toolbar: Contains frequently used commands. You can customize it to include tools and commands that you frequently use.

Ribbon: Commands and tools organized into command sets.

Row Headings: Sequential numbers in gray boxes on the left side of the worksheet. Clicking on the row heading selects the entire row.

Status Bar: Displays information about the active worksheet.

Tabs: To access the various command sets and tools.

Title Bar: Displays the name of the application you are currently using and the name

of the file (the Microsoft Excel workbook) on which you are working.

Vertical Scroll Bar: Allows you to move vertically in your document. To navigate vertically, click the scroll bar with your left mouse button and drag upward or downwards until the desired portion of the document is in view.

View Buttons: Allows you to display documents in several different document views (Normal, Page Layout, and Page Break Preview).

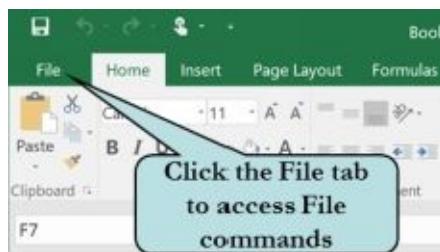
Worksheet Tabs: Displays the worksheets contained in the current workbook. Clicking on the worksheet tabs allows you to navigate from one worksheet to another.

Worksheet Window: The white working area where you type and edit your worksheet. Consists of columns and rows.

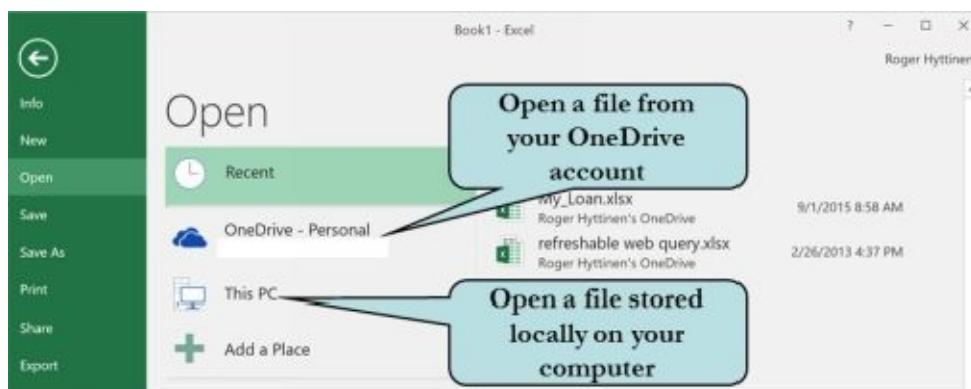
Zoom Slider: Allows you to increase or decrease the magnification of your document.

Opening an Existing Workbook

In Excel 2016, file management commands are located under the File tab on the Ribbon. This view is referred to as Backstage View. From Backstage View, you can perform many file commands such as opening, closing, saving and printing files. To open an existing document, click the File tab and then click Open to display the Open dialog box. From there, navigate to the folder that contains that Excel workbook you wish to open. If you have recently opened a workbook, it may be listed in the right pane under the Recent Workbooks area. Click the workbook name in the Recent Workbooks list to quickly open it.



You can save, view and open files from your OneDrive account (formerly called SkyDrive). In fact, when opening or saving a document, your OneDrive account is the first option on the list. Saving your items in your OneDrive cloud account ensures that you can access your document from multiple devices as well as from other computers. Because students in this class may have not yet set up their own OneDrive account, we will be working only with files stored locally. However, you may wish to explore OneDrive on your own.



As you will quickly discover, there are several ways to accomplish the same task in Microsoft Excel. Many commands under the File Options menu have an equivalent keyboard command that will accomplish the same thing. For instance, to open an existing workbook in Microsoft Excel, you can also use the keystroke combination Ctrl + O to quickly jump to the Open pane in Backstage view. Another way to jump to view is to press the Alt + F keystroke combination rather than clicking the File tab.

Follow these steps to open an existing Excel workbook:

- 1. Click the File tab on the top left of your screen (or press Ctrl + O).**
- 2. Click the Open icon in the left pane.**
- 3. To open a file stored on your OneDrive account, click the the name of the OneDrive account under the Open pane and then navigate to the folder that contains**

the document that you wish to open.

4. To open a file stored locally on your computer or on a network, click This PC under the Open pane and then navigate to the folder you want to open from the top of the right pane.

Or

Click the Browse icon in the Open pane and then navigate to the folder you want to open.

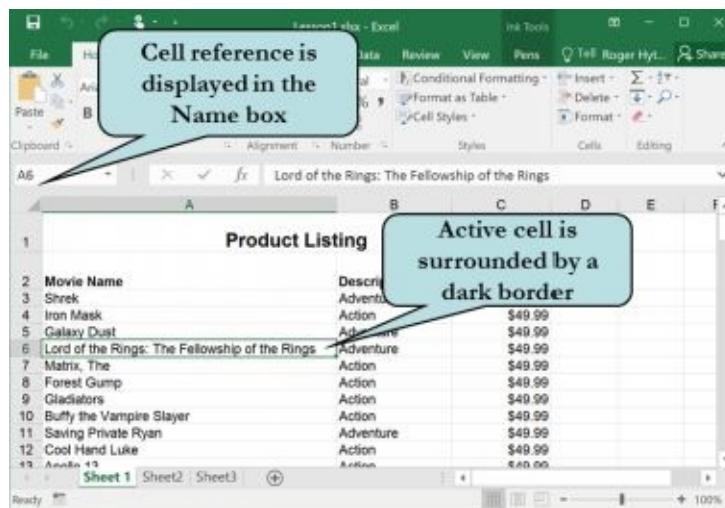
5. Select the desired file.

6. Click Open.

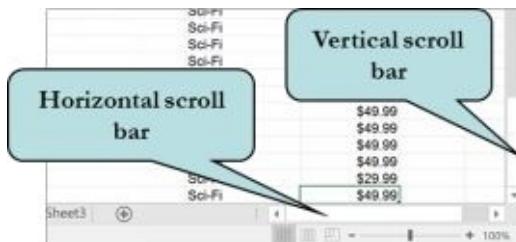
Tip: To open an existing Excel document directly without creating a blank worksheet first, launch the Excel application, click the Open Other Workbooks link in the left pane and then navigate to the folder where the file is located.

Navigating a Worksheet

To move from one location to another in Excel, click in the cell that you want to activate. That cell then becomes the active cell.



Moving around in a worksheet becomes more challenging as the worksheet becomes larger. Luckily, Excel contains Scroll Bars to help you move from one area of your worksheet to another. Excel contains both horizontal and vertical scroll bars. Clicking and dragging the Scroll Bar moves you to the position in the workbook where you are when you release the mouse button.



In addition to changing position in the worksheet by clicking with your mouse, there are several methods for navigating a worksheet using your keyboard. Some of these are:

Move Left: Left Arrow Key or Shift + Enter

Move Right: Right Arrow Key, Tab Key or Enter Key

Move Down: Down Arrow Key

Move Up: Up Arrow Key

Move to cell A1: Ctrl + Home keys

Move to last cell with data: Ctrl + End keys

Move to beginning of a row: Home

Move down one screen: Page Down

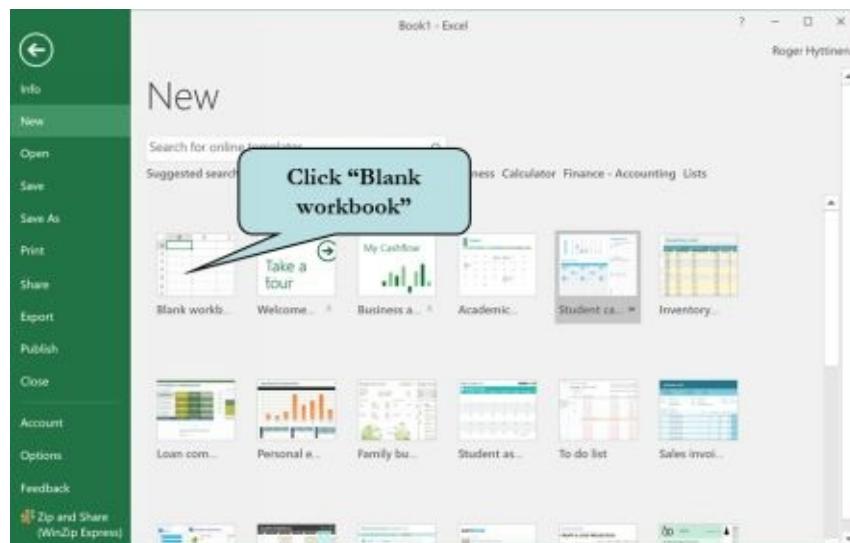
Move up one screen: Page Up

Move to the next sheet in workbook: Ctrl + Page Down

Move to the previous sheet in workbook: Ctrl + Page Up

Creating a New Workbook

We have already seen that when you first launch Microsoft Excel, the Welcome Screen displays, from where you can create a new workbook. You can also create a new workbook from within another workbook. The new document command is located under the File tab menu. You can also use the keyboard shortcut Ctrl + N to bypass Backstage view.



To create a blank new workbook, follow these steps:

- 1. Click the File tab and then click New from the menu to display the Welcome Screen.**
- 2. Click Blank Workbook in the center pane.**
- 3. To bypass the Welcome Screen, hold down the Ctrl and N keystroke combination (Ctrl + N) to create a new blank workbook.**
- 4. Begin typing in the new workbook.**

Saving a New Workbook

You can save your workbook file to your OneDrive account, to a hard disk, to a removable disk such as a zip drive or USB flash drive, or to a network drive. The first time you save a document, the Save As Dialog pane in Backstage view appears, prompting you for the name of the workbook and the location where you wish to save it. This only displays the first time you save a new workbook. To save a file, click the File tab and then click Save or use the keyboard shortcut Ctrl + S. You can also click the Save button on the Quick Access Toolbar, directly to the right of the Excel button. The default file format for new Excel workbooks is the .xlsx format.



To save an existing workbook with a different file name or in a different location, select Save As from the File Options menu (in the left pane of Backstage view), and then type the new name for the workbook in the file name text box. The original file will be closed and the file with the new name becomes the active workbook.

After you save a workbook, the file remains open so you can continue to work on it. You can save any subsequent changes quickly by clicking on the Save icon. It is a good idea to save your workbooks often.

Save your workbooks by following these steps:

1. Click the File tab and then click Save from the menu

Or

Click the Save icon on the Quick Access Toolbar

Or

Hold down the Ctrl key and S keystroke combination (Ctrl + S)

2. Click Computer or your OneDrive account (depending on where you wish to save your file).

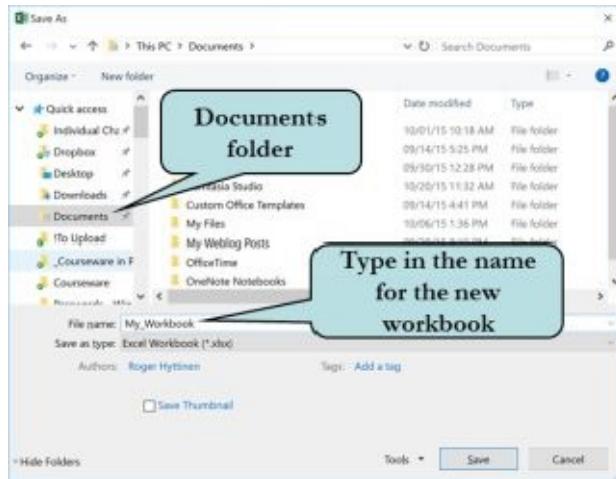
3. Click the Browse icon and then navigate to the folder where you want to save your file (many people prefer to save their workbooks in the Documents folder)

Or

Click the name of the folder under the Recent Folders list.

4. Type the desired file name in the File name box.

5. Click Save.



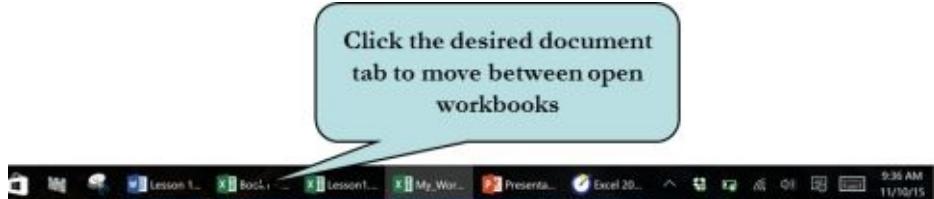
The Save As dialog box

If you want to save an existing working with a different file name (thus creating a copy of the workbook), you can do so as follows:

- 1. Click the File tab and then click Save As from the menu. The Save As dialog box will appear.**
- 2. In the File name box, type the new name for your workbook.**
- 3. To save the document in a different file format, click the Save as Type drop-down list and choose the desired file format.**
- 4. To save the workbook in a different folder, navigate to the folder you want.**

Moving Between Workbooks

Each new workbook that you open is represented by a button on the Windows Taskbar. To move between open documents, click the appropriate button on the Taskbar. You can also move between other open applications such as Word or PowerPoint by clicking on the appropriate document button on the Taskbar.



To jump to another Excel workbook, you can additionally click on the View tab and then click the Switch Windows button. The Switch Windows list displays all currently open Excel documents. Click on the document you wish to make active.



You can also use the Alt + Tab keystroke combination to scroll through all open documents as well as other open applications. Hold down the Alt key and then press Tab. With the Alt key held down, continue to press the Tab key until the desired document or application is highlighted.

To move between open workbooks, follow these steps:

1. Click on the appropriate Document button on the Windows Taskbar.

Or

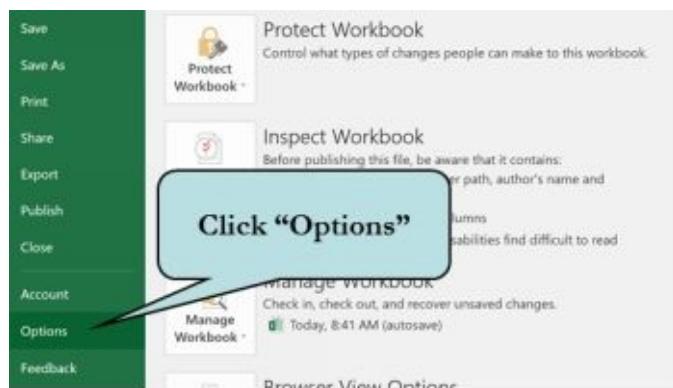
Click the View tab on the Ribbon, click the Switch Windows button, and then click on the open workbook to which you wish to move.

Or

Hold down the Alt key and then press Tab until the document or application you want is highlighted. Release the Alt key.

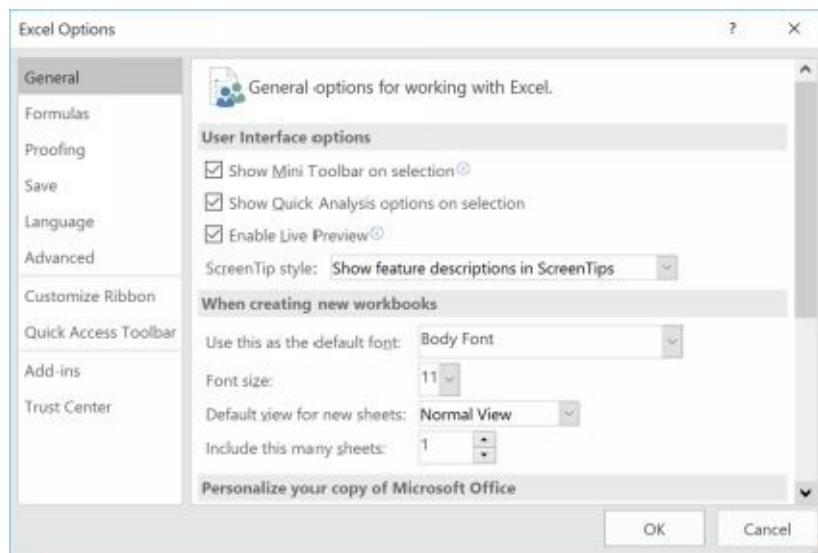
Setting Excel Options

In older versions of Excel, you could set preferences for specific program settings from the Options dialog box. The Options command has been moved to the File Options menu in Backstage view which displays when you click the File tab.



From the Excel Options dialog box, you can specify such options as setting a default location to save files, setting the default file format, setting display options and much more.

You may wish to spend some time browsing through the Excel Options dialog box and set any preferences that may help you work with less effort.



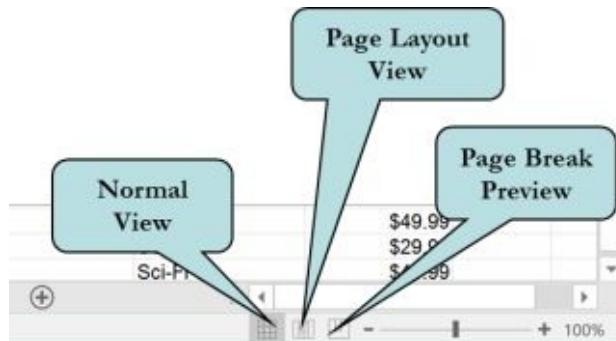
Excel Options dialog box

Here's how to set Excel options:

- 1. Click the File tab and then click the Options button on the bottom of the left pane.**
- 2. Click the desired option category in the left pane.**
- 3. Set any options in the right pane.**
- 4. Click OK.**

Switching between Views

Views control how your document appears on the screen. You can quickly switch views by clicking on one of the View Buttons located on the lower right-hand corner of the document window. You can also switch between views by clicking the View tab and then clicking the desired View command button on the Ribbon.



The available views are:

Normal View

Used for entering, editing and formatting data. In Normal view, headers, footers, backgrounds and other objects are not visible.

Page Layout View

This view is used for entering, editing and formatting text, while displaying graphics, headers/footers, objects, margin borders, etc.

Page Break Preview

Displays the worksheet with marked page breaks, allowing you to change their position.

Custom Views

Allows you to save your current display settings and quickly apply them in the future.

Here's how to quickly switch views in Excel:

1. Click the appropriate view button on the lower right-hand corner of your screen

Or

Click the View tab and then click the desired View command button on the Ribbon.

2. To create and use a custom view:

- a. Set up your worksheet the way you like it (title rows, print area, etc.)
- b. Click the View tab on the Ribbon.
- c. Click the Custom Views button on the Workbook Views group of the Ribbon.
- d. Click the Add button on the Custom Views dialog box.
- e. Type in a Name for your view.
- f. Choose whether to include print settings and/or hidden rows, columns & filter

settings.

g. Click OK.

h. To apply a custom view, Custom Views button, choose the view you wish to apply and then click the Show button.

Using Tell Me to Obtain Help

Tell Me is a new feature in Excel 2016 designed to provide assistance and get you up and running as quickly as possible. On the Ribbon is a text box that contains the text Tell me what you want to do. You can enter in keywords and phrases related to what tasks you want to accomplish to display the actions you're looking for. As you type each letter, Excel immediately begins suggesting relevant commands. This comes in especially handy if you know that there's a command for what you want to do but aren't quite sure where it's located.



Don't worry if you don't know the exact wording for a command or action – Excel uses natural language for the search, similar to what you might use for a Bing or Google search for example. If you need additional help, there's a help link on the bottom of the Tell Me window or you can type the word: Help in the search box to bring up the familiar Help Screen window.

Here's how to use the Tell Me feature to obtain help:

1. Click in the Tell Me box on the Excel Ribbon.

Or

Press the Alt + Q keystroke combination.

2. Type your search term.

3. Click the item in the results list to execute the command.

4. To obtain additional help for your search term, click the Get Help on [search term] in the list.

Closing a Workbook and Exiting Excel

When you are finished working on your Excel document, you can close it by either choosing Close from the File Options menu or by clicking the Close Window button, which is represented by an x on the top right of your screen. This will close the current workbook and display the next open workbook. Don't worry if you forget to save your changes – Excel will ask you if you wish to save your recent changes before closing the workbook.

Note that the Close Window button only closes the active workbook. If you have many workbooks open, it can be a tad time-consuming to close each workbook one at a time. In earlier versions of Excel, you could close all workbooks at once and Exit Excel from Backstage view. This is no longer the case as that option has been removed from Backstage view beginning with Excel 2013. You can however, add the Exit command to the Quick Access Toolbar (File tab > Options > Quick Access Toolbar) if you prefer this method of closing Excel. Otherwise, when you close the last open workbook by clicking on the Close button, the Excel application will exit as well. You can also use the Alt + F4 keystroke combination to close the Excel application along with the last open workbook.



If you wish to close the last open workbook but keep the Excel application open, click the File tab and then click Close or use the keystroke combination Ctrl + W.

In summary, here's how to close an Excel workbook:

1. Click the File tab and then click Close from the File Options menu

Or

Click on the Close button on the document window.

Or

Press the Ctrl + W keystroke combination.

2. If prompted, click Yes to save any changes.

For easy access, you may wish to add the Exit Command to the Quick Access toolbar. Here's how:

1. Click the File tab and then click Options in the left panel.

2. Click Quick Access Toolbar in the left pane.

3. Click the Choose Commands From drop-down list and select File Tab from the list.

4. Click Exit in the left window and then click the Add button.

5. Click OK.

Chapter 2 - Working with Data

Entering Text and Numbers

Data that you enter into an Excel worksheet can be either text, numbers or a formula. Text that is entered into cells is referred to as a label and is not included in formulas, whereas numbers can be either labels or values. When entering numbers into a cell, Excel automatically treats them as values and aligns them to the right edges of the cell. If you wish a numerical value to be treated as a label – that is to say, to take on the same formatting as labels (which are left-aligned), you can precede the numerical value with an apostrophe ('). Thus, to enter the year as a label, you would type: ‘2015.

To begin entering data, click on the cell into which you wish to enter data (this becomes the active cell) and begin typing. Once you are finished, press Enter to confirm your entry. Any time you wish to clear the contents of a cell into which you have begun typing, press the Esc key or the X key to the left of the formula bar.

	A	B	C	D	E
1	Stores	Q1	Q2	Q3	Q4
2	New York	14391	11524	16979	21075
3	San Franci	22987	25424	24552	29780
4	Dallas	15344	17045	19024	23242
5					

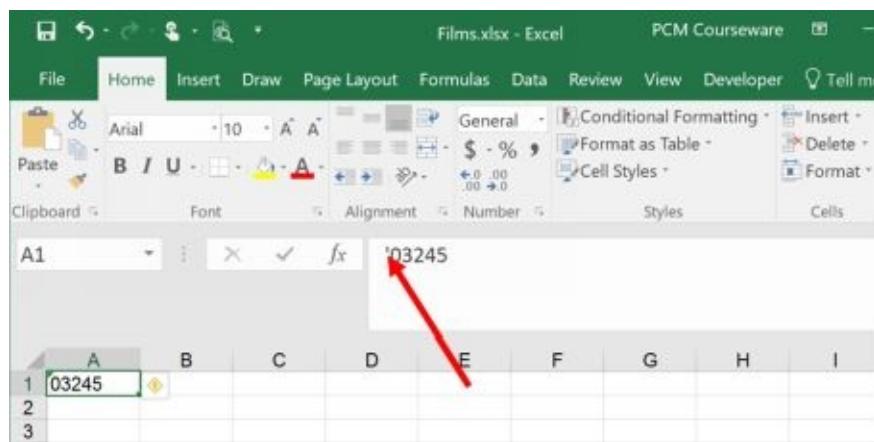
Here's how to enter text or numbers into a cell:

- 1. Click on the cell into which you wish to enter a value.**
- 2. Type your entry.**
- 3. Press Enter to confirm your entry and move to the next cell.**

Entering Numbers as Text

If you ever enter in a number that begins with a zero such as a zip code (03245), Excel will drop the leading zero because it thinks your entering in a number – and numbers do not begin with zero. To have Excel treat the number as text, type in an apostrophe before the number.

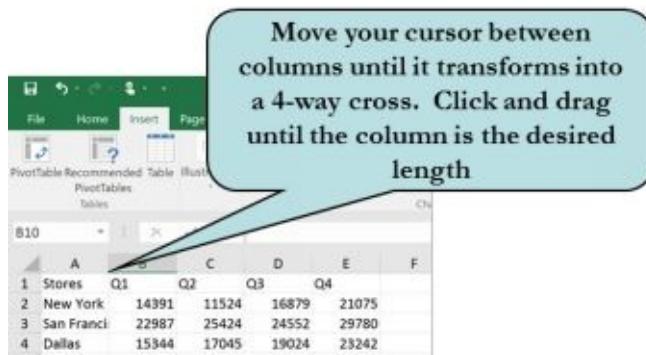
‘03245



Changing Column Width:

As you type, the cells in Excel do not automatically adjust to accommodate your text. When this happens, the text overflows from one cell into the other. To widen the column, we must perform the following steps:

- 1. Move your cursor to the column heading on the right border of the column whose width you wish to change.**
- 2. Your cursor will change into a 4-way black cross with right-pointing arrows.**
- 3. Click with your left mouse button and drag to the right until the column is the desired width.**

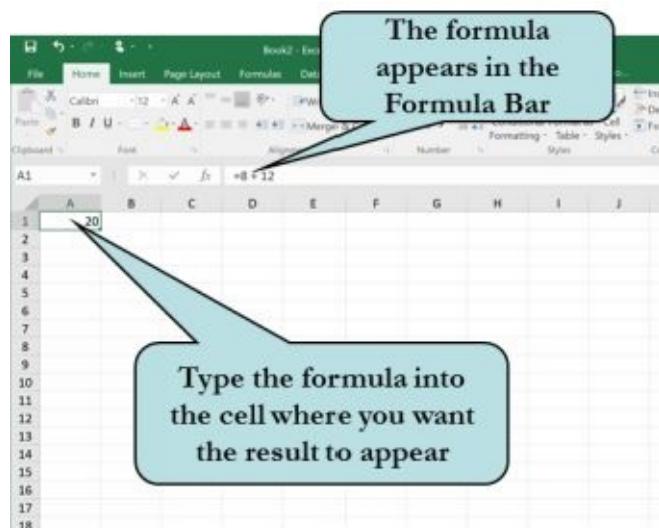


Entering Simple Formulas

Formulas perform calculations such as addition, subtraction, multiplication and division on your spreadsheet. You type the formula in the cell where you wish the result to appear. The formula itself does not appear in the cell rather the result of the formula. The formula appears in the formula bar.

To tell Excel that you are about to enter a formula, you must precede it with an equal (=) sign. For instance, if you wished to find the total for the numbers 8 and 12, we would enter:

=8+12 in the active cell.



Valid mathematical operators that you can use in your formulas include:

- + Addition
- Subtraction
- * Multiplication
- / Division

In addition to performing calculations on actual numbers ($= 11 + 2 + 5$), you can perform calculations on the value of cells by using Cell References in your formula. If you wanted to find the total of the cells A3, B6 and C7, you would enter the formula:

=A3 + B6 + C7

Excel calculates by hierarchy and order of operations. When Excel performs a calculation it does so in the following order:

1. Exponentiation
2. Multiplication and Division
3. Subtraction and Addition

For example, if we had a formula which read:

= A2 + B3 * B7

The B3 * B7 part of the formula is calculated first, then the result is added to A2.

If a formula contained both a multiplication and a division operator Excel would calculate them from left to right. The same applies for subtraction and addition.

We can change the order in which Excel performs its calculations by enclosing the relative function in parenthesis. Let's say we had the formula $=5+10*5$ the result would be 55. If we changed this to: $=(5 + 10) * 5$ the result would be 75.

In summary, here are the steps to creating a simple formula:

- 1. Click in the cell where you want the result of your formula to display.**
- 2. Type: =**
- 3. Type the formula using hard-coded numbers or cell references.**
- 4. Press Enter to confirm the formula.**

Choosing Formula Cell References

If you have a large worksheet in which you wish to create a formula that uses several different cell references, it might sometimes be easier to select your cells manually, rather than try to remember the cell addresses for each value you want to include in your formula. This can be accomplished by typing the equal sign (=) and then with your mouse (or stylus or finger if using a touch device), selecting the cells that you want to include in the formula.

You can choose your cell references manually by following these steps:

- 1. Activate the cell in which you wish to enter the formula.**
- 2. Type = to begin your formula.**
- 3. Click in the first cell you wish to include in your formula.**
- 4. Enter the appropriate mathematical operator (+, -, * or /).**
- 5. Click in the next cell you wish to include in your formula.**
- 6. Enter the appropriate mathematical operator.**
- 7. Continue steps 5 & 6 until you have selected all of the cells to be included in your formula.**
- 8. Press the Enter key to confirm the formula.**

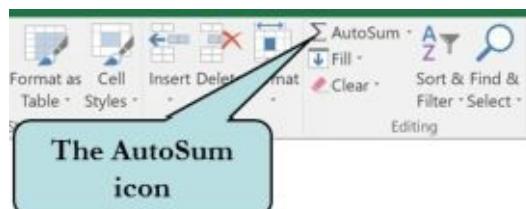
Using AutoSum

If you wish to perform a common calculation such as SUM on a contiguous range of data, you can use the AutoSum button (located on the Home Ribbon). Clicking on the AutoSum button automatically selects a range of cells (vertical or horizontal) and calculates the total of all cells in that range. That is to say, when the cell that contains the SUM function is at the end of a row or column, Excel always uses that entire column or row in the calculation. However, if any cell in the range contains a blank row or column, the range to be totaled stops there.

The screenshot shows a Microsoft Excel spreadsheet titled "IncomeStatement.xlsx - Excel". The Home ribbon is selected, and the formula bar displays the formula $=\text{SUM}(B6:B10)$. The worksheet contains a table titled "Semi-Annual Income Statement" with data for January and February. A callout bubble points to the formula in cell B19 with the text "AutoSum automatically selects a range of cells".

	January	February
Video Rentals	\$12,300.00	\$15,600.00
Video Sales	\$405.00	\$720.00
Investment Interest	\$325.00	\$335.00
DVD Player Sales	\$400.00	\$605.00
Snack Sales	\$200.00	\$190.00
Net Sales		
Cost of Goods Sold		

If Excel does not choose the range of cells you wish to use, you can choose the range manually by clicking on the first cell of the range and dragging to the last cell of your range.



If we wanted to total the values from B3 to B18, clicking the AutoSum button while having B19 as the active cell would automatically enter the following formula in cell B19:

$$=\text{SUM}(B3:B18)$$

This tells Excel to sum the values in the B3 to B18 range.

The AutoSum feature includes other functions in addition to the SUM function. By clicking on the arrow to the right of the AutoSum button, you can choose the AVERAGE, COUNT NUMBERS, MIN, or MAX functions instead of the SUM. These functions will be discussed in more detail in a later chapter.

To calculate totals with AutoSum, follow these steps:

- 1. Click in the cell where you want to display the calculation.**
- 2. To sum only some of the numbers in the range, select the cells to be included in the formula.**
- 3. Click the AutoSum button on either the Home Ribbon or the Formulas Ribbon**

Or

Press the Alt + = keystroke combination.

4. To perform another calculation such as Average, Count, Min, or Max, click the arrow next to the AutoSum button and choose the function that you want.

5. Press Enter.

Total rows and columns at the same time using AutoSum

As we have seen, Excel's AutoSum button provides one-click access to several aggregate functions: Sum, Average, Count Numbers, Max and Min. But you don't have to total rows and columns separately - you can calculate them at the same time.

To total adjacent rows and columns at the same time, follow these steps:

- 1. Highlight the range you want to total. Be sure to include an extra row and column for the formulas.**

	January	February	March	April	May	June	Total
Video Rentals	\$12,300.00	\$15,000.00	\$13,995.00	\$15,266.00	\$16,792.60	\$16,094.25	
Video Sales	\$495.00	\$700.00	\$980.00	\$1,235.00	\$1,358.50	\$1,127.00	
Investment Interest	\$325.00	\$335.00	\$350.00	\$375.00	\$412.50	\$402.50	
DVD Player Sales	\$400.00	\$525.00	\$605.00	\$495.00	\$544.50	\$695.75	
Snack Sales	\$200.00	\$150.00	\$225.00	\$315.00	\$346.50	\$258.75	
Net Sales							

- 2. Click the arrow on the AutoSum button on the Home tab of the Ribbon or the Formulas tab of the Ribbon.**



- 3. Select the function you want from the drop-down list. Excel will enter in the formulas in both the selected rows and the selected columns.**

You're not only limited to adjacent rows and columns. You can also total non-adjacent rows and columns at the same time. It involves only one extra step: selecting the additional rows & columns.

To total non-adjacent rows and columns at the same time, follow these steps:

- 1. Highlight the first range you want to total. Be sure to include an extra row and column for the formulas.**
- 2. Hold down the Ctrl key and highlight the second range you want to total, also including an extra row and column for the formulas.**

	January	February	March	April	May	June	Total
Video Rentals	\$12,300.00	\$15,000.00	\$13,995.00	\$15,266.00	\$16,792.60	\$16,094.25	
Video Sales	\$495.00	\$700.00	\$980.00	\$1,235.00	\$1,358.50	\$1,127.00	
Investment Interest	\$325.00	\$335.00	\$350.00	\$375.00	\$412.50	\$402.50	
DVD Player Sales	\$400.00	\$525.00	\$605.00	\$495.00	\$544.50	\$695.75	
Snack Sales	\$200.00	\$150.00	\$225.00	\$315.00	\$346.50	\$258.75	
Net Sales							

	January	February	March	April	May	June	Total
Videos	\$85.00	\$150.00	\$205.00	\$205.00	\$215.25	\$235.75	
DVD Player	\$100.00	\$125.00	\$145.00	\$145.00	\$152.25	\$166.75	
Snacks	\$35.00	\$20.00	\$40.00	\$40.00	\$42.00	\$46.00	
Total Cost of Goods Sold:							

- 3. Click the arrow on the AutoSum button on the Home tab of the Ribbon or the Formulas tab of the Ribbon.**

4. Select the function you want from the drop-down list. Excel will enter in the formulas in both the selected rows and the selected columns for both ranges.

Excel sums rows & columns of both ranges at once

Revenue							
	January	February	March	April	May	June	Total
Video Rentals	\$12,300.00	\$15,000.00	\$13,995.00	\$15,266.00	\$16,792.60	\$16,094.25	\$89,447.85
Video Sales	\$495.00	\$700.00	\$980.00	\$1,235.00	\$1,358.50	\$1,127.00	\$5,895.50
Investment Interest	\$325.00	\$335.00	\$350.00	\$375.00	\$412.50	\$412.50	\$2,200.00
DVD Player Sales	\$400.00	\$525.00	\$605.00	\$495.00	\$44.50	\$695.75	\$3,265.25
Snack Sales	\$200.00	\$150.00	\$225.00	\$315.00	\$315.00	\$258.75	\$1,495.25
Net Sales:	\$13,720.00	\$16,710.00	\$16,155.00	\$17,686.00	\$19,454.00	\$16,578.25	\$102,303.85

Cost of Goods Sold							
	January	February	March	April	May	June	Total
Videos	\$85.00	\$150.00	\$205.00	\$205.00	\$215.25	\$231.75	\$1,096.00
DVD Player	\$100.00	\$125.00	\$145.00	\$145.00	\$152.25	\$166.75	\$834.00
Snacks	\$35.00	\$20.00	\$40.00	\$40.00	\$42.00	\$46.00	\$223.00
Total Cost of Goods Sold:	\$220.00	\$295.00	\$390.00	\$390.00	\$409.50	\$448.50	\$2,153.00

Changing & Deleting Data

To delete the contents of a cell, click in the cell to activate it and then press the Delete key. This erases the entire contents of that cell. If you wish to simply replace the contents of the cell, you do not need to press the Delete key — just begin typing and the contents are automatically replaced by whatever you type.

There may be times, however, when you don't want to delete the entire contents of a cell but rather, only need to change part of the cell's contents. For example, you may have discovered an error in a formula you entered and wish to modify it. Rather than retype the entire formula, it would be easier just to edit the existing formula.

To change the contents of a cell, do this:

- 1. Activate the cell you wish to edit and then click in the formula bar.**

A	B	C	D	E	F
1	Stores	Q1	Q2	Q3	
2	New York	14391	11524		69
3	San Francisco	22987	25424		43
4	Dallas	15344	17045	19024	23242
5	Total	52722	53993	60555	74097
6					241367

- 2. Position the I-beam pointer at the location in the formula bar where you want to change or insert text.**

Or

Double-click within the cell you wish to edit. This places you in edit mode.

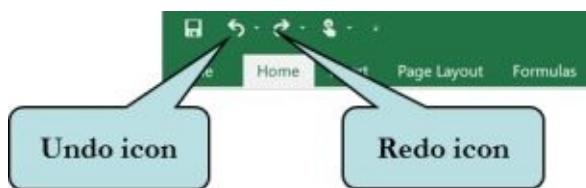
- 3. Make your changes.**

Using Undo/Redo

Excel contains a powerful feature called Undo/Redo that allows you to reverse any editing action, including formatting. While entering data, you may have accidentally activated the wrong cell and inadvertently replaced the data in that cell. You can reverse this action with the Undo command.

Each time you initiate the Undo command, it will reverse the last action that you did; thus, clicking the Undo button 20 times will undo the last 20 actions as if they had never occurred. Rather than clicking the Undo button 20 times to undo multiple actions, clicking the arrow next to the Undo button allows you to quickly undo multiple past actions by navigating down the history list and selecting the number of actions you wish to undo.

Redo allows you to reverse the action of an Undo command.



To use the Undo command, follow these steps:

1. Click the Undo icon on the Quick Access Toolbar.

Or

Press the Ctrl + Z keystroke combination.

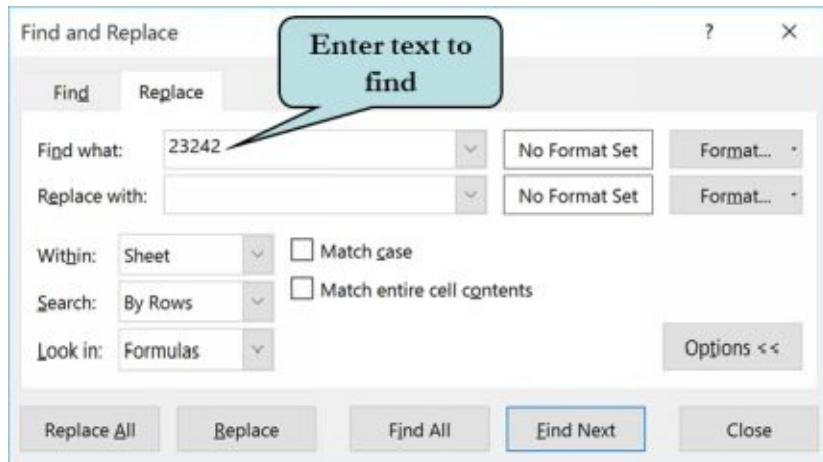
To use the Redo command, follow these steps:

1. Click on the Redo icon on the Quick Access Toolbar.

Or

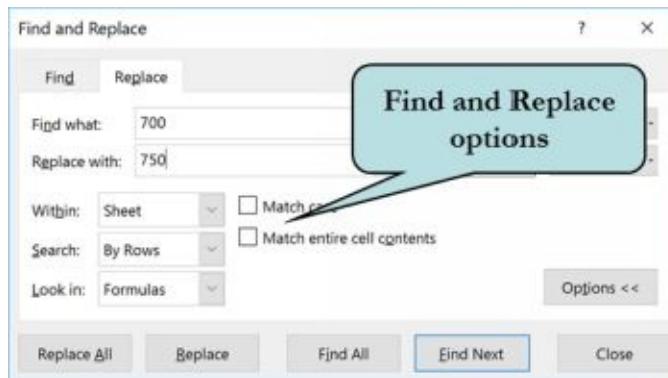
Press the Ctrl + Y keystroke combination.

Using Find and Replace



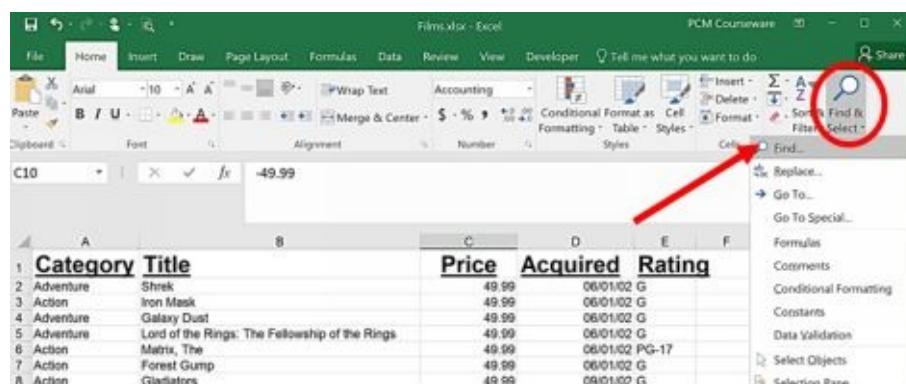
You can find specific information in an Excel worksheet or workbook by using Excel's Find and Replace feature. Once you find the entry for which you are searching, you can replace it with any desired value of text or numbers, or move on to find the next occurrence of the data by clicking the Find Next button.

By clicking on the Options button in the Find and Replace dialog box, Excel presents additional search options such as the ability to search in the active worksheet or the entire workbook as well as the choice to search in formulas, values and cell comments.



To use the Find and Replace feature, follow these steps:

1. Click the Find & Select button on the Home Ribbon and select Find from the drop-down menu



Or

Press the **Ctrl + F** keystroke combination.

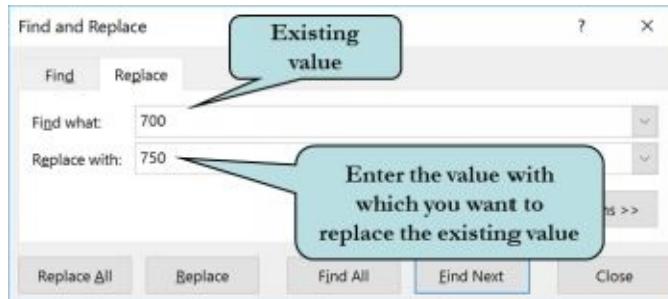
2. If you want to replace existing data with new data, click the Replace tab

Or

Press the Ctrl + H keystroke combination.

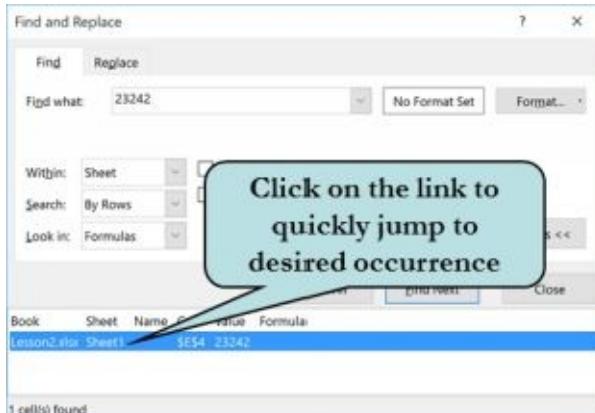
3. Enter the text you want to find in the Find what: box.

4. Enter the text with which you want to replace the existing text in the Replace with: text box.



5. Click on Find Next to search for the first instance of the text in the Find What box.

6. To search for all instances of the text, click Find All. The lower pane of the dialog box will expand to display all instances of the Find All command. You can quickly jump to the desired instance by clicking the data under any of the columns.



7. Click Replace to replace one instance at a time, clicking Find Next to move from one instance to another.

8. Click Replace all to replace all instances at once.

9. Click Close to close the Find and Replace dialog box.

Using Find and Replace to Remove Blank Spaces in Cells

If you click in an Excel cell that contains data and then press the Spacebar, it appears as though the data has been deleted and that the cell is empty. While it's true that tapping the Spacebar does erase the contents of a cell, it leaves something behind: a blank space.

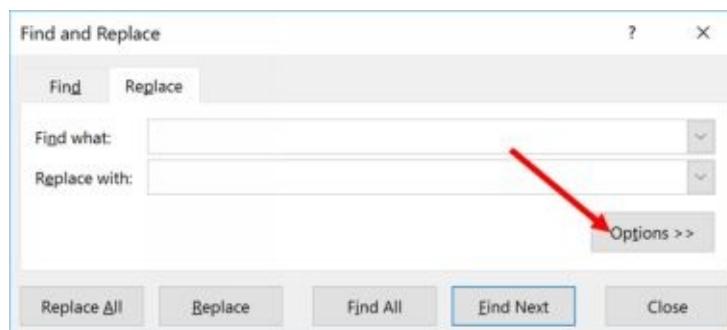
A blank space means that the cell is in fact, not empty. This can sometimes cause problems with your calculations so you'll want to make sure you remove them.

The easiest way to do this is by using the Find and Replace dialog. You'll want to replace the contents of any cells that contain a single blank space with *nothing*.

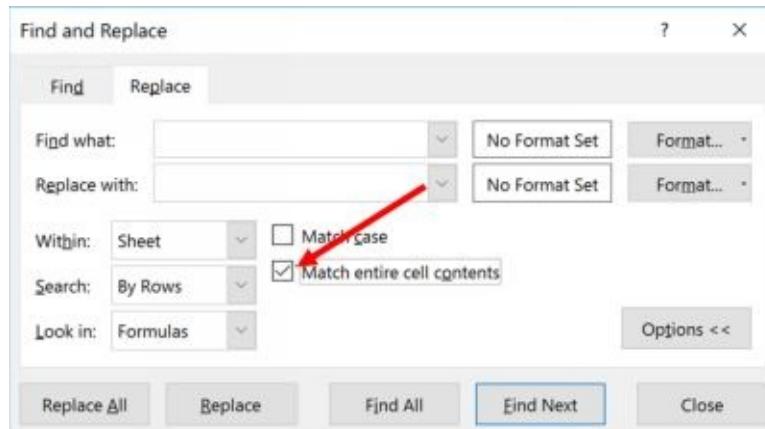
To use Find and Replace to remove blank spaces in cells, follow these steps:

1. Press Ctrl + H to display the Find and Replace dialog box.

2. Click the Options button.

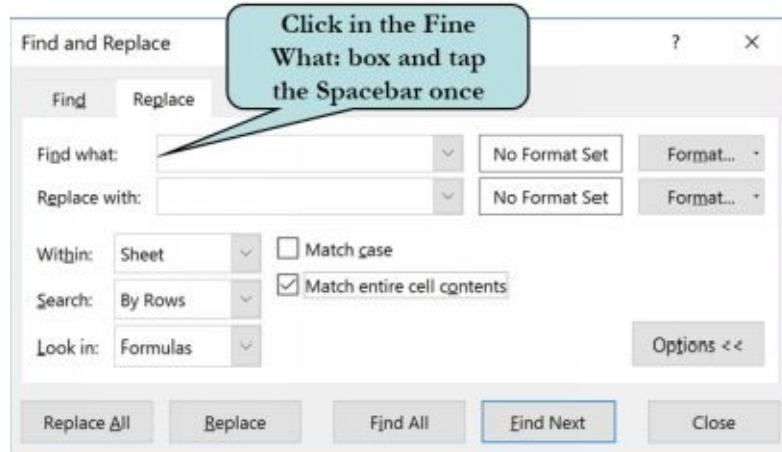


3. Click the checkbox next to Match Entire Cell Contents. THIS IS VERY IMPORTANT- if this checkbox is not checked, any cells containing spaces (such as those between words or in formulas for example) would be deleted.

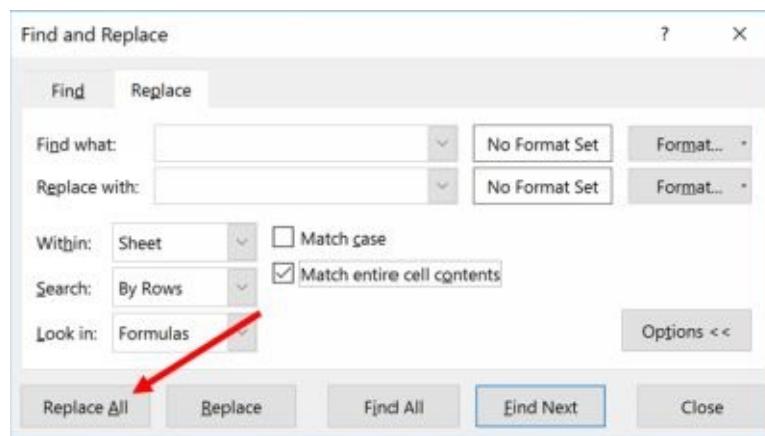


4. Click in the Find What box.

5. Press the Spacebar once to add a single space.



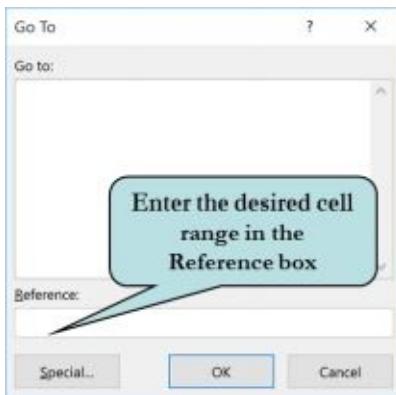
6. Click the Replace All button. Because we didn't add anything in the Replace With box, all instances of a blank space are replaced with *nothing* or, in other words, removed.



7. To ensure that you don't have cells containing 2 blank spaces, repeat steps 1-6 above, except press the Spacebar twice in the Find What box.

Using the Go To Command

Excel's Go To command, located under the Find & Select command button, allows you to quickly jump to and select a specific cell or cell range (including named ranges) in your worksheet. This can come in especially handy if you want to select a long range of cells in a large worksheet.



The Special button on the Go To dialog box also allows you to select other areas of your worksheet, such as formulas, comments, blank cells within your data range, constants (non-formula entries) and more.

Here's how to use the Go To command:

1. Click the Find & Select button on the Home Ribbon and select Go To from the list.



Or

Press the **Ctrl + G** keystroke combination.

2. Enter the cell, cell range or named range you wish to find and select.
3. Click OK.
4. To find other worksheet items such as formulas, comments, blank cells within your data range, constants, etc., click Special and make your choices.



Spell Checking Your Worksheet

Excel has a built-in spelling and grammar checker which allows you to automatically check your worksheets for misspelled words. Microsoft Excel uses its built-in dictionary to offer suggestions for any errors it finds and you can then choose the correct spelling of the word from the Suggestions list or add the word to the dictionary so that Excel will not flag it again in the future.



Spelling dialog box

When Excel finds a questionable spelling error, a dialog box displays, prompting for a suggested action:

Ignore Once: Ignores this instance of the spelling error and continues to check the rest of the document.

Ignore All: Ignores all instances of the spelling error and continues to check the rest of the document.

Add to Dictionary: Adds the word in question to the built-in dictionary so that it will not be flagged in the future.

Change: Changes this instance of the spelling error to the selected suggestion.

Change All: Changes all instances of the spelling error in the document to the selected suggestion.

AutoCorrect: Adds the error and the correction to the error to Excel's AutoCorrect list so that Excel will automatically correct the error in the future.

To check spelling and grammar in a worksheet, follow these steps:

- 1. Move to the beginning of the worksheet.**
- 2. Click the Spelling icon on the Review Ribbon under the Proofing group**



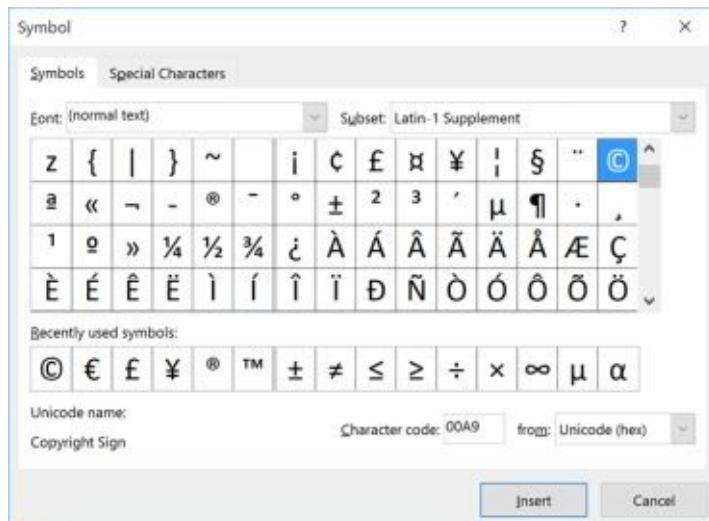
Or

Press the F7 key.

- 3. When an error is found, highlight the desired correction from the Suggestions List.**
- 4. To change an error:**
 - a. Choose Change to change this particular instance of the error to the highlighted suggestion.**
 - b. Choose Change All to change all instances of the error to the highlighted suggestion.**
- 5. To ignore an error:**
 - a. Choose Ignore to ignore this instance of the error and continue checking the document.**
 - b. Choose Ignore All to ignore all instances of the error and continue checking the document.**
- 6. To add the word to the built-in dictionary so it will not be flagged in the future, click Add to Dictionary.**
- 7. Click OK when finished.**

Inserting Symbols

Microsoft Excel supplies hundreds of special characters that do not appear on your keyboard that you can use in your worksheets. For example, you can insert international symbols such as á or ñ, symbols such as a trademark symbol (®), em dash (—), copyright symbol (©) and many more.

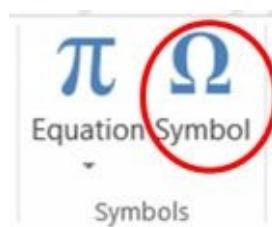


Each font set contains its own set of symbols or characters. The Windings and Monotype Sorts contain a nice variety of useful characters.

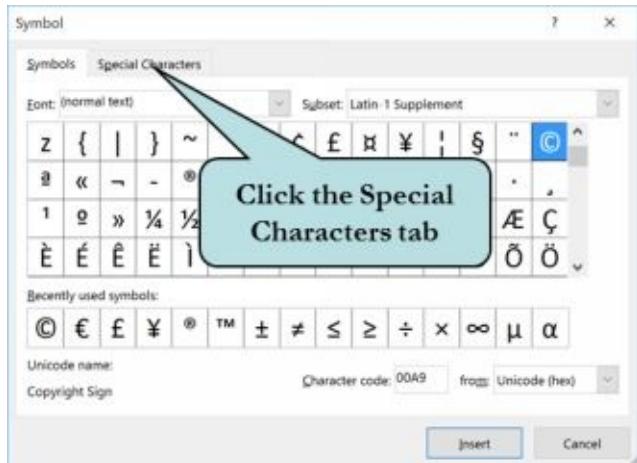
You can insert a recently used symbol by clicking the symbol in the Recently used symbols list in the Symbol dialog box. The Special Characters tab displays a list of common symbols such as the em dash, copyright and trademark symbols.

To insert symbols or special characters into your worksheet, follow these steps:

- 1. Set the insertion point where you wish to insert a symbol.**
- 2. Click the Insert tab on the Ribbon.**
- 3. Click the Symbol button.**



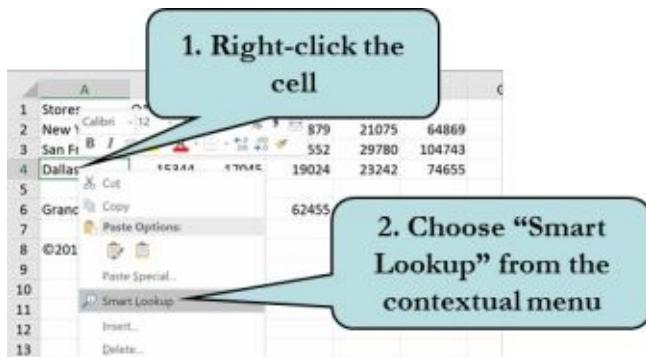
- 4. Select the font set you wish to use from the drop-down Font list.**
- 5. If available, select the font subset from the Subset drop-down list.**
- 6. To insert a commonly used symbol, click the Special Characters tab.**



7. Click the symbol you wish to insert.
8. Click the Insert button.
9. Click the Close button.

Using Smart Lookup

The Smart Lookup feature in Excel is a handy reference that provides contextually relevant information for selected text. Smart Lookup uses Bing search results so you will need to be connected to the Internet in order to use the feature.



To use Smart Lookup, select the cell that contains the text that you want to look up, right-click and choose Smart Lookup from the contextual menu. The Insights pane will then display on the right-side of your screen. Click any link in the pane to view the associated webpage in your browser. To obtain a definition of a selected word, click Define on top of the pane.

You can also click the Smart Lookup icon on the Review Ribbon.

To use the Smart Lookup feature, follow these steps:

- 1. Select the word or phrase that you want to look up.**
- 2. Click the Smart Lookup icon on the Review Ribbon.**



Or

Right-click the selected cell and choose Smart Lookup from the contextual menu.

- 3. When the box appears informing you that the highlighted text will be sent to Bing, click the Got it button.**
- 4. To view a definition of the highlighted term, click the Define link on top of the Smart Lookup window.**



5. To see relevant information relating to the highlighted words or phrase, click the Explore link on top of the window.
6. When finished, click the Close button on top of the Insights pane.

Chapter 3 - Editing a Worksheet

Working with Ranges

A range is a related group of cells. In Chapter 2, we looked at the SUM function where Excel totals a group of cells. If we wanted to retrieve a total for the cells B2 to B15, the formula would be written as:

$$=\text{SUM}(\text{B2:B15})$$

Here, the formula B2:B15 designates all cells in the B2 to B15 range. This is an example of a contiguous range; that is to say, a group of cells that are next to each other in the same row or column.

There are several reasons why you might want to select a range in Excel:

- Apply the same formatting quickly to a group of cells
- Use the range in a function such as SUM or AVERAGE
- Apply a function or formula to several columns/rows at once
- Designate a group of cells as a print area
- Designate a group of cells for sorting

The screenshot shows a Microsoft Excel spreadsheet titled "Rimbaud - Excel". The data consists of two columns: "Title" and "Genre". A callout bubble labeled "Selecting a Range" points to the cell containing "Antz". The range A17:B37 is highlighted with a light blue selection color. The status bar at the bottom indicates: Average: 18798.41167 Count: 60 Max: 37565 Sum: 451161.88.

Title	Genre
Saving Private Ryan	Action
Cool Hand Luke	Action
Apollo 13	Action
Count of Monte Cristo	Action
Fugitive, The	Action
Harry Potter and the Sorcerer's Stone	Action
Hunt for Red October	Action
Antz	Comedy
Hair Spray	Comedy
Monty Python's Flying Circus	Comedy
When Harry Met Sally	Comedy
Arsenic & Old Lace	Comedy
Manhattan	Comedy
The Others	Suspense
Virginia	Suspense
Psycho	Suspense
Airplane!	Comedy
Blazing Saddles	Comedy
Groundhog Day	Comedy
Harold and Maude	Comedy
My Cousin Vinny	Comedy
Dumb and Dumber	Comedy
This is Spinal Tap	Comedy
American Pie	Comedy
American Graffiti	Comedy
Clerks	Comedy
Caddyshack	Comedy
Grosse Pointe Blank	Comedy

You can select a range in a variety of ways:

To Select a Contiguous Group of Cells

1. Click in the first cell in the group.
2. With the left mouse button held down, drag in the desired direction to select the range.

Selecting the range B7:D10

A	B	C	D
6 Video Rentals	\$12,300.00	\$15,000.00	\$13,995.00
7 Video Sales	\$495.00	\$700.00	\$980.00
8 Investment Interest	\$325.00	\$335.00	\$350.00
9 DVD Player Sales	\$400.00	\$525.00	\$605.00
10 Snack Sales	\$200.00	\$150.00	\$225.00
11 Net Sales	\$13,720.00	\$16,710.00	\$16,155.00
			\$17,886.00

To Select an entire Row or Column

- Click the column heading to select the entire column.

Click on the Column Heading to select the entire column

A	B	C	D
1	January	February	March
2 Video Rentals	\$12,300.00	\$15,000.00	\$13,995.00
3 Video Sales	\$495.00	\$700.00	\$980.00
4 Investment Interest	\$325.00	\$335.00	\$350.00
5 DVD Player Sales	\$400.00	\$525.00	\$605.00
6 Snack Sales	\$200.00	\$150.00	\$225.00
7 Net Sales	\$13,720.00	\$16,710.00	\$16,155.00
8			
9			

- Click on the row heading to select the entire row.

Click on the Row Heading to select the entire row

A	B	C	D	E	F
1	January	February	March	April	May
2 Video Rentals	\$12,300.00	\$15,000.00	\$13,995.00	\$15,266.00	\$16,792.60
3 Video Sales	\$495.00	\$700.00	\$980.00	\$1,235.00	\$1,358.50
4 Investment Interest	\$325.00	\$335.00	\$350.00	\$375.00	\$412.50
5 DVD Player Sales	\$400.00	\$525.00	\$605.00	\$495.00	\$544.50
6 Snack Sales	\$200.00	\$150.00	\$225.00	\$315.00	\$346.50
7 Net Sales	\$13,720.00	\$16,710.00	\$16,155.00	\$17,886.00	\$19,454.60
8					
9					

- To select additional rows or columns, hold down the left mouse button and drag in the desired direction.

To Select an entire Worksheet

- Click the Select All button (above row 1 and to the left of column A).

The “Select All” button

A	B	C	D	E	F
1	January	February	March	April	May
2 Video Rentals	\$12,300.00	\$15,000.00	\$13,995.00	\$15,266.00	\$16,792.60
3 Video Sales	\$495.00	\$700.00	\$980.00	\$1,235.00	\$1,358.50
4 Investment Interest	\$325.00	\$335.00	\$350.00	\$375.00	\$412.50
5 DVD Player Sales	\$400.00	\$525.00	\$605.00	\$495.00	\$544.50
6 Snack Sales	\$200.00	\$150.00	\$225.00	\$315.00	\$346.50
7 Net Sales	\$13,720.00	\$16,710.00	\$16,155.00	\$17,886.00	\$19,454.60
8					
9					

To Select a Non-contiguous range of cells

- Click in the first cell you wish to select.
- Hold down the Ctrl key.
- With the Ctrl key held down, select any additional non-adjacent cells.

To Select a Large Area of Contiguous Cells

- Click in the first cell in the upper left of the range.

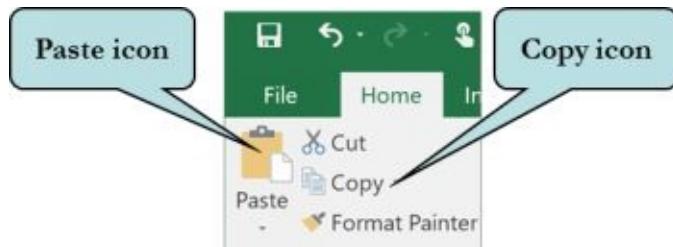
2. Hold down the Shift key.

3. With the Shift key held down, click in the last cell of the lower right of the range.

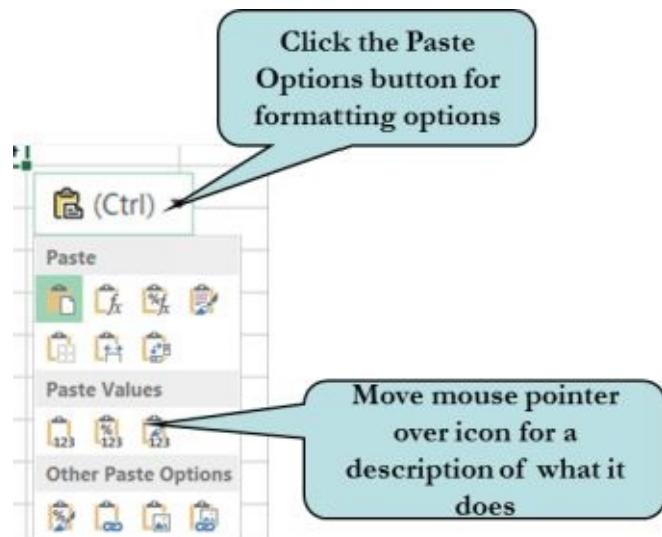
Tip: You can also use the **Shift + Space** keyboard shortcut to select the entire row and **Ctrl + Space** to select the entire column.

Copying and Pasting Data

When you want to duplicate data in several locations, whether it be another worksheet, another workbook or another application entirely, you can save time by using Excel's copy command rather than retyping the data you want to duplicate. When you copy data, it is placed on the clipboard, an area in memory that holds copied items. You can then insert the selection into another location by using the Paste command.



When you paste the contents of the clipboard into your worksheet, the Paste Options Button appears. When you click the button, a drop-down box displays, allowing you to decide how the information is to be pasted into your document. For instance, if pasting from another document, you could choose to change the formatting of the pasted text to match that of the current document.



To copy and paste one item of data, follow these steps:

- 1. Select the cell range you wish to copy.**
- 2. Press the Ctrl and C keystroke combination (Ctrl + C).**

Or

Click the Copy button on the Home Ribbon.

- 3. Select the cell range to receive the data.**
- 4. Press the Ctrl and V keystroke combination (Ctrl + V).**

Or

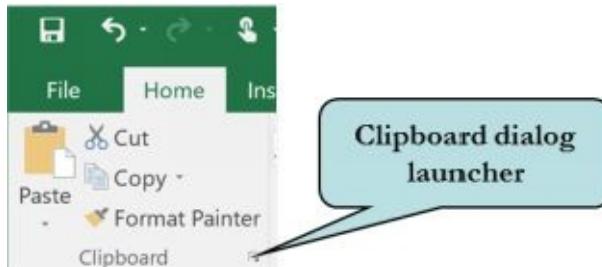
Click the Paste button on the Home Ribbon

Tip: You can also **right-click** on selected text and then choose Copy from the contextual menu. Right-click and choose Paste after you have set the insertion point where you want to insert the copied text.

Using the Office Clipboard

The Office Clipboard allows you to assemble data from several locations in the same document or from different Office documents, and then paste the items one at a time into any Microsoft Office document. Unlike the Windows clipboard which holds only one item, the Office Clipboard can store up to 24 items that you have cut or copied.

To use the Office Clipboard feature, ensure that the Clipboard Task Pane is visible by clicking the Clipboard Dialog Launcher on the bottom right corner of the Clipboard command group. Then, use the standard copy or cut commands. Each item, up to 24, that you copy or cut will be individually placed in the Clipboard for your later use.

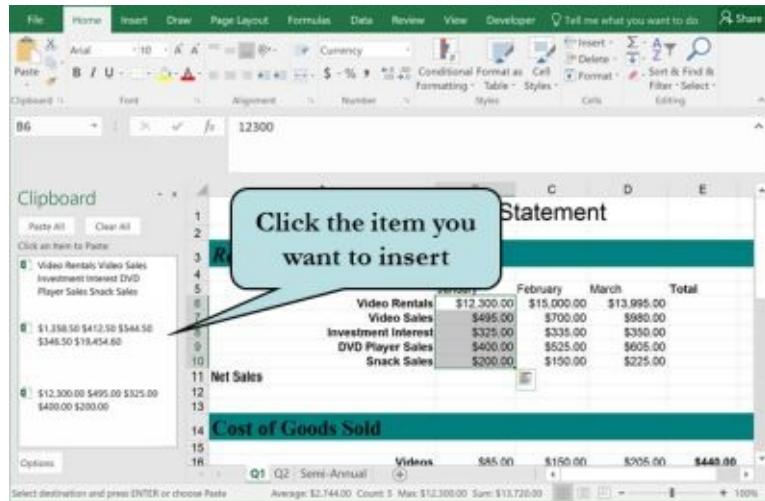


Once you exit Excel, all items from the Office Clipboard are removed.

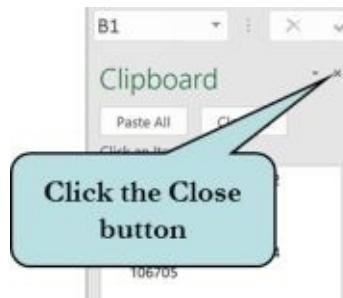


To use the Office Clipboard, follow these steps:

- 1. On the Home tab in the Clipboard command group, click the Clipboard Dialog Box Launcher.**
- 2. Select the item you wish to copy or cut.**
- 3. Click the Copy or Cut button.**
- 4. Repeat steps two and three for any additional items you want to place on the Clipboard.**
- 5. Set the insertion point in the document where you wish to paste one of the items from the Office Clipboard.**
- 6. Click the item in the Clipboard list that you want to paste or click Paste All to paste all of the Clipboard items at once.**

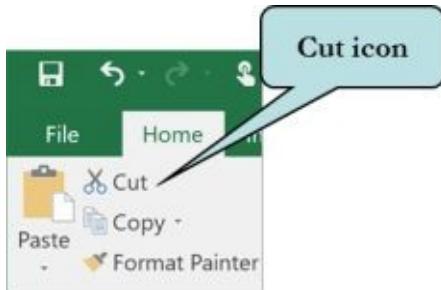


- 7. When finished, click Clear All to remove all items from the Office Clipboard.**
- 8. To turn off the Office Clipboard, click the Close button on the Clipboard task pane.**



Cutting and Pasting Data

When you wish to move data from one location to another rather than duplicate it like we did in the previous lesson, use Excel's Cut and Paste commands. Using the Cut and Paste commands, the data is deleted from its original location and moved to the new location. Like the copy command, the data is stored temporarily on the Windows clipboard.



Using the Cut and Paste commands allows you to rearrange worksheet cells, rows and columns with ease. To cut and paste data, follow these steps:

- 1. Select the cell range you wish to delete.**
- 2. Press the Ctrl and X keystroke combination (Ctrl + X).**

Or

Click the Cut button on the Home Ribbon.

- 3. Select the cell range to receive the data.**
- 4. Press the Ctrl and V keystroke combination (Ctrl + V).**

Or

Click the Paste button on the Home Ribbon

Tip: You can also **right-click** on selected text and then choose Cut from the contextual menu. Right-click and choose Paste after you have set the insertion point where you want to insert the copied text.

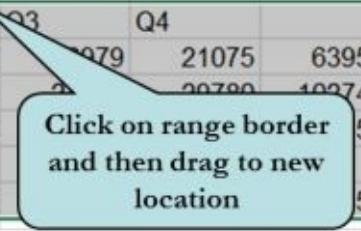
Copying and Moving Cells using Drag-and-Drop

Instead of using the Cut/Copy and Paste commands, you can also move and copy cells or ranges of cells using the **drag-and-drop** method. That is to say, you can manually move the contents of cells to another location by first selecting the cell range and then dragging the cells with your mouse to the new location.

To copy cells instead of moving, hold down the **Ctrl** key as you drag.

Here's how to copy or move a range using Drag-and-drop:

- 1. Select the range of cells to be copied or moved.**
- 2. Position your mouse pointer over the dark border of the selection until the pointer becomes a black 4-way arrow.**
- 3. To move the range, click with your left mouse button and drag to the new location.**



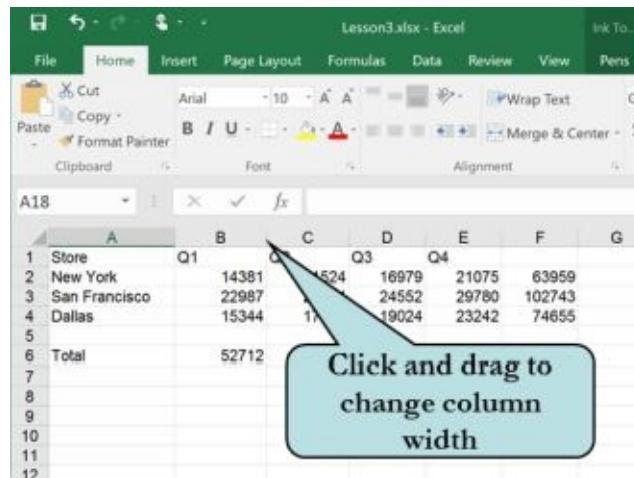
7							
8	Store	Q1	Q2	Q3	Q4		
9	New York	14381	11524	979	21075	63959	
10	San Francisco	22987	25424	9790	20790	102743	
11	Dallas	15344	17045			55	
12	Total	52712	53993			57	
13							

Click on range border
and then drag to new
location

- 4. To copy the range, press and hold the Ctrl key as you drag.**

Changing Column Width

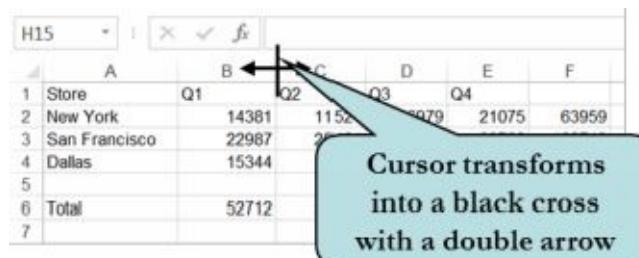
When typing data into a cell, we often find that the column is not wide enough to accommodate the text and sometimes the end of our text will be either cut off or will continue into the next cell. In such a case, we will want to adjust the column width by clicking on the boundary of the right side of the column heading and dragging until the column is the desired width.



Rather than change the size of a column manually, you can use Excel's Column Width commands in which you enter precise values for the column width.

To change the width of a column by dragging, do this:

- 1. Move your mouse pointer over the boundary of the right side of the column heading until the mouse pointer changes into a black cross with a double arrow.**
- 2. Click and hold the mouse button down and drag until the column is the desired width.**



To change the width of multiple columns, follow these steps:

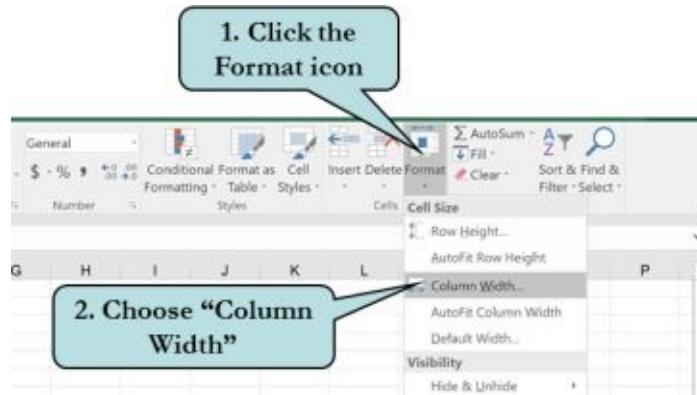
- 1. Select the columns you wish to change by selecting the column headings.**
- 2. Move your mouse pointer over the boundary of the right side of any column heading until the mouse pointer changes into a black cross with a double arrow (To change the columns widths of All columns or rows in the worksheet, click the Select All Button).**
- 3. Click and hold the mouse button down and drag until the columns are the desired width.**

To change the size of a column using the column width command

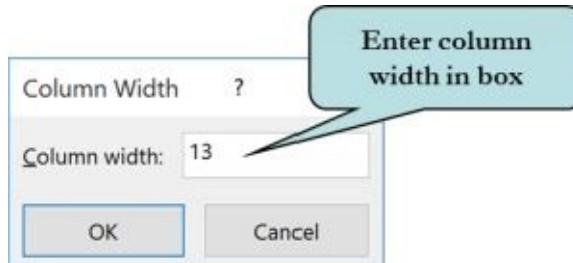
- 1. Highlight the column(s) you wish to change.**
- 2. Right-click and choose Column Width from the contextual menu**

Or

Click the Format button on the Cells group on the Home Ribbon and choose Column Width from the drop-down menu.



- 3. Enter the appropriate value in the pop-up dialog box. The value is expressed by average number of digits which the row or cell can accommodate using the default font. For example, a column width of 13 should be able to accommodate 13 digits in that cell.**



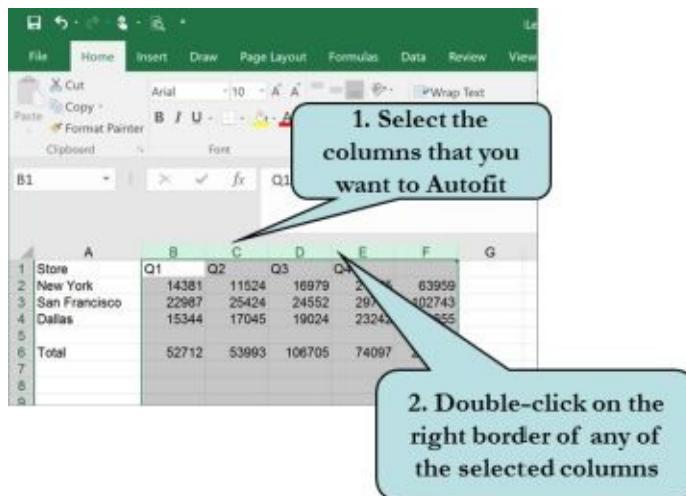
- 4. Click OK.**

Autofit

You can also use Excel's Autofit feature. This allows you to automatically change the width of a column or height of a row to accommodate the widest or tallest entry.

To Change the Size of a Column or Row using Autofit:

1. For Columns, double-click on the right border of the column heading. The column width will adjust to accommodate the largest entry in that column.



2. For Rows, double-click on the bottom border of the row heading. The row height will adjust to accommodate the tallest entry in that row.

Changing Row Height

At times, you may wish a particular row to stand out by increasing the font size such as in a worksheet title heading. In this case, you would also need to adjust the row height to accommodate the taller text of the increased font size. The process for changing the width of columns works the same way for changing the height of rows – click on the boundary of the bottom of the row heading and drag until the row is the desired height.

	Store	E	F
1	New York	Q4	
2	San Francisco	979	21075
3	Dallas	14552	29780
4	Chicago	15344	19024
5	Philadelphia	23242	74655
6	Total	52712	53993
		106705	74097
			241357

Just as we saw with changing column width, you also change the size of a row (rather than dragging manually) by using Excel's Row Height command in which you enter precise values for row height.

To change the height of a single row, follow these steps:

- 1. Move your mouse pointer over the bottom border of the row heading until the mouse pointer changes into a black cross with a double arrow.**
- 2. Click and hold down the mouse button and drag downwards until the row is the desired height.**

To change the height of multiple rows, follow these steps:

- 1. Select rows you wish to change by clicking on the row headings.**
- 2. Move your mouse pointer over the boundary on the bottom of any row heading until the mouse pointer changes into a black cross with a double arrow (to change the row heights of All rows in the worksheet, click the Select All button).**
- 3. Click and hold the mouse button down and drag until the rows are the desired height.**

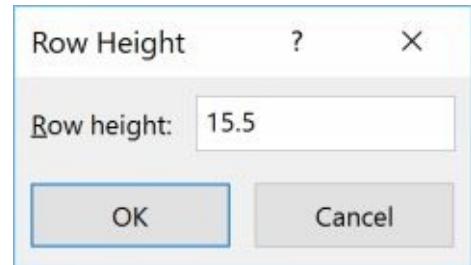
To Change the Height of a Row using the Row Height Commands

- 1. Highlight the row(s) you wish to change.**
- 2. Right-click and choose Row Height from the contextual menu**

Or

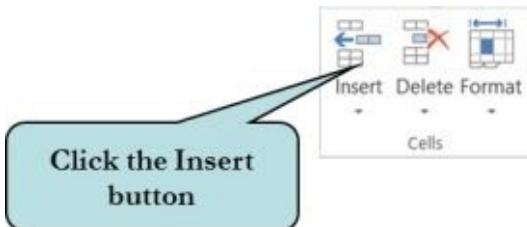
Click the Format button on the Cells group on the Home Ribbon and choose Row Height from the drop-down menu.

- 3. Enter the appropriate value in the pop-up dialog box. The value represents height measurements in points (1 point is equal to 1/72 of an inch).**



Inserting and Removing Rows and Columns

To change the appearance of your worksheet, you can insert additional columns and rows or delete existing ones. When you insert a new column into your worksheet, existing columns shift to the right. When inserting new rows, existing rows shift down.



To insert a column, follow these steps:

- 1. Select the column where you would like to insert a new column. If you wish to insert more than one column, select as many columns as you would like to insert.**
- 2. In the Home Ribbon, click the Insert button on the Cells group.**

Or

Right Click and choose Insert from the contextual menu.

To insert a row, follow these steps:

- 1. Select the row where you would like to insert a new row. If you wish to insert more than one row, select as many rows as you would like to insert.**
- 2. In the Home Ribbon, click the Insert button on the Cells group.**

Or

Right Click and choose Insert from the contextual menu.

To remove a row or column, do this:

- 1. Select the column or row that you wish to remove.**
- 2. Click the Delete button on the Cells group**

Or

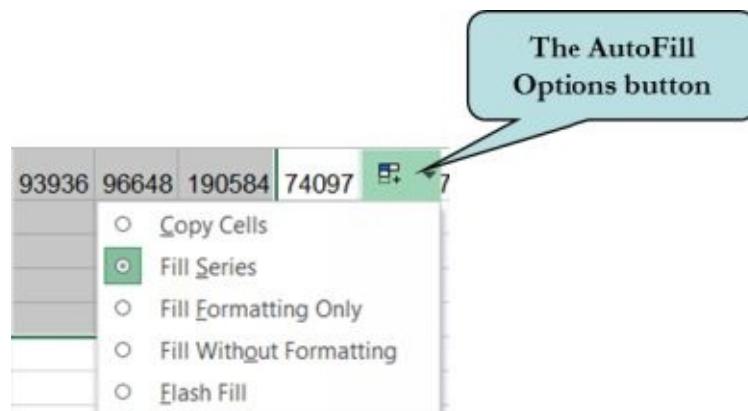
Right-click and choose Delete from the contextual menu.

- 3. To clear only the contents of a row or column, highlight the row or column and press the Delete key.**

Copying Data and Formulas with AutoFill

You can copy data and formulas to adjacent cells using the AutoFill feature. To use AutoFill, select the cell whose data you wish to copy and then move your mouse pointer over the cell's fill handle, the small black box on the lower right corner of the cell. Your mouse pointer will transform into a black cross.

Then, click and drag to the adjacent cell(s) where you wish to copy the data. Once the action is completed, the AutoFill Options button appears, allowing you to choose the option of copying just the data, copying the formatting only, or copying the data without the formatting.



To use AutoFill, follow these steps:

- 1. Activate the cell whose data or formula you wish to copy.**
- 2. Move the mouse pointer over the fill handle until the pointer transforms into a black cross.**

1	Quarterly Sales FY 2012				
2		Q1	Q2	Q3	Q4
3	Store				
4	New York	14381	11524	16979	21075
5	San Francisco	22987	25424	24552	29780
6	Milwaukee	41224	42655	38972	45268
7	Dallas	15344	17045		74655
8	Total	93936	96648	190584	241357

- 3. Click and drag to the cell(s) where you wish to copy the data.**
- 4. Release the mouse button.**
- 5. If desired, choose an option from the AutoFill Options button by clicking the arrow.**

Using AutoFill to Create a Series

You can use AutoFill to create a series or a sequence of values. For instance, you can quickly fill in cells that follow a sequence of 5, 10, 15, etc. You need only provide an

example of a couple of entries to show Excel the pattern for the series. For a series such as a sequential date, you need only provide one example — Excel will automatically increment the date by one day.

Here's how to create a series using AutoFill:

- 1. Select one or more adjacent cells which contain the series pattern.**
- 2. Move the mouse pointer over the fill handle on the last cell until the pointer transforms into a black cross.**
- 3. Click and drag down or across to the number of cells you wish to contain the series.**
- 4. Release the mouse button.**

A	B	C	D
1	Quarterly Sales FY 2012		
2			
3	Store	Q1	Q2
4	New York	14381	11524
5	San Francisco	22987	25424
6	Milwaukee	41224	42655
7	Dallas	15344	17045
8			

Click and drag downward to fill in the series

Tip: When you first select a series of data, a small multi-colored box appears next to the sizing handle. This is the Quick Analysis feature, which will be discussed in a later lesson. The Quick Analysis box appears when you select data; the Auto-Fill box appears have you have finished dragging.

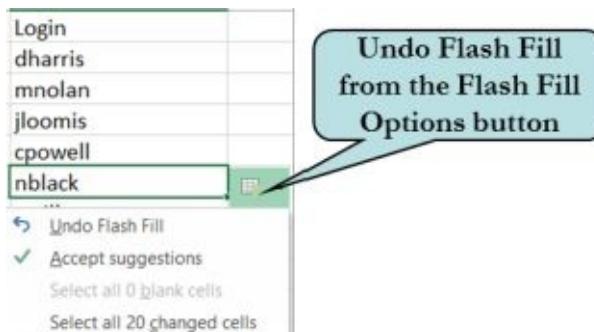
Filling in Cells using Flash Fill

A handy and time-saving feature in Excel is the **Flash Fill** feature. As you begin typing data, Flash Fill allows you to fill in empty cells based upon patterns that already exist in your spreadsheet. For instance, if you have a field that combines the first names and last names of your customers into one field, you can easily split them into separate fields using Flash Fill. Likewise, you can combine separate fields into one using the same method. If you have a huge spreadsheet, you don't even have to click and drag to fill in the cells – Flash Fill does it for you.

B	C	D	E	F	G	H	I
FirstName	LastName	Address	City	State	Zip	HomePhone	Login
Daniel	Harris	387 N. Pine St.	Canon City	CO	81212 (719) 555-5736	dharris	
Mary	Nolan	4256 N. Oakland Av	Milwaukee	WI	53211 (414) 555-5242	mnolan	
James	Loomis	8724 W. Pine St.	Hancock	MI	49905 (906) 555-3465	jloomis	
Cathy	Powell	916 S. Davis	Cheyenne	WY	82005 (307) 555-2524	cpowell	
Nancy	Black	5322 Poodle Lane	Milwaukee	WI	53211 (414) 555-4495	nblack	
Cedrick	Miller	612 E. Lyon	Milwaukee	WI	53211 (414) 555-0601	cmiller	
Norman	Wyler	6212 Huck St.	Milwaukee	WI	53211 (414) 555-9062	nwyler	
David	McBride	802 Patriot's Court	Milwaukee	WI	53211 (414) 555-2702	dmcbride	
Mona	Fielen	512 N. Hemlock	Milwaukee	WI	53211 (414) 555-2308	mfielen	
Randy	Andersen	103 N. Riverboat Rd	Milwaukee	WI	53211 (414) 555-9215	randersen	
Alice	Juntinen	2006 W. Center	Denver	CO	80207 (303) 555-3456	ajuntinen	
Thomas	Landersson	6007 E Clinton Hill	Colorado	CO	303-212 1234 555-0932	tlandersson	

Press Enter to fill in all
cells in the row with
the suggested pattern

As you type, Excel begins filling in information for the rest of that field. Additionally, it displays how subsequent rows will be filled in. Once you fill in the data, a Flash Fill Options button appears, allowing you to Undo the Flash Fill if you don't like the results. You also can select all of the remaining cells in the series in order to change their formatting, if you so desire.



To use Flash Fill to copy data or a formula, follow these steps:

- 1. Begin typing in the cell.**
- 2. When Flash Fill suggestions appear, press the Enter key.**
- 3. To Undo Flash Fill or to select all of the cells that Flash Fill has filled in, click the Flash Fill button and then make your selections.**

Chapter 4 – Formatting a Worksheet

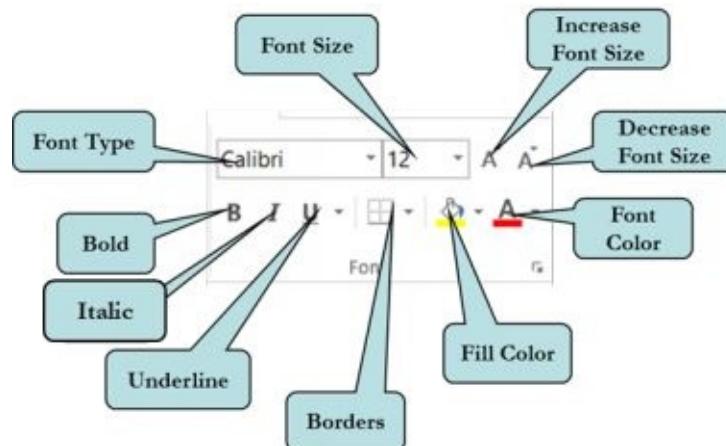
Formatting Text

One powerful feature in Microsoft Excel is the ability to format the text in your worksheet. For instance, you can modify the typeface (or font) of your text, change the size of your text, or emphasize text by applying bold, italic or underlining.

Some common text formatting options are:

- Changing the font style (typeface)
- Changing the font size
- Adding bold and italic formatting
- Underlining text
- Adding borders
- Increasing/decreasing Font Size

The quickest and easiest way to apply and modify text formatting is to use the Formatting Tools on the Home Ribbon under the Font group. To change text emphasis, select the cell or cell range you wish to format then click on the appropriate button (Bold, Italic or Underline). To change the font or font size, select the text and then choose the desired option from the Font or Font Size drop-down list. For an explanation of what a tool does, move your mouse pointer over it to display an informational box. The box will also display the keyboard shortcut for the command, if any.



Common Formatting Options on the Font Group

Another handy formatting tool is the Mini-Toolbar. The Mini-Toolbar displays whenever you right-click on selected cells and provides quick access to common formatting commands such as bold, italic, font color, font type, font size, fill color, increase indent, decrease indent and increase/decrease font size. If you wish to turn off this feature, you can do so from the Excel Options dialog box.

Here's a quick guide to using Excel's formatting tools:

1. Select the text that you want to modify.
2. Click the Home tab on the Ribbon.
3. To emphasize text, click on the Bold, Italics or Underline icon on the Font group

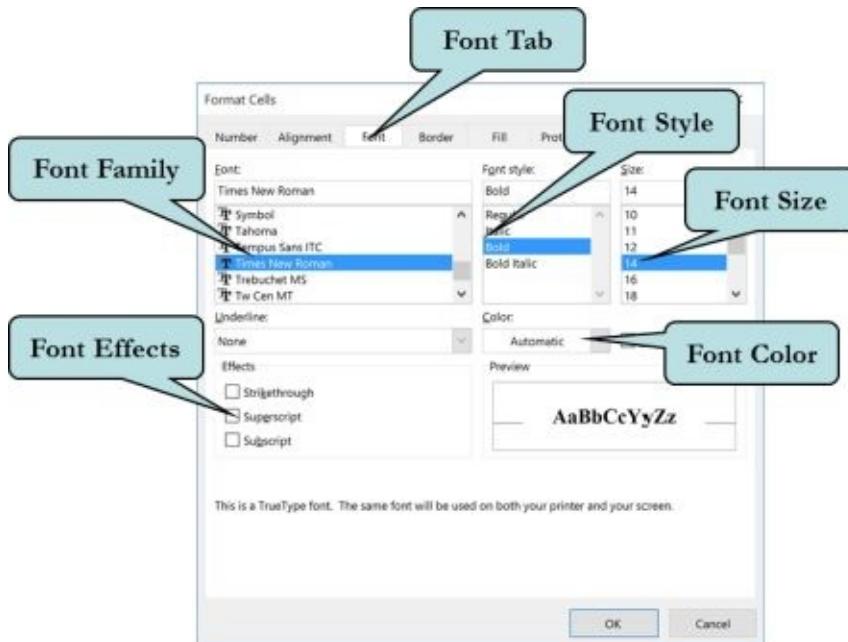
of the Home Ribbon.

- 4. To change the font type, click the arrow on the font drop-down list and select the desired typeface.**
- 5. To change the font size, click the arrow on the font size drop-down list and select the desired font size or, type the size manually in the font size box.**
- 6. To increase or decrease the size of the selected text, click the Increase Font Size button or Decrease Font Size button.**
- 7. To use the Mini-toolbar, select the text you want to modify, right-click and then choose the desired option from the Mini-toolbar.**



Using the Format Cells Dialog Box

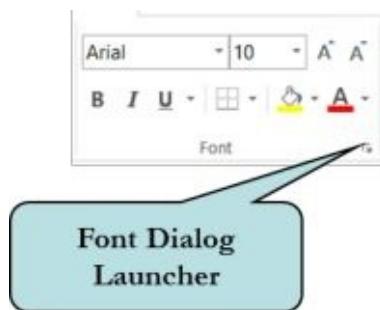
The Format Cells Dialog Box allows you to apply multiple formats (bold, italic, font size, font type, font color, etc.) to selected text at once. Additionally, you will find formats that are not available on the Ribbon. To apply multiple formatting to selected text, click the Font Dialog Box Launcher on the lower-right corner of the Font command set and then make your desired selections.



The Font Dialog Box

To apply formatting using the Format Cells dialog box, follow these steps:

- 1. Select the text whose formatting you wish to modify.**
- 2. Click the Font Dialog Box Launcher on the Ribbon**



Or

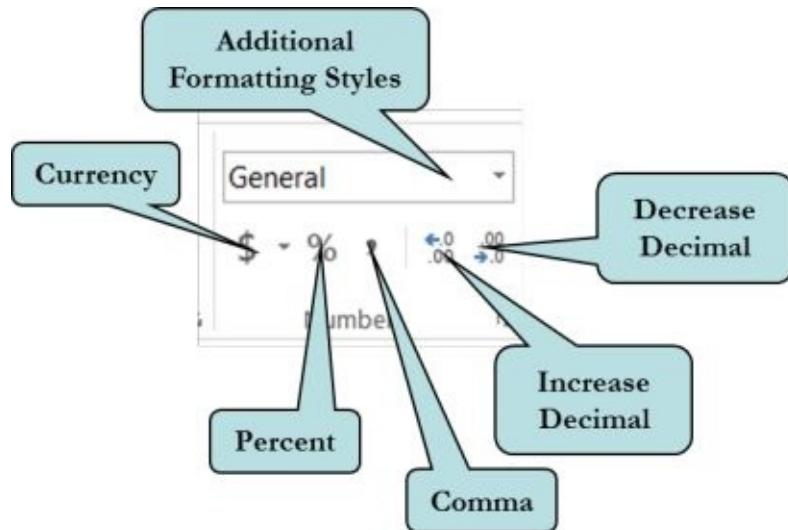
Press the Ctrl + 1 keyboard shortcut and click the Font tab.

- 3. Select the formatting you wish to apply.**
- 4. Click OK when finished.**

Tip: You can also display the Format Cells dialog box by clicking the Format button on the Cell group of the Ribbon and then click Format Cells. Click the Font tab to display font options.

Formatting Values from the Ribbon

The Ribbon contains many options for applying number formatting or, in other words, the way in which numerical values are displayed. Buttons for the three most common number formats – Currency Style, Percent Style and Comma Style can be found on the Number group on the Home Ribbon. Two additional buttons allow you to increase and decrease the number of decimal places.



Click the drop-down list on the Number group to choose value formatting options (date, time, text, fraction, etc.).

Here's how to format values from the Ribbon:

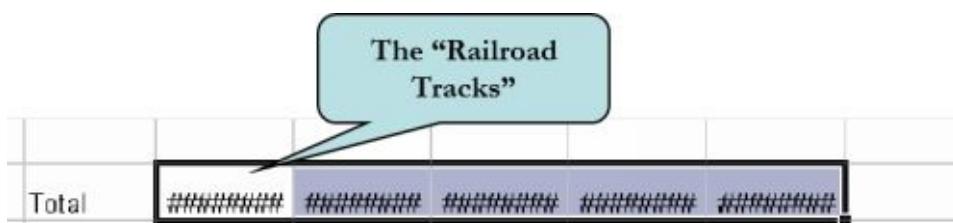
- 1. Select the cell or cell range to format.**
- 2. Click the Home tab to display the Home Ribbon.**
- 3. Click the Currency, Percent or Comma button**

Or

Click the drop-down list on the Number group and choose the desired cell format.

- 4. To change the number of decimal places, click the Increase Decimal or Decrease Decimal button.**
- 5. For additional formatting options, display the Format Cells dialog box.**

Sometimes when we change the format of our data, the value no longer displays in the cell. Instead, the cell is populated with the pound sign (commonly referred to as “the railroad tracks”) as shown below. This occurs when a numerical value is longer than the cell can accommodate. To solve this problem, we need only increase the width of our columns.



Formatting Numbers

The Number tab of the Format Cells dialog box contains many further options for applying number formatting. In fact, there are twelve different number formats that you can apply from the Format Cells dialog box. These are:

General: No number formatting is applied. Example: 1234.2

Number: By default, this format provides two decimal points with negative numbers being preceded by a dash. To display negative numbers in red, click the format you want in the Negative numbers box. If you wish to include a dash, click the Use 1000 Separator. You can also adjust the number of decimal places from the Decimal Places box.

Currency: The US currency symbol (\$) precedes the number. This format provides two decimal points, with a comma as a thousands separator. Negative numbers are surrounded by parenthesis.

Accounting: Same as the Currency format except that the currency symbol is aligned to the left edge of the cell and decimals are aligned vertically on the right side of the cell.

	A	B	C	D
1	\$2,343.00	\$ 2,343.00		
2	\$1,325.92	\$ 1,325.92		
3	\$43,222.00	\$43,222.00		
4				

Date: Formats the numbers as a date, with a two digit month, two digit year and a two digit year. To change the date format, choose the one you want from the **Type:** box.

Time: Formats the entry in the default time format with hour, minutes and seconds, each separated by a colon: 6:23:45 AM

Percentage: Excel multiplies the value in the cell by 100 and adds the percentage (%) symbol at the end. Example: 45 becomes 4500%. .45 becomes 45%.

Fraction: Provides for up to one digit on either side of the slash. Example: 4/5. You can modify the number of digits from the **Type:** box.

Scientific: Used for entering in long numbers. The default format has two decimal places.

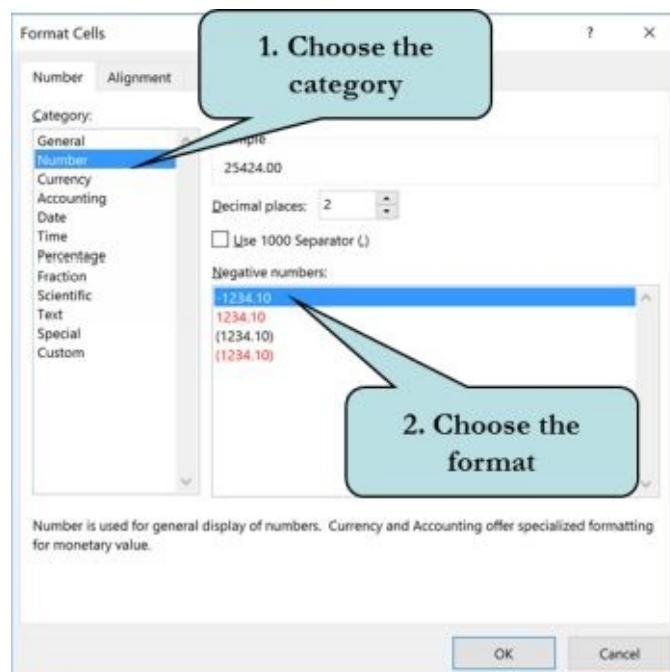
Text: Used format numbers so that they are treated as text. Use this when you have numbers with leading zeros, such as: 0034263.

Special: Used to display zip codes, telephone numbers and social security numbers in their proper format, without needing to enter in any special characters.

Custom: Create your own custom number formats. Many people find it helpful to edit existing number format in order to create a custom format.

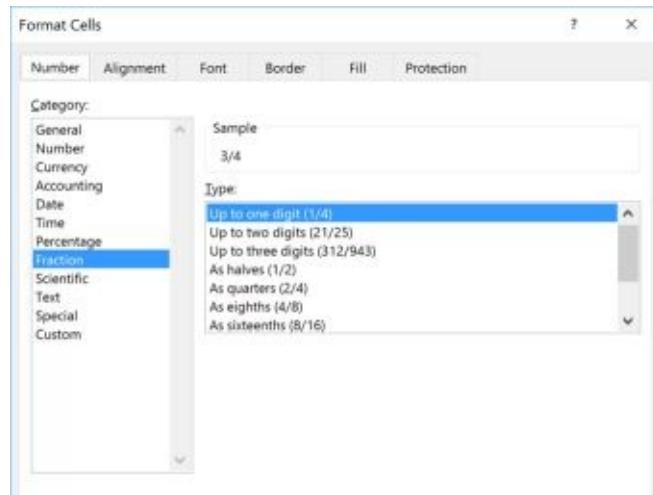
Here's how to format values from the Format Cells dialog box:

- 1. Select the cell(s) whose values you wish to modify.**
- 2. Click the Number Dialog Box Launcher on the Ribbon.** This will display the Number tab. You can also click the dialog launcher on the Font or Alignment group to open their respective tabs in the Format Cells dialog box.
- 3. Select the Category you want in the left pane (General, Number, Currency, Accounting, Date, Time, Percentage, Fraction, Scientific, Text, Special, or Custom).**
- 4. Choose the format you want.** The options displayed are dependent on the category.
- 5. Click OK when finished.**



More about Fractions

You can format numbers in Excel so that fractions display in old-school format, such as 3/4 or 1/2 from the Format Cells dialog box. Excel also supports compound fractions such as 4 1/2.

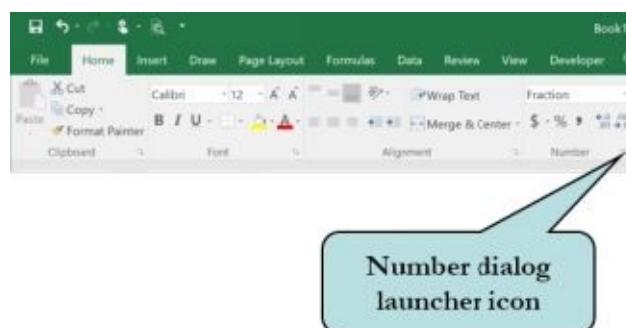


To format numbers as fractions, follow these steps:

- 1. Select the cells you want to format.**
- 2. Right-click the selected cells and choose Format > Cells from the menu**

Or

Click the dialog launcher on the Number group of the Ribbon.



- 3. Click the Fractions category in the left pane.**
- 4. Choose the fraction format you want from the Type: window.**
- 5. You can also apply the Fraction format automatically as you enter in numbers. For compound fractions, type the whole number, tap your spacebar and then the fraction, such as 8 1/2. If the fraction is less than 0, type a 0, followed by a space and then the fraction, such as 0 3/4.**

Book1 - Excel

File Home Insert Draw Page Layout Formulas Data Review View

Paste Calibri 12 A A Alignment Number Styles

B I U Font Alignment Number Styles

Clipboard Conditional Formatting

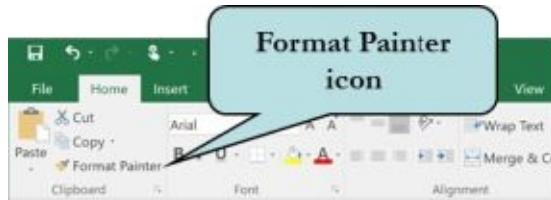
B3 9.25

	A	B	C	D	E	F	G
1	Hours worked:						
2	Mon	8 1/2					
3	Tue	9 1/4					
4	Wed	3/4					
5	Thu	7 3/4					
6	Fri	10 1/2					

Numbers are automatically formatted as fractions

Using the Format Painter Button

Using the Format Painter button on the Home Ribbon allows you to copy the formatting from one cell or cell range to another cell or cell range. This procedure copies all formats including font typeface, number formatting, cell and font color, alignment, etc. to the new cell range. To copy the formatting to several locations, double-click the Format Painter button. It will then continue to be activated until you click its icon to deactivate it.



Follow these steps to copy formats from one cell or cell range to another

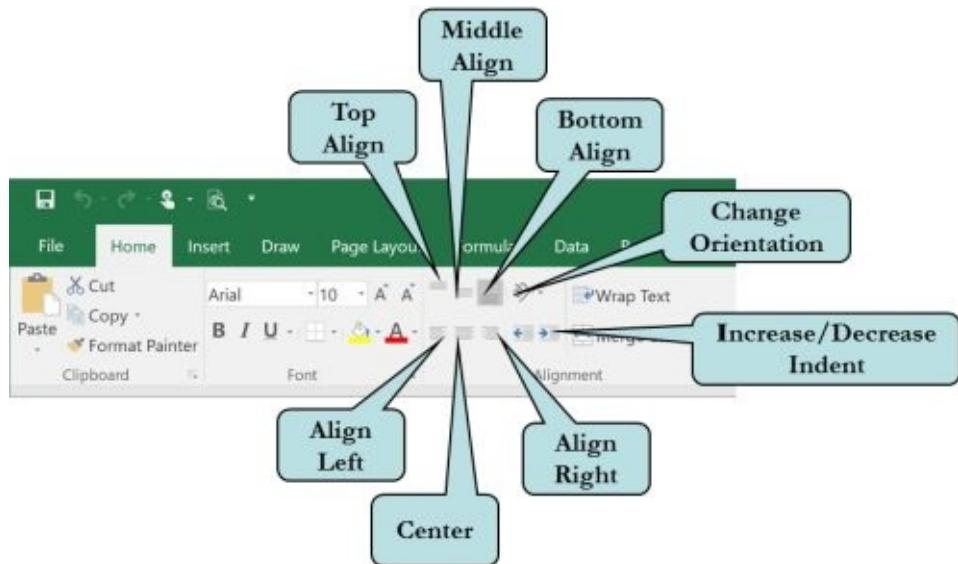
- 1. Select the cell or cell range whose formatting you wish to copy.**
- 2. Click the Format Painter icon under the Clipboard command set on the Ribbon.**
- 3. To copy the formatting to several locations, double-click the Format Painter button.**
- 4. Click on the location(s) to receive the formatting.**
- 5. If applying formatting to more than one location, click the Format Painter button to deactivate it.**

Follow these steps to copy column widths from one column to another

- 1. Select the heading of the column whose width you wish to copy.**
- 2. Click the Format Painter icon under the Clipboard command set on the Ribbon.**
- 3. Click the heading of the new column or column range to which you wish to copy the width.**

Alignment and Text Wrapping

When entering data into cells, the default alignment is left-aligned along the bottom for text and right-aligned along the bottom for numbers. Excel supplies many other alignment options from which to choose – left alignment, right alignment, center alignment, as well as horizontal and vertical alignment options.



The alignment options are available on the Alignment group on the Home Ribbon:

Align Left: Aligns cell contents along the left edge of the cell

Align Right: Aligns cell contents along the right edge of the cell

Center: Centers the cell contents within the cell

Top Align: Aligns text to the top of the cell

Middle Align: Aligns text so that it is centered between the top and bottom of the cell

Bottom Align: Aligns text to the bottom of the cell

Orientation: Allows you to rotate text

Decrease Indent: Decrease the margin between the border and the text in the cell

Increase Indent: Increase the margin between the border and the text in the cell

Wrap Text: Wraps the text within a cell so it does not cross adjoining cells or get cut off

Other alignment options are available from within the Format Cells dialog box.

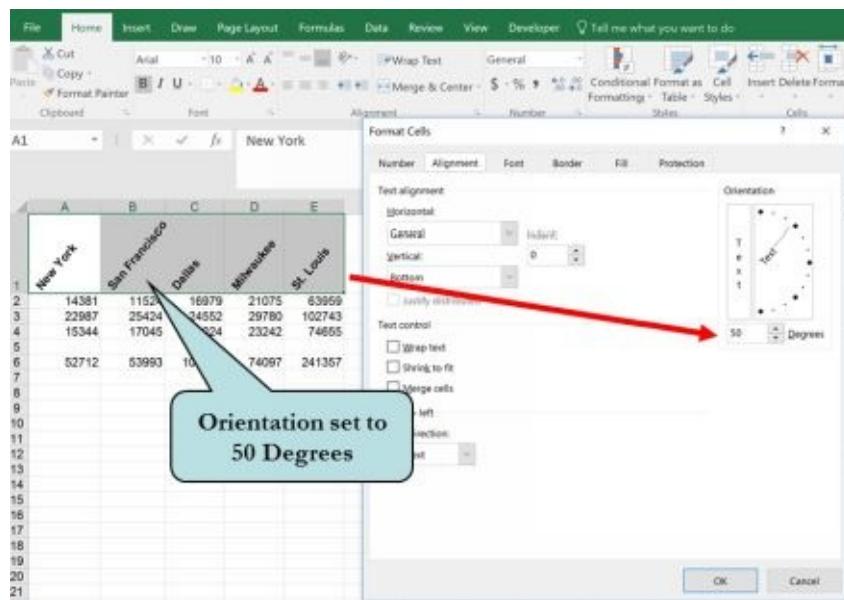
To change the alignment of data within cells, follow these steps:

1. Select the cell or cell range whose data you wish to align.

2. Click the desired alignment button on the Alignment group on the Home Ribbon

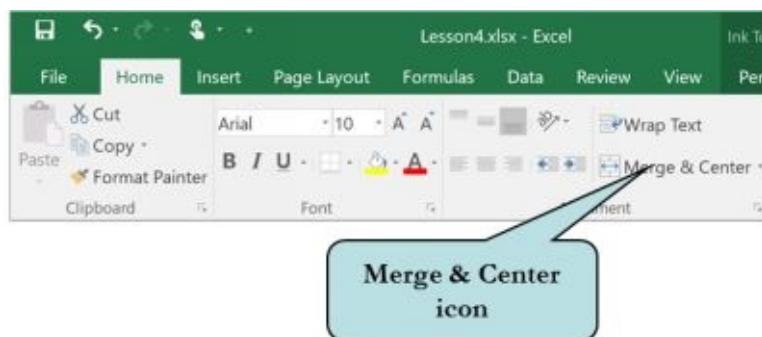
Or

1. Select the cell or cell range whose data you wish to align.
2. Display the Format Cells dialog box.
3. Click the Alignment Tab.
4. Choose options from the Horizontal and/or Vertical combo box.
5. Select any desired additional options such as Wrap Text, Orientation or Text Direction.
6. Click OK.



Merging Cells and Centering Text

With Excel's Merge Cells and Center Text feature, you can spread the contents of several cells into one merged cell. A merged cell is created by combining one or more cells into one new larger cell. For instance, you may have a lengthy title that spans several cells. The Merge Cells and Center Text feature combines the extra cells into one large cell and centers the text within the new cell. You can change the text alignment by choosing Left or Right alignment from the Home Ribbon or by choosing additional options from the Format Cells dialog box.



Once the cells have been merged, they can be returned to their original state by clicking the arrow on the Merge & Center button with the merged cell selected and choosing Unmerge Cells from the list.

To merge cells and center text, follow these steps:

- 1. Ensure that the data to be merged and centered is located in the leftmost cell.**
- 2. Select the cells you wish to merge.**
- 3. Click the Merge & Center icon on the Alignment group on the Home Ribbon.**

B1	A	B	C	D	E	F
1						
	Quarterly Sales for FY 2014					

Merged Cells with the Text Centered

Adding Cell Borders

You can separate or outline a cell or group of cells by applying borders (left, right, top or bottom) to the edges of cells. Border options can be found under the Borders button on the Font group on the Home Ribbon or under the Border tab of the Format Cells dialog box. The Format Cells dialog box contains additional border options such as line style and border color.

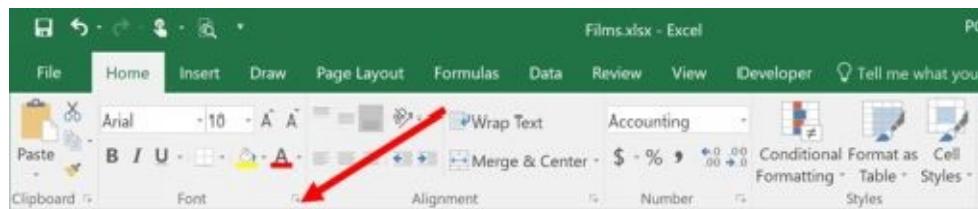


To apply cell borders, follow these steps:

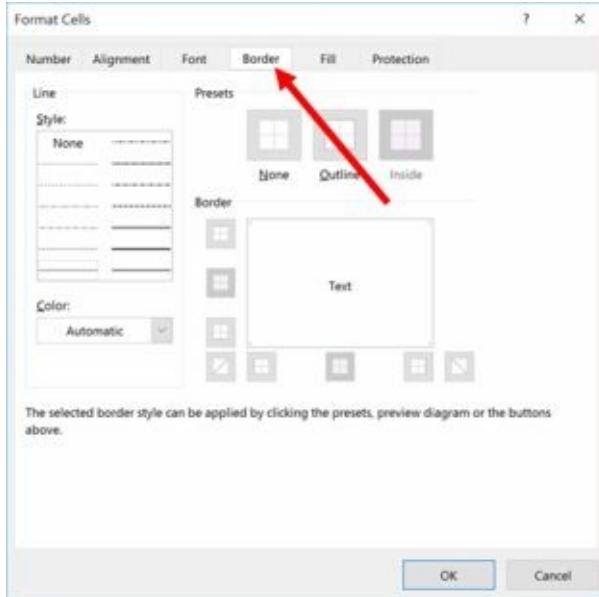
- 1. Select the cell or range of cells to which you want to apply borders.**
- 2. Click the arrow on the Borders button on the Home Ribbon.**
- 3. Select a border style from the palette.**

Or

- 1. Select the cell or range of cells to which you want to apply borders.**
- 2. Click the Font Dialog Launcher.**



- 3. Click the Border tab.**

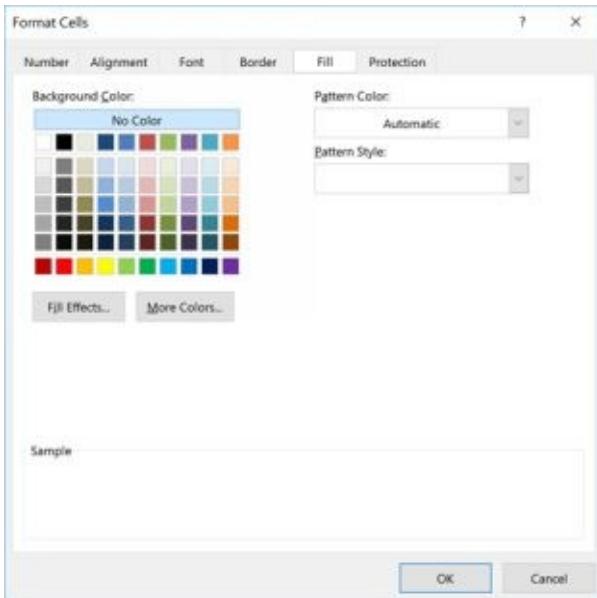


Border Tab of the Format Cells dialog box

- 4. Select Border Type from the list surrounding the Sample Window (clicking in the Sample Window on the borders will add and remove the border that you have chosen).**
- 5. Select a Line Style, if desired.**
- 6. Select a Border Color if desired.**
- 7. Click OK.**

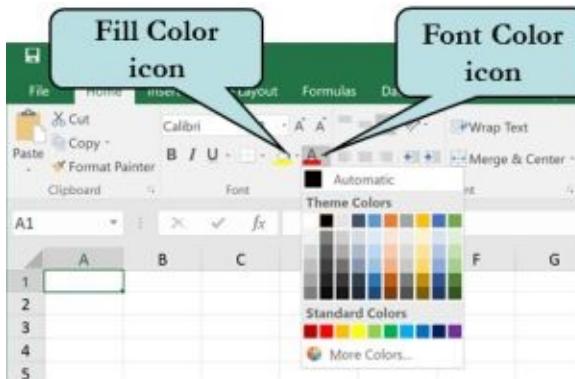
Applying Colors and Shading to Cells

To add some pizzazz to your worksheet or to make a particular cell or cell range stand out, you can apply patterns and background colors to the cells in your worksheet. Background color options are located under the Fill tab of the Format Cells Dialog box (you can also click the Fill Color button on the Home Ribbon on the Font group then choose the desired background color from the color palette).



Fill tab of the Format Cells dialog box

Additionally, you can change the color of the fonts in your worksheet by changing the foreground color of a selected cell or cell range. Excel's Color Palette provides a wide variety of colors from which to choose.



Follow these steps to apply a background color to cells:

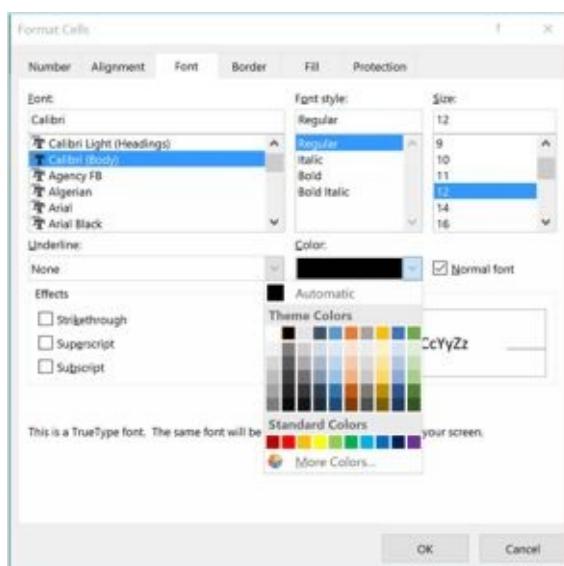
- 1. Select the cell or range of cells to which you want to apply a color.**
- 2. Click the Font Dialog Launcher.**
- 3. Click the Fill tab.**
- 4. Choose a color from the Color Palette.**
- 5. If desired, choose a Pattern from the Pattern Style drop-down list.**
- 6. To blend the color of your pattern with another color, select the additional color from the color palette in the Pattern Color drop-down list.**

Or

- 1. Select the cell or cell range to which you want to apply a color.**
- 2. Click on the arrow to the right of the Fill Color icon on the Home Ribbon.**
- 3. Select the background color from the Color Palette.**

Follow these steps change the font color:

- 1. Select the cell or range of cells to which you want to apply a font color.**
- 2. Click the Font Dialog Launcher.**
- 3. Click the Font tab.**
- 4. From the Color list box, choose a color from the Color Palette.**
- 5. Click OK.**



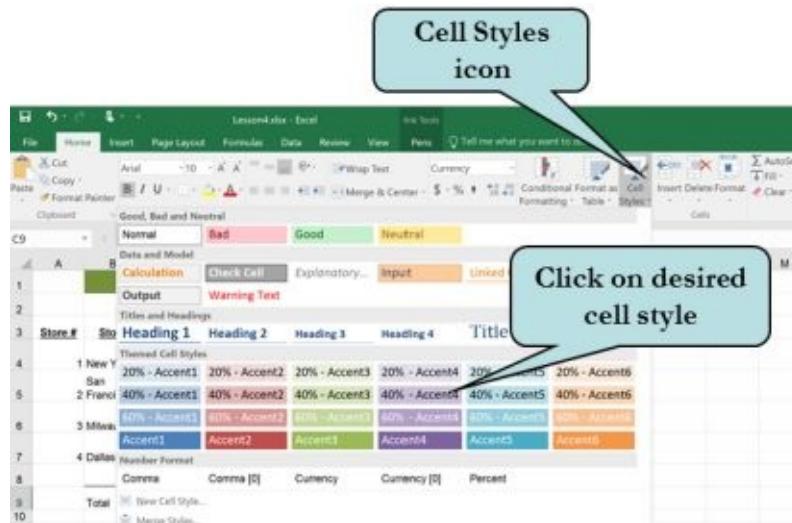
The Font Tab of the Format Cells dialog box

Or

- 1. Select the cell or range of cells to which you want to apply a font color.**
- 2. Click the arrow to the right of the Font Color icon on the Home Ribbon.**
- 3. Click on the desired font color.**

Applying Cell Styles

Another way to format a cell is to use one of Excel 2016's styles from the Cell Styles Gallery. A Cell Style is a collection of formats such as a particular font type and size, particular shading, font color, background color, and more. The Cell Styles Gallery on the Styles group of the Home Ribbon displays a variety of pre-defined formats that you can quickly apply to your cells. As you move your mouse pointer over any of the styles in the gallery, the formatting of your worksheet changes to reflect what your cells would look like if you were to apply the style. This is an example of Excel's Live Preview feature.



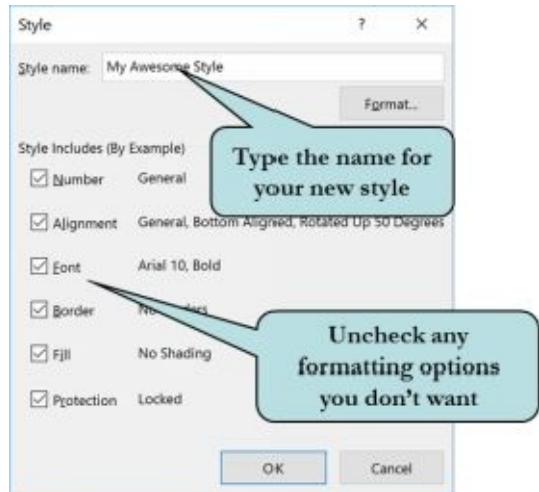
As you work more with Excel, you will most likely develop your own preferred formats for particular worksheets. Rather than setting these formats over and over in your worksheets, you can store these formatting options in Excel's Cell Style Gallery. You should consider adding any special cell formatting that you plan to use in the future. Cell Styles can be a real time-saver if you find yourself applying the same formatting over and over.

To apply an existing style, follow these steps:

- 1. Select the cell or cell range to which you wish to apply a style.**
- 2. Click any Cell Styles on the Styles Group on the Ribbon.**
- 3. Move your mouse pointer over any of the styles to preview how the formatting will look on your worksheet.**
- 4. Click the Style you wish to use.**

To create a new style, follow these steps:

- 1. Manually apply any formatting to a cell that you wish to include in your style.**
- 2. Click the Cell Styles icon on the Ribbon.**
- 3. Click New Cell Style on the bottom of the gallery list.**
- 4. Enter a name for your new style in the Style Name text box.**



Style dialog box

5. Uncheck any formatting options underneath the Style Includes (By Example) that you do not wish to include in your new style.
6. Click the Format button to change the formatting options.
7. Click OK. Your new style will now display on top of the Cell Styles gallery under the Custom category.

Hiding and Unhiding Rows and Columns

Sometimes you may wish to remove a row or column from view but not permanently delete it from your worksheet. For instance, you may want to print out only relevant rows or columns. Excel allows you to temporarily hide a row or column from view using the Hide command. When a row or column is hidden, note that the row heading or column heading disappears from view as well. Hidden objects can still perform and be included in calculations.

To unhide a column or row, you must first select the rows or columns adjacent to the hidden one(s) before using the unhide command.

A	B	C	D	E	F
1	Quarterly Sales by Store				
2					
		New York	San Francisco	Milwaukee	Dallas
3					
4	Q1	14,381	22,987	41,224	15,344
6	Q3	16,979	24,552	38,972	19,024
7	Q4	21,075	29,780	45,268	23,242
8					

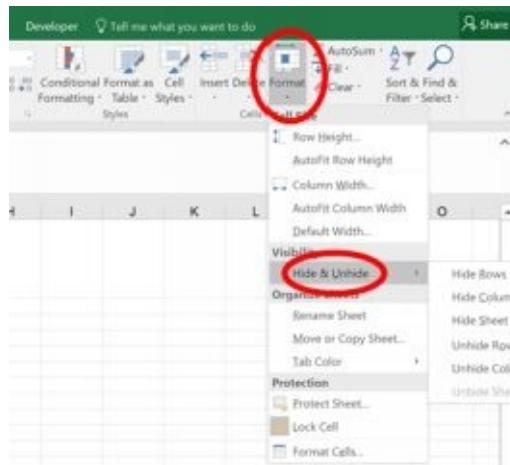
Hidden Row 5 Disappears from View

To hide columns, follow these steps:

- 1. Select the column or columns to be hidden.**
- 2. Right-Click and choose Hide from the pop-up menu.**

Or

- 1. Select the column or columns to be hidden.**
- 2. Click the Format button on the Cells group of the Home Ribbon.**



- 3. Point to Hide & Unhide under the Visibility area.**

- 4. Click Hide Columns.**

To hide rows, follow these steps:

- 1. Select the row or rows to be hidden.**
- 2. Click the Format button on the Cells group of the Home Ribbon.**
- 3. Point to Hide & Unhide under the Visibility area.**

4. Click Hide Rows.

Or

- 1. Select the row or rows to be hidden.**
- 2. Right-Click and choose Hide from the pop-up menu.**

To unhide columns, follow these steps:

- 1. Select the columns to the left and right of the hidden one(s).**
- 2. Click the Format button on the Cells group of the Home Ribbon.**
- 3. Point to Hide & Unhide under the Visibility area.**
- 4. Click Unhide Columns.**

Or

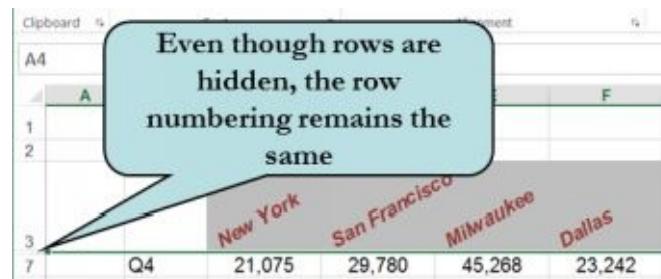
- 1. Select the columns to the left and right of the hidden one(s).**
- 2. Right-Click and choose Unhide from the pop-up menu.**

To unhide rows, follow these steps:

- 1. Select the rows above and below the hidden one(s).**
- 2. Click the Format button on the Cells group of the Home Ribbon.**
- 3. Point to Hide & Unhide under the Visibility area.**
- 4. Click Unhide Rows.**

Or

- 1. Select the rows above and below the hidden one(s).**
- 2. Right-Click and choose Unhide from the pop-up menu.**



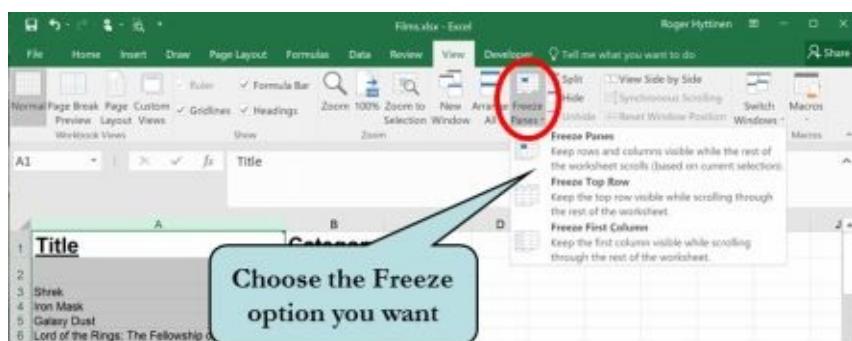
Freezing and Unfreezing Rows and Columns

If you have a large worksheet, you may wish to keep the data labels of your rows and/or columns in view as you scroll. To accomplish this, freeze rows and/or columns in place by using the Freeze Panes command on the View Ribbon. The frozen columns or rows will be bordered by a thin black line. When scrolling downward, any rows that are frozen will remain on the top of the screen in view as you scroll. Likewise, as you scroll to the right, any columns that are frozen will remain on the left of the screen in view as you scroll.



To freeze/unfreeze rows or columns in place, follow these steps:

1. Select the cell below the row(s) and/or to the right of the column(s) you wish to freeze.
2. Click the View tab on the Ribbon
3. Click the Freeze Panes icon and then click the option you want (Freeze Panes, Freeze Top Row or Freeze First Columns).

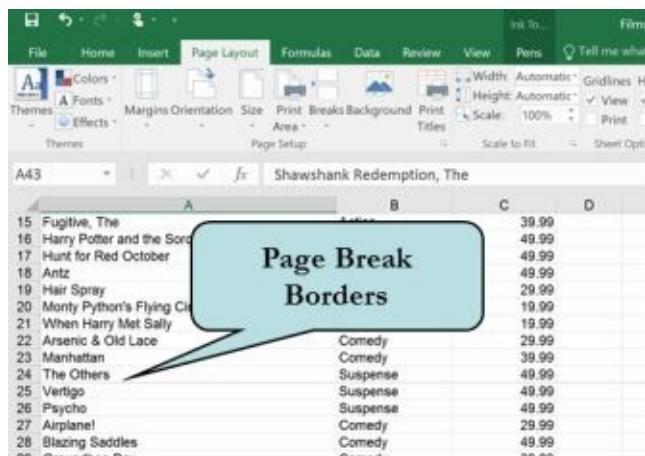


4. To unfreeze panes, click anywhere in your worksheet, click the Freeze Panes button and then click Unfreeze Panes.

Inserting and Removing Page Breaks

When the data in your worksheet does not fit on one printable page, Excel automatically inserts page breaks, dependent on the page setup of the document (margins, paper size, etc.). The automatic page breaks appear as dashed lines on the worksheet. In the example below, any data after column E and row 50 will print on a separate page. You can adjust these page breaks manually by displaying your worksheet in Page Break Preview and then adjusting the page break borders by dragging the thick page break borders to a new location.

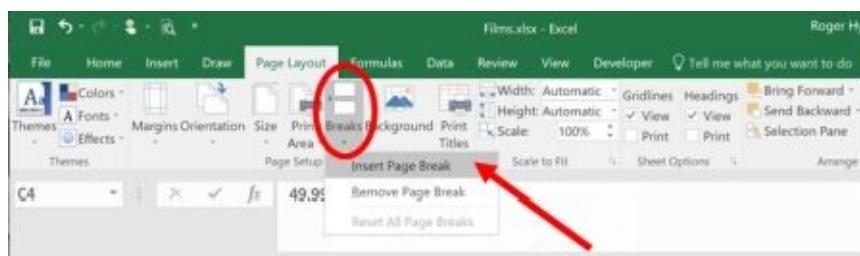
You can also insert a manual page break in your worksheet by clicking the Breaks button on the Page Layout tab and then choosing Insert Page Break from the menu. This will override the automatic page breaks.



	A	B	C	D
15	Fugitive, The		39.99	
16	Harry Potter and the Sorcerer's Stone		49.99	
17	Hunt for Red October		49.99	
18	Antz		49.99	
19	Hair Spray		29.99	
20	Monty Python's Flying Circus		19.99	
21	When Harry Met Sally		19.99	
22	Arsenic & Old Lace	Comedy	29.99	
23	Manhattan	Comedy	39.99	
24	The Others	Suspense	49.99	
25	Vertigo	Suspense	49.99	
26	Psycho	Suspense	49.99	
27	Airplane!	Comedy	29.99	
28	Blazing Saddles	Comedy	49.99	

Here's how to insert a manual page break:

- 1. Click any cell below the row where you wish to insert a manual page break.**
- 2. Click the Page Layout tab on the Ribbon.**
- 3. Click the Breaks button under the Page Setup group.**



- 4. Select Insert Page Break from the menu.**

Here's how to remove a manual page break:

- 1. Click the cell below the row where you inserted a manual page break.**
- 2. Click the Page Layout tab on the Ribbon.**
- 3. Click the Breaks button under the Page Setup group.**
- 4. Select Remove Page Break from the menu.**

Here's how to remove all manual page breaks:

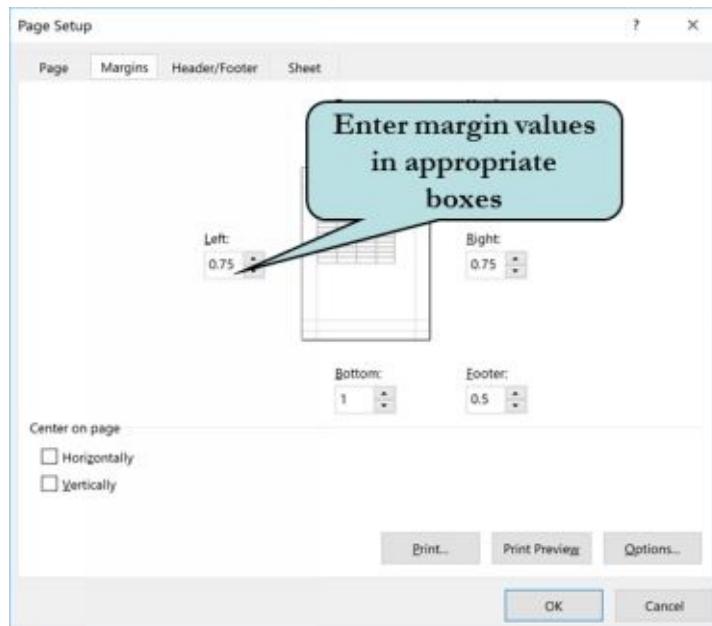
- 1. Click the Page Layout tab on the Ribbon.**
- 2. Click the Breaks button under the Page Setup group.**
- 3. Select Reset All Page Breaks from the menu.**

Chapter 5 - Page Setup and Printing

Adjusting Margins

Margins refer to the amount of white space between the text of the worksheet and the left, right, top and bottom edges of the page. Margins can also be thought of as page boundaries — once the text reaches the boundary of the margin, it wraps to the next line or the next page.

Keep in mind that changing the margins of your worksheet affects every page in the document – not just the active paragraph or page. To modify margins, click the Margins button on the Print Layout tab and make your selections.



Setting Custom Margins

Here's how to set standard margins:

1. Click the Page Layout tab on the Ribbon.
2. Click the Margins button and select Normal, Wide, Top or Narrow.



Here's how to create custom margins:

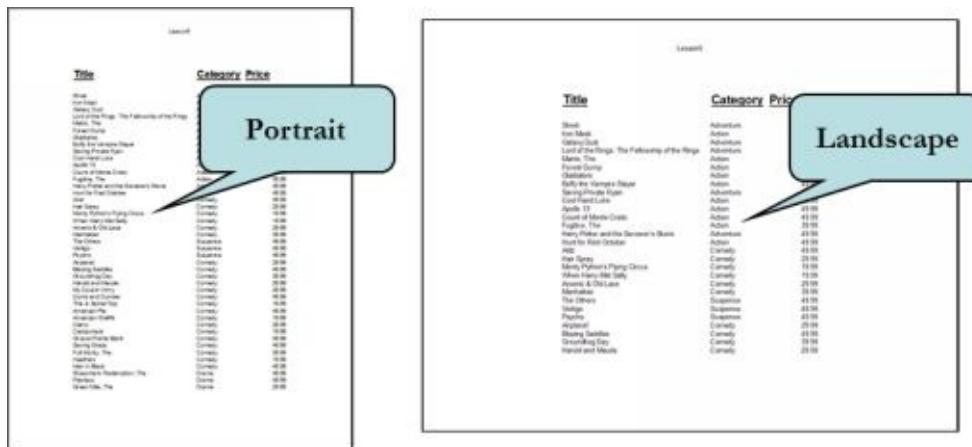
1. Click the Page Layout tab on the Ribbon.
2. Click the Margins button.

- 3. Click Custom Margins on the list to display the Page Setup dialog box.**
- 4. Enter the margin values (in inches) in the Top, Left, Bottom and Right boxes in the Margins area.**
- 5. If desired, click the checkbox next to Horizontally or Vertically to center your data on the page.**
- 6. Click OK when finished**

Tip: You can also display the Page Setup dialog box by clicking on the Page Setup Dialog Launcher. Click on the Margins tab to display margin options.

Setting Page Orientation

Microsoft Excel allows you to change the Page Orientation; that is to say, the orientation of text – either wide or long – on the page. There are two choices of orientation: Portrait which prints across the shortest width (taller than longer) of the paper and Landscape which prints across the longest width (longer than taller) of the paper.



To set page orientation, follow these steps:

1. Click the Page Layout tab on the Ribbon.
2. Click the Orientation button and select either Portrait or Landscape.



3. Click OK when finished

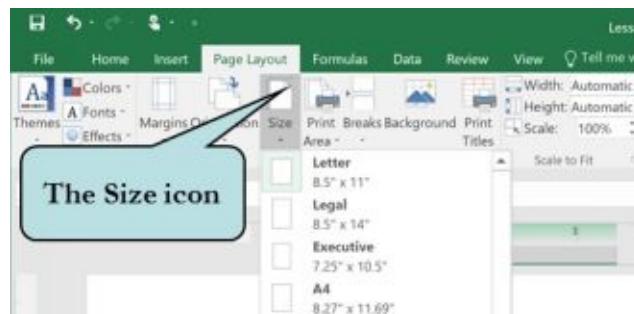
Or

1. Click Portrait or Landscape from the Margins tab of the Page Setup dialog box.

Setting Paper Size

You may not always be working with the standard paper size of 8 ½" x 11". Luckily, Microsoft Excel can print on many different paper sizes such as legal size (8 ½" x 14"), A4, A3, etc.

The default paper size in Microsoft Excel is 8 ½" x 11". This is the standard paper size in the United States for most documents.



Here's how to set standard paper size:

1. Click the Page Layout tab on the Ribbon.
2. Click the Size icon and select the desired paper size from the list.

Here's how to set a non-standard paper size:

1. Click the Page Layout tab on the Ribbon.
2. Click the Page Setup Dialog Launcher to display the Page Setup dialog box.



3. Click the Page tab.
4. Select the desired paper size from the Paper Size drop-down list.

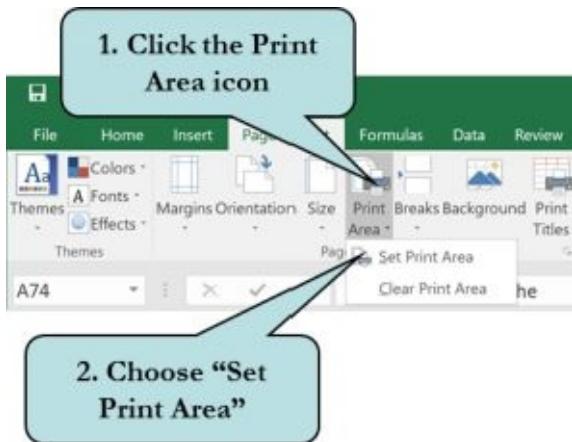


5. Select any paper source options.

6. Click OK when finished

Defining a Print Area

left to its own devices, Excel will print all the data that is in the currently active worksheet. You can however, force Excel to use a defined print area for the worksheet. Start by selecting the cell range that you want to print. Then, click the Print Area button under the Page Setup group on the Page Layout Ribbon and choose Set Print Area from the list.



If you wish to delete a print area, click the Print Area button and choose Clear Print Area.

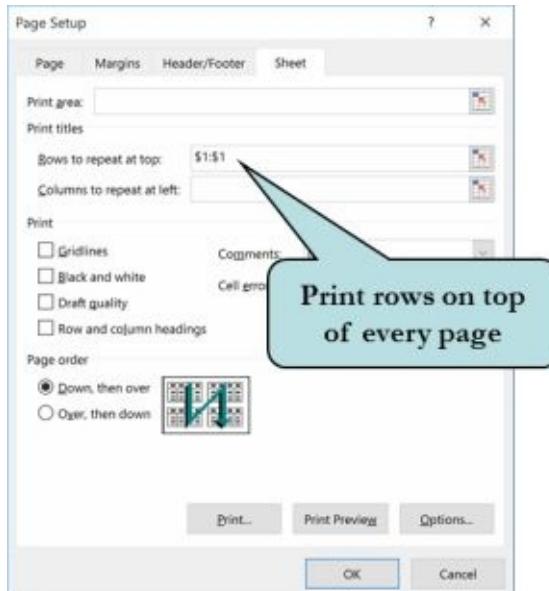
To define a Print Area, follow these steps:

- 1. Click the Page Layout tab on the Ribbon.**
- 2. Click the Print Area button and select Set Print Area from the list.**
- 3. To remove a print area, click the Print Area button and select Clear Print Area from the list.**

Tip: You can also add and remove a print area from the Sheet tab of the Page Setup dialog box.

Printing Worksheet Titles

If your worksheet spans several pages, you may wish to repeat one or more rows or columns as titles on each page. For example, if working with an income/expense statement, your first column might contain a category title with each month spanning to the right of your worksheet. You can set rows and columns to repeat on each page from the Sheet tab of the Page Setup dialog box.



To print rows or columns on every page, follow these steps:

1. Click the Page Setup Dialog Launcher on the Page Setup Ribbon

Or

Click the Print Titles button on the Ribbon.

2. Click the Sheet Tab if necessary.

3. Click in the Rows to Repeat at Top text box or in the Columns to Repeat at Left text box.

4. Click the Collapse Dialog Box button.



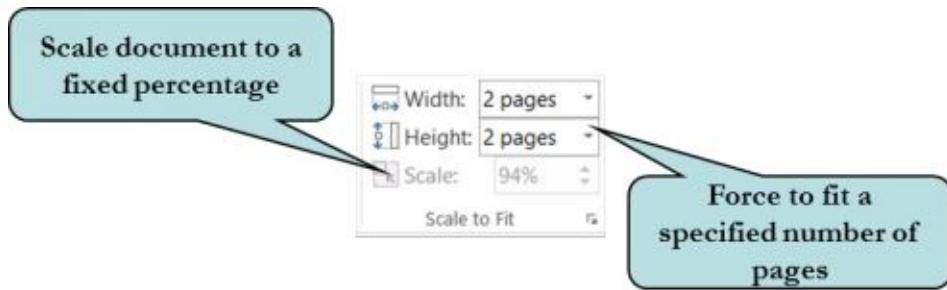
5. Select the row(s) or column(s) in your worksheet to be repeated.

6. Click the Display Dialog Box button to return to Page Setup Mode.

Note: You can also manually type in the range of the rows or columns to repeat in the appropriate box.

Forcing a Worksheet to Fit

If you want to reduce the size of data on a printout, you can use the Scale to Fit tools on the Page Layout Ribbon. This is especially helpful if your data spans more than one page in width or height and you wish to shrink it so that it fits on one page. Reducing the scale of your printout allows you to fit more rows and columns on each page. Be careful though – reducing the scaling too much can result in a printout that is unreadable.



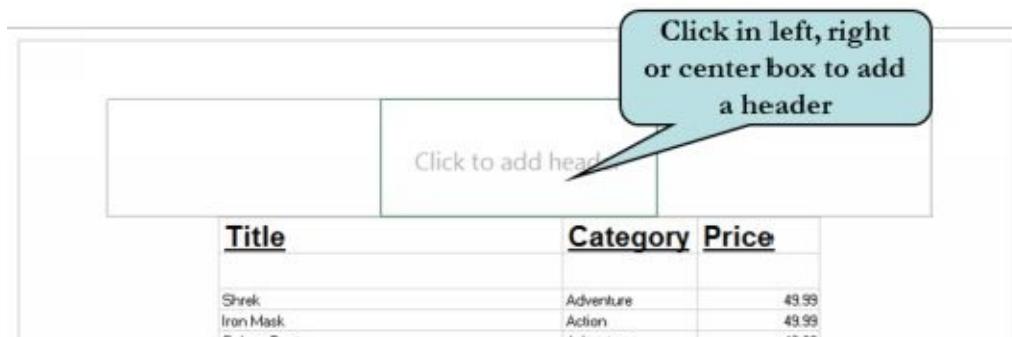
To force a worksheet to fit on a specified number of pages, follow these steps:

- 1. Click the Page Layout tab on the Ribbon.**
- 2. To scale the worksheet to fixed percentage, enter a value between 10 and 400 in the Scale box under the Scale to Fit group.**
- 3. To adjust the printout to a specific number of pages, click the Width and Height drop-down arrows and choose the desired number of pages.**

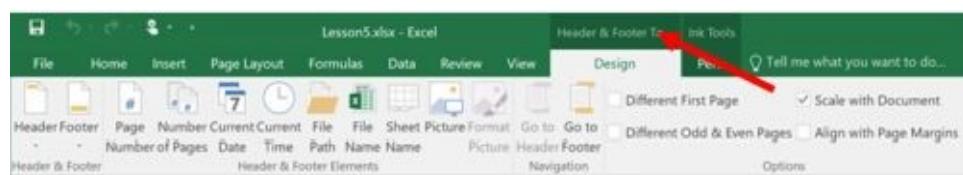
Tip: You can also set worksheet scaling from the Page tab of the Page Setup dialog box.

Inserting Headers and Footers

When you want to automatically print certain information on the top or bottom of every page, you can insert a Header or a Footer into your document. The information in the header section appears at the top of every printed page while the information in the footer section appears at the bottom of every printed page. If your worksheet contains more than one page, you should consider adding a header and/or footer. Creating a header or footer is accomplished by using the Header/Footer Tab of the Page Setup dialog box, from the Insert Ribbon or by directly clicking in the Header and Footer areas of your worksheet and entering in the desired information.



Excel comes with several pre-defined headers and footers (page numbers, current date, sheet name, file name, author, etc.) that you can add to your worksheets. If you prefer to add your own custom header or footer, click on the left, center or right side of the Header or Footer window and type in your custom text. The contextual Header and Footer Tools Ribbon contains its own set of icons which allow you to insert page numbers, insert total pages, insert the date and time, insert the file name, sheet name or file path, insert a picture from a file or format a picture.



Contextual Header & Footer Design Ribbon

Here's how to add a header or footer to a worksheet:

- 1. Switch to Page Layout view.**
- 2. Scroll to the top of any page of your worksheet until you see “Click to add header.” To add a footer, scroll to the bottom of any page of your worksheet until you see “Click to add footer.”**

A screenshot of an Excel spreadsheet showing the 'Click to add header' text circled in red. The spreadsheet has the same structure as the previous image, with columns for 'Title', 'Category', and 'Price', and data for 'Shrek' and 'Iron Mask'.

Title	Category	Price
Shrek	Adventure	49.99
Iron Mask	Action	49.99

- 3. Move your mouse pointer over the words “Click to add header” or “Click to add footer” until three boxes appear.**

Add header		
Title	Category	Price
Shrek	Adventure	49.99
Iron Mask	Action	49.99
Galaxy Dust	Adventure	49.99
Lord of the Rings: The Fellowship of the Rings	Adventure	49.99
Matrix, The	Action	49.99
Forest Gump	Action	49.99
All movies	All movies	49.99

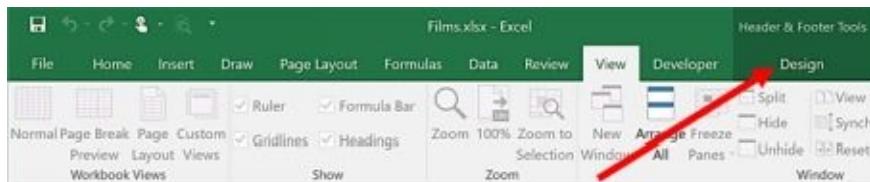
4. Click the left, right or center section boxes at the top or bottom of your worksheet, depending on where you want to add your header or footer information.

The diagram shows a table with a header row. Three callout boxes point to the header row: 'Left Section' points to the first column, 'Center Section' points to the middle column, and 'Right Section' points to the last column. The table contains data for various movies with columns for Title, Category, and Price.

Add header		
Title	Category	Price
Shrek	Adventure	49.99
Iron Mask	Action	49.99
Galaxy Dust	Adventure	49.99
Lord of the Rings: The Fellowship of the Rings	Adventure	49.99
Matrix, The	Action	49.99
Forest Gump	Action	49.99
All movies	All movies	49.99

5. Type your information in the desired box.

6. To view the Header and Footer Ribbon, click the contextual Design tab under Header & Footer tools.



7. To insert predefined elements such as page number, number of pages, current date or current time, click the icon on the contextual Design Ribbon for the element you want.

8. To insert a predefined header or footer, click the Header or Footer button on the Ribbon and choose the information you want to add from the list.

9. Click the Go to Header or Go to Footer icon to switch between the Header and the Footer.

10. To remove the header or footer from the first page, click the Different First Page checkbox on the Ribbon.

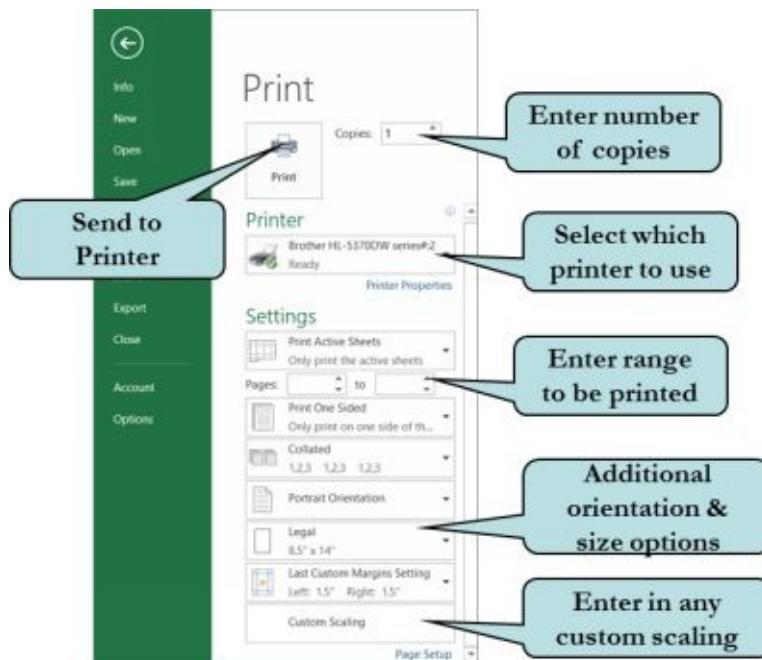
11. Click the Different Odd and Even Pages checkbox if you want a different header or footer for odd and even pages.

12. To close the header and footer window, click anywhere in your worksheet.

Tip: You can also jump to the Header or Footer area of your worksheet by clicking the Header & Footer button on the Text group of the Insert Ribbon.

Printing a Worksheet

Before you're finally ready to print your worksheet, you may first want to set some **Printer Options**. For instance, you may need to specify which printer to use, the number of copies to be printed, or even designate Excel to print only a specific page range of your document. Printer options you can set will vary, depending on the type of printer you are using.



To set printer options & to print a worksheet, follow these steps:

1. Click the **File tab** and then click **Print** on the **File Options** menu to display the **Print Options** pane

Or

Press the **Ctrl + P** keystroke combination.

2. If necessary, choose which printer to use from the **Printer** drop-down list.
3. Click the heading under **Settings** and choose **Print Active Sheets**, **Print Entire Workbook** or **Print Selection**.
4. To print a specific range, enter the page numbers in the **From** and **To** boxes.
5. To print more than one copy of a document, enter the value in the **Number of copies** box in the **Copies** area.
6. Click the **Print** icon to send the document to the printer.

Tip: To send a document directly to the printer without displaying the Print pane, click the Quick Print icon on the Quick Access toolbar. To add the Quick Print icon to the Quick Access toolbar, click the drop-down arrow and choose Quick Print from the list.

Chapter 6 - Formulas and Functions

Copying Formulas

Once you've created a formula, you'll no doubt prefer to copy and paste it across rows or columns, rather than reentering the formula manually into each cell. Using copy and paste, you can copy a formula to a large range of cells with a couple of keystrokes (or taps). Unlike using the fill handle, copy and paste allows you to paste formulas to non-adjacent cells. When you paste formulas, the cell references will automatically update depending on the type of cell reference – Relative, Absolute or Mixed.

Here's how to copy a formula using Copy and Paste:

- 1. Select the cell that contains the formula you want to copy.**
- 2. Click the Copy icon on the Home Ribbon**

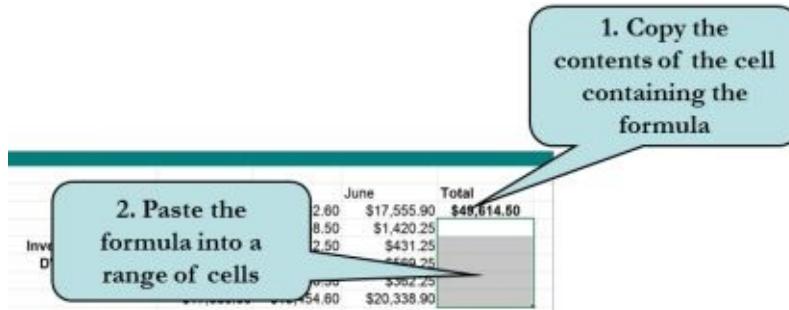
Or

Right-click and choose Copy from the contextual menu.

- 3. Highlight the range of cells where you want to paste the formula.**
- 4. Click the Paste icon on the Home Ribbon**

Or

Right-click and choose Paste from the contextual menu.



Here's how to copy a formula to adjacent cells using the Fill Handle:

- 1. Select the cell that contains the formula you want to copy.**
- 2. Move your mouse pointer over the fill handle on the lower-right corner of the cell. Your cursor will transform into a black cross.**
- 3. Click and drag downward to fill the desired cell range. Release the mouse button.**

April	May	June	Total
\$15,266.00	\$16,792.60	\$17,555.90	\$49,614.50
\$1,235.00	\$1,358.50	\$1,420.25	
\$375.00	\$412.50	\$431.25	
\$495.00	\$544.50	\$569.25	
\$315.00	\$346.50	\$362.25	
\$17,686.00	\$19,454.60	\$20,338.90	

1. Click on the fill handle

2. Click and drag downward to copy the formulas to an adjacent cell range

Relative References

As we have seen previously, when you copy a formula to a new location, the formula automatically adjusts to its new location. For example, suppose you have the following formula in cell D3:

=B3 * C3

If you copy this formula down to cell D4, Excel will automatically change this formula to read:

=B4 * C4

This is called a Relative Cell Reference. When a formula is copied to a new location, it will reference the new cells based on their relative location to the original cells containing the formula. Relative Cell References are the default type of references in Excel.

Absolute References

There are times when you do not want the cell reference to change when you copy or move cells to a new location. In such a case, you would need to enter the cell reference as an Absolute Reference. An absolute reference does not change when it is copied or moved to a new location – it always refers to the same cell address. Absolute cell references are preceded by a \$ (dollar sign) in front of both the column reference and the cell reference.

As an example, suppose we have the following formula in cell D3:

=B3 * \$C\$3

If you copy this formula down to cell D4, you would have:

=B4 * \$C\$3

The first part of this formula (B4) is a relative cell reference, which automatically adjusts to its new location. The second part of the formula (\$C\$3) or the absolute cell reference does not change after being copied — it still refers to the original cell location of C3.

Mixed References

You can also use a combination of Absolute and Relative cell references in your formulas. This is called a Mixed Reference. You have the choice of making either the column or the row absolute, such as \$D3 (column is absolute, row is relative) or F\$6 (column is relative, row is absolute). The row or column preceded by the \$ (the absolute reference) will not change when copied or moved, whereas the row or column reference not preceded by the \$ (the relative reference) automatically adjusts to its new location.

As an example, suppose you have the following formula in cell D3:

=\$B3 * C3

If you copy this formula down to cell E4 (one column to the right and one row down), you would have:

=\$B4 * D4

The \$B4 portion of the formula contains a Mixed Reference — the row adjusts automatically to the new location (from row 3 to row 4) but the column address continues to reference column B.

The MIN, MAX, COUNT and AVERAGE Functions

In an earlier lesson, you learned how to enter the SUM function using the AutoSum button. There are also several other functions available using the AutoSum feature. These are:

SUM: Totals the values in a selected range

AVERAGE: Computes the average of the values in a selected range

MIN: Returns the lowest value in a selected range

MAX: Returns the highest value in a selected range

COUNT NUMBERS: Totals the number of cells with values in a selected range

To enter additional functions using AutoSum, follow these steps:

- 1. Select the cell or range of cells where you want the formula to be inserted.**
- 2. Click the arrow to the right of the AutoSum button on the Editing group of the Ribbon.**
- 3. Choose the desired function.**



Available AutoSum Aggregate Functions

- 4. If the cell range that Excel chooses is not the desired range, drag over the range to be included in the formula.**
- 5. Press the Enter key to verify the formula.**

Entering Functions Manually

In addition to using the AutoSum button for the above functions, you can also type in these functions manually, directly into the desired cell. The format is:

=Function name, cell range surround by parenthesis.

For example, if you wanted to find the Average for the cell range B3 to B8, you would enter the following formula in cell B9:

=AVERAGE(B3:B8)

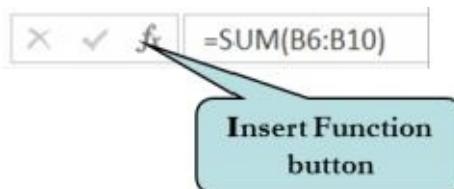
To include non-contiguous cells in the formula, separate each cell or cell range by a comma. For example, if you wanted to find the Average for cells B3:B8, D3:D8 and cell F5, the formula would read:

=AVERAGE(B3:B8, D3:D8, F5)

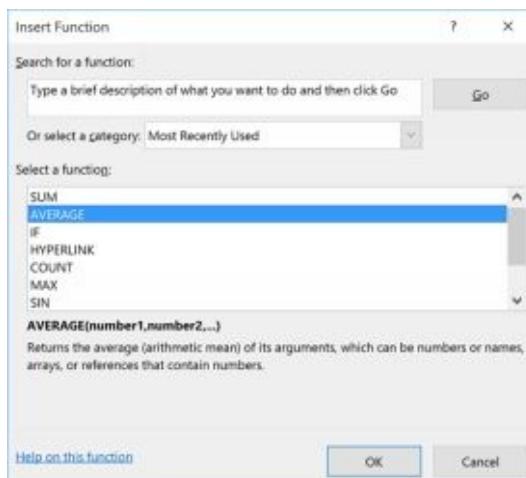
The Insert Function Button

In addition to the five functions discussed in the last section, there are many other pre-defined functions available to you in Excel – financial functions, logical functions, date and time functions and statistical functions, just to name a few of the available categories.

To access Excel's pre-defined functions, click the Insert Function button located to the left of the Formula Bar or on the Function Library group of the Formulas Ribbon. The Insert Function dialog box allows you to choose from a wide array of handy functions.



Once you have chosen the desired function, the Function Arguments dialog box opens, prompting you for each required (or optional) argument. You can type the cell address directly into the argument boxes or you can click the Collapse Dialog Box button and manually select the cell or cell range to be included in the arguments.



Insert Function dialog box

Here's how to enter a function using the Insert Function feature:

1. Click the Insert Function Button to the left of the Formula Bar

Or

Click the Insert Function Button on the Formulas Ribbon.

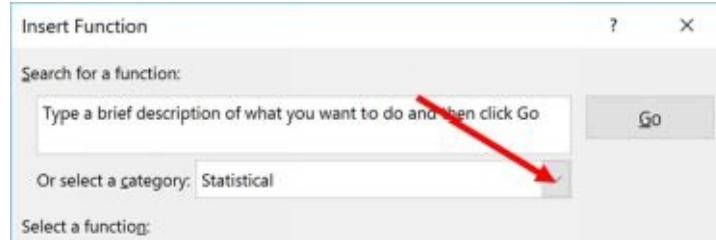
Or

Click the arrow on the AutoSum button and select More Functions.

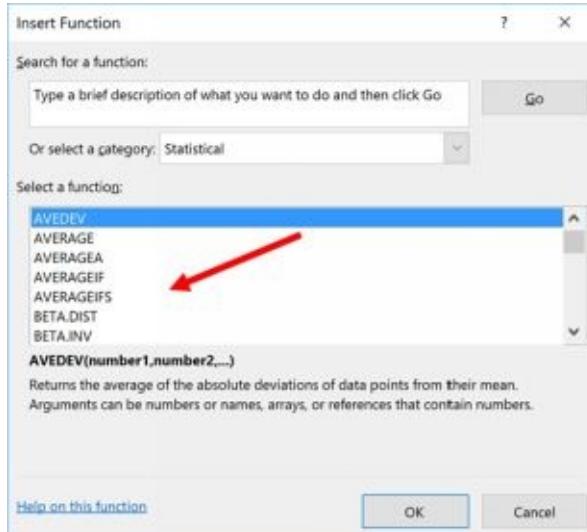
Or

Press the Shift + F3 keystroke combination.

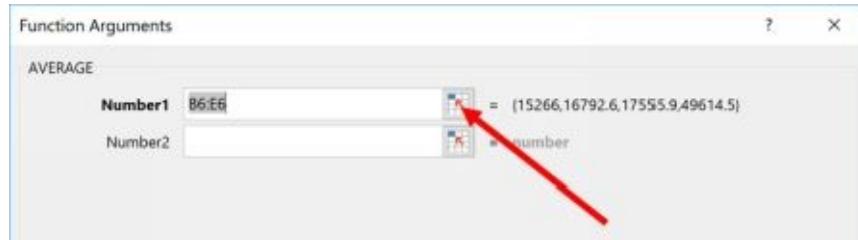
2. Select a Function Category from the Category combo box.



3. Select a function from the Select a Function list box.



4. Click the Collapse Dialog Box button to select the cell or cell range for the arguments (or type in the arguments manually in the argument text boxes).



5. Click the Display Dialog Box to return back to the Function Arguments dialog box.

6. Click OK.

Chapter 7 - Using a Formula to Join the Contents of Multiple Cells

Combine Cells using the Ampersand

Excel allows you to quickly combine (or concatenate) the contents of two or more cells into a new cell. There are a few different methods for doing this. The first one we are going to look at is using an **ampersand**.

To combine the contents of two or more cells, separate each cell in the formula with an ampersand (&). For instance, if cell A1 contained the text *John* and cell B1 contained the text *Smith*, you can join them with the following formula:

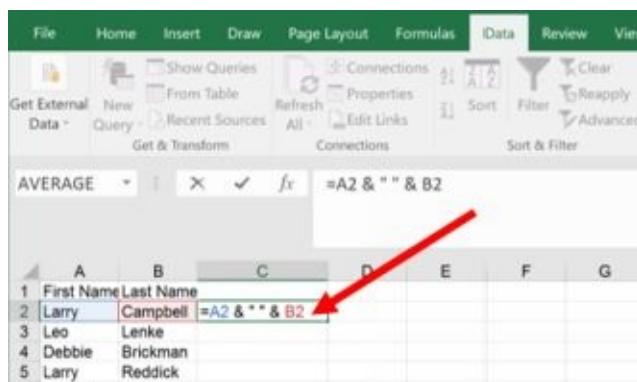
=A1&B1

However, the result will be: *JohnSmith*

This is perhaps not quite what we want. The combining of the two cells neglected to add an intervening space between the names. To add a space between the two words, tap the spacebar to add a blank space surrounded by quotations, followed by an ampersand:

=A1 & " " & B1

This will return: *John Smith.*



A	B	C	D	E	F	G
1	First Name	Last Name				
2	Larry	Campbell	=A2 & " " & B2			
3	Leo	Lenke				
4	Debbie	Brickman				
5	Larry	Reddick				

Let's say you want to combine two cells, one containing the city (Chicago) and one containing the state (IL). In this case, you'll want to add a comma and a space to the formula, to obtain the result: Chicago, IL. The resulting formula would be:

=A1 & ", " & B1

Once you've entered in the formula, use the fill handle to drag the formula into the rows below, for as many entries as there are.

File Home Insert Draw Page Layout Formulas Data Review View Developer Tell me what you want to do

Paste Arial 10 A A Wrap Text General

B U Font Alignment Number Styles Cells

C2 =A2 & " " & B2

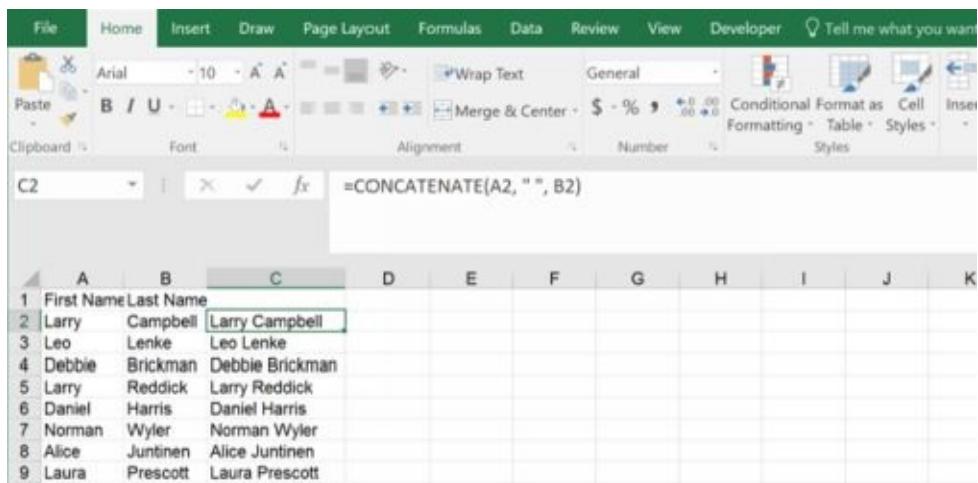
	A	B	C	D	E	F	G	H	I	J	K	L
1	First Name	Last Name										
2	Larry	Campbell	Larry Campbell									
3	Leo	Lenke	Leo Lenke									
4	Debbie	Brickman	Debbie Brickman									
5	Larry	Reddick	Larry Reddick									
6	Daniel	Harris	Daniel Harris									
7	Norman	Wyler	Norman Wyler									
8	Alice	Juntinen	Alice Juntinen									
9	Laura	Prescott	Laura Prescott									
10	Thomas	Henderson	Thomas Henderson									
11	Ann	Wittier	Ann Wittier									
12	Jenny	Wilks	Jenny Wilks									
13	Charles	Bandino	Charles Bandino									
14	Jaime	Rickman	Jaime Rickman									
15	James	Loomis	James Loomis									
16	David	McBride	David McBride									
17	Mona	Fielen	Mona Fielen									

Use the fill handle to drag the formula into the rows below

Combine cells using the CONCATENATE Function

If you don't want to mess around with ampersands, there's another way to join the contents of cells and that's using the Concatenate function. Instead of an ampersand separating the different entries, use a comma instead. So using the example above, to combine cells A1 and B1, you would use the following formula:

=CONCATENATE(A1, " ", B1)



The screenshot shows a Microsoft Excel spreadsheet. The ribbon at the top has tabs for File, Home, Insert, Draw, Page Layout, Formulas, Data, Review, View, Developer, and a 'Tell me what you want' search bar. The 'Home' tab is selected. The font group on the ribbon shows 'Arial' and '10'. The alignment group shows 'Wrap Text' and 'General'. The styles group includes 'Conditional Format as Table' and 'Cell Styles'. The formula bar shows the formula =CONCATENATE(A2, " ", B2). The main area displays a table with columns A, B, and C. Column A contains first names, column B contains last names, and column C contains the concatenated result. Row 1 is a header row with 'First Name' and 'Last Name'. Rows 2 through 9 show data points.

	A	B	C	D	E	F	G	H	I	J	K
1	First Name	Last Name		D	E	F	G	H	I	J	K
2	Larry	Campbell	Larry Campbell								
3	Leo	Lenke	Leo Lenke								
4	Debbie	Brickman	Debbie Brickman								
5	Larry	Reddick	Larry Reddick								
6	Daniel	Harris	Daniel Harris								
7	Norman	Wyler	Norman Wyler								
8	Alice	Juntinen	Alice Juntinen								
9	Laura	Prescott	Laura Prescott								

Using our city and state example, complete with a comma separator, the formula would read:

=CONCATENATE(A1, " , " , B1)

Combine cells using the CONCAT Function

The CONCAT function was recently introduced into Excel 2016 and is designed to replace the CONCATENATE function. It works similarly to the CONCATENATE function but it also allows you to combine the text from multiple ranges and/or strings. For instance, you can combine one cell range with another, such as:

=CONCAT(A1:E1)

A screenshot of Microsoft Excel showing the formula bar with the formula =CONCAT(A2:C2) and the worksheet area below. The worksheet contains four rows of data. Row 1 has headers 'Area Code' (A1), 'First 3' (B1), and 'Last 4' (C1). Rows 2 through 4 contain numerical values: Row 2 (414, 322, 5555), Row 3 (906, 482, 9722), and Row 4 (555, 972, 7806). The formula is applied in cell E2, resulting in the concatenated string '4143225555'. The formula bar shows the full formula =CONCAT(A2:C2).

	A	B	C	D	E	F	G	H
1	Area Code	First 3	Last 4		Number:			
2	414	322	5555		4143225555			
3	906	482	9722					
4	555	972	7806					
5								

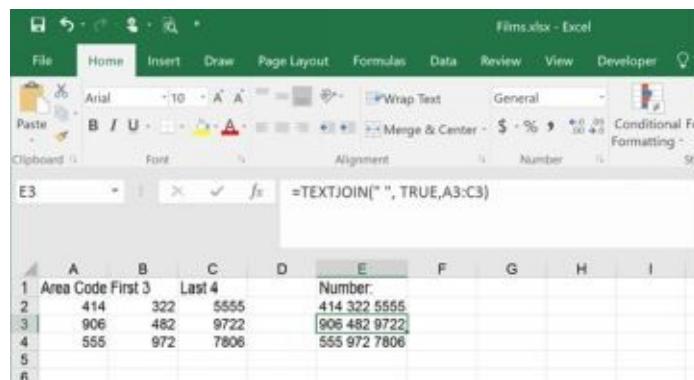
You can also use it just like you did with the CONCATENATE function:

=CONCAT(A1, " ", B1)

Joining Text with the TEXTJOIN Function

Another new addition to Excel is the TEXTJOIN Function, This combines the text from multiple ranges (or strings), and includes a delimiter that you specify between each value that will be combined. The Arguments for this function are:

TEXTJOIN(delimiter, ignore_empty, Cell Range)



The screenshot shows an Excel spreadsheet titled "Films.xlsx - Excel". The formula bar at the top displays the formula =TEXTJOIN(" ", TRUE,A3:C3). The main worksheet contains four rows of data. Row 1 has headers "Area Code First 3" and "Last 4". Rows 2 through 4 contain numerical values: Row 2 (414, 322, 5555), Row 3 (906, 482, 9722), and Row 4 (555, 972, 7806). To the right of the data, there is a column labeled "Number:" followed by the concatenated results: "414 322 5555", "906 482 9722", and "555 972 7806".

The first argument is the delimiter you want to use. If you wanted to add a space between cells, then type: “ ” The second argument is the ignore_empty. If you want the formula to ignore empty cells, type: TRUE.

The last argument indicates the items that are to be joined. This could be non-adjacent cells (A2, B4, C4, J31) or a cell range (A3:E3).

So if cell A1 contained the text *John* and cell B1 contained the text *Smith* and you wanted a space between them, you can join them with the following formula:

=Text Join(" ", TRUE, A1:B1)

Pasting as Values

Once you've combined your cells using a formula, you may decide that you no longer need the original data. However, if you delete those cells (the ones referenced in your formula), you will get the #REF! error.

A	B	C	D
1	Number:		
2	#REF!		
3	#REF!		
4	#REF!		

The way to remove the formulas from cells but retain their values is to use the **Paste as Values** command. This comes in handy when you only need to calculate a formula once but want to save the result of the calculation.

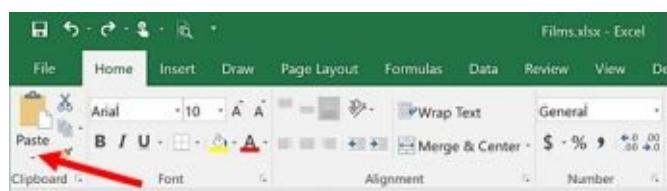
To Paste as Values, follow these steps:

1. Select the range of formulas whose values you want to retain.
2. Press the Ctrl + C keyboard combination

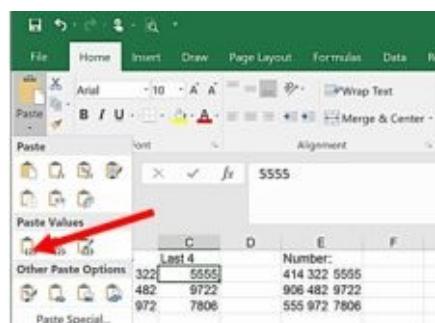
Or

Click the Copy icon on the Home Ribbon.

3. With the range still selected, click the drop-down arrow on the Paste icon

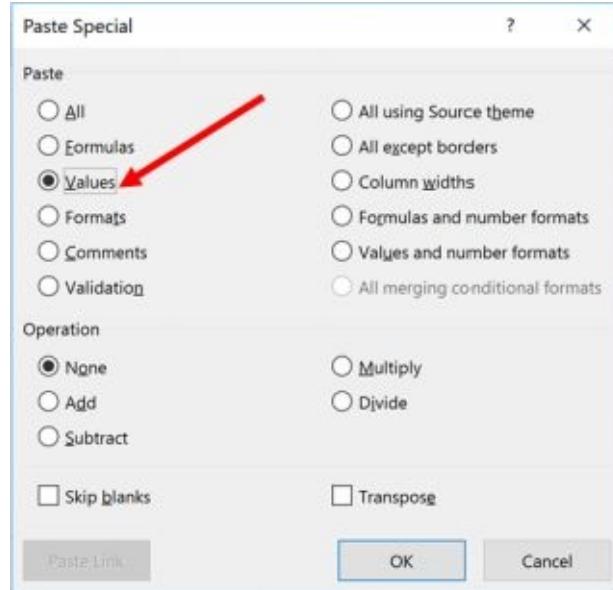


4. Click the first icon under the Paste Values area.



Or

Click **Paste Special** from the Paste arrow list and click the radio button next to **Values**. Click OK.



Chapter 8 - Modifying Workbooks

Adding and Deleting Worksheets

When creating a new workbook, Excel provides you with one default worksheet named Sheet 1. To insert additional worksheets, use the New Sheet icon at the end of the sheet tabs. Excel will insert a new worksheet at the very end of the sheet tab. To specify where you want to insert a new sheet, click on the worksheet tab of the sheet to the left of which you want to insert a new sheet, right-click on the active sheet tab and then choose Insert from the contextual menu.

To delete a worksheet, click the Delete arrow on the Home Ribbon and choose Delete Sheet. Excel will delete the active worksheet.



To Insert a new worksheet, follow these steps:

1. Click the New Sheet icon at the end of the sheet tabs

Or

Right-click on the sheet tab to the left of which you want to insert a new sheet and then choose Insert from the contextual menu. Click the Worksheet icon and click OK.

Or

Click on the sheet tab to the left of which you want to insert a new sheet and then press Shift + F11

Or

Click on the sheet tab to the left of which you want to insert a new sheet, click the Insert button on the Cells group of the Home Ribbon and choose Insert Sheet from the menu.

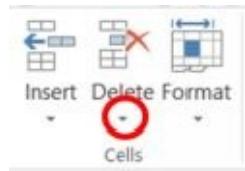
To Delete a worksheet, follow these steps:

1. Click on the tab of the sheet to be deleted.

2. Click the Delete arrow on the Home Ribbon and choose Delete Sheet

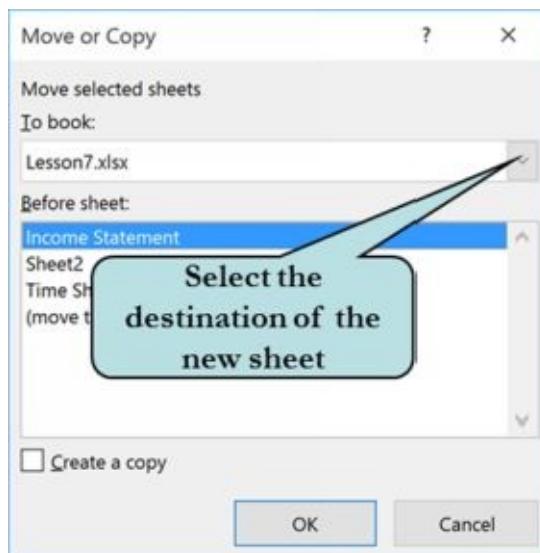
Or

Right-Click on the tab of the sheet you wish to delete and then choose Delete from the contextual menu.



Copying Worksheets

You can copy an entire worksheet in Excel, including all of its data and formatting by using the Move or Copy Sheet command from the menu. Excel provides a sequential number after the worksheet name to allow you to distinguish between the new sheet and the original sheet. For example, if you copied a sheet named June Sales, the new copied sheet would be named June Sales (2). You can copy a worksheet to any workbook that is open, to the current workbook or to a new workbook file. You can also copy a worksheet manually by pressing and holding the Ctrl key and then dragging the worksheet tab with your mouse to the new location.



To copy a worksheet, follow these steps:

- 1. Click on the Worksheet tab of the sheet you wish to copy.**
- 2. Right-click and choose Move or Copy from the contextual menu.**

Or

Click the Format button on the Home Ribbon under the Cells group and choose Move or Copy Sheet under the Organize Sheets category.

- 3. Select the Workbook into which you wish you copy the worksheet (the default is the current workbook).**
- 4. Select the location of the new sheet in the Before Sheet list box.**
- 5. Click the check box next to Create a Copy to copy the worksheet rather than move it.**
- 6. Click OK.**

Or

- 1. Hold down the Ctrl key and then drag with your mouse to the desired location.**

Renaming Worksheets

Excel by default provides the generic names of Sheet 1, Sheet 2 and Sheet 3, etc. to worksheets. To rename a worksheet, double-click on the tab of the worksheet to receive the new name and then type in the desired new name. Another way to rename a worksheet is to right-click on the worksheet tab, select Rename from the contextual menu, and then type the new name.

To rename a worksheet, follow these steps:

- 1. Double-click on the worksheet tab of the sheet to be renamed.**

Or

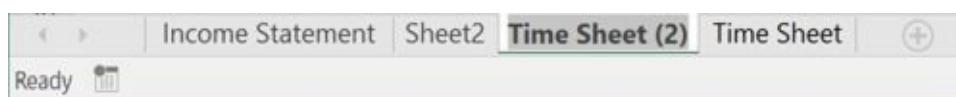
Right-click on the worksheet tab of the sheet to be renamed and then choose Rename from the contextual menu.

Or

Click the Format button on the Home Ribbon under the Cells group and choose Rename Sheet under the Organize Sheets category.

- 2. Type the new name.**

- 3. Press Enter.**



Type in new name when sheet tab is highlighted

Repositioning Worksheets

After you begin creating worksheets in your workbook, you may decide that the worksheets are not in the order that you would like. You can rearrange them by clicking the tab of the worksheet you want to move and then dragging it to the new location. As you drag, a small black arrow appears marking the new location of the sheet should you release the mouse button.

Here's how to reposition a worksheet:

- 1. Click and hold the left mouse button on the tab of the worksheet you wish to move.**
- 2. Drag the worksheet to the new location.**
- 3. Release the mouse button.**

Tip: You can also move worksheets from the Move or Copy dialog box.

Grouping Worksheets

Excel allows you to work on several worksheets simultaneously by grouping them together. When worksheets are grouped, any formatting, data entry or changes you make to the active sheet are made to every sheet in the group. Grouping sheets is a quick way to apply formatting to or delete several sheets at once. When multiple worksheets are grouped together, [Group] appears in the title bar on top of the worksheet window.

Here's how to group sheets:

- 1. Click the tab of the first worksheet in your group.**
- 2. Hold down the Ctrl key and then click the tabs of any additional sheets you want to include in your group.**
- 3. To group all worksheets, right-click on any worksheet tab and choose Select All Sheets from contextual menu.**

Here's how to ungroup sheets:

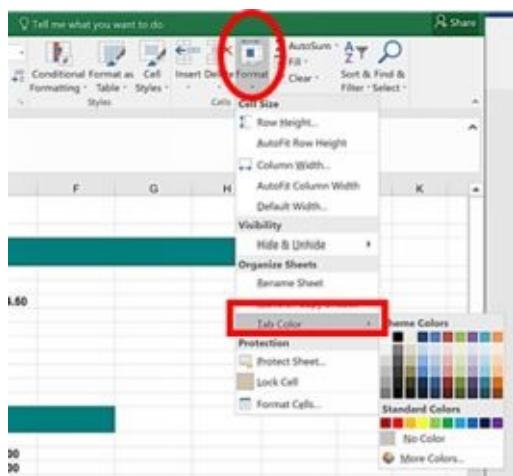
- 1. Click the tab of any worksheet not in your group**

Or

Right-click the tab of any grouped worksheet and select Ungroup Sheets from the pop-up menu.

Changing Worksheet Tab Colors

Excel provides the option of applying colors to your worksheet tabs. This can be useful if you have a large workbook comprised of many worksheets. You might want to give each worksheet in a particular group a separate color. The tab color only appears when the worksheet is not the active worksheet.



Here's how to change the tab color of your worksheets:

1. Select the tab of the worksheet or worksheets to which you wish to apply a color.
2. Click the Format button on the Home Ribbon under the Cells group and choose Tab Color under the Organize Sheets category.

Or

Right-click on the tab for the worksheet or worksheet group and then choose Tab Color from the contextual menu.

3. Choose a color from the Format Tab Color Palette.

Here's how to remove tab color:

1. Select the tab of the worksheet or worksheets whose color you wish to remove.
2. Click the Format button on the Home Ribbon under the Cells group and choose Tab Color under the Organize Sheets category.

Or

Right-click on the tab of the worksheet or worksheet group and then choose Tab Color from the pop-up menu.

3. Choose No Color from the Format Tab Color Palette.

Using 3-D Formulas & References

When you need a formula which references data from several worksheets, you create a 3-D Formula. A 3-D Formula uses 3-D References; that is to say, references to cells in a different worksheet. To create a 3-D Reference, the format is:

'Sheet Name'!Cell Name

For example, suppose we have three sheets named 2013, 2014 and Yearly Totals. In the Yearly Totals sheet, we want to calculate the sum of the values in cell C18 from both the 2011 and 2012 sheets. Thus, our formula in the Yearly Totals worksheet would be:

=‘2013’!C18 + ‘2014’!C18

To use a function such as SUM, AVERAGE, etc. in our 3-D formula, the format is:

=SUM(‘Sheet1:Sheet2’!C12:C35)

You can create your 3-D formula yourself by typing it into the cell or you can manually select the appropriate worksheets and cells to include in your formula.

To create a 3-D Formula, follow these steps:

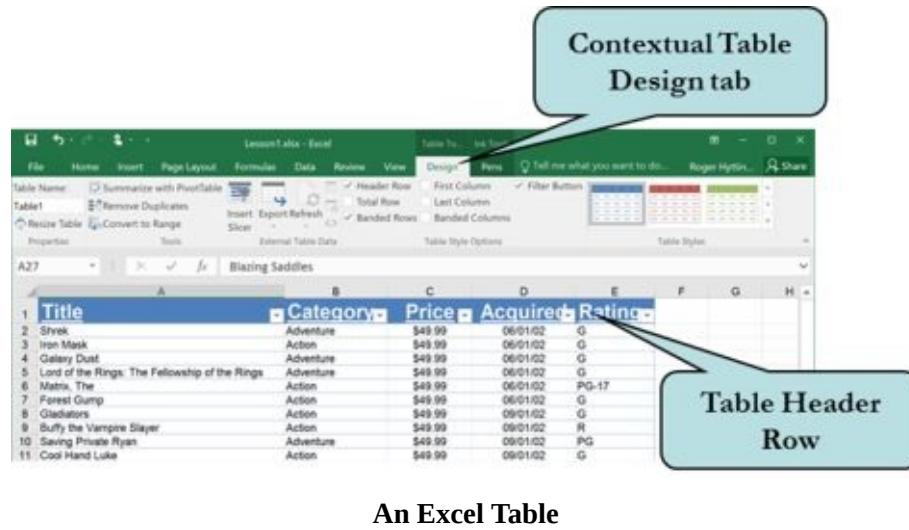
- 1. In the cell where you want your formula to display, type = and the beginning of the formula, such as: =Sum(**
- 2. Group the worksheets whose data you will include in the formula if the data is in the same cell address in each worksheet.**
- 3. Select the cell or cell range to include in the formula.**
- 4. Type the remainder of the formula if applicable and press Enter.**

Chapter 9 - Working with Tables

Creating a Table

In Excel 2016, an organized, related consecutive collection of data in rows and columns is called a **Table** (referred to in older versions of Excel as “Lists”). Entering your data in table format allows you to easily sort, analyze, format and manage your data later.

Excel uses column labels in the first row of your table. If you do not designate the first row as a column heading, Excel will insert a generic header row with the titles Column 1, Column 2, etc.



An Excel Table

When your data is converted to a table, you can easily sort your table data any way you wish, filter your data to display only those records that meet a specific criterion, and quickly apply formatting to the table. As soon as your data is converted to a table, the contextual Table Tools tab is displayed, under which you can access the Design Ribbon. From the Design Ribbon, you can apply formatting with one click from the Table Styles Gallery.

Some things to keep in mind when creating Excel tables:

- Each column should contain a column heading (field names)
- There should be no spaces between the column heading and the first row of data
- There should be no spaces between the rows or columns in the data range
- Separate other data not related to the list by blank rows or columns

To create an Excel table, follow these steps:

1. Click anywhere within a range of consecutive data that is to make up your table.

Or

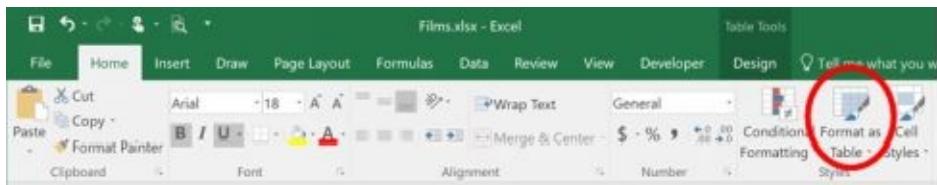
Select the cell range that is to make up your table.

2. Click the Insert Tab on the Ribbon and click the Table button

Or

Click the Format as Table button on the Home Ribbon and then choose a table style

(don't worry – you can change the style later if you choose).



3. If your table contains column headings, click the My Table has headers checkbox.
 4. If the cell range indicated in the Format as Table or Create Table dialog box is not correct:
 - a. Click the Collapse Dialog box button.
- The dialog box has a title bar 'Format As Table' and a close button 'X'. Below it is a question 'Where is the data for your table?' followed by a text input field containing the cell range '=\\$A\\$1:\\$E\\$128'. Underneath is a checked checkbox labeled 'My table has headers'. At the bottom are two buttons: 'OK' and 'Cancel'. A callout bubble with the text 'Collapse Dialog button' points to the bottom-left corner of the dialog box.
- b. Select the correct cell range.
 - c. Click the Expand Dialog box button.
5. Click OK.

Enter Data into a Table

In older versions of Excel, the final row of your table was referred to as the insert row, into which you would add records to your table. Now, you simply enter new data in the **first row beneath the table**. The table will automatically expand to include your new row of data.

123 Starship Troopers	Sci-Fi	\$49.99	1/14/2003	G
124 Planet of the Apes	Sci-Fi	\$49.99	1/14/2003	G
125 Rollerball	Sci-Fi	\$49.99	1/14/2003	PG-17
126 Mission to Mars	Sci-Fi	\$49.99	1/14/2003	PG
127 Highlander	Sci-Fi	\$29.99	1/14/2003	PG
128 Virus	Sci-Fi	\$49.99	1/14/2003	PG
129				
130				
131				
132				

You can also insert a new row anywhere within your table. The table range will automatically expand to accommodate the new row.

When working in a large table with many rows of data, it is not necessary to freeze the heading row as you scroll through your worksheet. Anytime a cell within your table is activated, the columns headings (A, B, etc.) are replaced by your table headings on top of your screen.

Title	Category	Price	Acquired	Rating
109 Spiderman	Action	\$49.99	11/22/2002	PG
110 Batman	Action	\$49.99	11/22/2002	PG
111 It Came From Outer Space	Sci-Fi	\$49.99	11/22/2002	C
112 Jurassic Park	Action	\$49.99	11/22/2002	PG
113 Terminator	Action	\$49.99	11/22/2002	PG
114 Mad Max	Sci-Fi	\$49.99	11/22/2002	PG
115 Star Wars 1	Sci-Fi	\$49.99	11/22/2002	PG
116 Galaxy Quest	Sci-Fi	\$49.99	11/22/2002	PG
117 Time After Time	Sci-Fi	\$49.99	1/14/2003	G
118 Last Starfighter, The	Sci-Fi	\$49.99	1/14/2003	G
119 Bicentennial Man	Sci-Fi	\$49.99	1/14/2003	G
120 Hobbit, The	Sci-Fi	\$49.99	1/14/2003	G
121 Titan A.E.	Sci-Fi	\$49.99	1/14/2003	G
122 Impostor	Sci-Fi	\$49.99	1/14/2003	G
123 Starship Troopers	Sci-Fi	\$49.99	1/14/2003	G
124 Planet of the Apes	Sci-Fi	\$49.99	1/14/2003	G
125 Rollerball	Sci-Fi	\$49.99	1/14/2003	PG-17
126 Mission to Mars	Sci-Fi	\$49.99	1/14/2003	PG
127 Highlander	Sci-Fi	\$29.99	1/14/2003	PG
128 Virus	Sci-Fi	\$49.99	1/14/2003	PG
129 Sleepy Hollow				

Deleting Rows and Columns

If you no longer need a column or a row of data in your table, you can easily remove it by selecting the row or column you wish to remove and then clicking the Delete button on the Home Ribbon. The table range automatically adjusts to reflect the deleted item.

If you wish to simply clear the data from a row or column (and not the row or column itself), select the row or column and then press the Delete key on your keyboard.

Here's how to delete a row or column from a table:

- 1. Click the Home tab on the Ribbon.**
- 2. Select the row or column heading for the row or column you want to delete.**
- 3. Click the Delete button on the Cells group on the Ribbon.**

Formatting a Table

Excel provides several predefined table styles (previously called quick styles) that you can use to quickly and easily format a table. Table styles include professional looking combinations of fill colors, fonts, borders, font colors and patterns. If none of the predefined table styles meets your needs, you can create your own custom styles.

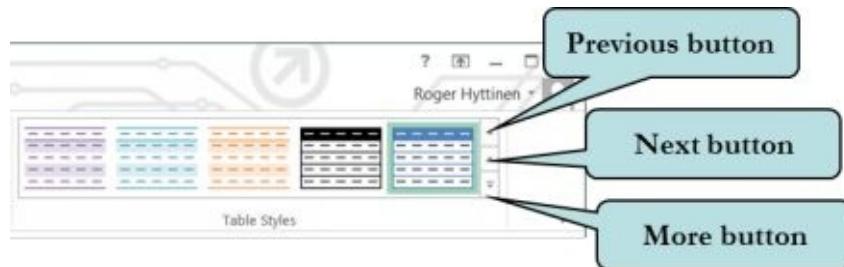


Table Styles are found on the contextual Design tab under Table Tools. The Ribbon displays only a few of the available styles. To scroll the style gallery, click the previous or next buttons. To display the entire table gallery, click the More button.

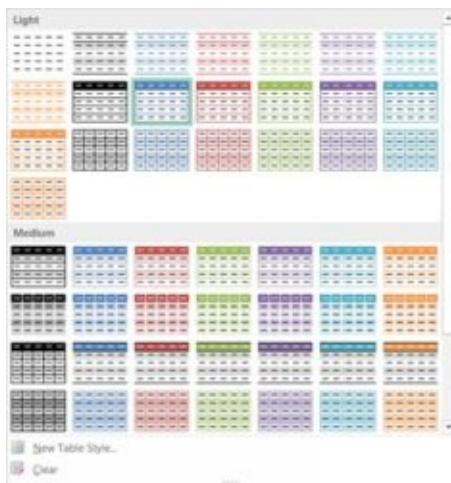


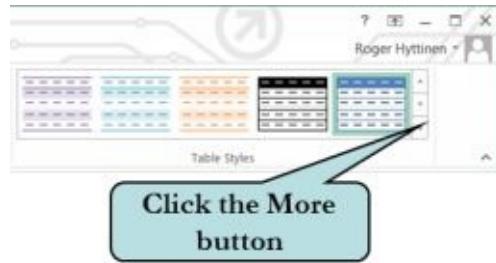
Table Styles Gallery

You can further modify the formatting of your table by modifying table style options such as hiding or displaying the header row, adding special formatting to the first or last columns, or displaying banded rows or columns, in which the even rows or columns are formatted differently from the odd rows and columns, much like an accounting greenbar report.

To remove a table style, click the More button on the Table Styles group and choose Clear from the menu. The table will display in the default table format.

To format a table, follow these steps:

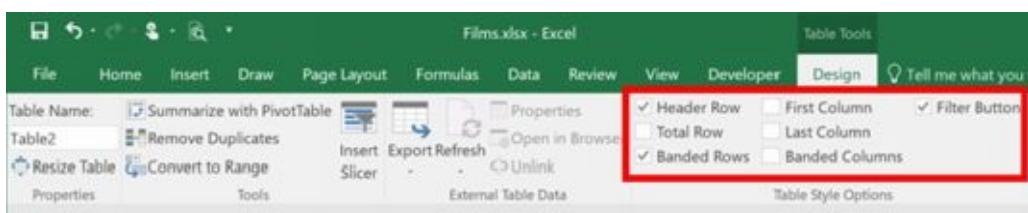
- 1. Click anywhere within the table to activate it.**
- 2. Click the contextual Design tab under Table Tools on the Ribbon.**
- 3. Click the More button on the Table Styles group to display the styles gallery.**



4. Move your mouse pointer over any of the styles to display a preview of the style.
5. Click the style that you want.
6. To remove a table style, click the More button on the Table Styles group and click Clear on the menu.

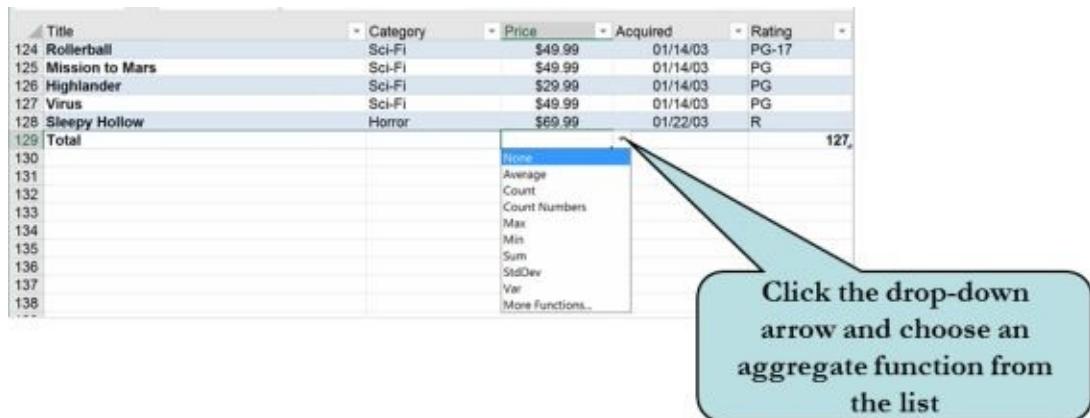
To format table elements, follow these steps:

1. Click anywhere within the table to activate it.
2. Click the contextual Design tab under Table Tools on the Ribbon.
3. On the Table Style Options group, do one of the following:
 - a. To turn the header row on or off, select or clear the Header Row check box.
 - b. To display special formatting for the first or last column of the table, select the First Column or Last Column check box.
 - c. To display odd and even rows with different formatting, select the Banded Rows check box.
 - d. To display odd and even columns with different formatting, select the Banded Columns check box.
 - e. To turn the totals row on or off, select or clear the Total Row check box.
 - f. To turn the filter button on the columns headings on or off, select or clear the Filter Button check box.



Totaling Data in a Table

You can quickly total data in a table using the Total Row feature on the Table Style Options group of the contextual Design Ribbon. Clicking the Total Row check box adds a new row at the end of the table, with the word Total in the leftmost cell. Clicking in any of the cells in a total row displays a drop-down list from where you can choose an aggregate function to apply to the data in the row, such as Sum or Average.



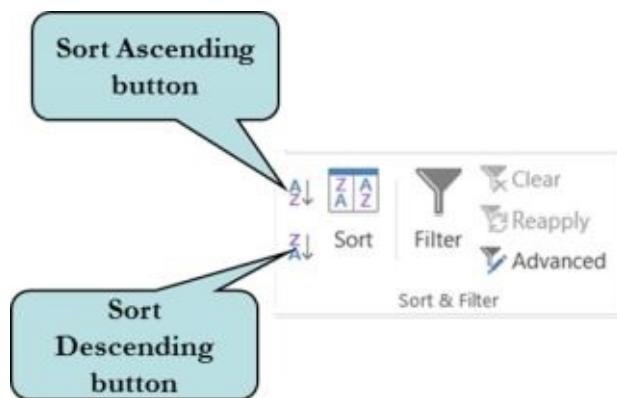
Typing a formula directly in the row beneath a table will automatically create a total row for you.

Here's how to total data in a table:

- 1. Activate any cell within your table.**
- 2. Click the contextual Design tab under Table Tools on the Ribbon.**
- 3. Click the Total Row check box in the Table Style Options group on the Ribbon. The Total row will appear below the table and display the word Total in the leftmost cell.**
- 4. Click in the cell in the total row for the column that you want to calculate.**
- 5. Click the drop-down arrow in the cell and select the aggregate function that you want to use.**

Sorting Data in a Table

Once you have entered data into a table, you can reorganize it in alphabetical or numerical order. For example, you may want to sort a list of customers alphabetically by last name or sort the list numerically by sales. Excel allows you to sort in either ascending (A to Z for alphabetical data, smallest to largest for numbers and oldest to most recent for date) or descending order (Z to A for alphabetical data, largest to smallest for numbers and most recent to oldest for dates).



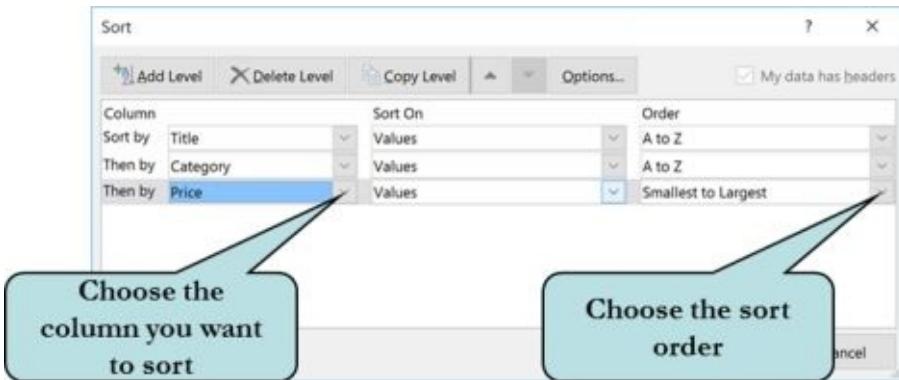
To quickly sort a single column of data in a table, click anywhere in the column that you wish to sort and click the **Sort Ascending** or **Sort Descending** button on the Sort & Filter group on the Data Ribbon. Excel will sort all of the data in the selected column, as well as the other columns in your table so that all of your rows are sorted correctly.

So in summary, here's how to quickly sort data in a table:

1. Click anywhere in the column that you wish to sort.
2. Click the Data tab on the Ribbon.
3. Click the Sort Ascending or Sort Descending icon on the Sort & Filter group on the Data Ribbon.

Sorting Multiple Columns

Excel also allows you to sort by multiple columns. To sort by more than one field, use the Sort dialog box. From here, you can choose which columns you want to sort and the order that they are to be sorted. You can sort by up to 64 columns.



To sort a table by multiple columns, follow these steps:

- 1. Activate any cell within your table range.**
- 2. Click the Data tab on the Ribbon.**
- 3. Click the Sort button on the Sort & Filter group on the Data Ribbon.**



- 4. Select the field by which you want to sort in the Sort By drop-down list.**
- 5. Click the Sort on arrow to select on what to sort (values, cell, color, font color or cell icon).**
- 6. Click the Order arrow to choose the sort order.**
- 7. To add another level, click the Add Level button. To copy an existing level, click anywhere on the level you want to copy and click the Copy Level button.**
- 8. To change the sort order, click the Move Up or Move Down buttons (arrows).**
- 9. To delete a sort order, click anywhere on the level and click the Delete button.**
- 10. When finished, click OK.**

Filtering Data using AutoFilter

Many times, rather than working with an entire table, you may wish to work with only a subset of your data. Using the AutoFilter feature, you can display only the records with which you wish to work and hide all others from view. For example, in working with our films workbook, we could automatically filter our list to display only films with a category of Adventure.

When creating a table in Excel 2016, the AutoFilter option is automatically enabled and a drop-down arrow appears to the right of each column heading in the list. To apply the filter, click on the arrow and then uncheck the box next to the entries you do not want to display. To redisplay all fields, click on the arrow again and then choose All from the drop-down list or click the Clear button to remove all filters in your table.



You can also change the sort order using AutoFilter by choosing the desired sort order from the AutoFilter list.

To AutoFilter a list, follow these steps:

- 1. Activate any cell in your table area.**
- 2. Click the arrow next to the field name to which you want to apply a filter.**
- 3. Uncheck the box next to any entries that you do not wish to display.**



- 4. Repeat steps 3 & 4 for any additional fields you want to filter.**
- 5. To show all records, click the box next to (Select All).**
- 6. To clear a filter, click the arrow for the column whose filter you want remove and choose Clear from the list. Click Reapply to reapply a filter.**
- 7. To remove all filters from the table, click the Clear button on the Sort & Filter**

group on the Data Ribbon.

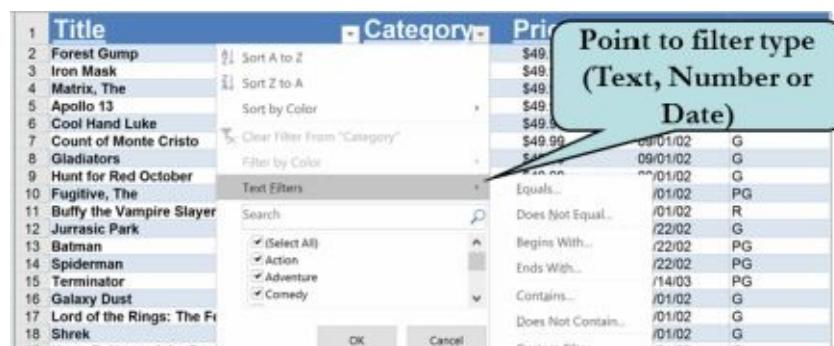


8. To remove the AutoFilter arrows, click the Filter button on the Sort & Filter group on the Data Ribbon to deselect it.

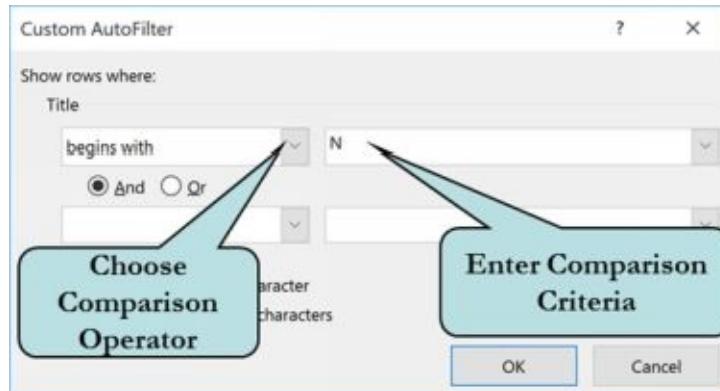
Creating Custom Filters

The AutoFilter feature allows you to select only one specific value. However, you may at times want to search for records that meet multiple criteria. For instance, you may want to list products that are greater than \$20 or display only dates that fall between a specific date range. Using the Custom AutoFilter dialog box, you can create complex criteria using comparison operators such as:

- Equals/does not equal
- Is greater than/is less than
- Is greater than or equal to
- Is less than or equal to
- Begins with/does not begin with
- Ends with/does not end with
- Contains/does not contain



You can also combine multiple criteria for a single column by using the logical operator AND or the logical operator OR. For example, you may wish to display products that are greater than \$20 and less than \$50.

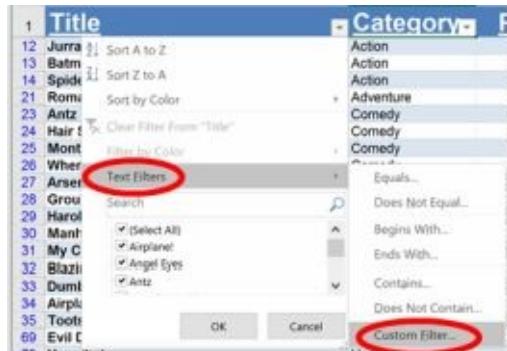


Here's how to create a custom filter:

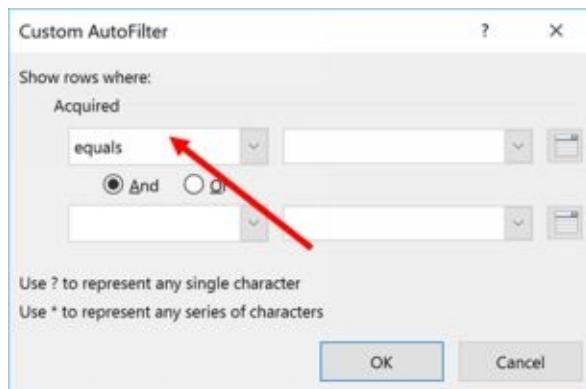
1. **Activate any cell in your list area.**
2. **Click the arrow next to the field name to which you want to apply a filter.**
3. **Point to the Filter type (Text Filters, Number Filters, Date Filters) to display a menu of comparison operators**

Or

Point to the Filter type and choose Custom Filter.

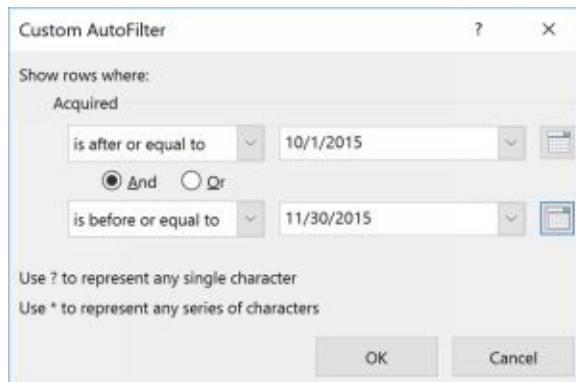


- 4. Click the leftmost combo box and choose the desired comparison operator from the list.**



- 5. Click the rightmost combo box and type in your criteria.**

- 6. To enter multiple criteria, click the AND or the OR radio button and repeat steps 4 and 5 for the next row.**



- 7. Click OK when finished.**

Chapter 10 - Working with Charts

Creating a Chart



A chart is a graphical representation of data and is an effective way to illustrate relationships and/or trends in data. Charts can be a powerful tool when used to provide data analysis and data comparisons. For example, you may wish to illustrate the change in sales trends from one quarter to the next — or the productivity of one store compared to another.

Excel can create a wide variety of charts — bar charts, line charts, pie charts, column charts, etc. and Excel 2016 makes creating charts easy with its numerous charting tools. To insert a chart, select the data you want to include in your chart, click the chart type button on the Insert Ribbon and then choose the chart type you want from the gallery.

If you're not quite sure which chart is the best for your data layout, click the Recommended Charts button on the Charts group of the Ribbon. Excel will display suggested chart types for your data layout.

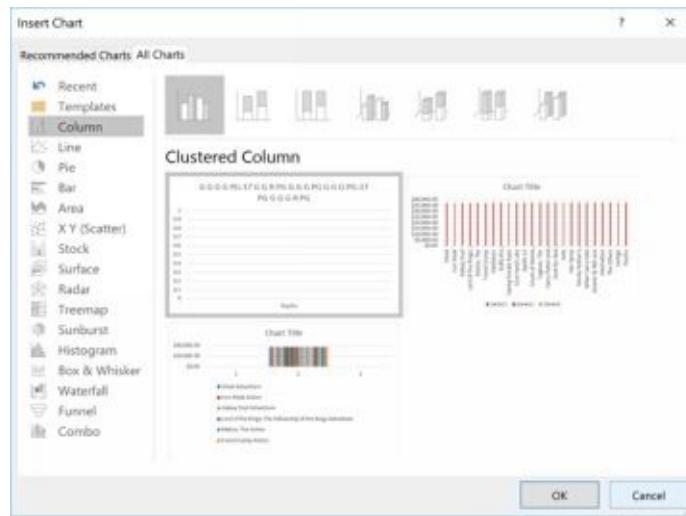
To create a chart, follow these steps:

- 1. Select the data you wish to include in your chart.**
- 2. Click the Insert tab on the Ribbon.**
- 3. Click the button for the chart type you want on the Chart Types group on the Ribbon.**
- 4. Click the Chart Type you want (move your mouse over the chart icons to see a description of the chart).**



- 5. To display all chart types, click the Charts dialog launcher, click the All Charts**

tab on top of the dialog box and then choose the Chart Type you want from Insert Chart dialog box.



The Insert Chart dialog box

6. To allow Excel to recommend the best chart type for your data layout, click the Recommended Charts button on the Charts group of the Ribbon

Or

Click the Charts dialog launcher and click the Recommended Charts tab on top of the dialog box.

Moving a Chart

When you insert a chart into the same worksheet as its underlying data (instead of its own worksheet), the chart is embedded and can then be moved and resized like a standard graphical object. Most of the time, you will not be satisfied with the placement of the chart in the worksheet and will want to move it to a more desirable location. In order to move a chart, you must first activate it by clicking on the chart's white area or on the border of the chart object. Do not click on an object such as the plot area (the gray section) or a data series as you will select that particular area rather than the entire chart. Once the chart is activated, click inside the chart area, hold down your mouse button and drag the chart to the new location.

Another option for moving a chart is using the Cut and Paste method. Select the chart and click the Cut button on the Home Ribbon (or press Ctrl + X). Then, select the cell where you wish to paste your chart and click the Paste button on the Home Ribbon (or press Ctrl + V).

To move a chart by dragging, follow these steps:

- 1. Click the white Chart Area or on the chart's border to select the chart and hold down your left mouse button.**
- 2. Drag the chart to the new location on your worksheet.**

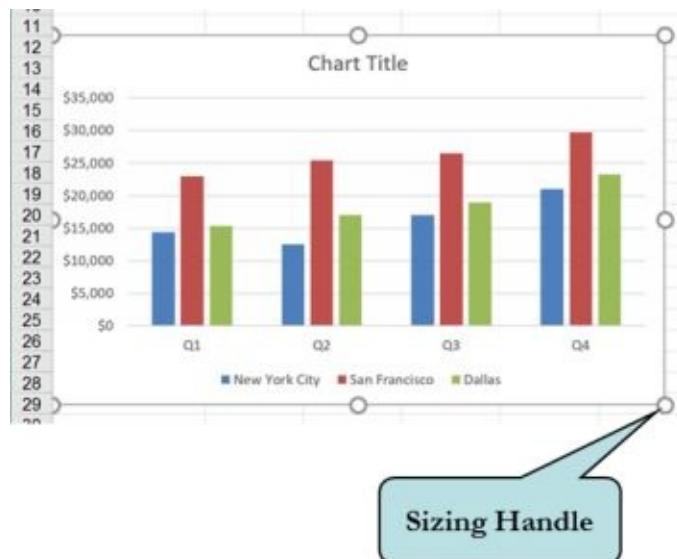


To move a chart using cut and paste

- 1. Click the chart to select it.**
- 2. Click the Cut button on the Home Ribbon (or press Ctrl + X).**
- 3. Select the cell where you wish to paste the chart.**
- 4. Click the Paste button on the Home Ribbon (or press Ctrl + V).**

Resizing a Chart

You can change the size of an embedded chart by holding your mouse pointer over any of the chart's sizing handles until the pointer transforms into a double arrow. Then, drag either inwards or outwards, depending on whether you want to decrease or increase the size of the chart. As you drag, you will see a dark bordered outline which represents the size of chart.



Here's how to resize a chart:

- 1. Select the chart by clicking on the white chart area.**
- 2. Position your mouse pointer over a sizing handle until the pointer transforms into a double arrow.**
- 3. Click the sizing handle and drag it inward to reduce the size of the chart or outward to increase the size of the chart.**
- 4. Release the mouse button when the chart is the desired size.**

Changing the Layout and Style

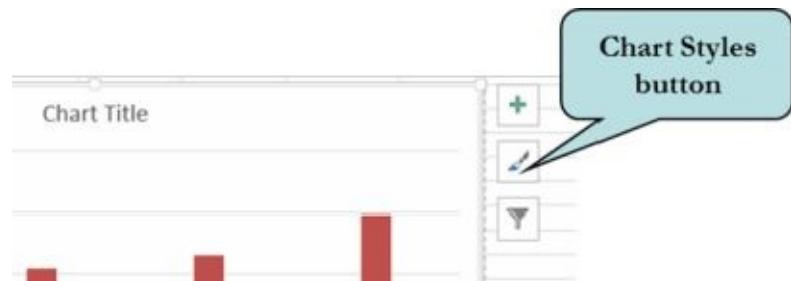
After creating your chart, two contextual Ribbons appear under Chart Tools when the chart is selected: Design and Format. These two Ribbons contain tools and commands that you can use to format your chart, apply various styles and change the chart layout.



The tools under the contextual Design Ribbon allows you to apply various predefined chart layouts and chart styles as well as change the chart type and modify the existing chart data. There are a wide variety of chart styles both in 2-D and 3-D formats that you can apply from the Chart Styles group on the Ribbon. Click the More button to display a gallery of all available chart styles.

For each chart type, you can also apply a preset layout from the Quick Layout button.

Another way to change the chart layout is by clicking the Chart Styles button which appears whenever a Chart is selected. Click the button and choose the style you want to use from the Gallery.



For each chart type, you can also apply a preset layout from the Quick Layout button.

To change the layout and style of a chart, follow these steps:

- 1. Click the chart to select it.**
- 2. To change a chart layout click the contextual Design tab under Chart Tools. Make your desired selection from the Chart Styles group.**

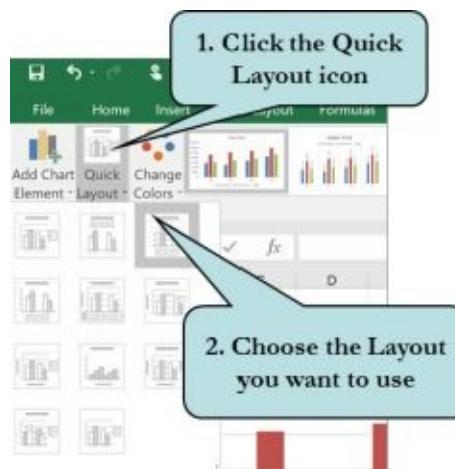


- 3. Click the More button on the Chart Layouts or Chart Styles group to display additional style thumbnails.**



Click the “More” button to display the gallery

4. To change the layout, click the Quick Layouts button and choose the layout you want to use from the Gallery.



To change the style of a chart using the Chart Styles button, do this:

1. Click the chart to select it.
2. Click the Chart Styles button when it appears (the center button).



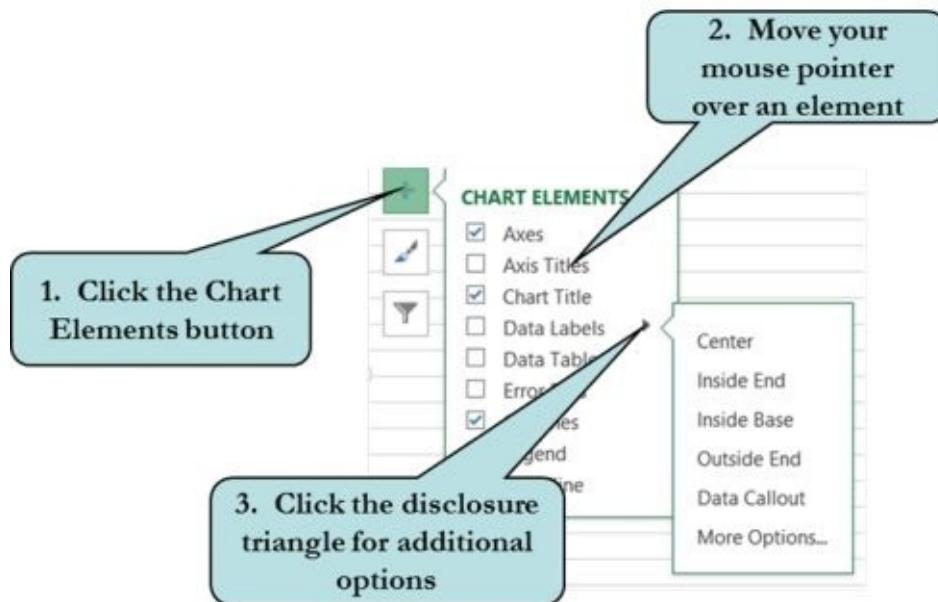
Click the Chart Styles button

3. Click the Style tab.
4. Click the style you want to apply from the gallery.

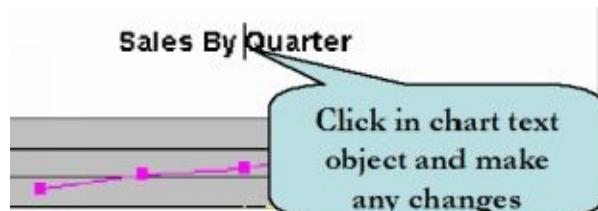


Labeling Chart Elements

After creating your chart, you may wish to customize its various elements, depending on the chart layout you have chosen. Labeling a chart element inserts a small text box on or near the chart element. For instance, you may wish to display or reposition a chart title, axis titles, the chart legend or add data labels or the data table. To add or modify a chart element, click the Chart Elements button (the first button in the Chart buttons group) and move your mouse pointer over the chart element you want to add. As you do so, a black disclosure triangle appears, indicating additional options. Click the disclosure triangle and then make your selections.



You can then format the actual text of the labels by clicking inside of the text box, drag-selecting the existing text and then typing your changes.



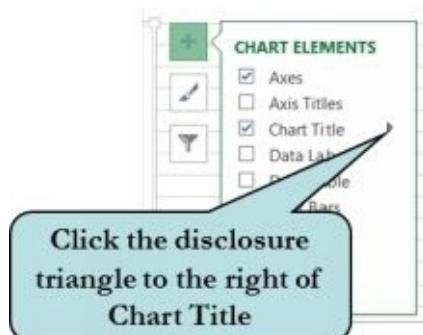
You can also insert chart elements from the contextual Design tab on the Ribbon. Click the Add Chart Element button on the Ribbon, point to the element you want to add and then click the location and/or type of object.

To add/modify a chart's labels, follow these steps:

- 1. Click the chart to select it.**
- 2. Click the Chart Elements button in the Chart Buttons group when it appears.**



3. Click on the Chart Element you want to add.
4. To set additional options, click the disclosure triangle when it appears for the object you want to modify and select the location and/or type of element.

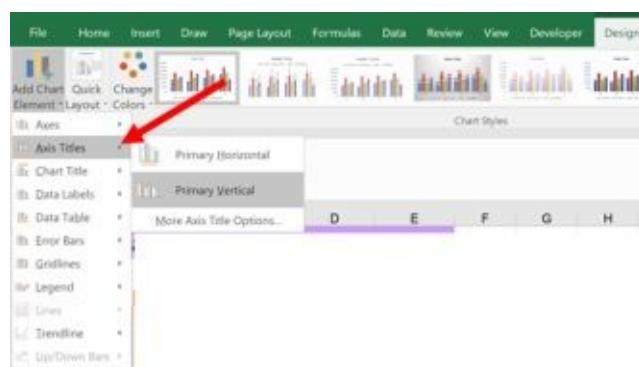


Or

1. Click the Chart to select it
2. Click the contextual Design tab under Chart Tools.
3. Click the Add Chart Element button on the Chart Layouts group of the Ribbon.



4. Point to the element you want to use (Such as Axis Titles, Chart title, Data Labels) and select the location and/or type of element from the submenu.

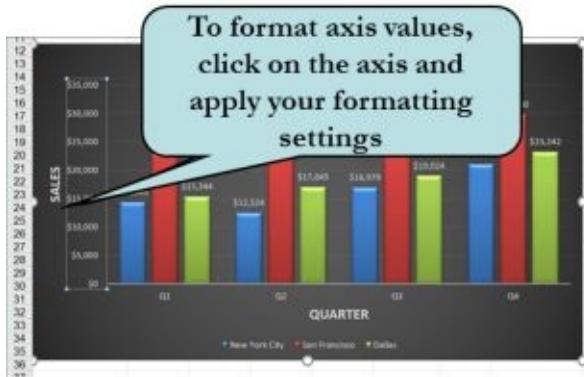


Here's how to change chart text:

1. Click on the Text Object you wish to edit.
2. Click inside of the selected object and begin typing.

Formatting Chart Text

You can format any text object on your chart, such as the chart title and chart axis labels using the formatting techniques that you have already learned. For instance, you can change the text or apply various formatting such as bold, italics, font size, font type, text alignment, colors and patterns. Use the Mini-Toolbar which displays whenever you right-click on highlighted text or any of the commands on the Font group on the Home Ribbon.



Additionally, you can use the Format Object pane, which allows you to apply a wide variety of formatting all from one location. Right-click the object and choose Format [Selected Object] from the contextual menu. Make your selections in the pane on the right side of your screen.

To format chart text, follow these steps:

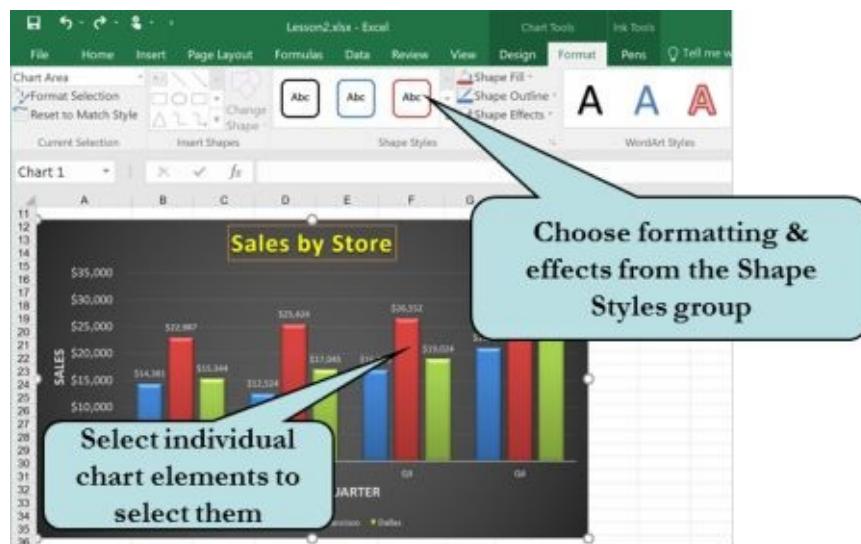
- 1. Click on the border of the Text Object you wish to edit (this includes axis values).**
- 2. Click the Home tab on the Ribbon and make any selections from the Font group on the Ribbon (Bold, Italic, Font Color, Font Size, etc.)**

Or

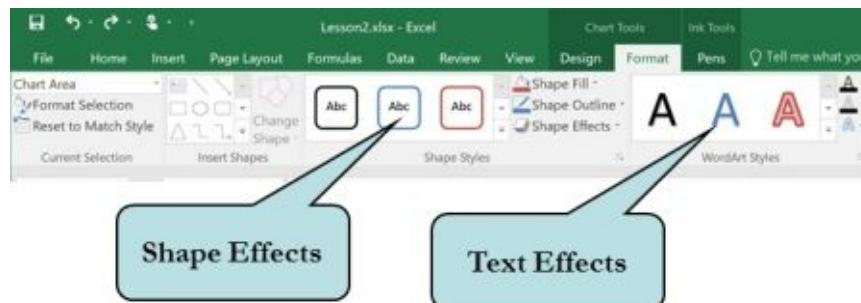
Right-click and choose Format [Selected Object], click the desired tab and make your changes. Click OK.

Formatting Chart Elements

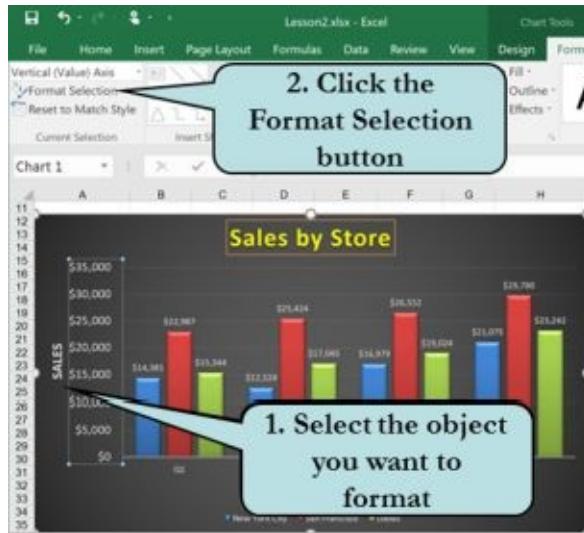
From the contextual Format tab, you can apply formatting such as fill color (solid, gradient, picture or texture) and borders as well as visual effects like shadows, reflection, glow, and bevel to the individual elements of your chart. In order to do so, you must first select the object and then choose the formatting you wish to apply. For instance, if you wanted to change the fill color for one of the bars for a specific data series, you would select the bar you want to change, click the Shape Fill button on the Ribbon and choose the desired color from the color palette.



Use the Shape Fill, Shape Outline or Shape Effects buttons on the Shape Styles group to apply effects to your chart shapes. The Shape Styles gallery also includes some interesting effects. To add effects to the text on your chart, use the Text Fill, Text Outline or Text Effects buttons on the WordArt group.



Another handy way to format chart elements is by using the Format Selection button on the Design Ribbon. When clicked, the Format Object pane appears on the right side of your screen from where you can apply multiple formatting.

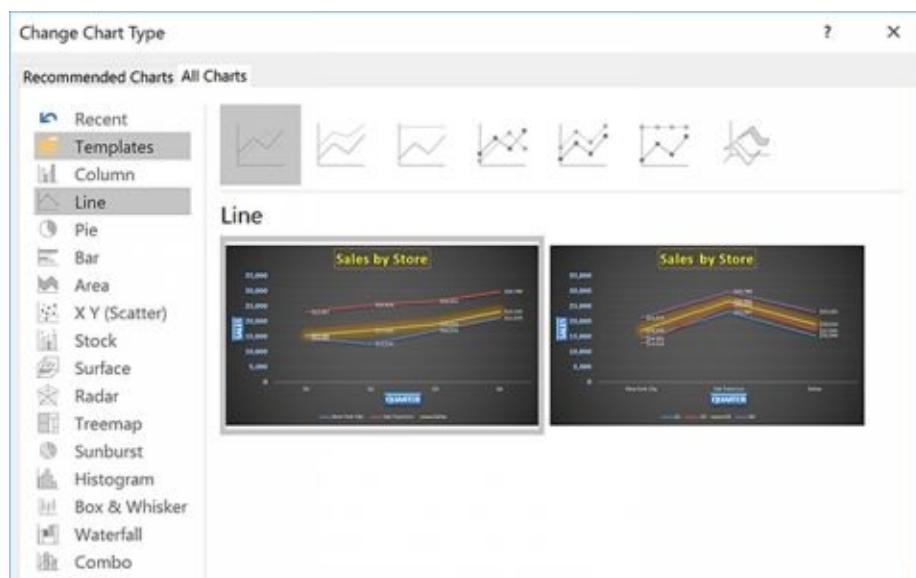


To apply formatting to chart elements, follow these steps:

- 1. Click the chart object that you want to format.**
- 2. Click the contextual Format tab under Chart Tools.**
- 3. To apply a fill color to the object, click the Shape Fill arrow on the Shape Styles group and choose the desired color from the color palette. Click Picture, Gradient or Texture to fill the object with any of these items.**
- 4. To apply or modify the lines or border of an object, click the Shape Outline arrow on the Shape Styles group and choose the options you want.**
- 5. To apply an effect to an object, click the Shape Effects arrow on the Shape Styles group, point to the desired category from the list and then click the effect you want to apply from the gallery.**
- 6. To apply effects to chart text, use the tools on the WordArt Styles group.**

Changing the Chart Type

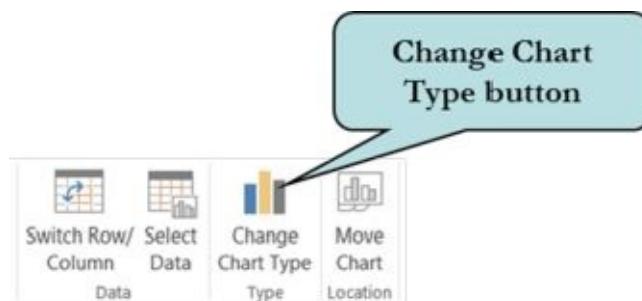
Excel offers many different chart types to aid you in communicating various types of information. Once your chart is created, you can change the type of chart to a pie chart, a line chart, an area chart, a histogram, and more. To change the chart type, click the Change Chart Type button on the Type group under the contextual Design tab under Chart Tools to display the Chart Type dialog box. From there, you can choose from a wide array of chart types.



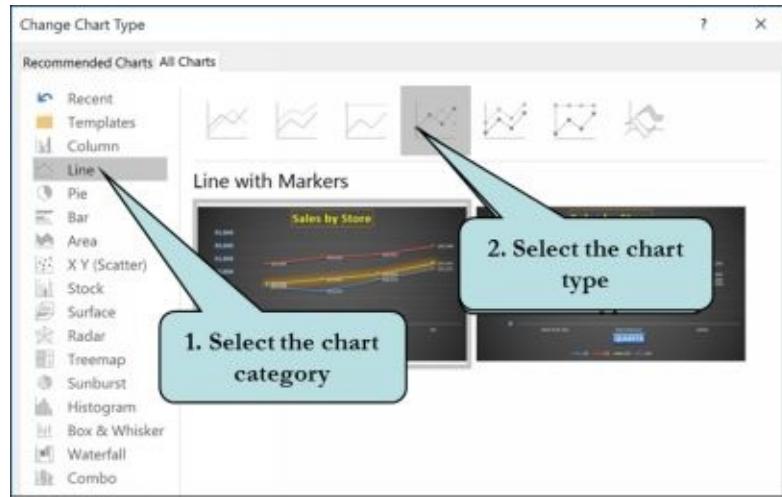
Change Chart Type dialog box

To change the chart type, follow these steps:

- 1. Click the chart to select it.**
- 2. Click the contextual Design tab under Chart Tools on the Ribbon.**
- 3. Click the Change Chart Type button on the Type group.**



- 4. Click the chart type category that you want in the left pane.**



5. Click the chart type that you want in the right pane.
6. To view recommended chart types based upon your data, click the Recommended Charts tab.
7. Click OK when finished.

Showing or Hiding Gridlines

Gridlines are horizontal or vertical lines displayed in the plot area that help you to visualize the value point values in a chart. There are two types of gridlines: Major gridlines and Minor gridlines. Major gridlines are displayed at each value on an axis while minor gridlines occur between the values of an axis.



Depending on the chart style, gridlines can help improve the readability of a chart; however, they should be used sparingly so as not to make your chart appear too cluttered.

Here's how to add/modify a Chart's labels:

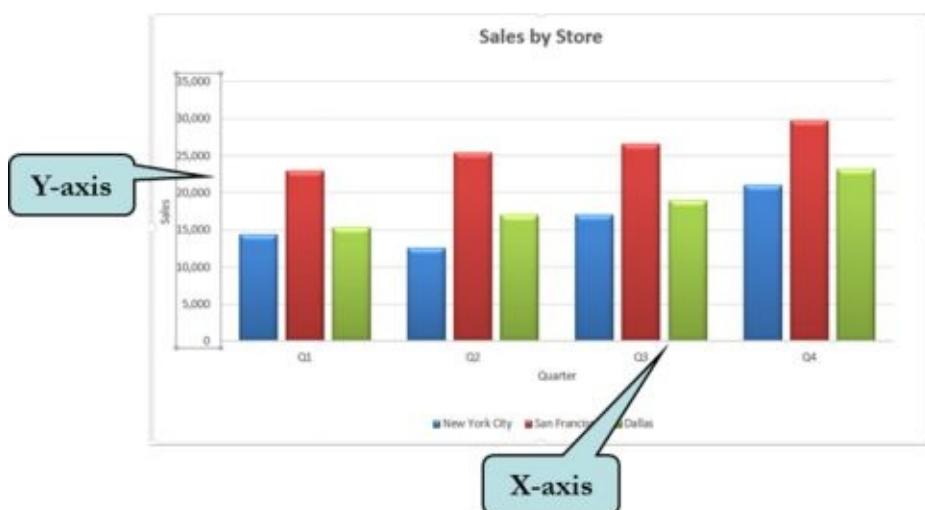
1. Click the chart to select it.
2. Click the Chart Elements button in the Chart Buttons group when it appears.
3. Point to the Gridlines.
4. Click the disclosure triangle when it appears.
5. Point to Primary Major Vertical, Primary Major Horizontal, Primary Minor Vertical or Primary Major Horizontal.
6. To apply custom formatting to gridlines, click More Options from the submenu.

OR

1. Click the Chart to select it
2. Click the contextual Design tab under Chart Tools.
3. Click the Add Chart Element button on the Chart Layouts group of the Ribbon.
4. Point to the Gridlines and choose Primary Major Vertical, Primary Major Horizontal, Primary Minor Vertical or Primary Major Horizontal from the list.

Customizing Axes

For most charts, data is plotted along the horizontal (X) axis and along the vertical (Y) axis (3-D charts contain a (Z) axis as well). Categories are generally plotted on the horizontal axis and values are plotted on the vertical axis. Thus, the x-axis is referred to as the category axis and the y-axis is referred to as the value axis. We have already seen that you can change various formatting options such as font type, color and size, alignment of text, formatting of numbers and patterns of both category and value axis data.



When you create a chart, Excel automatically creates a default scale for the horizontal and vertical axis. Sometimes, the default scale is not ideal and your chart may prove difficult to read. The Axis command button on the Layout group allows you to display values in thousands, millions, etc. Additionally, you can set the minimum and maximum values for the value axis, as well as the major and minor units of measurement (you will need to turn on minor gridlines as you learned in the last lesson for the minor gridlines to display) from the Format Axis dialog box.

If axis readability is an issue, you may wish to also consider changing the axis alignment from the Format Axis pane.



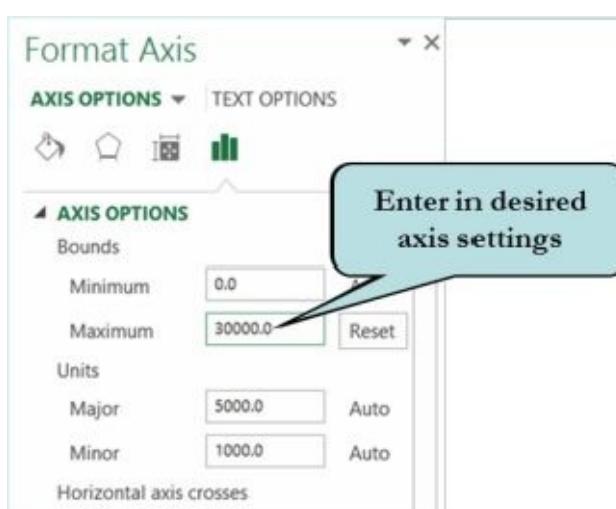
Format Axis Pane

To format the category and value axis, follow these steps:

1. Click on any values of the axis you want to modify.



2. Click the Chart Elements button in the Chart Buttons group when it appears.
 3. Point to the Axes.
 4. Click the disclosure triangle when it appears.
 5. Click More Options to display the Format Axis pane.
 6. To change how the values are displayed on the Primary Vertical Axis, choose the desired display (Default Axis, Thousands, Millions, Billions, or Log Scale) in the Format Axis pane.
 7. To modify the layout of the horizontal axis, choose the desired options from the Format Axis pane.
 8. Choose any other desired options.
- Or
9. Select the desired axis options in the Format Axis pane.



Tip: You can also right-click on an axis and choose Format Axis from the menu to display the Format Axis pane.

Creating a Pie Chart

Pie Charts show the relative size of parts in a whole. Each data series in a pie chart has a unique color (or pattern) and the data will be sorted with largest numbers appearing first. Pie charts have no x-axis or y-axis and have only one data series. Because of this, your data values should be arranged in one column or one row, with an optional column or row for category names.



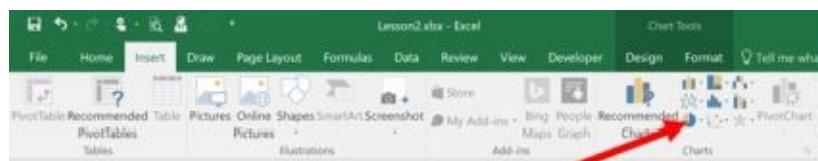
You can consider using a pie chart when:

- You have only a few numbers to chart (you should not have more than seven categories).
- You have only one data series to plot.
- You don't have any negative or zero values.
- Your data series does not include many low numbers (they will be too small to compare).
- You want to show how each value in your series contributes to the whole.

Once your pie chart is created, you can then rotate the slices for different perspectives or pull individual slices out of the chart to draw attention to them. Use the Layout, Data Labels or More Data Labels options to specify the labeling of the pie slices.

To create a Pie Chart, follow these steps:

- 1. Select the data you wish to include in your chart.**
- 2. Click the Insert tab on the Ribbon.**
- 3. Click the Pie Chart button on the Charts group and click the type of pie chart you want to insert.**



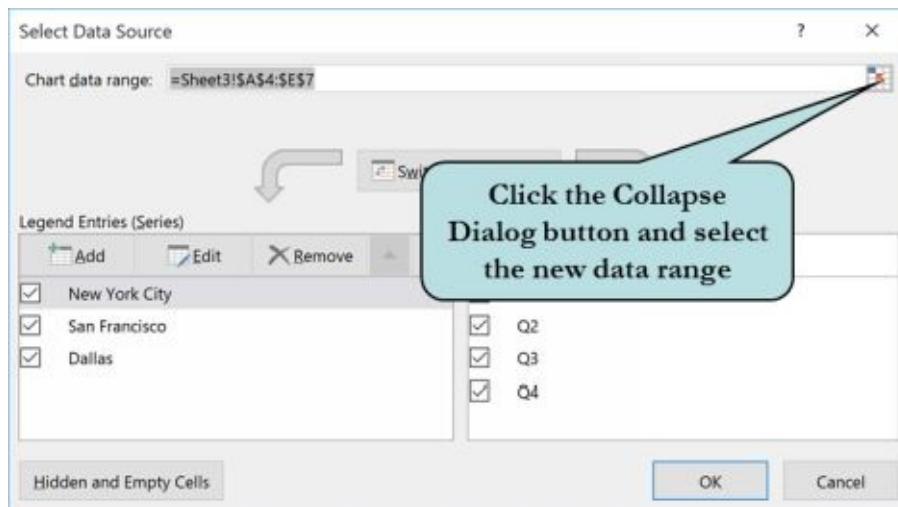
- 4. Use the Data Labels or More Data Labels Options from the Add Chart Element button on the Design Ribbon or the Chart Elements button on the Chart Buttons group to specify the labeling of the pie slices.**



Changing a Chart's Source Data

As you add additional columns or rows of information to your worksheet or remove rows or columns of data that are no longer relevant, you will need to modify the source data for your chart. The source data consists of the cell references of the underlying data upon which a chart is based.

To change the source data of a chart, activate the chart, click the Select Data button on the Data group of the Design Ribbon, click the collapse dialog box button and then highlight the new range of data to be included in the chart.



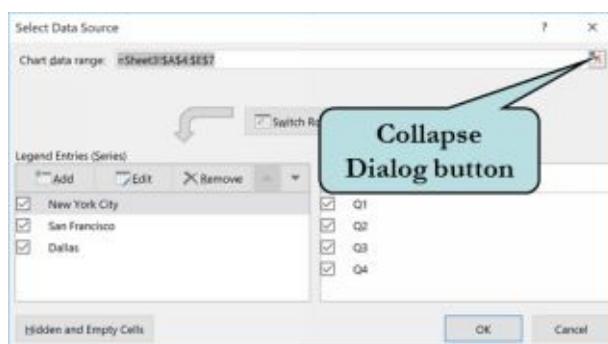
You can also delete a data series by selecting the data series you want to remove and clicking the Remove button. To reorder your data series, click the data series you want to move and click the Move Up or Move Down arrows.

To change the source data of a chart, follow these steps:

- 1. Select the Chart.**
- 2. Click the contextual Design tab on the Ribbon.**
- 3. Click the Select Data button on the Data group.**



- 4. Click the Collapse Dialog Box button on the right side of the Chart Data Range text box.**



5. Select the entire data range you wish to include in the chart.



6. Click the Expand Dialog button.



7. Click OK to close the Source Dialog box.

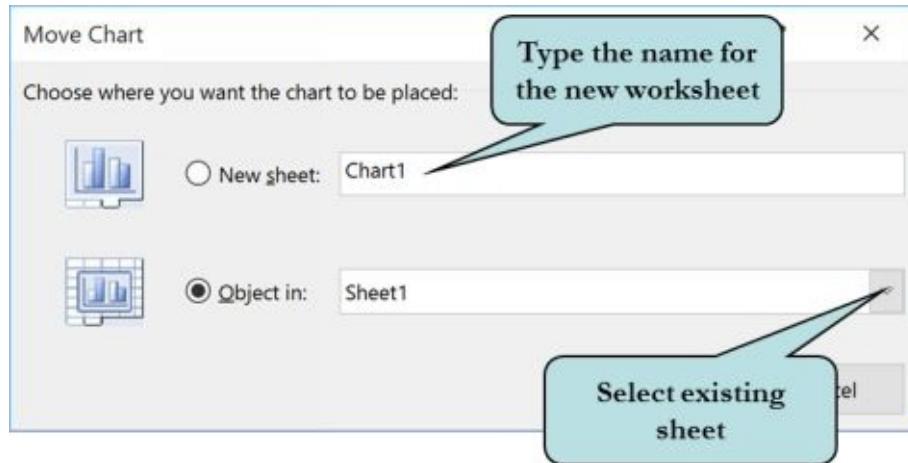
To delete a data series, follow these steps:

- 1. Select the Chart.**
- 2. Click the contextual Design tab on the Ribbon.**
- 3. Click the Select Data button on the Data group.**
- 4. Click the Data Series name you want to delete and click the Remove button.**

Tip: You can also modify an individual data series by clicking the Add button to add a new data series or Edit to change the range of an existing data series. You will need to select the range for both the Series Name (category value) and the Series Values.

Moving a Chart to a Different Worksheet

By default, all new charts are created in the active worksheet as embedded objects. To move a chart to a new worksheet or to a different worksheet, click the Move Chart button on the Location group of the Design Ribbon. The Move Sheet dialog box will display, allowing you to select an existing worksheet to which to move your chart or to specify the name for a new worksheet.

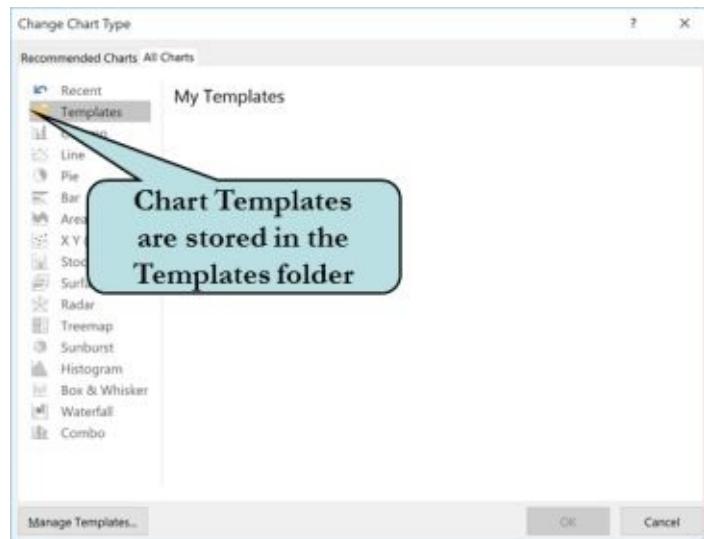


To move a chart to a different worksheet, follow these steps:

- 1. Select the chart.**
- 2. Click the contextual Design tab on the Ribbon.**
- 3. Click the Move Chart button on the Location group.**
- 4. To move a chart to an existing sheet, click the Object in drop-down list and choose the worksheet from the list.**
- 5. To move a chart to a new sheet, click the New Sheet radio button and type in the name for the new sheet if desired.**
- 6. Click OK.**

Saving a Chart Template

If you have spent some time extensively customizing a chart, you can save its formatting as a chart template. Saving a chart as a template will save any customization you have made to a chart and will be available for use in other workbooks. This is especially handy for companies who like to maintain a collection of standard charts to maintain consistency in their reporting.



All chart templates that you save appear in the Templates category of the Insert Chart dialog box. This means that you can create new charts based on your template or apply the template to an existing chart. If need to copy your templates to another computer, click the Manage Templates button on the Insert Chart dialog box to open an Explorer window. From there, you can copy and paste your templates to another folder or disk drive.

Here's how to save a chart as a template:

- 1. Select the chart.**
- 2. Right-click on the chart.**
- 3. Click Save as Template from the contextual menu.**



- 4. Type a name for your chart.**
- 5. Click Save.**

Filtering Chart Data

Excel 2016 allows you to filter the data display in your chart using the Chart Filters button. You can filter by either series or category. To hide a series or category from view, click the checkbox next to it to uncheck it. Click the item again to redisplay it.



To filter chart data, follow these steps:

1. Select the chart.
2. Click the Chart Filters button.



3. To deselect all data, click the Select All check box to deselect it.
4. Uncheck the checkbox next to any items you want to hide.



5. To redisplay an item, click the check box to check it.

6. When finished, click Apply.

Using Sparklines

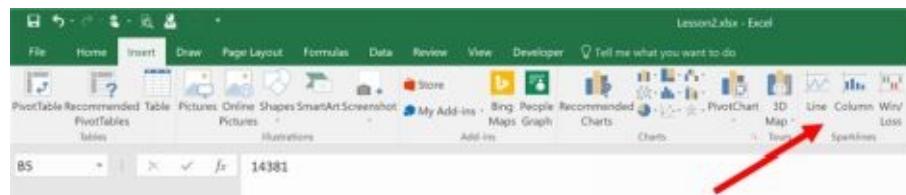
A handy feature in Excel is Sparklines. A Sparkline is a little chart that is displayed in the background of a cell and can help you to spot data trends at a glance. Sparklines take little room (the contents of one cell) and allow you to see your underlying data and a graphical representation of data trends right next to each other. What's especially handy, is that if you change any of the underlying data, the Sparklines update instantly.



Sparklines can be added from the Insert tab of the Ribbon.

To insert Sparklines into your worksheet, follow these steps:

1. Click the Insert tab on the Ribbon.
2. Choose Line, Column or Win/Loss (shows a basic positive or negative representation of your data set) from the Sparklines group.



3. Select or enter the range of cells that will serve as the underlying data for the Sparklines.



4. Click in the Location Range box and then select or enter the range of cells where you wish the Sparklines to appear.
5. Click OK.

Customizing Sparklines

Once you have added Sparklines, you can then customize them from the contextual Design tab on the Ribbon. The Design Ribbon contains options such as displaying high and low points, displaying negative points, changing the style of the Sparklines, or changing the marker color. Axis options also allow for additional customization.



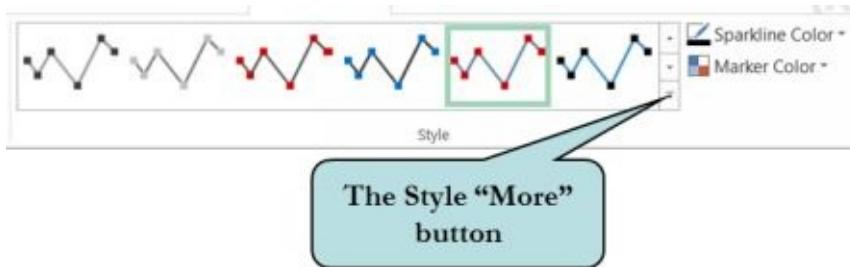
Sparklines contextual Design tab

To customize Sparklines, follow these steps:

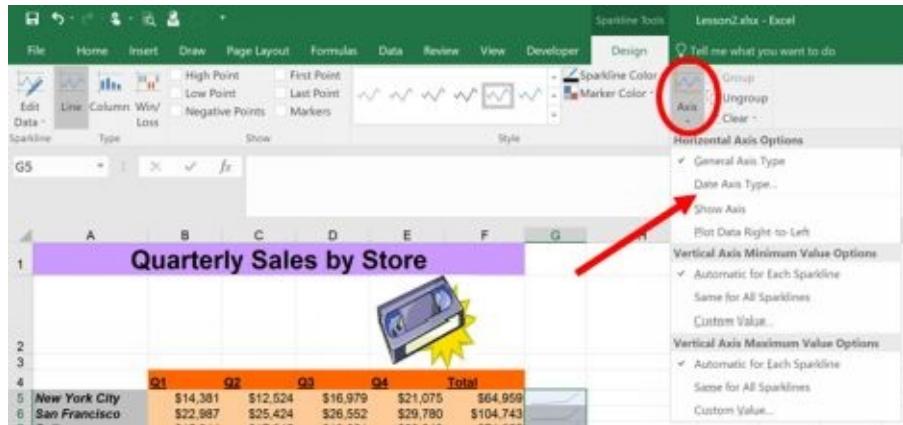
- 1. Click on any one of the Sparklines to display the contextual Design tab.**
- 2. Click the Design tab.**
- 3. To change the type of Sparkline, chose Line, Column or Win/Loss from the Type group.**
- 4. To display or hide data Points and Markers, check or clear the checkbox next to the desired option on the Show group.**



- 5. To change the style of the Sparklines, choose the style you want from the Style group. Click the More button to display additional styles.**



- 6. To change the color of the Sparklines, click the Sparkline Color button on the Style group and choose the desired color from the color palette.**
- 7. To change marker color, click the Marker Color button on the Style group, point to the marker whose color you want to change and choose the desired color from the color palette.**
- 8. To modify axis options, click the Axis button and make your selections.**



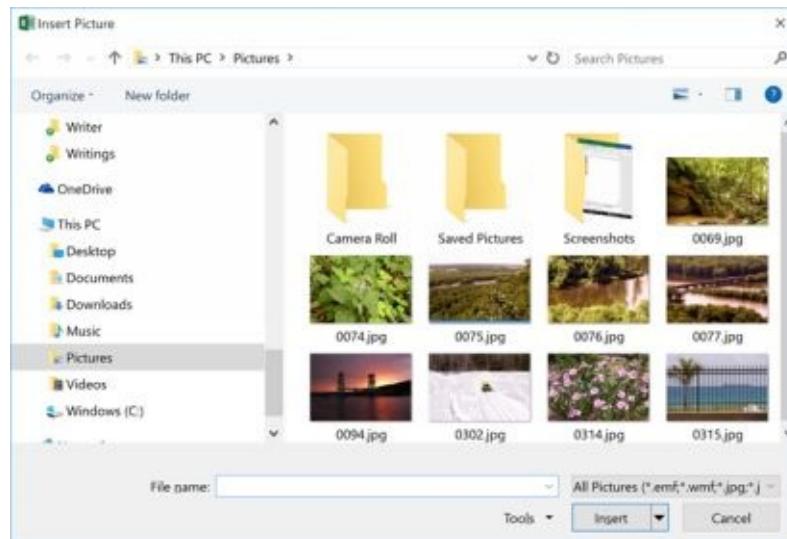
9. To ungroup a Sparkline so that you can apply separate formatting to it, select the cell that contains the Sparkline that you wish to separate from the others and click the Ungroup button. To Group Sparklines, select all of the Sparklines you wish to group and click the Group button.

10. To change the underlying data source for or the location of the Sparklines, click the Edit Data button on the Sparklines group and make your desired selections.

Chapter 11 - Working With Graphics

Adding Pictures

Microsoft Office allows you to insert graphical images into your worksheets from your computer drive, an external drive or network drive. These can be images that you have created in another program such as Adobe Photoshop™, images that you have uploaded from a digital camera or images that have been purchased. Excel supports a wide variety of graphical formats such as .jpg, .gif, .bmp, etc. Adding images can really add an extra touch to your spreadsheets.



To insert a picture, follow these steps:

- 1. Activate the worksheet on which you wish to insert the image.**
- 2. Click the Insert tab on the Ribbon.**
- 3. Click the Pictures icon under the Illustrations group to display the Insert Picture dialog box.**



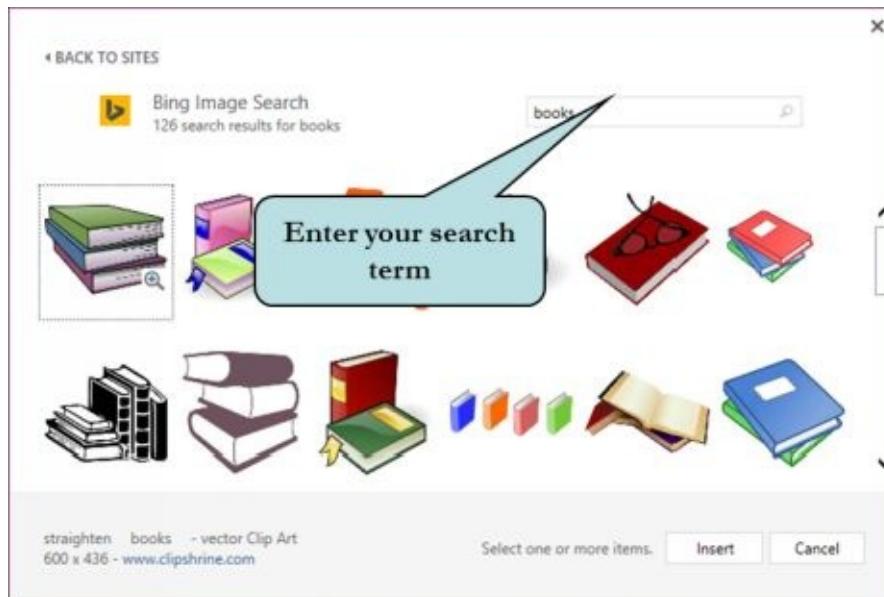
- 4. Navigate to the folder that contains the image you wish to insert.**
- 5. Click the file to select it and then click the Insert button.**
- 6. To change the width and/or height of an image, enter in the values you want in the Height and Width boxes on the Size group of the contextual Format Ribbon.**

Enter in the height
and width values



Inserting Online Images

You can also insert images from the Internet into your worksheets by using the Online Pictures icon on the Insert Ribbon. What this does is allows you to search for images using Bing Image Search. Type in the description for what you are searching for in the Search Box and results matching your search term will display. You can then download the image and insert it into your worksheet.



Images are subject to copyright so be sure you obtain permission from the website's owner before using any image publicly. Many images are covered under the Creative Commons license, which allows you to use the image in certain situations as long as attribution is made to the image creator.

To insert an online picture, follow these steps:

- 1. Activate the worksheet on which you wish to insert the image.**
- 2. Click the Insert tab on the Ribbon.**
- 3. Click the Online Pictures button on the Illustrations group of the Ribbon.**



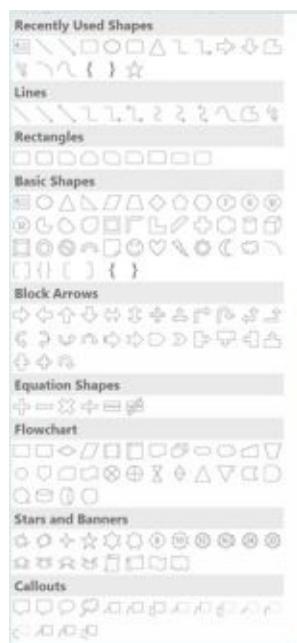
- 4. Click in the Bing search box and type in the search term for the image you want and then press Enter. If you want to insert images from your OneDrive account, click Browse in the OneDrive area.**
- 5. Click the image that you want to insert.**
- 6. Click the Insert button.**

Adding Shapes

Excel contains many powerful ready-made drawing tools such as lines arrows, rectangles, circles, cubes, block arrows, callouts, stars and banners that you can add to your worksheets. Move your mouse pointer over any drawing icon to display an informational box explaining what the drawing tool is. These tools are located on the Illustrations group under the Insert Ribbon.

The Shapes are grouped for you by the following categories:

- Recently Used Shapes
- Lines
- Rectangles
- Basic Shapes
- Block Arrows
- Equation Shapes
- Flowchart
- Stars and Banners
- Callouts



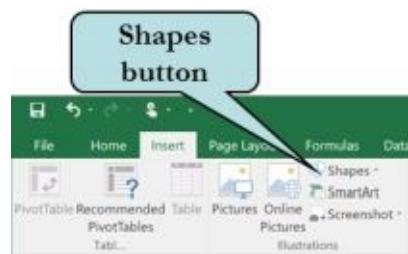
One of the more common tools you may use is the text box. Text boxes allow you to place text anywhere on your worksheet. For example, you can add a caption to a picture by creating a text box and situating it near the picture. Using text boxes as well as the other drawing tools can draw attention to particular areas of your worksheet, helping you to convey your message more easily and effectively, and can also add a bit of pizzazz to your Excel documents.

To draw an object on your worksheet, click on the desired drawing object button and with your left mouse button held down, drag the object onto your worksheet until it is the size that you want.

To add a shape, follow these steps:

1. **Activate the worksheet onto which you want to place a Shape.**

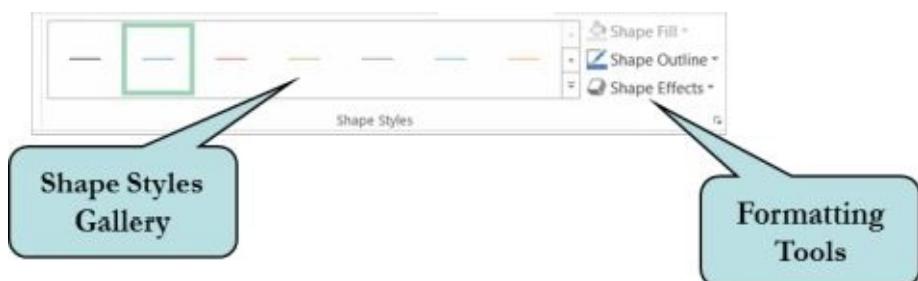
- 2. Click the Insert tab on the Ribbon.**
- 3. Click the Shapes button on the Illustrations group on the Ribbon.**



- 4. Click the Shape that you want to add to your worksheet from the Shapes gallery.**
- 5. Click on the worksheet and draw the Shape until it is the desired size.**

Formatting Drawing Objects

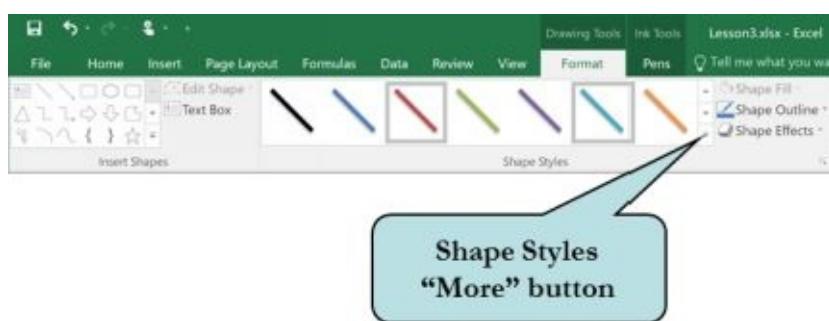
Chances are that after having drawn your object, you will want to apply formatting to it so that it blends in with the rest of your worksheet. The Shape Styles group on the contextual Format Ribbon contains several tools with which you can modify such settings as line color, width and style and fill color. You can also apply special effects such as shadows, bevel, glow, and 3-D or also apply a predesigned Shape Style to your object from the Shape Styles gallery. The selections available from the Shape Styles gallery depend on the type of object selected.



To apply formatting to your objects, you first need to select the object and then click on the appropriate formatting tool on the Ribbon. To apply formatting to more than one object at a time, hold down the Ctrl key and then select the desired objects.

To apply formatting to drawing objects, follow these steps:

- 1. Click the object to activate it.**
- 2. Click the contextual Format tab under Drawing Tools.**
- 3. To apply a fill color to the object, click the Shape Fill arrow on the Shape Styles group and choose the desired color from the color palette. Click Picture, Gradient or Texture to fill the object with any of these items.**
- 4. To apply or modify the lines or border of an object, click the Shape Outline arrow on the Shape Styles group and choose the options you want.**
- 5. To apply an effect to an object, click the Shape Effects arrow on the Shape Styles group, point to the desired category from the list and then click the effect you want to apply from the gallery.**
- 6. To apply a quick Shape Style which contains a combination of various effects, fill, and outline formatting, click the Shape Style More button and choose the desired style from the gallery.**



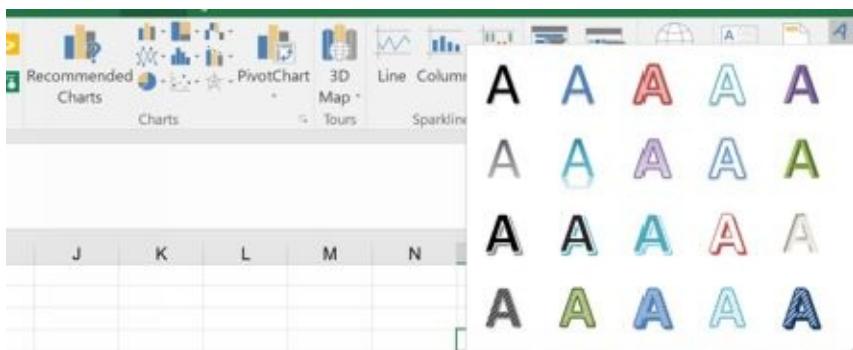
- 7. To change the weight of an arrow or line, click the Shape Outline button on the**

Shape Styles group, point to Weight and then select the thickness you want.

Tip: You can see a preview of most formatting and styles by moving your mouse pointer over any gallery thumbnail or color swatch button. The effect will be temporarily applied to the selected object. This is an example of Excel's Live Preview feature.

Inserting WordArt

WordArt is a gallery of text styles and effects that you can add to your spreadsheets. With WordArt, you can add spectacular effects to the text of your worksheets – you can shadow it, bevel it, mirror it, and make it glow. As with text boxes, you can apply formatting to WordArt shapes as well as change the text itself.



The WordArt button is located on the Insert Ribbon on the Text group and will display the WordArt Gallery when clicked. From the Gallery, select the style of WordArt you wish to add and then type the text for your WordArt object.

From the contextual Format tab (which displays when the WordArt object is selected), you can apply a variety of text effects by clicking the Text Effects button on the WordArt styles group.

To insert WordArt, do this:

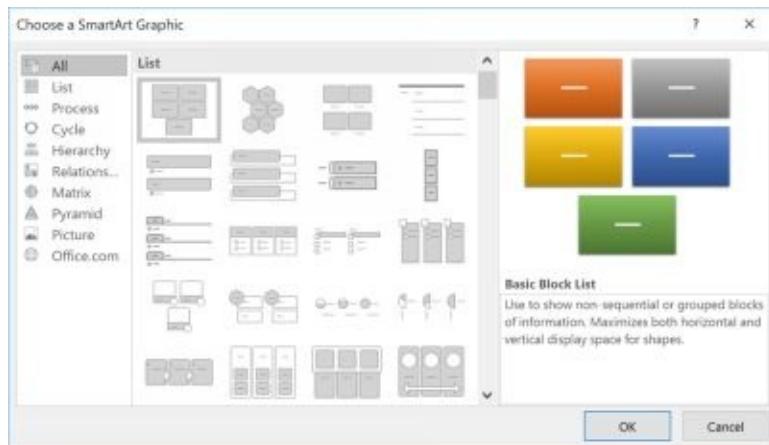
- 1. Click the WordArt button on the Text group of the Insert tab.**



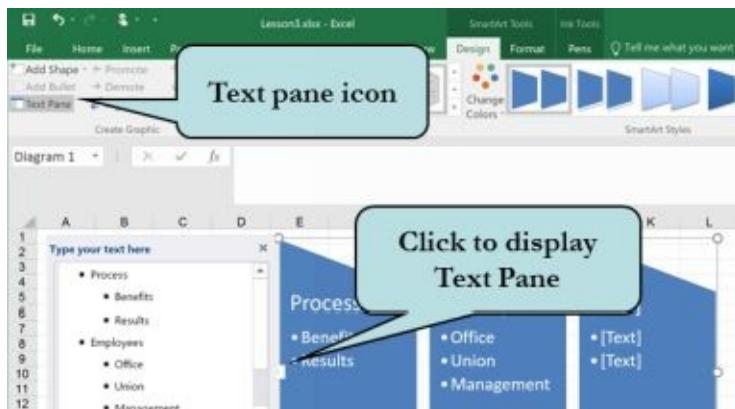
- 2. Click on the desired WordArt format in the WordArt Gallery.**

Inserting SmartArt

SmartArt is a feature in Microsoft Office that allows you to insert graphical objects such as diagrams, organization charts, flow charts, graphical lists, matrix, and much more to illustrate processes and relationships. With the wide-range of formatting tools available such as colors, bevels, and shadows etc., you can easily create extremely impressive spreadsheets.



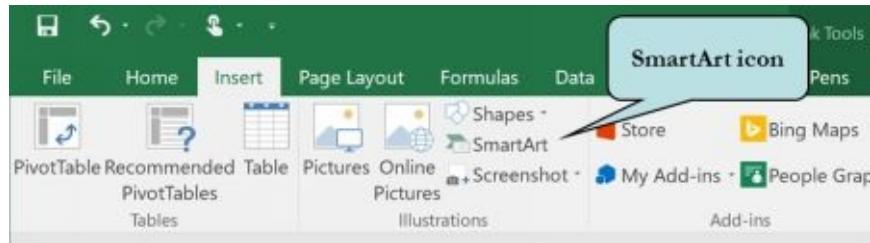
After you have inserted a SmartArt object, you can manipulate and format the object in many ways from the contextual Design tab and the Format tab on the Ribbon. Options include applying a quick style to a SmartArt graphic, changing its orientation, changing its layout, and changing its colors, just to name a few.



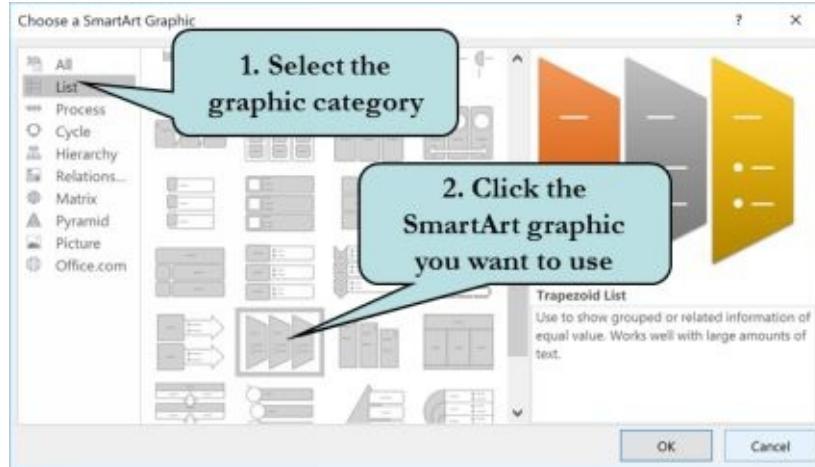
The quickest way to add text is to click directly into the SmartArt object and begin typing. You can also use the Text Pane to enter your text. Click the Text Pane button on the contextual Design tab on the Create Graphic group or click the control with two arrows along the left side of the object to display the text pane.

To insert SmartArt into a worksheet, follow these steps:

- 1. Click the Insert tab on the Ribbon.**
- 2. Click the SmartArt button on the Illustrations group to display the SmartArt gallery.**



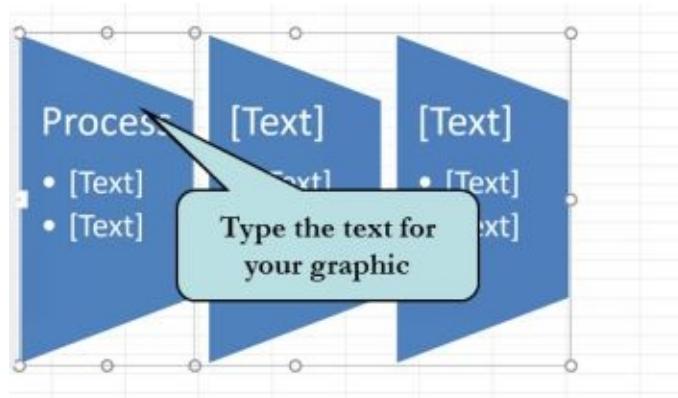
3. Click the desired category in the left pane.



4. Click the SmartArt graphic you want to use in the center pane.

5. Click OK.

6. Click in the SmartArt object and type in your text.



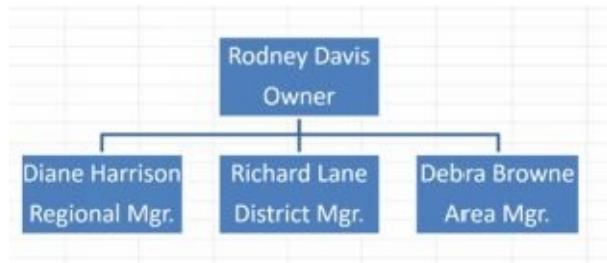
Or

Click the Text Pane button on the contextual Design tab and type in your text in the text pane.

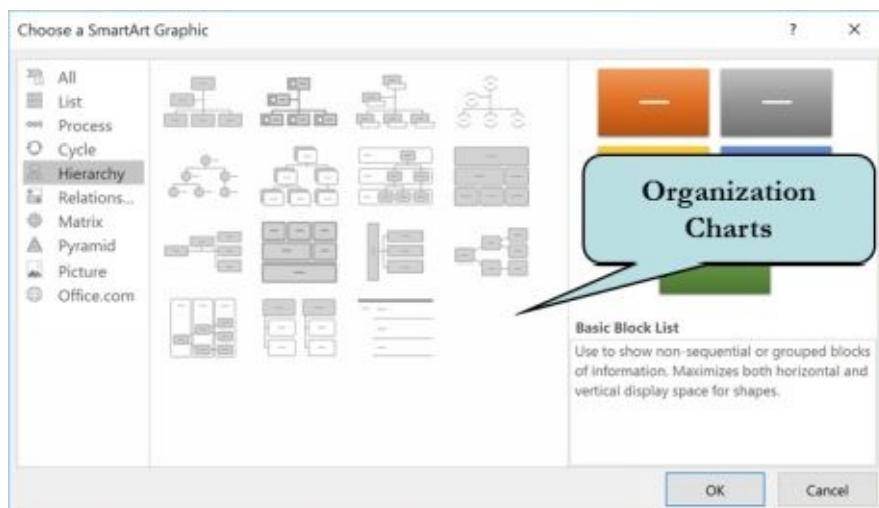
7. Click the contextual Design or Formatting tabs on the Ribbon to modify the SmartArt object.

Inserting an Organization Chart

Microsoft Office provides the ability to insert diagram objects into your worksheets. One of these diagram objects that is often used is the Organization Chart which allows you to illustrate hierarchical relationships such as the structure of a business (i.e. names, titles and departments of managers).



The organization chart is the 1st object located in the Hierarchy category of the SmartArt gallery.



To insert an Organization Chart, follow these steps:

- 1. Select the worksheet into which you wish to insert an Organization Chart.**
- 2. Click the Insert tab on the Ribbon.**
- 3. Click the SmartArt button on the Illustrations group.**
- 4. In the left pane, click Hierarchy.**
- 5. In the middle pane, click the type of Organization chart you wish to insert.**

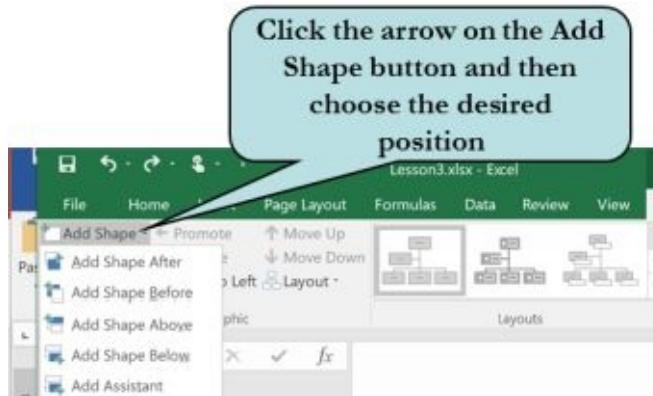


- 6. Click OK.**
 - 7. Click inside the text box shape to add text to a shape.**
- Or**
- Type your text in the Text Pane (click the Text Pane button on the Create Graphic group to display the Text Pane).**
- 8. Click outside of the Organization Chart shape when finished.**

Modifying an Organizational Chart

After you create your Organization Chart, you can add additional shapes/relationships (or nodes) at any time by clicking on the shape to which you want to add a relationship, clicking the Add Shapes arrow on the Create Graphic group and selecting the position where you wish to insert the new shape. You can also add new shapes from the Text Pane by setting the insertion point in the shape where you want to add a new shape and pressing the Enter key. You can then press the Tab key to indent the shape or the Shift + Tab keystroke combination to demote the position of the shape.

To delete a shape/relationship, select the relationship, and then press the Delete key.



Like the other graphical objects with which we have been working, you can format your Organization Chart by adding special effects such as glow, 3-D rotation and bevel as well as changing the layout or applying SmartArt Styles to the object.

To add new shapes/relationships, do this:

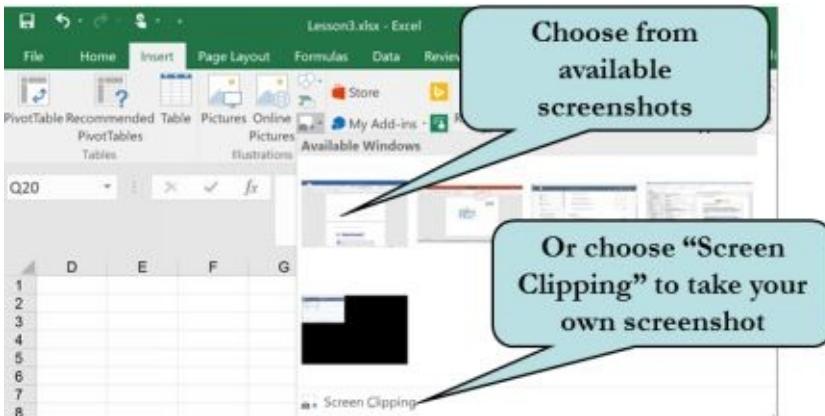
- 1. Click the shape to which you want to add a new relationship.**
- 2. Click the Add Shapes arrow on the Create Graphic group under the contextual Design Ribbon and select the position where you wish to insert the new shape (before, after, above, below or assistant).**
- 3. Click in the new shape to enter text.**

To format an Organization Chart, do this:

- 1. Click anywhere in the Organization Chart to select it.**
- 2. Click the contextual Design tab under SmartArt Tools.**
- 3. Click the desired Layout or SmartArt Style that you want to apply to the Organization Chart. To see additional styles or layouts, click the scroll up or scroll down buttons or click the More button to display the entire Layout or SmartArt Style gallery.**
- 4. To format individual nodes (shapes), select the shape you want to format, click the contextual Format tab and make your formatting selections.**

Taking a Screenshot

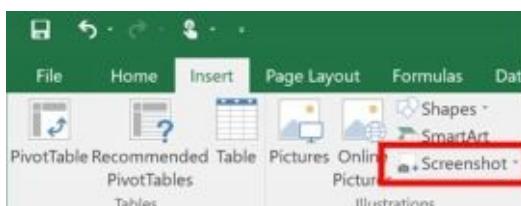
A handy feature in Excel is the ability to take a screenshot directly from within an Excel document. The Screenshot tool is located on the Illustrations group of the Insert Ribbon. When you click the Screenshot button, several screenshot samples from your open documents will display. You can either choose from the available sample screenshots or take your own screenshot by clicking the Screen Clipping option. If you select Screen Clipping, the active Excel document will be minimized and a resizable window will appear over next open window (whether this be another open document or your Desktop).



Note that the Screenshot feature is not available in documents saved in Excel 2003 format or earlier.

Here's how to take a screenshot:

- 1. Open the Excel document into which you wish to insert the Screenshot (you can also insert screenshots into Word and PowerPoint documents).**
- 2. Click the Insert tab on the Ribbon.**
- 3. Click the Screenshot button on the Illustrations group on the Ribbon.**



- 4. To insert one of the available screenshots from open windows, click the thumbnail for the screenshot you wish to use under the Available Windows area.**
- 5. To take your own screenshot, click Screen Clipping on the Screenshot menu and then trace around the area you wish to capture.**

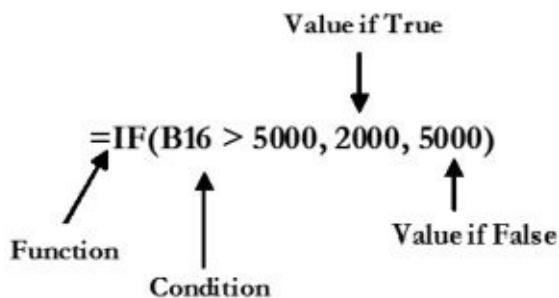
Chapter 12 - Financial & Logical Functions

Using the IF Function

Using the IF function, you can tell Excel to evaluate a condition and perform one of two calculations based on that condition. The two calculations are dependent on whether the condition is true or false. For example, if the sales of a store was greater than 5000, you could give the manager a \$2,000 bonus (condition is true); if the sales were less than \$5000, the manger would get a \$500 bonus (condition is false).

You can either type the IF function directly into the cell or click the Insert Function button and use the Insert Function dialog box.

Using the example above, the format of the IF function is:



To use the IF function, follow these steps:

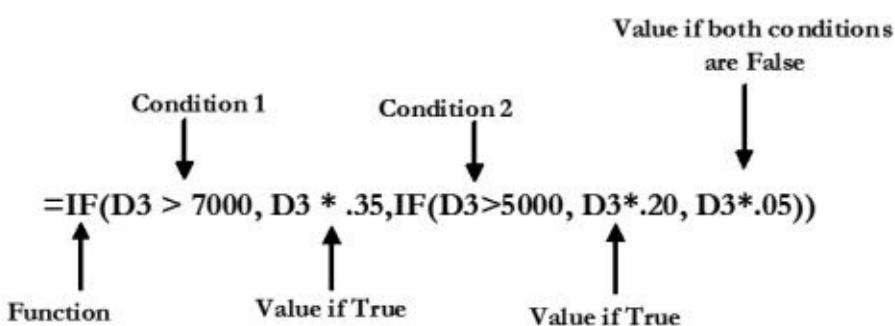
1. **Activate the cell in which you want to place the formula.**
2. **Type: =IF(**
3. **Enter the condition for which to test, followed by a comma.**
4. **Enter the value if the condition is true followed by a comma.**
5. **Enter the value if the condition is false.**
6. **Type) to close the formula.**
7. **Press the Enter key to verify the formula.**

Using Nested Functions

At times, you may want Excel to perform a calculation based on more than one condition. For example, if a store has more than \$5,000 in sales, the manager receives a 20% bonus. But if a store has more than \$7,000 in sales, the manager would receive a 35% bonus. However, if the store has sales less than \$5,000, the manager would only receive a 5% bonus. To accomplish this, we need to use a Nested IF Statement.

In a nested function, Excel reads the function from left to right. The first part of the formula consists of the first condition and the value if true. If the value does not meet the true condition, Excel continues to the next IF function and evaluates the second condition. The last part of the formula will contain the value if all conditions are false.

A nested IF function is illustrated below:



In the above example, we are looking at the value in cell D3. If the value is greater than \$7000, then Excel calculates a 35% bonus (.35 * the value of cell D3). If the value is not greater than \$7000, Excel continues on to the next IF statement which evaluates whether the value in D3 is greater than 5000. If the value is greater than \$5000, Excel calculates a 20% bonus (.20 * the value of cell D3). If the value is not greater than \$5000 or, in other words, both of the conditions are false, Excel continues on and instead calculates a 5% bonus.

The screenshot shows an Excel spreadsheet with the title "Sales by Store" in cell A1. The spreadsheet contains data from January to March across four stores: New York, Dallas, San Francisco, and Philadelphia. The columns are labeled Month, Store, Manager, Sales, and Bonus. The Bonus column uses a nested IF formula to calculate the bonus based on sales. The formula in cell E3 is =IF(D3>7000, D3*.35, IF(D3>5000, D3*.20, D3*.05)). The calculated bonuses are shown in the Bonus column, such as \$1,354.40 for Daniel Browne in January.

Month	Store	Manager	Sales	Bonus
January	New York	Daniel Browne	\$6,822.00	\$ 1,354.40
January	Dallas	Jan Loomis	\$4,322.00	\$ 216.10
January	San Francisco	Linda Brickman	\$7,322.00	\$ 2,562.70
January	Philadelphia	Lance Norris	\$4,999.00	\$ 249.95
February	New York	Daniel Browne	\$7,900.00	\$ 2,765.00
February	Dallas	Jan Loomis	\$5,322.00	\$ 1,064.40
February	San Francisco	Linda Brickman	\$6,500.00	\$ 1,300.00
February	Philadelphia	Lance Norris	\$3,000.00	\$ 150.00
March	New York	Daniel Browne	\$5,000.00	\$ 250.00
March	Dallas	Jan Loomis	\$4,500.00	\$ 225.00
March	San Francisco	Linda Brickman	\$9,799.00	\$ 3,429.65
March	Philadelphia	Lance Norris	\$4,999.00	\$ 249.95

Note that because the formula contains two IF statements, we need to terminate the formula with two closing parenthesis.

The COUNTIF Function

A screenshot of Microsoft Excel showing a table of movie data. The table has columns for Category, Title, Price, Acquired, and Rating. The formula `=COUNTIF(B2:B400, "Superman")` is entered in cell G1, and the result 3 is displayed in cell G2.

Category	Title	Price	Acquired	Rating
Adventure	Shrek	49.99	06/01/02	G
Action	Iron Mask	49.99	06/01/02	G
Adventure	Galaxy Dust	49.99	06/01/02	G
Adventure	Lord of the Rings: The Fellowship of the Rings	49.99	06/01/02	G
Action	Matrix, The	49.99	06/01/02	PG-17
Action	Forest Gump	49.99	06/01/02	G
Action	Gladiators	49.99	09/01/02	G
Action	Buffy the Vampire Slayer	49.99	09/01/02	R
Adventure	Saving Private Ryan	49.99	09/01/02	PG
Action	Cool Hand Luke	49.99	09/01/02	G
Action	Apollo 13	49.99	09/01/02	G
Action	Count of Monte Cristo	49.99	09/01/02	G
Action	Fugitive, The	39.99	09/01/02	PG
Adventure	Harry Potter and the Sorcerer's Stone	49.99	09/01/02	G
Action	Hunt for Red October	49.99	09/01/02	G
Comedy	Antz	49.99	10/15/02	G
Comedy	Hair Spray	29.99	10/16/02	PG-17
Comedy	Monty Python's Flying Circus	19.99	10/17/02	PG

The COUNTIF function in Excel comes in handy if you need to know how many occurrences of something appears in a range of data. For instance, if you have a list of movies, you could view a count of the number of movies before 2014.

The COUNTIF function consists of 2 arguments: The cell range and the criterion. Using the example above, let's say that the Year cell range for our movies is B2:B400. If we wanted to find out how many movies in our list were made prior to 2014, our formula would read:

=COUNTIF(B2:B400, "<2014")

As we can see, the arguments are separated by a comma and the last argument (the criterion) is surrounded by quotes.

A diagram showing the formula `=COUNTIF(B2:B400, "<2014")`. Two speech bubbles point to the formula: one labeled "Cell Range" pointing to the range `B2:B400`, and another labeled "Criterion" pointing to the value `<2014`.

An another example, if we wanted to find out how many of our customers are from Illinois, the formula would read (assuming the state field range is B1:B800):

=COUNTIF(B1:B800, "IL")

You can also use wildcards in the formula, in which the asterisk symbol (*) can replace any number of characters. Using our movies list as an example, if we used the asterisk after the word "Superman", we would get a count of all of our movies whose title begins with Superman (Superman 1, Superman 2, Superman Returns). To do this, our formula would read:

=COUNTIF(B1:B400, "Superman*")

So keep the COUNTIF function in mind should you ever need to find the number of

occurrences of specific data in your dataset. It can be a real time-saver.

Using the PMT Function

The PMT function is used to calculate payments due on a loan based on constant payments and assuming a constant interest rate. With the PMT function, you can easily figure out what your monthly payments will be on a mortgage or car loan.

To calculate loan payments, the PMT function uses 3 arguments:

1. **rate** – the interest rate. If you had a loan that you had to pay monthly with an interest rate of 8%, this argument would read: .08/12 (interest rate divided by 12 months).
2. **nper** – the total number of payments of the loan. If the loan is a 30 year mortgage and you make a monthly payment, this argument would read: 12 * 30 (12 months times 30 years - or you can enter 360).
3. **pv** – the present value of the loan. This is the total loan amount upon which you want your formula to be based and is typically entered as a **negative number**. Thus, if your loan was for a \$150,000 mortgage, then this argument would read: -150000.

Thus, the format of the PMT function is:

=PMT(rate, nper, pv)

The PMT function can also be used to calculate an **investment goal**. For example, you can calculate how much money you need to invest in order to achieve a specific dollar amount, assuming a constant interest rate and number of payments. So rather than using the present value (pv) we need to enter the future value (fv). The format of the PMT function to calculate an investment goal would be:

=PMT(rate, nper,, fv)

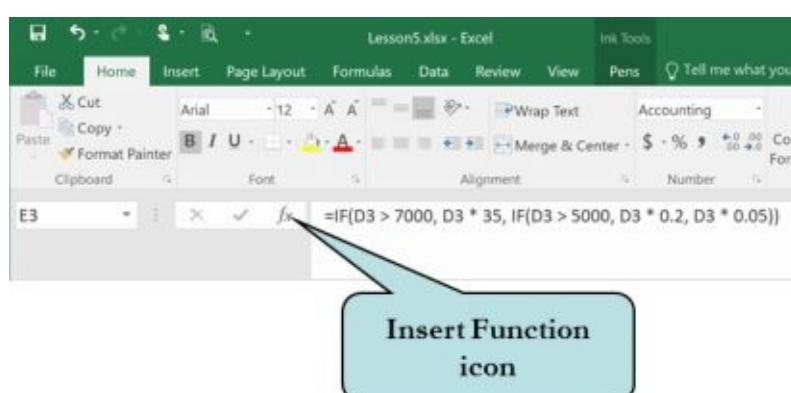
As an example, suppose you wanted to save \$15,000 in the next 5 years and you know that the interest rate for the account will be 7%. To calculate what your monthly investment would be, the formula would read:

=PMT(.07/12,12*5,-15000)

Note: You can either type in the formula for the PMT function manually, or use the Insert Function button.

To calculate a loan with the PMT function, follow these steps:

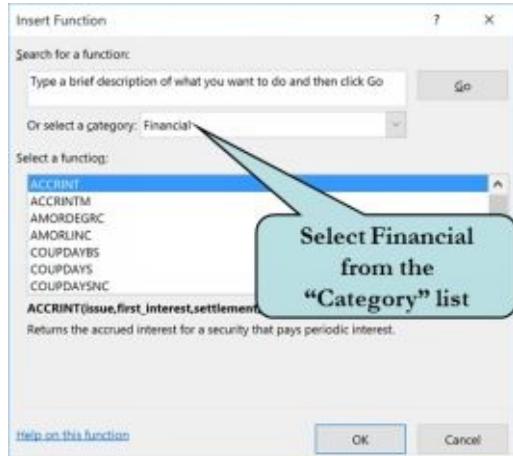
1. **Activate the cell in which you want to place the formula.**
2. **Click the Insert Function icon to the left of the toolbar**



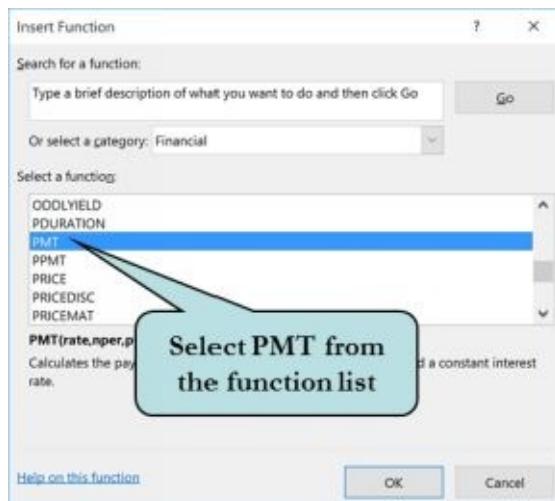
Or

Click the Formulas tab and click the Insert Function button on the Function Library group (you can also click the Financial button on the Function Library and choose PMT from the list. Then, skip to step 6).

3. Select Financial from the Select a Category drop-down list.

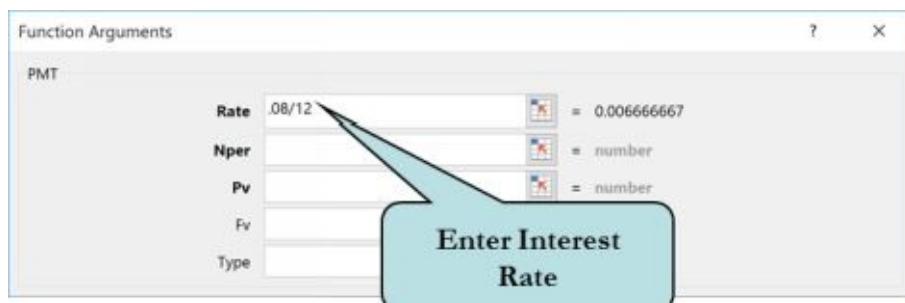


4. From the Insert Function box, Select PMT from the Select a Function list box.



5. Click OK.

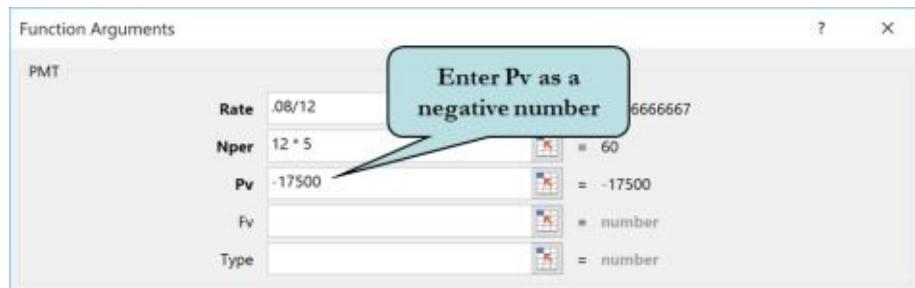
6. Enter the interest rate per period (ie. Monthly: rate /12, Semiannual: rate /6, etc.) in the Rate text box.



7. Enter the total number of payments of the loan in the Nper text box. For instance, for a 5-year loan, you can enter 12 * 5 or 60.

8. For loan payments, enter the loan amount as a negative number in the Pv text

box.



Or

For future value amount, enter the future value to be achieved as a negative number in the Fv text box.

9. Press the Enter key to verify the formula.

Note: If your arguments already exist on your spreadsheet, you can reference the cell address in the function, rather than hardcode the values (i.e. PMT(A1/12, B1, C1)).

Using the FV Function

The FV function is used to calculate the future dollar amount you will have saved assuming a fixed payment period at a set interest rate. For example, you may wish to calculate the balance of your savings account if you deposit \$75 a week for 5 years at 6% interest.

To calculate future value, the FV function uses 3 arguments:

1. **rate** – the interest rate. If you are depositing an amount weekly into your account with an interest rate of 6%, this argument would read:

.06/52 (rate divided 52 weeks).

2. **nper** – the total number of payments you want to make. To deposit an amount weekly into your account for 5 years, this argument would read:

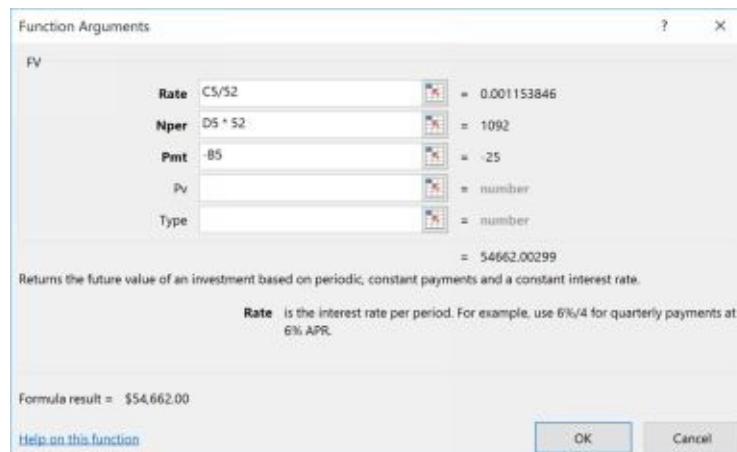
5 * 52 (5 years * 52 weeks)

3. **pmt** – the amount to be deposited each period. This is entered as a **negative number**. Thus, if you were to deposit \$75 a week, this argument would read:

-75.

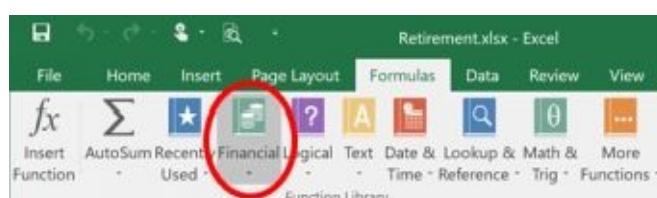
Thus, the format of the FV function is:

=FV(rate, nper, pmt)



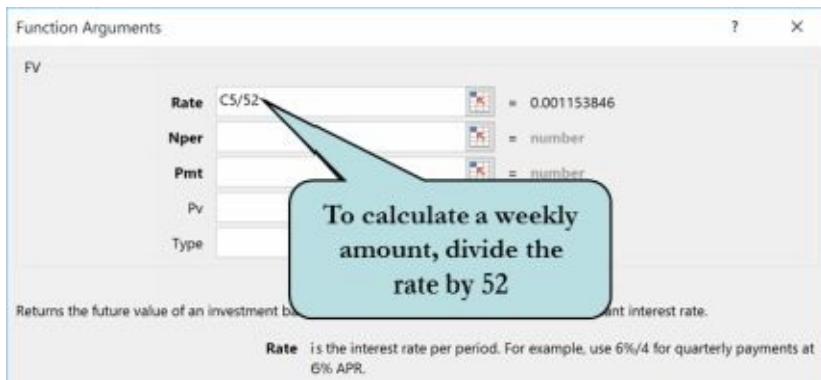
To calculate a future value with the FV function, follow these steps:

1. **Activate the cell in which you want to place the formula.**
2. **Click the Insert Function button.**



3. **Select Financial from the Select a Category drop-down list.**
4. **Select FV from the Select a Function list box.**
5. **Click OK.**

6. Enter the interest rate per period in the Rate text box.



7. Enter the total number of payments of the loan in the Nper text box.

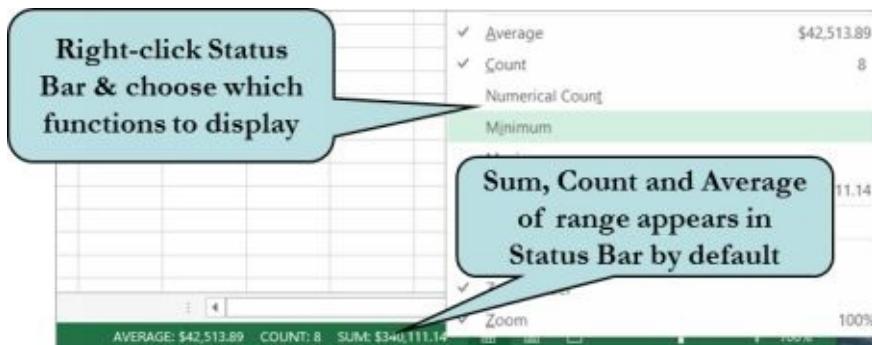
8. Enter the payment amount for each period as a negative number in the Pmt text box.

9. Press the Enter key to verify the formula.

Using AutoCalculate

The fastest way to perform a calculation on a range of cells is by using the AutoCalculate feature. And the best part is, you don't even have to type in a formula – it's automatic! Whenever you highlight a range the cells, the sum, the average and the count of that range is displayed in the Status bar.

However, you aren't only limited to these functions. You can also calculate the Numerical Count, Maximum, and Minimum of the range simply by right-clicking on the Status Bar and choosing the desired function.



Here's how to use the AutoCalculate feature:

- 1. Select the range of cells you wish to calculate.**
- 2. Right-click on the Status bar to choose another function type and click the box next to the function you want to display.**
- 3. See result in the Status bar.**

Chapter 13 - Date and Time Functions

Understanding Date/Time Functions

At times, you may need to calculate the time interval between two dates in years, months, days, hours or even minutes and seconds. Luckily, Excel supplies several functions for calculating dates and times and the amount of time between two dates and/or times. Below are some common date/time functions and any arguments that they may take:

DATE(year, month, day) – Creates a date based on the arguments. The arguments can be hard coded (i.e. =DATE(2003, 1, 23) or cell references (=DATE(A1, B1, C1))

TODAY() – Displays today's date in a cell.

NOW() – Displays the current date and time in a cell. It is only updated when the worksheet is recalculated or a file is opened.

DAY – returns the “day” value for a specific date.

MONTH – returns the “month” value for a specific date.

YEAR – returns the “year” value for a specific date.

TIME(hour, minute, second) – Creates a time based on the arguments.

HOUR – returns the “hour” value for a specific time.

MINUTE – returns the “minute” value for a specific time.

SECOND – returns the “second” value for a specific time.

DAY360(begin_date, end_date) – Returns the number of days between two dates based on a 360-day year (twelve 30-day months), which is used in some accounting calculations. Use this function to help compute payments if your accounting system is based on twelve 30-day months.

The above date and time functions, as well as many others can be accessed by using the Insert Function feature of Excel.

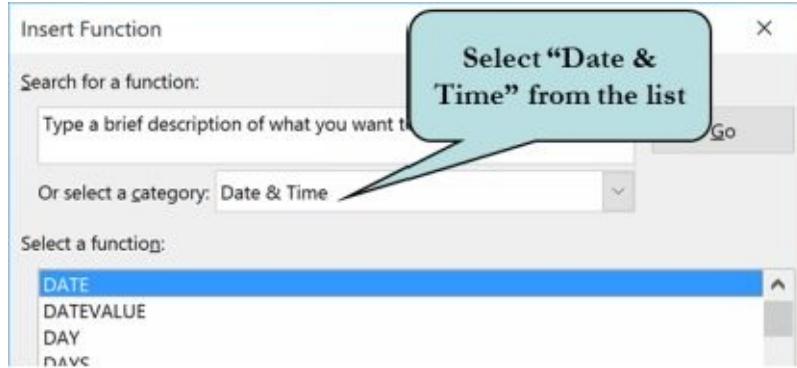
To use a Date or Time function, follow these steps:

- 1. Activate the cell where you wish to insert your date/time function.**
- 2. Click the Insert Function button to the left of the formula bar**

Or

Click the Formulas tab on the Ribbon and click the Insert Function button on the Function Library group.

- 3. Select Date & Time from the Category drop-down list.**



4. Select the desired date or time function from the Select a Function list box.
5. Click OK.
6. Type any required arguments or click the collapse dialog box to select them manually in your worksheet.
7. Click OK when finished.

Tip: You can also display the Function Arguments dialog box by clicking the Date & Time button on the Formulas Ribbon.

Adding a Date and a Date Interval

One of the most common date calculations used is that of adding together a date and a date interval. For instance, if your customer invoices are due every 30 days, you would find the next due date by adding 30 to the last billing date. To add the number of days to a date, just use basic addition. For instance, if you wanted to add 30 days to today's date, the syntax would be:

=TODAY + 30

Adding Months & Years to a Date

If we want to add months or years to a date, the formula becomes a little more complex. To accomplish this, you will need to use the DATE function along with several arguments. Let's say we wanted to add 6 months to today's date. The format would be:

=DATE(YEAR(TODAY()),MONTH(TODAY())+6,DAY(TODAY()))

This formula is broken down as follows:

1. **YEAR(TODAY())** – returns the Year portion of today's date.
2. **MONTH(TODAY())+6** – returns the Month portion of today's date and adds 6 months to it.
3. **DAY(TODAY())** – Returns the day portion of today's date. The two closing parenthesis close the **DATE** part of the formula and the last argument, the **MONTH** part of the formula.

So if we wanted to add 45 days to the current date, our formula would read as follows:

=DATE(YEAR(TODAY()),MONTH(TODAY()),DAY(TODAY()) + 45)

Note that you may need to format the cell as a Date from the Format Cells dialog box as Excel will return the date in serial number format.

Subtracting Dates

A	B	C	D	E	F	G	H
1	Retirement Dates						
2	Employee Name	Date of Hire	Retirement date	Months to Retirement	Years to Retirement		
5	Jim Howard	2/1/1995	2/1/2020	300	25		
6	Ann Scheibell	6/1/1997	6/1/2015	216	18		
7	Dan Wood	8/15/1994	8/1/2007	156	13		
8	Melissa Binger	7/1/2000	7/1/2028	336	28		
9	Samuel White	6/1/1992	6/1/2005	156	13		
10	Monica Sheiler	6/1/1993	6/1/2009	192	16		
11	Matt Henning	7/1/1998	6/1/2011	156	13		
12	Erik Luoma	7/1/1990	7/1/2021	372	31		

If you want to calculate how much time has passed between two dates, you need simply subtract the oldest date from the most recent date. For example, if the value in cell A1 was 12/31/2014 and the value in cell B1 was 9/3/2014, your formula would read:

$$=A1 - B1$$

The resulting answer would be 4/28/1900 – hardly what we expected. In order to get the correct response, we need to format the cell where the formula resides as a Number (Select Number from the drop-down list on the Number group on the Home Ribbon). Our answer would then be 119 representing the number of days between the two dates.

To calculate the number of months between two dates, use the formula:

$$=MONTH(A1)-MONTH(B1)$$

Once again, you will need to apply a number format to the cell containing the formula. One important note: ***This formula will only work if the months occur in the same year.***

To calculate the number of months between two dates falling in different years, use the following formula:

$$=((YEAR(A1)-YEAR(B1))*12)+MONTH(A1)-MONTH(B1)$$

In this formula, we take the oldest year, multiply it by 12 months, and then subtract it from the most recent year. Then, subtract the month of the oldest year from the most previous year and add it to the year result.

To calculate the number of years between two dates, our formula would read:

$$=YEAR(A10)-YEAR(B1)$$

Calculating Time Intervals

When you want to calculate the number of hours between two times, you subtract the least recent time from the most recent time. The result will be displayed in days. To calculate the result in hours, multiply the result of the calculation by 24.

1	Time Sheet for Matt Henning			
2				
3	Date	In	Out	Hours
4	1/20/2013	7:15 AM	4:00 PM	8.75
5	1/21/2013	7:30 AM	3:30 PM	8.00
6	1/22/2013	7:00 AM	4:30 PM	9.50
7	1/23/2013	7:00 AM	4:15 PM	9.25
8	1/24/2013	7:00 AM	3:45 PM	8.75

For instance, suppose cell A1 had the value of 7:00 AM and B1 contained the value of 3:30 PM. To calculate the number of hours between the two times, our formula would read:

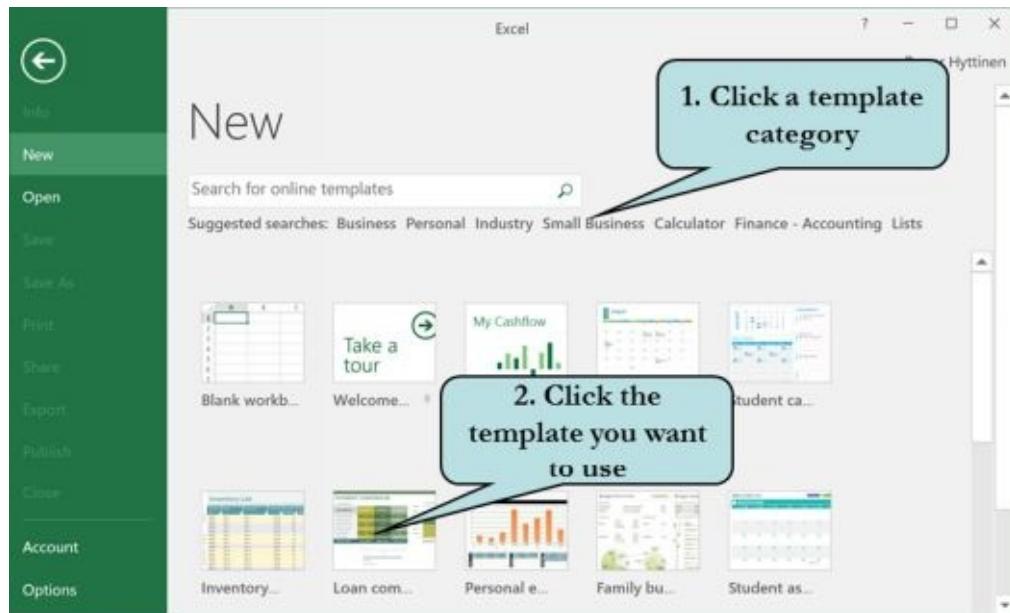
$$=(B1-A1)*24$$

Note: The cells containing the formula need to be formatted as a **Number**.

Chapter 14 - Managing Workbooks

Creating a Workbook Using a Template

Excel includes a few pre-defined templates which automate the process of creating common forms such as invoices, expense statements, loan amortizations, time cards and balance sheets. This is especially helpful if you find yourself creating the same type of report over and over again. To use a template, create a new workbook based on a template and fill in the data – the design and formatting process is already done for you. You can use the installed templates that came with Excel or download hundreds of additional templates from Microsoft Office Online.



To create a workbook from a template, follow these steps:

- 1. Click the File tab and then click New.**
- 2. Click the Template category on top of your screen**

Or

Choose an existing template from the right pane

Or

Type a search term in the Search Box and tap the Enter key.



- 3. Click the template you want to view. A preview of the template is displayed in the window.**
- 4. To change categories, choose the category you want in the right pane.**

5. Click the Create button. If it is an offsite template, the template is now downloaded to your computer from Microsoft's site.

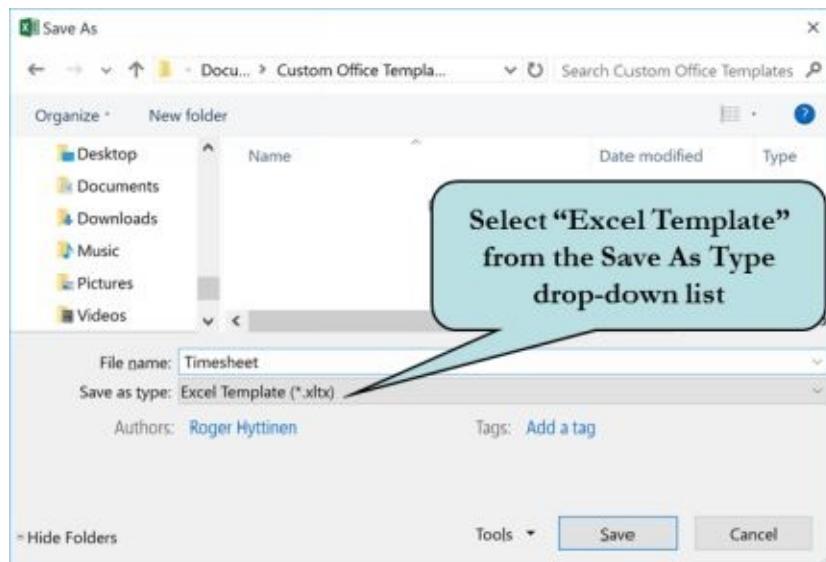
Creating a New Template

As we saw in the last section, Excel provides a variety of templates without you having to add any design changes or formatting – all you need to do is enter in the data. However, you also have the ability to create your own templates that you can use in other workbooks. This is especially useful if you need to create a particular type of report on a regular basis with consistent text, formatting or formulas. Rather than starting from scratch each time, you can set up the design and formatting ahead of time.

Excel templates are saved with the .xltx extension. By default, Excel stores any new templates in the Custom Office Templates folder. If you wish your template to appear in the Personal category when creating a new workbook, you must store your template in the default folder.

To create a new template, follow these steps:

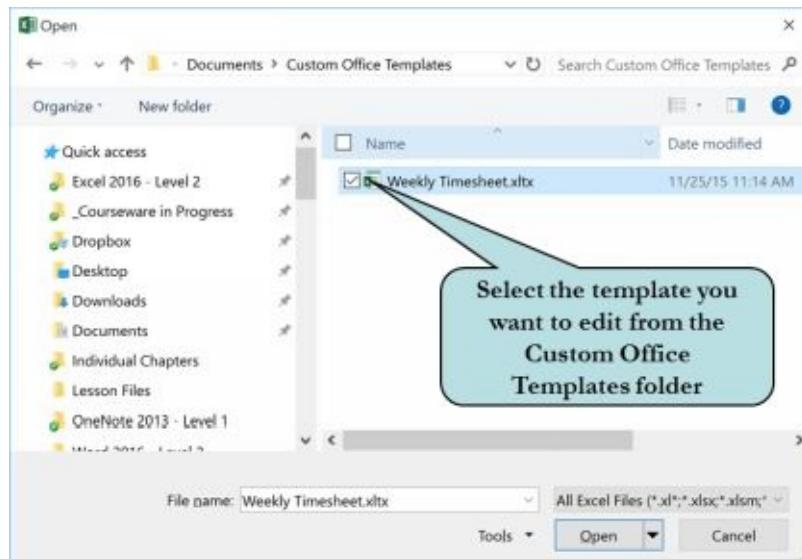
- 1. Create a new Excel workbook with the desired formatting, design, formulas, and headings.**
- 2. Click the File tab and click Save As from the File Options pane.**
- 3. Click the Browse button to display the Save As dialog box.**
- 4. Click the Save as type drop-down arrow and select Excel Template from the list. If your template contains macros, choose Excel Macro-Enabled Template.**



- 5. Type the name for your template in the File Name text box.**
- 6. Click the Save button.**

Editing a Template

You make changes to a template just as you would make changes to a normal workbook file — simply open the file directly, make your changes and then save the file. Template files are saved in the Custom Templates folder (which is located under your Documents folder) by default. You may need to navigate to this folder to find your existing templates. Being able to find your template files is especially handy if you want to copy your templates to another computer or make a backup of any templates that you have created or downloaded.



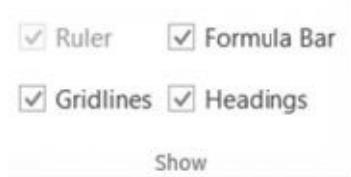
Another way to edit a template (although a bit sloppier) is to create a new workbook based upon the template that you want to edit. Make your changes and then save the new workbook as a Template (with the same name as the original template), as we did in the last lesson. Click Yes when asked if you wish to replace the existing file.

To edit an existing template, follow these steps:

- 1. Click the File tab and then click Open.**
- 2. Click Computer in the center pane.**
- 3. Click Browse in the right pane.**
- 4. Click Documents in the left pane (may be under the Libraries section).**
- 5. Double-click Custom Office Templates.**
- 6. Select the desired template file and click Open.**
- 7. Make any changes to the template.**
- 8. Click the Save button to save your changes.**

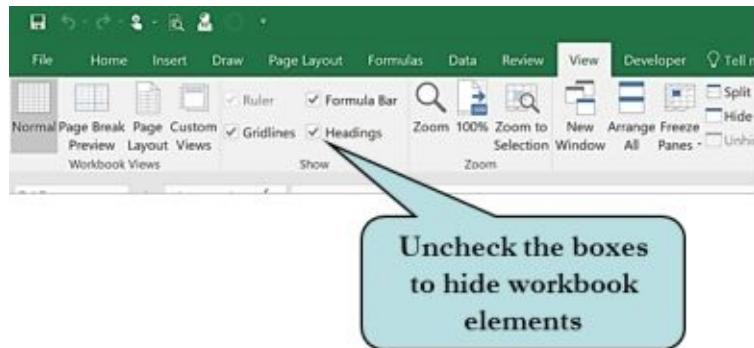
Showing or Hiding Workbook Elements

New workbooks contain a default set of elements: Ruler, Gridlines, Message Bar, Formula Bar, Column Headings and Row Headings. Excel allows you to display or hide these items by checking or clearing the box next to the item. This feature can come in handy if you need extra room for formatting or wish to see how your spreadsheet will look without gridlines.



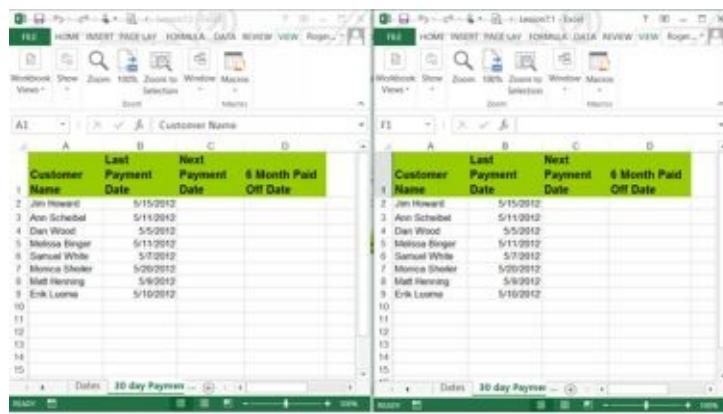
To display or hide workbook elements, do this:

- 1. Click the View tab on the Ribbon.**
- 2. Click or clear the check box for the element you wish to display or hide on the Show group.**



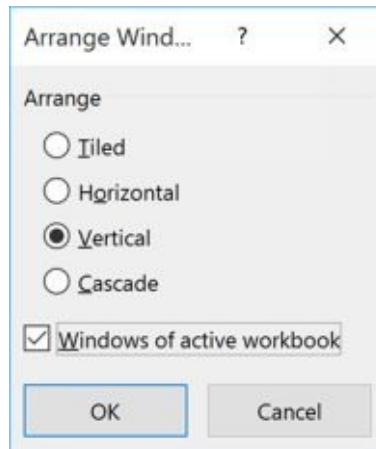
Creating a Workspace

You may find yourself needing to compare two worksheets in the same workbook simultaneously or needing to work on two worksheets at the same time. With Excel, you can view multiple worksheets in your workbook in the same window by using the New Window and Arrange All commands on the View Ribbon. This is referred to as Creating a Workspace. You will first need to open a second window and then position the worksheets in the desired arrangement (tiled, horizontal, vertical or cascade). Note that the ability to save workspaces has been discontinued in recent versions of Excel. However, you still can open workspaces saved in previous versions of Excel.



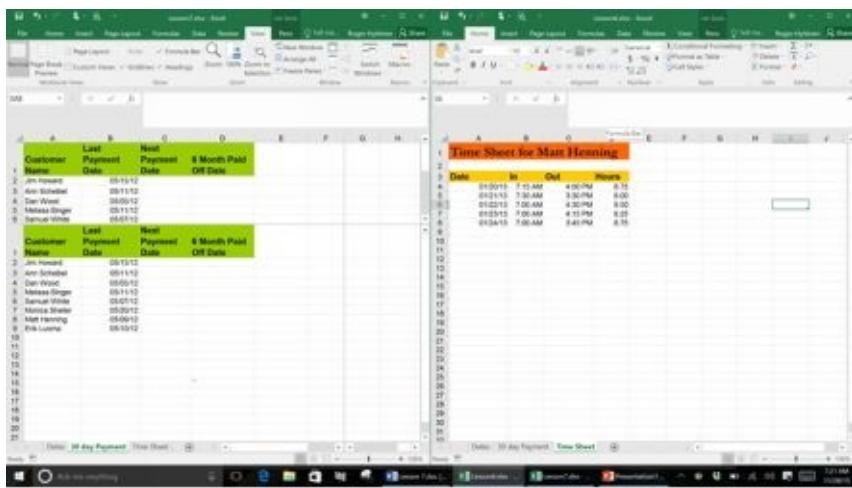
To create a workspace, follow these steps:

1. Open the workbook file(s) for which you want to create a workspace.
 2. Click the View Tab on the Ribbon.
 3. Click the New Window button on the Window group to add a second window.
 4. Click the Arrange All button on the Window group.
 5. Click the check box next to Windows of Active Workbook.



- 6. Click the radio button next to the window arrangement you want.**
 - 7. Click the desired worksheet tab in each window.**

Comparing Two Workbooks Side by Side

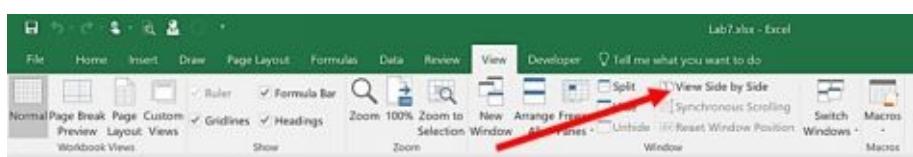


When working with multiple workbooks, you may at times need to copy or move data from one document to another or perhaps compare the content of two documents. In addition to the New Window command, Microsoft Excel includes the View Side by Side feature, located on the Window group of the View Ribbon, allowing you to display two open workbooks alongside one another. You need to have at least two different documents opened in order to use this feature.

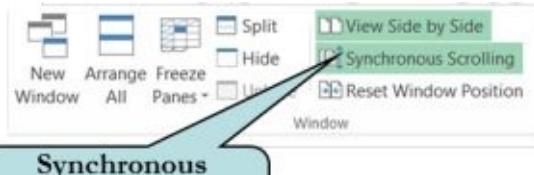
The Synchronous Scrolling button on the Window group allows you to synchronize scrolling – that is to say, when you move the scrollbar upwards or downwards, both worksheets move in that direction. If you modify the window position of one of the worksheets, you can restore the Side by Side view by clicking the Restore Window Position button. To return to normal view, click the View Side by Side button.

To display two workbooks side-by-side, follow these steps:

- 1. Open the workbooks you wish to view.**
- 2. Click the View tab on the Ribbon.**
- 3. If you have only two open workbooks, click the View Side by Side button on the Window group.**



- 4. If you have more than two open workbooks, click the View Side by Side button on the Window group and then select the workbook you wish to display alongside of the active workbook from the list. Click OK.**
- 5. If you want to synchronize scrolling, ensure that the Synchronous Scrolling icon is toggled on.**

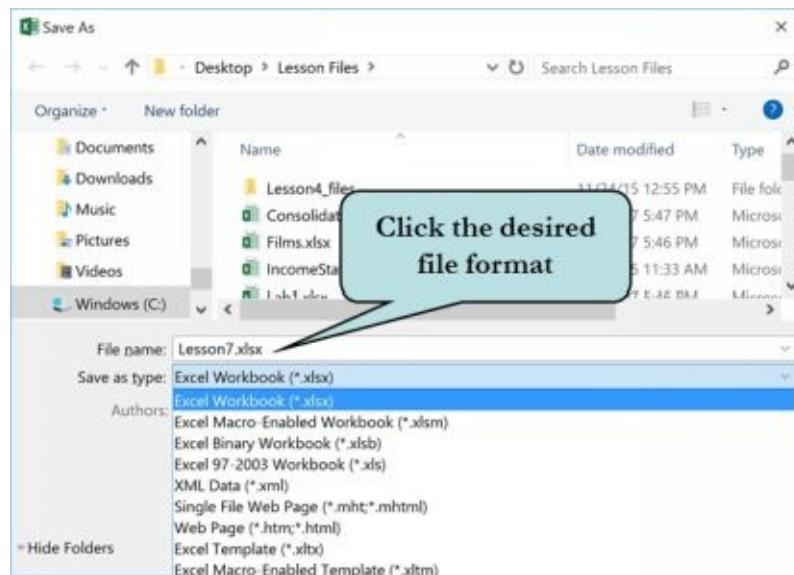


6. Click the View Side by Side button when you are finished comparing the two workbooks.

Saving a Workbook in a Different File Format

Earlier, we saw how to save an Excel workbook as a Template. In addition, Excel allows you to save your workbooks in different file formats which can then be read by other applications. For instance, you may need to save your file in a previous version of Excel, an XML file or even a comma delimited text file (CSV). Be aware, however, that saving Excel documents in different file formats can result in the loss of some of the original formatting of the document.

For some of the file formats such as comma delimited or space delimited, Excel will only allow you to save the active worksheet. If you have more than one worksheet that you wish to save in a different file format, you will need to save each sheet individually.



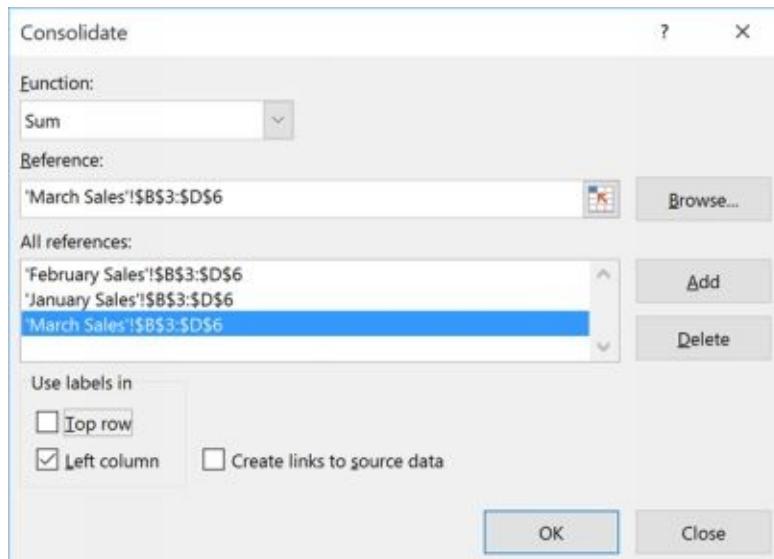
To save an Excel workbook in a different format, follow these steps:

- 1. Click the File tab.**
- 2. Click Save As in the left pane.**
- 3. Select the location where you want to save your file (Computer, OneDrive or SharePoint).**
- 4. Click the Browse button and then navigate to the folder where you want to save your file.**
- 5. Click the arrow to the right of the Save as Type drop-down list.**
- 6. Select the desired file format.**
- 7. Type a new name for the document in the File name text box, if desired.**
- 8. Click the Save button.**

Tip: To bypass Backstage view and jump directly to the Save As dialog box, press the **F12 key**.

Using Data Consolidation

Excel allows you to consolidate similar values from several ranges of data into a single worksheet. For instance, you may have sales figures in separate worksheets or workbooks for January through June. You can easily total the figures in a new worksheet by using Data Consolidation and the SUM Function. Additionally, you can create a live link to the data ranges of the worksheets that you consolidate.



To consolidate data, follow these steps:

- 1. Open all workbooks that contain the data you want to consolidate.**
- 2. Select the cell range where you want the new consolidated data to show.**
- 3. Click the Data tab on the Ribbon.**
- 4. Click the Consolidate button on the Data Tools group.**



- 5. Choose the desired function from the Function drop-down list.**

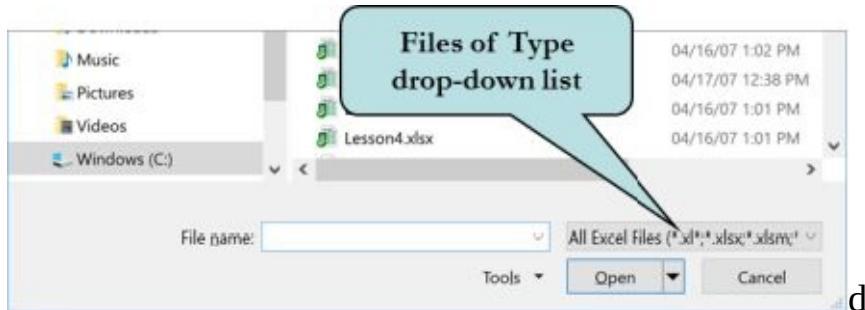


- 6. Click the Collapse Dialog Box in the Reference text box and select the first cell range you wish to add to the consolidation.**
- 7. Click the Expand Dialog Box.**
- 8. Click Add.**
- 9. Repeat Steps 6, 7, & 8 for each cell range you wish to add to the consolidation.**
- 10. Click OK.**

Chapter 15 - Importing & Exporting Data

Importing External Data into Excel

Excel allows you to import data from many popular formats such as text files, database applications such as Microsoft Access or dBase, XML Spreadsheets and even HTML data into your spreadsheet. To import data created in another application, display the File Options pane and then select the type of file you would like to import from the Files of Type box.



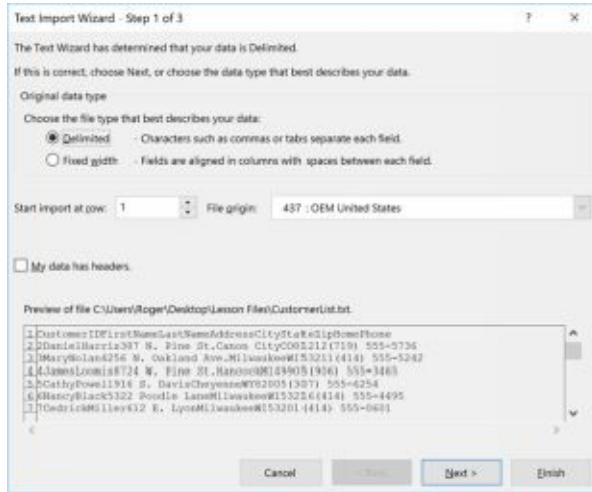
Once the data is imported, you can make changes to the file and apply any formatting that you wish. However, it is recommended that you save the file in Excel format as any formatting changes may be lost if the file type is still in the native format.

To import data into Excel, follow these steps:

- 1. Click the File tab and then click Open.**
- 2. Click the Browse icon in the center pane.**
- 3. From the Files of Type: drop-down list, choose the type of file you wish to import.**
- 4. Navigate to the folder which contains the file.**
- 5. Select the file you wish to import.**
- 6. Click Open**

Importing Text Data into Excel

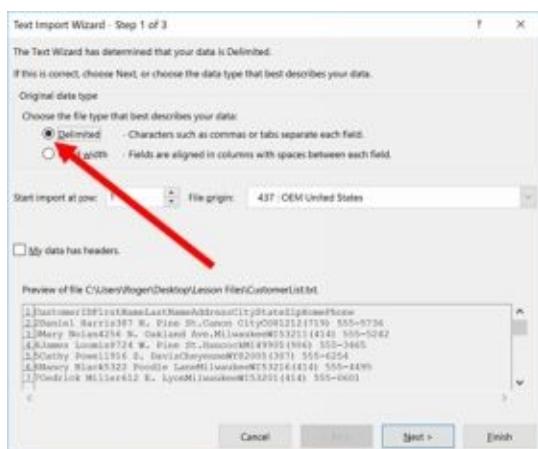
When importing text data from external sources, it is usually separated by delimiters such as a comma, a tab or a space. If some cases, it might even be in a fixed-width format, in which each field contains a specific number of characters. In order to import a text file, Excel launches the Text Import Wizard, which allows you to tell Excel how the data is to be arranged, what column formatting you want to use and which delimiters separate the data. Additionally, you can specify which columns to import and apply column formatting before the import.



Text Import Wizard dialog box

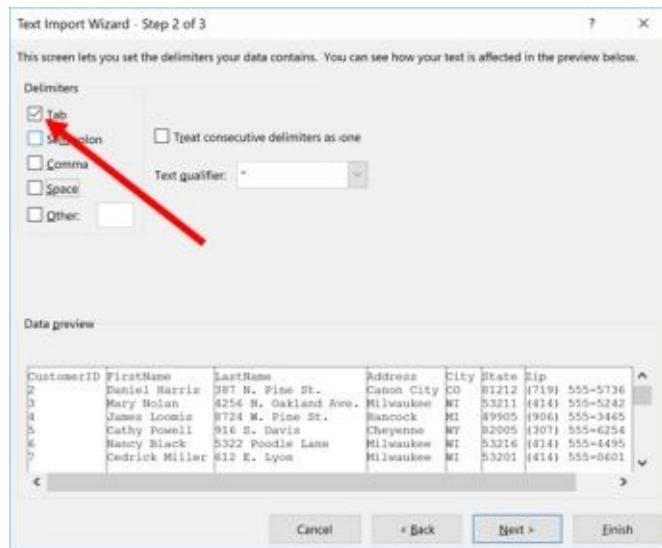
To import text data into Excel, follow these steps:

- 1. Click the File tab and then click Open.**
- 2. Click the Browse icon in the center pane.**
- 3. From the Files of Type: drop-down list, choose the type of file you wish to import.**
- 4. Navigate to the folder where the file you wish to import is located.**
- 5. Select the file and then click Open.**
- 6. Choose whether the file is Delimited or Fixed Width.**

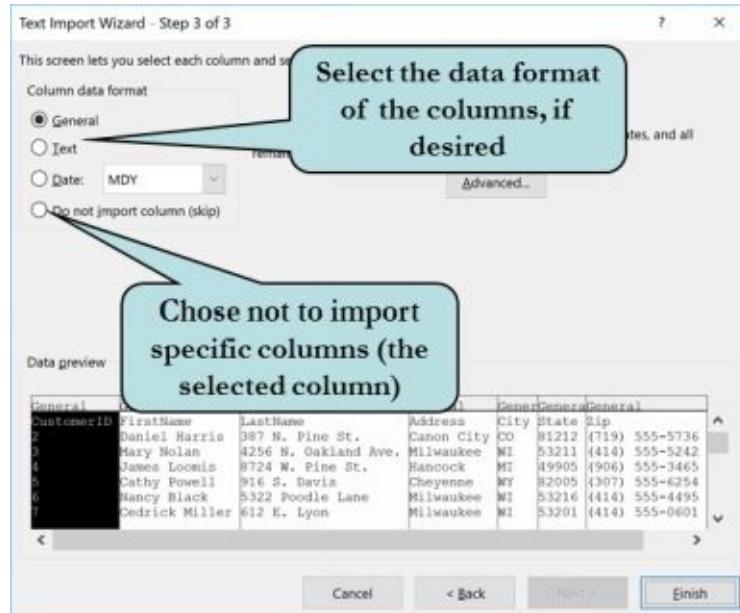


- 7. Click the Next button.**
- 8. In Step 2, select the type of delimiter (tab, comma, semicolon, space or other) and**

click the Next button.



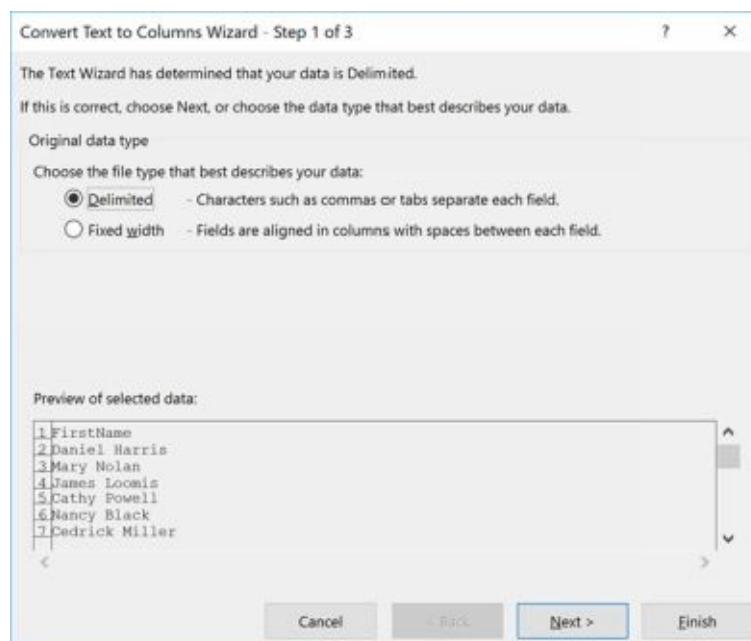
9. Set any column formatting (text, date, etc.). If you do not wish to import a particular column, highlight the column and then select the Do not import column (skip) radio button.



10. Click the Finish button.

Converting Text to Columns

Sometimes the data that we import may not end up in the exact format we want. For instance, we may discover that the first name and last name fields are combined into one column. If you have a column of data that is separated by a delimiter (most often a space), then use the Text to Columns Wizard on the Data Ribbon to separate it into separate columns. For example, the name “Dan Baker” uses the space delimiter. To launch the wizard, click the Text to Columns button on the Data Ribbon.



To convert text to columns, follow these steps:

1. Select the column that you want to separate.

The screenshot shows the Excel ribbon with the 'Data' tab selected. The ribbon also includes 'File', 'Home', 'Insert', 'Draw', 'Page Layout', 'Formulas', 'Review', 'View', and 'Developer'. Below the ribbon, a table is displayed with the following data:

	Customer	FirstName	LastName	Address	City	State	Zip	HomePhone
1								
2	2	Daniel Harris		381 N. Pine St.	Canon City	CO	81212 (719) 555-5736	
3	3	Mary Nolan		4256 N. Oakland Ave.	Milwaukee	WI	53211 (414) 555-5242	
4	4	James Loomis		8724 W. Pine St.	Hancock	MI	49905 (906) 555-3465	
5	5	Cathy Powell		916 S. Davis	Cheyenne	WY	82005 (307) 555-6254	

2. Click the Data tab on the Ribbon.

3. Click the Text to Columns icon on the Data Tools group of the Ribbon.

The screenshot shows the Excel ribbon with the 'Data' tab selected. A red arrow points to the 'Text to Columns' icon in the 'Data Tools' group. The ribbon includes 'File', 'Home', 'Insert', 'Draw', 'Page Layout', 'Formulas', 'Review', 'View', and 'Developer'. Below the ribbon, a table is displayed with the following data:

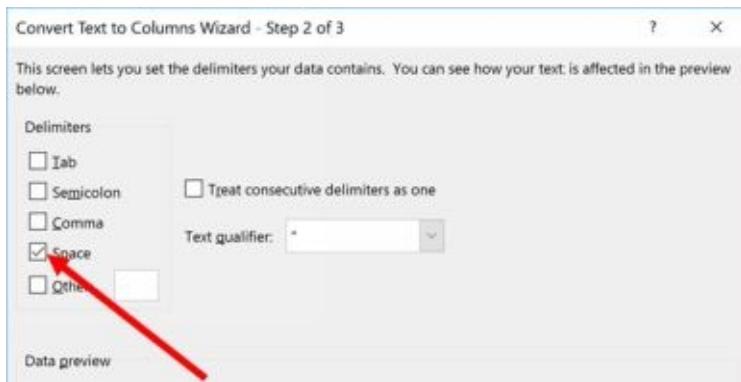
	Customer	FirstName	LastName	Address	City	State	Zip	HomePhone
1								
2	2	Daniel Harris		381 N. Pine St.	Canon City	CO	81212 (719) 555-5736	
3	3	Mary Nolan		4256 N. Oakland Ave.	Milwaukee	WI	53211 (414) 555-5242	
4	4	James Loomis		8724 W. Pine St.	Hancock	MI	49905 (906) 555-3465	
5	5	Cathy Powell		916 S. Davis	Cheyenne	WY	82005 (307) 555-6254	

4. Click Delimited.



5. Click the Next button.

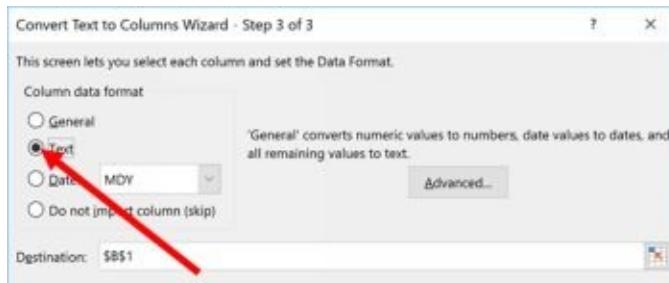
6. Select the type of delimiter (tab, comma, semicolon, space or other).



7. If the text in the column is surrounded by a qualifier such as “” or “”, choose the qualifier from the Text qualifier drop-down list.

8. Click Next.

9. Set any column formatting (text, date, etc.).

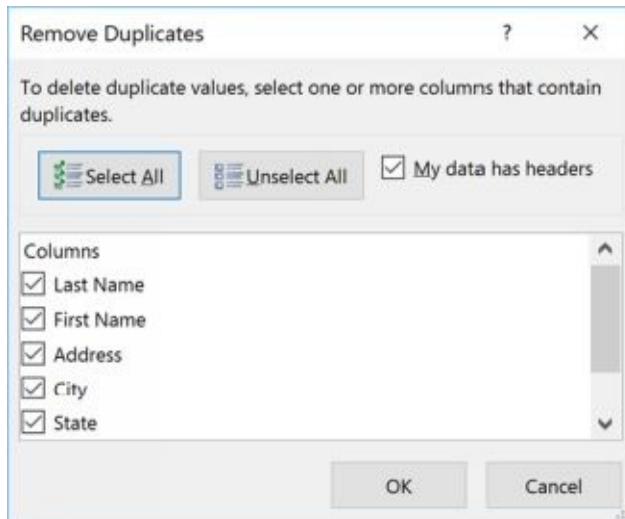


10. If you want your results to be placed in a different location than the original, click in the Destination box and select the desired target cell.

11. Click the Finish button.

Removing Duplicate Rows of Data

If you import data from several sources or if there are several people involved in combining the data, you may oftentimes encounter the problem of duplicate records. Luckily, this problem can be solved by Excel's Remove Duplicates feature.



What this does is looks for duplicates in all of the columns of the selected data, which is often what we want. For instance, we don't want to simply just look at the name column because there may be several John Smith's among your customer base. However, there should be only one John Smith living at 420 N. Crescent Way in St Louis, MO. So by checking across all columns, we ensure that there are no completely duplicated columns all the way across. However, you only do need to include those columns which absolutely cannot be duplicated. If you were working with a list of employees for instance, the Social Security field may be the only column for which you need to check for duplicates.

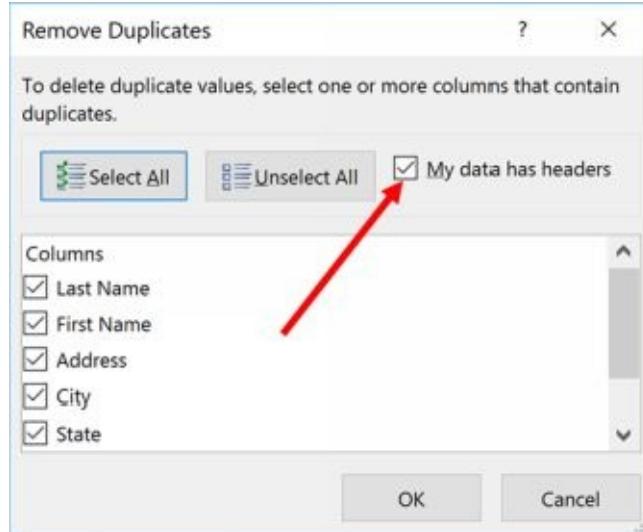
If your workflow entails a good amount of importing data, you'll no doubt eventually encounter duplicate records. The Remove Duplicates feature is a welcome feature and helps in quickly cleaning up a list of data.

To remove duplicate rows of data, follow these steps:

- 1. Click the Data tab on the Ribbon.**
- 2. Click anywhere in your data list. Ensure that there are no blank rows in the list.**
- 3. Click the Remove Duplicate icon on the Data Tools group of the Ribbon. Excel will highlight the entire list of data.**



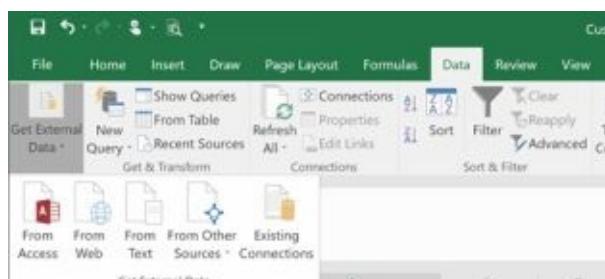
- 4. If your data list has a header row, ensure that My Data Has Headers is checked.**



5. By default, all columns are selected. To remove a column from the search, uncheck the box next to the column name.
6. Click OK. A message box displays informing you of the number of rows that have been removed and how many unique values remain.
7. Click OK.

Importing Data from a Database

In addition to importing spreadsheets from other applications and text files, Excel can also import data from a database. This can be a Microsoft Access database or an ODBC (Open Database Connectivity) database such as SQL or Oracle. To import from an Access database, click the **From Access** command button on the Data Ribbon. To choose a different type of database, click the From Other Sources button on the Data Ribbon and choose the type of database you want to import.

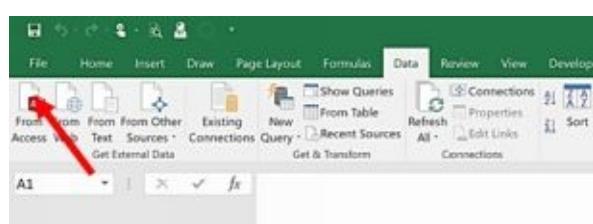


When importing from an Access database, you have the option of importing an existing **table or query**. Importing an existing query allows you to import filtered data. For instance, when using a customer address database, you may only want to import customers for a particular state. In this case, you could create a query in Access to perform the filtering and then select that query's data to import into Excel.

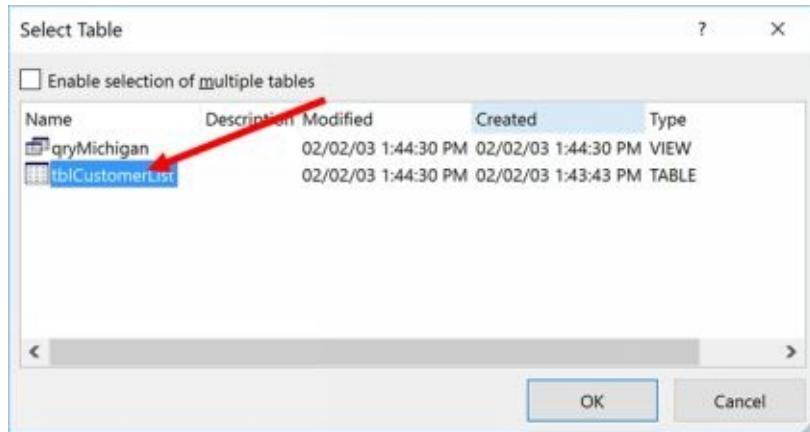


To import data from an Access database into Excel, follow these steps:

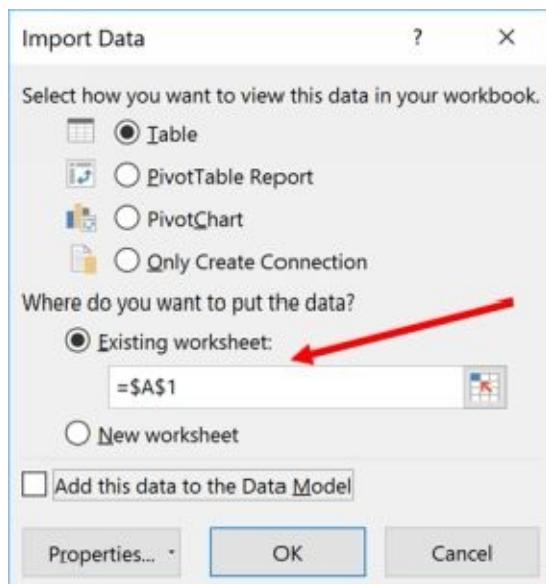
1. Create a new blank spreadsheet.
2. Click the Data tab on the Ribbon.
3. From the Get External Data group on the Ribbon, click the *From Access* icon.



4. Navigate to the folder where the database file is located.
5. Select the file and then click Open.
6. Choose the Table or the Query (called Views in some applications) you wish to import.



7. Choose whether you wish to place the data into the existing worksheet or into a new worksheet. If placing data into the existing worksheet, type in or select the destination address if desired.



8. Select whether you want to view your data in a Table, PivotTable Report or a PivotChart and Report.

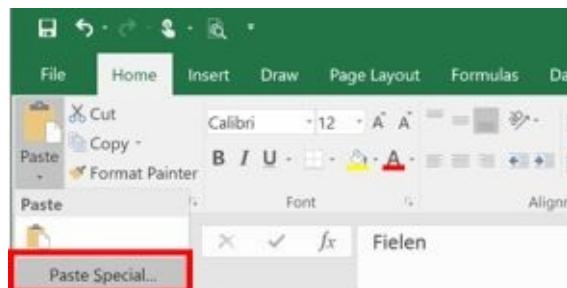
9. Click OK.

Tip: To create a live connection to an Access database (tables and queries), click the New Query icon on the Data Ribbon, point to From Database, click From Microsoft Access Database and then choose the desired table or query.

Linking to another File

Excel allows you to copy data from other Microsoft Office programs into your spreadsheets. If you insert data from another application using the standard Copy and Paste methods, a copy of the original data is inserted in your workbook and is completely separate from the original application - it can be modified any way you wish. You can instead choose to Link data to its original application. Data that is linked is automatically updated when the original document is modified. While you can apply formatting to linked data, any changes to the data itself can only be made in the original document.

To link data, copy the data to which you wish to link, click the Paste button arrow on the Home Ribbon, choose Paste Special and then click the Paste Link radio button.



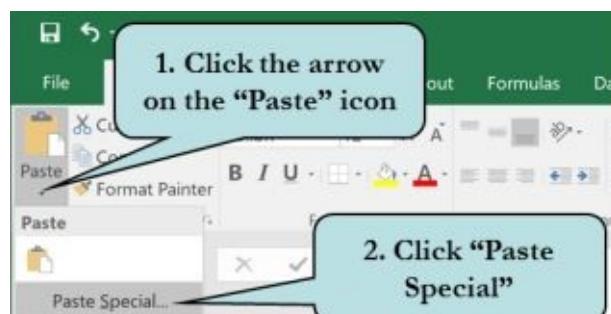
To create a link to another file, follow these steps:

- 1. Open the file to which you wish to link.**
- 2. Select the information in the source file.**
- 3. Click the Copy button on the Home tab**

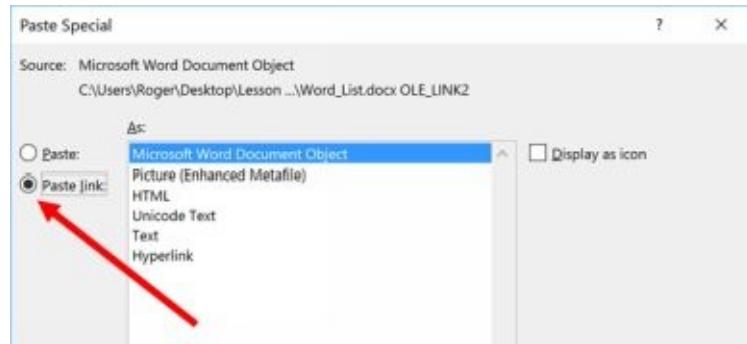
Or

Press the **Ctrl + C** keystroke combination.

- 4. Switch to the Excel file where you want to insert the link and set the insertion point where you want to place the link.**
- 5. Click the Paste button arrow on the Home tab.**
- 6. Click Paste Special.**

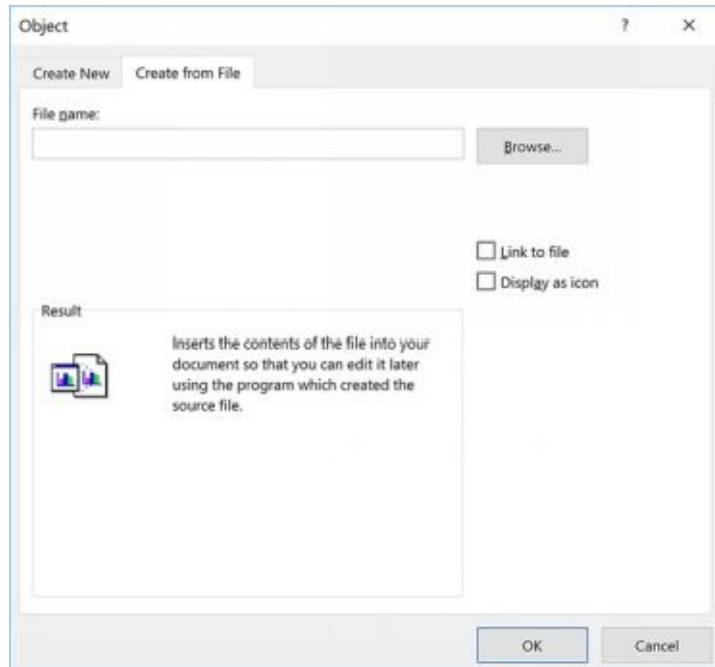


- 7. Click the Paste Link radio button and then click OK.**



Linking & Embedding Objects

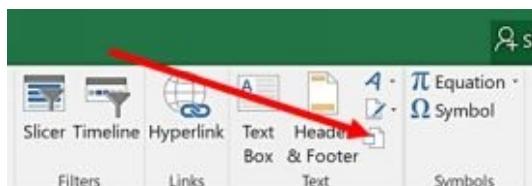
Excel also allows you to embed and link Microsoft Office objects such as text, charts, or pictures into a worksheet. When you embed data as an object, the data is stored in your worksheet. Double-clicking the object displays it as editable in Excel but with the Ribbons and toolbars of the original document. For example, if you double-click on an embedded Word table, Word's Ribbons will temporarily replace the Ribbons in Excel. With embedded objects, the data is only updated in Excel – the source document does not change.



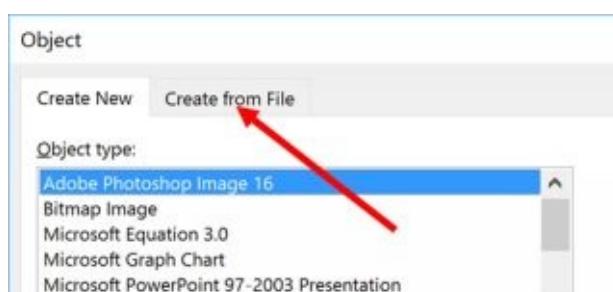
Linking data as an object on the other hand, is just a snapshot of the original source data – the data actually resides in the source file. Double-clicking on a linked object displays the source data in its original application.

To embed or link to an existing object, follow these steps:

- 1. Click the Insert tab on the Ribbon.**
- 2. Click the Object button on the Text group.**



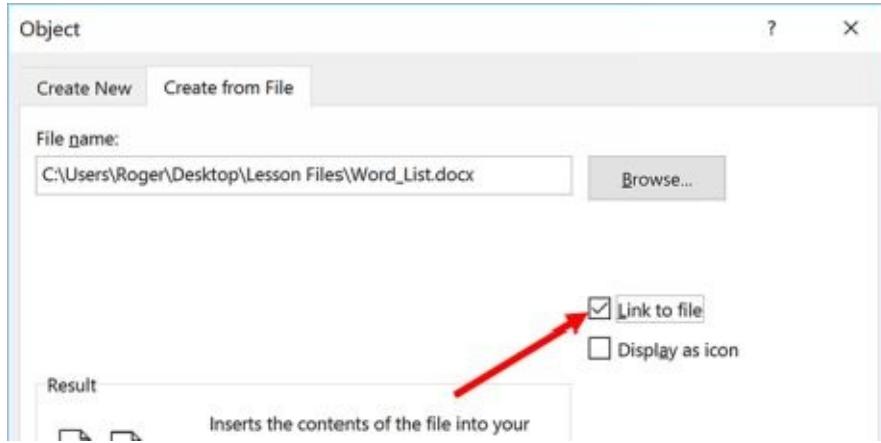
- 3. Click the Create from File tab on the Object dialog box.**



4. Click the Browse button and navigate to the folder that contains the file to which you want to link.

5. Select the file and click Insert.

6. To link to the object (rather than embed the object), click the Link to file check box.



7. Click OK

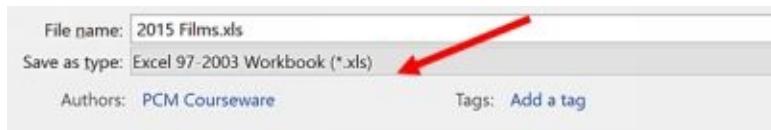
Exporting Data from Excel

Excel can export or save data in a variety of file formats such as older versions of Excel, text files, XML Spreadsheet (Extensible Markup Language) or as an XPS document, just to name a few. To accomplish this, use the Save As command from the File Options menu and then choose the desired file type from the Save as Type combo box.

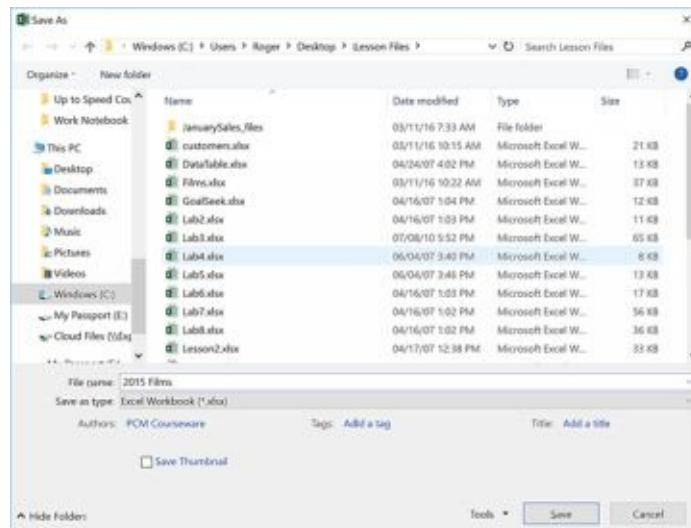
Note however, that when you save your file in another file format, Excel may, depending on the format, save only the active worksheet and not the entire workbook. You may also lose some formatting during the conversion.

To export data from Excel, follow these steps:

- 1. Click the File tab and click Save As.**
- 2. Navigate to the folder where your file is located.**
- 3. Select the desired file format from the Save as Type drop-down list.**



- 4. Type the file name in the File name box.**
- 5. Navigate to the folder where you wish to save the file.**
- 6. Click Save.**



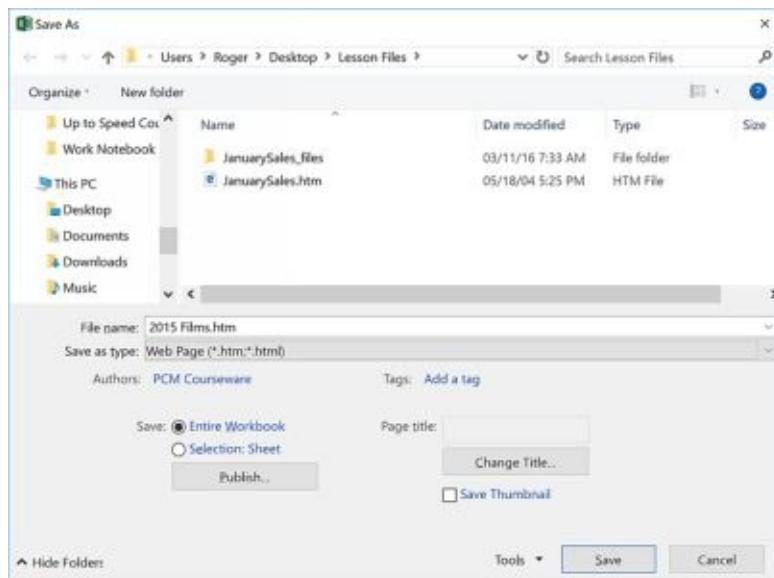
The Save As dialog box

Remember: A quick way to display the Save As window is to press the **F12 key** on your keyboard. This completely bypasses Backstage view.

Publishing Worksheets & Workbooks to the Web

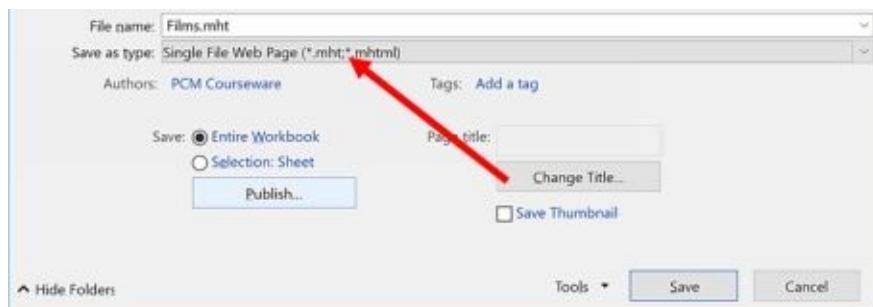
Another format to which you can export data from Excel is HTML (Hypertext Markup Language) which enables others to view your data via the World Wide Web. By choosing this format, users can view or even interact with your data via their Web browser.

In addition to standard HTML format, Excel also supports an additional Web format, MHTML, that you can use when exporting your data. Unlike exporting to HTML which creates a main HTML document and a support folder containing all support files, MHTML exports all of your data into one single file. Note however, that this file may not display properly in older Web browsers. To save a file in MHTML format, choose Single File Web Page from the Files as Type List.

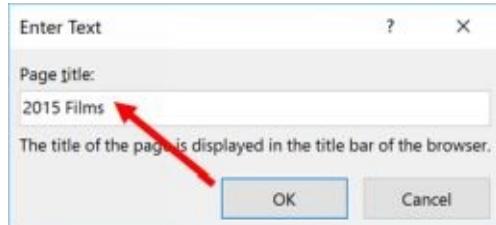


To export data in an interactive Web format, follow these steps:

- 1. If you want to only save a particular sheet as a Web page, click the desired sheet tab.**
- 2. Click the File tab.**
- 3. Click Save As from the File Options pane.**
- 4. Navigate to the folder where you want to save your file.**
- 5. Select Entire Workbook to save entire workbook file or Selection:sheet to save only the active sheet.**
- 6. In the Save as Type drop-down list, choose Web Page for HTML format or Single File Web Page for MHTML format.**

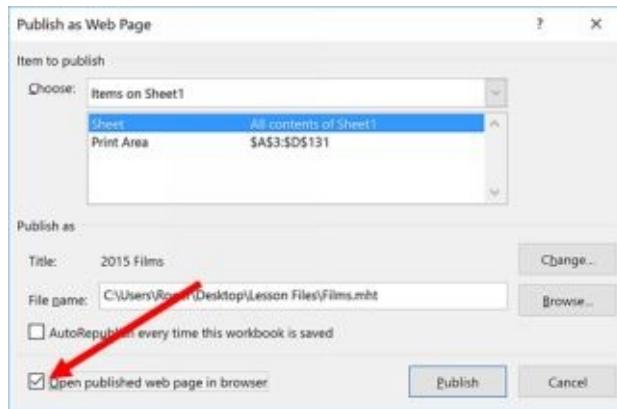


7. To establish a title for the Web page, click the Change Title button and then type in the new title. Click OK when finished.



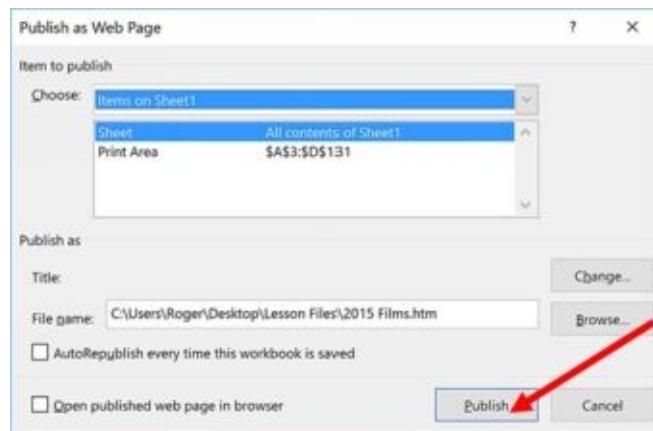
8. Click Publish.

9. To view the document in your Web browser, click Open published web page in browser.



10. To change the folder where the file will be saved, click Browse and navigate to the desired folder.

11. Click Publish.



Creating Web Queries

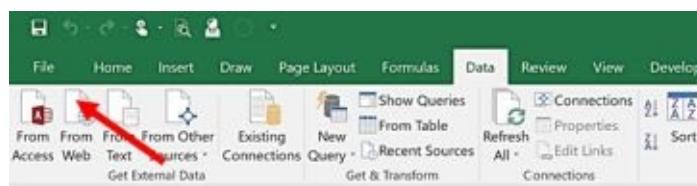
Excel allows you to retrieve data from the Web via Web queries by using the From Web feature on the Data Ribbon. With a Web query, you can retrieve data from a single table, multiple tables or bring in all of the text on the Web page. Once the data is retrieved, use the Refresh All command on the Data Ribbon to refresh the data.



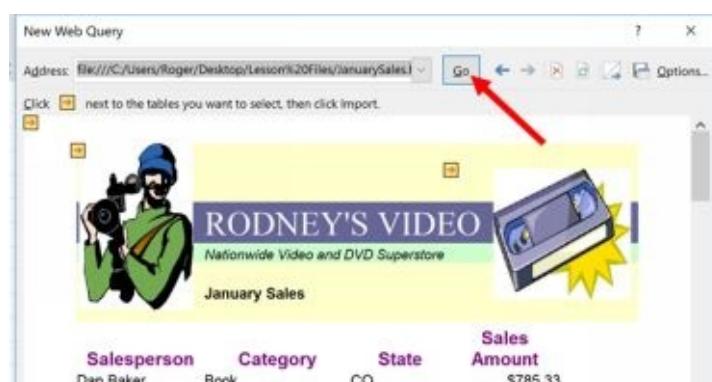
New Web Query Dialog Box

To retrieve data from the Web with a Web Query, follow these steps:

- 1. Click the Data tab on the Ribbon.**
- 2. Click the From Web button on the Get External Data group.**



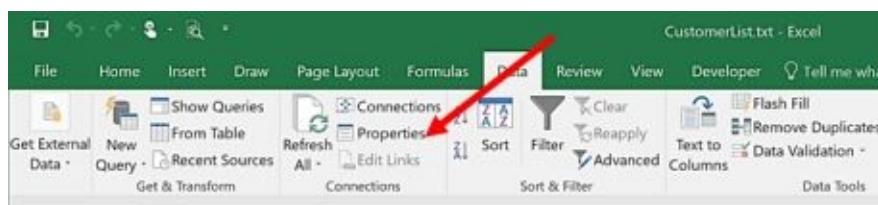
- 3. Type the Address of the Web page in the Address box.**
- 4. Click Go.**



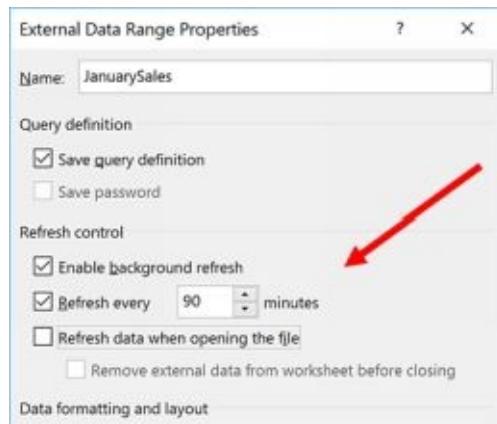
- 5. Click the Yellow Arrow next to each table you want to import.**



6. Click the Options button on the Address bar to select the format of the imported data.
7. Click the Import button.
8. Specify the cell where you want the web data to be placed.
9. Click OK.
10. Click the Properties icon on the Connections group of the Data Ribbon.



11. Choose how often you wish to refresh the data in your query. Click OK when finished.



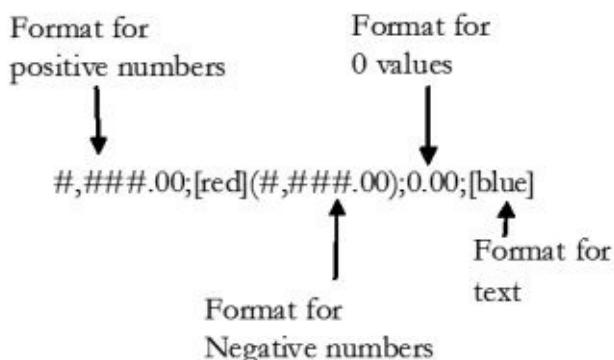
Tip: You can click the Refresh All icon on the Ribbon to manually refresh the data in your query.

Chapter 16 – Advanced Number Formatting

Creating Custom Number Formats

You can create a custom number format in Excel if one of the pre-defined formats does not fit your needs. For instance, you might want to create a format that will automatically insert the dashes in social security numbers so you don't have to enter them. Or perhaps you wish to create a custom format that displays negative numbers in a blue font. You also have the option of editing existing format codes in order to create a new one.

You can specify up to four sections of format codes. The format codes, separated by semicolons, define the formats for positive numbers, negative numbers, zero values, and text, in that order. If you specify only two sections, the first is used for positive numbers and the second is used for negative numbers. If you specify only one section, it is used for all numbers. If you skip a section, be sure to include the ending semicolon for that section.



So if we wanted to create a custom format to display numbers as currency with 2 decimal places with negative numbers in a blue font surrounded by parenthesis, our custom format would read: **\$#,##0.00;[Blue](\$#,##0.00)**

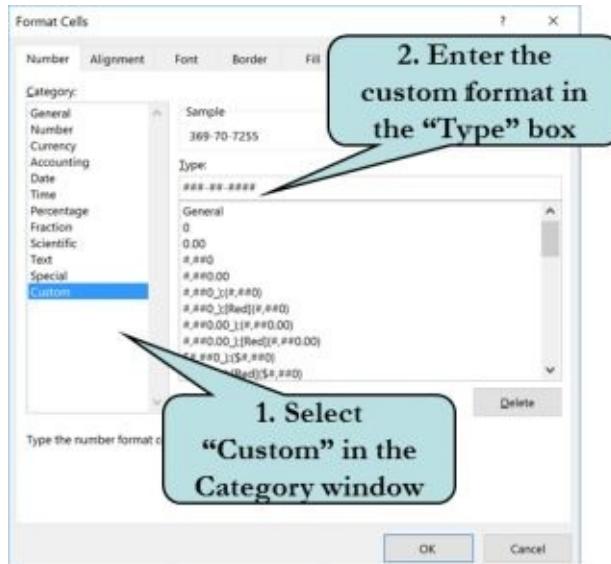
To create custom number formats, follow these steps:

- 1. Select the cell range you wish to format.**
- 2. Click the Format button on the Cells group of the Home Ribbon and choose Format Cells from the menu**

Or

Right-click and choose Format Cells from the contextual menu.

- 3. Click the Number Tab.**
- 4. In the Category list box, select Custom.**



- 5. In the Type text box, type in the desired format codes.**
 - 6. Click OK.**

Using Conditional Formatting

Conditional formatting allows you to apply formatting and icons to selected cells based on a particular criteria, that automatically updates whenever the data is changed. In other words, if the value of the cells meets specific conditions you set, then the conditional formatting will be applied. Conditional formatting is a good way to call attention to specific values in your worksheet. For instance, if your product inventory falls below a certain level, you might add a green fill color, a yellow font color and bold formatting to cause the value to stand out from other cells.

The screenshot shows a Microsoft Excel spreadsheet titled "Lesson2.xlsx - Excel". The Home tab is selected in the ribbon. A red arrow points to the "Conditional Formatting" button in the Styles group. A dropdown menu is open, displaying several options: "Highlight Cells Rules", "Top/Bottom Rules", "Data Bars", "Color Scales", "Icon Sets", "New Rule...", "Clear Rules", and "Manage Rules...". The data in the spreadsheet consists of a table with columns for Manager Name, SS Number, Store, and Income. The first row is a header, and the second row is highlighted with a yellow background.

	A	B	C	D	E
1	Manager Name	SS Number	Store	Income	
2	Jim Howard	389-70-7255	\$25,222.00		
3	Ann Scheibel	372-05-2432	(\$8,252.00)		
4	Dan Wood	370-78-0278	\$65,242.00		
5	Melissa Binger	380-78-9078	\$82,343.00		
6	Samuel White	389-89-2755	(\$15,999.00)		
7	Monica Sheiler	385-97-2422	\$51,355.00		
8	Matt Henning	350-97-8999	\$15,000.00		
9	Erik Luoma	389-11-9242	(\$5,224.00)		

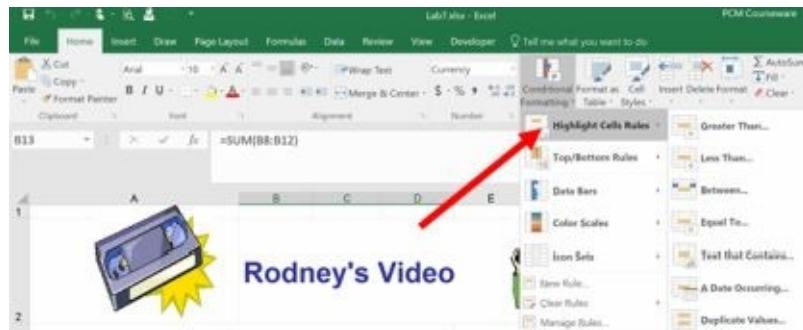
When applying conditional formatting, you need to choose the comparison rule you want to apply and then enter your criteria for the comparison. You can choose from the following comparison rules:

- **Greater Than**
- **Less Than**
- **Between**
- **Equal To**
- **Text that Contains**
- **A Date Occurring**
- **Duplicate Values**

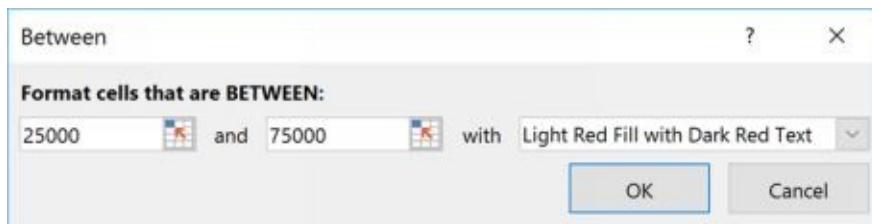
For more control, select **More Rules** from the Highlight Cell Rules menu. From here, you further customize your rules.

To use conditional formatting, follow these steps:

- 1. Select the cell range you wish to format.**
- 2. Click the Home tab on the Ribbon.**
- 3. Click the Conditional Formatting button on the Home Ribbon and then point to Highlight Cell Rules.**



4. Click the comparison rule you want to apply to the selected data.
5. Enter your criteria in the Comparison Rule dialog box.



6. Select the desired formatting to be applied when the condition evaluates as true from the drop-down list (click Custom to specify your own formatting.)
7. Click OK.

Applying Conditional Formatting Based on Top/Bottom Rules

Excel also allows you to apply quick conditional formatting to the contents of cells based upon top or bottom ranked values or those cells that are below or above average.

The screenshot shows the Microsoft Excel interface with the 'Home' tab selected. In the 'Conditional Formatting' section of the ribbon, a red arrow points to the 'Top/Bottom Rules' option, which is expanded to show various options like 'Top 10 Items...', 'Top 10 %...', 'Bottom 10 Items...', 'Bottom 10 %...', 'Above Average...', and 'Below Average...'. Below these are 'More Rules...' and other standard conditional formatting options like 'Data Bars', 'Color Scales', and 'Icon Sets'. The main content area displays a table titled 'Bonus Calculations' with columns for Manager, Name, SS Number, and Store Income. The rows are color-coded: rows 4, 5, and 6 are yellow, while rows 7 and 8 are light green. The 'Store Income' column for row 4 contains '\$25,222.00' in pink, and the 'SS Number' column for row 5 contains '372-05-2432' in pink.

The available comparison rules are:

- Top 10 Items
- Top 10%
- Bottom 10 Items
- Bottom 10%
- Above Average
- Below Average

To customize or create your own formatting rules, click More Rules from the Top/Bottom Rules menu and make your choices.

To use Conditional Formatting based on Top/Bottom Values, follow these steps:

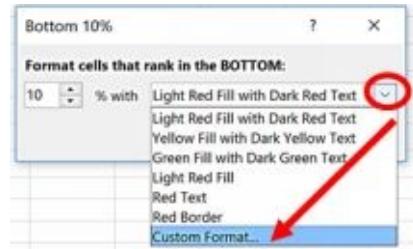
- 1. Select the cell range you wish to format.**
- 2. Click the Home tab on the Ribbon.**
- 3. Click the Conditional Formatting button on the Home Ribbon and then point to Top/Bottom Rules.**

This screenshot is similar to the one above, showing the Excel interface with the 'Home' tab selected. The 'Conditional Formatting' dropdown menu is open, and a red arrow points to the 'Bottom 10 Items...' option under the 'Top/Bottom Rules' section. The table 'Bonus Calculations' is visible in the background, with its rows numbered 1 through 8. The 'Store Income' column for row 8 contains '\$15,000.00' in pink, indicating it is one of the lowest values.

- 4. Click the Top/Bottom rule from the list that you want to apply to the selected data.**
- 5. If you want a number other than the top/bottom 10, enter it in the number box.**



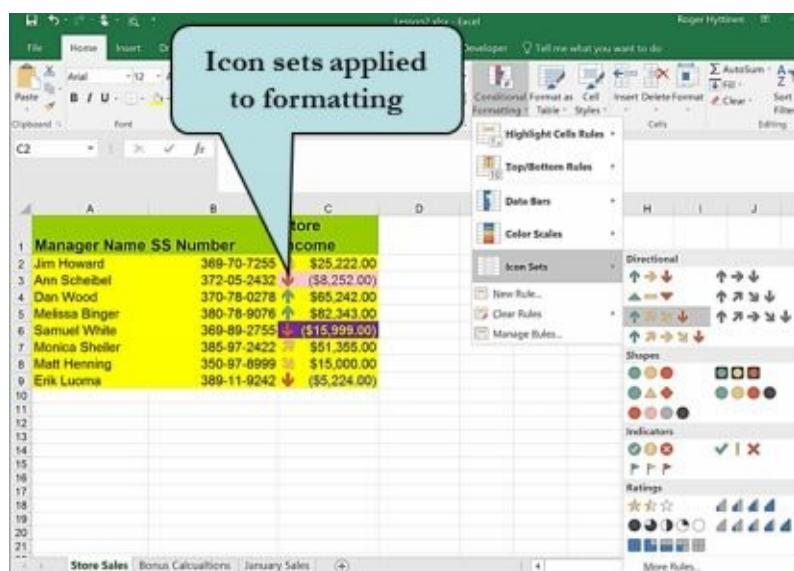
6. Select the desired formatting from the drop-down list. To specify your own formatting, click Custom Format from the list and make your selections.



7. Click OK.

Applying Specialized Conditional Formatting

Excel provides the ability to apply specialized conditional formatting using colored **Data Bars**, **Color Scales** and **Icon Sets**. Data Bars display a colored data bar relative to the value of the other cells in your range. Color Scales display a two or three gradient or solid color shading relative to the value of the other cells in your range. Excel will color the cells based on the color scale that you select. Icon Sets display an icon in the left of the cell to show visually where the value falls in the range.



As with the other conditional formatting options, click More Rules from any conditional formatting menu to modify or create your own formatting rules.

To apply conditional formatting using Data Bars, follow these steps:

1. Select the cell range you wish to format.
2. Click the Home tab on the Ribbon.
3. Click the Conditional Formatting button on the Home Ribbon and then point to Data Bars.
4. Click the colored data bar you want to use under the Gradient Fill or the Solid Fill area.
5. Click OK.
6. To modify or create your own customized formatting rules, click More Rules from the list.

The screenshot shows the Microsoft Excel ribbon with the 'Home' tab selected. In the 'Conditional Formatting' section of the ribbon, a callout bubble points to the 'Data Bars' option. The main area displays a table of data with rows 1 through 10. The 'Store Income' column (Column C) uses a data bar format where the length of the bar corresponds to the value in the cell. The first few cells have longer bars than the last few, which have shorter bars.

	Manager Name	SS Number	Store Income
1	Manager Name	SS Number	Store Income
2	Jim Howard	369-70-7255	\$25,222.00
3	Ann Scheibel	372-05-2432	(\$8,252.00)
4	Dan Wood	370-78-0278	\$85,242.00
5	Melissa Binger	380-78-9076	\$82,343.00
6	Samuel White	369-89-2755	(\$15,999.00)
7	Monica Sheller	385-97-2422	\$51,355.00
8	Matt Henning	350-97-8999	\$15,000.00
9	Erik Luoma	389-11-9242	(\$5,224.00)

To apply conditional formatting using Icon Sets, follow these steps:

- 1. Select the cell range you wish to format.**
- 2. Click the Home tab on the Ribbon.**
- 3. Click the Conditional Formatting button on the Home Ribbon and then point to Icon Sets.**
- 4. Click the icon you want to use under the Directional, Shapes, Indicators or Rating area.**
- 5. Click OK.**
- 6. To modify or create your own customized formatting rules, click More Rules from the list.**

	Mana	Store Income
1	Jim Howard	370-7255 \$25,222.00
2	Ann Scheibel	370-52432 (\$8,252.00)
3	Dan Wood	370-78278 \$65,242.00
4	Melissa Binger	380-78-9076 \$82,343.00
5	Samuel White	369-89-2755 (\$15,999.00)
6	Monica Sheller	385-97-2422 \$51,355.00
7	Matt Henning	350-97-8999 \$15,000.00
8	Erik Luoma	389-11-9242 (\$5,224.00)
9		

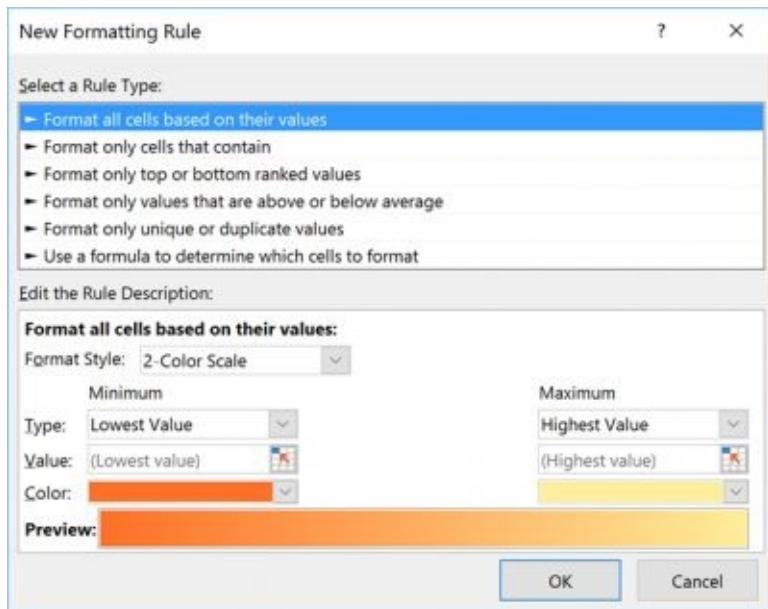
To apply conditional formatting using Color Scales, follow these steps:

- 1. Select the cell range you wish to format.**
- 2. Click the Home tab on the Ribbon.**
- 3. Click the Conditional Formatting button on the Home Ribbon and then point to Color Scales.**
- 4. Click the color scale you want to use.**
- 5. Click OK.**
- 6. To modify or create your own customized formatting rules, click More Rules from the list.**

	Mana	Store Income
1	Jim Howard	370-7255 \$25,222.00
2	Ann Scheibel	370-52432 (\$8,252.00)
3	Dan Wood	370-78278 \$65,242.00
4	Melissa Binger	380-78-9076 \$82,343.00
5	Samuel White	369-89-2755 (\$15,999.00)
6	Monica Sheller	385-97-2422 \$51,355.00
7	Matt Henning	350-97-8999 \$15,000.00
8	Erik Luoma	389-11-9242 (\$5,224.00)
9		

Creating your own Formatting Rules

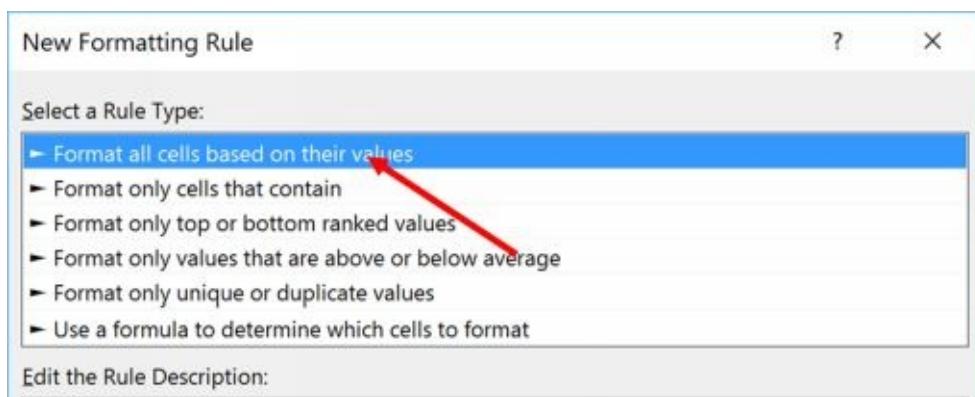
Rather than using the pre-defined conditional formatting rules, Excel allows you to create your own formatting rules. Using the New Formatting Rule dialog box, you can create custom rules based on specific values, based on top or bottom ranking, above or below average ranking, duplicate values, or even a formula to determine which cells to format.



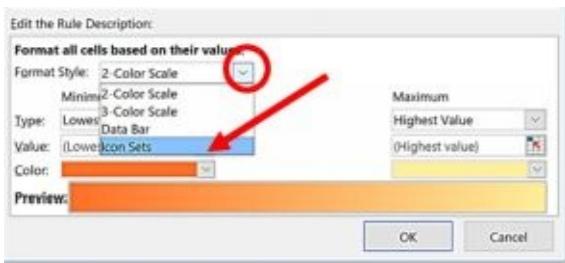
To display the New Formatting Rule dialog box, click the Conditional Formating button and select New Rule. Clicking More Rules on any of the Conditional Formatting menus will also display the dialog box.

To create a new Formatting Rule, follow these steps:

- 1. Select the cell range you wish to format.**
- 2. Click the Home tab on the Ribbon.**
- 3. Click the Conditional Formatting button on the Home Ribbon and click New Rule.**
- 4. In the top pane, click the Rule Type that you want.**

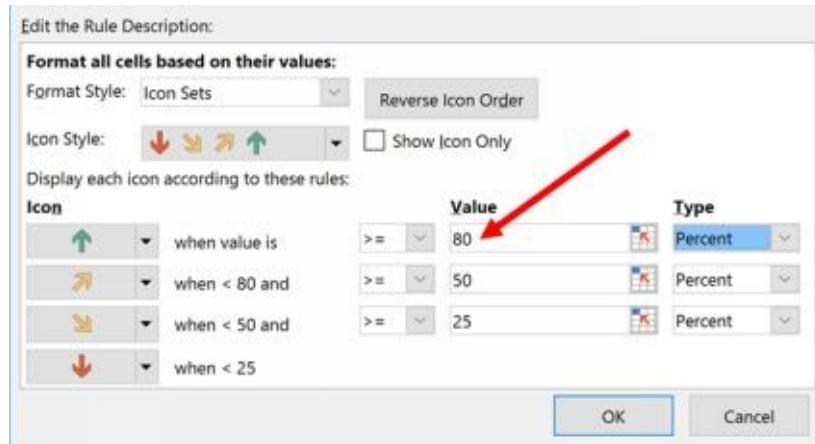


- 5. Specify any desired rule criteria.**
- 6. Click the Format Style arrow and choose the style you want from the list.**



7. Click the Format button (if available) to display the Format Cells dialog box to add additional formatting such as fill color, border options, font color, etc.

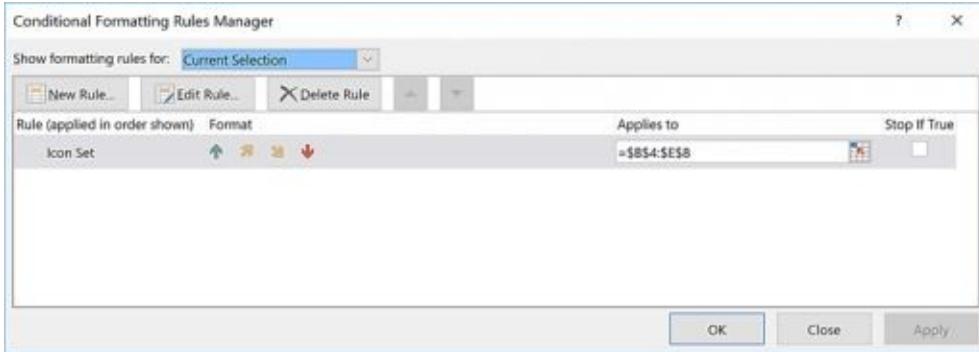
8. Enter/choose any additional comparison operators and criteria.



9. Click OK when finished.

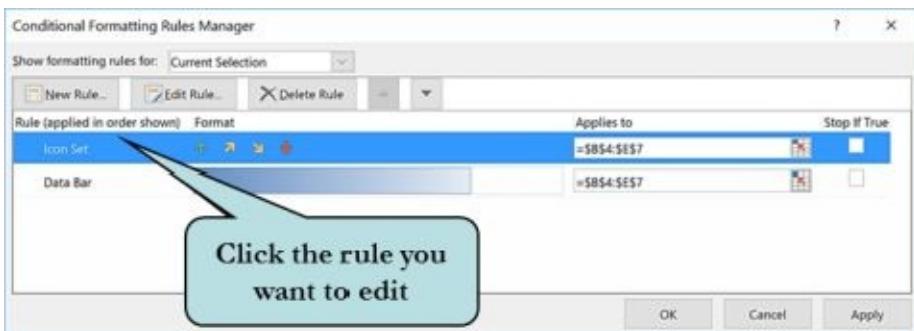
Managing Conditional Formatting

The Conditional Formatting Rules Manager dialog box allows you to create new rules, edit, delete or change the order of existing rules, and stop evaluation of the rules in your list at a specific rule. The rules in the Conditional Formatting Rules Manager dialog box are executed in the order that they are listed. If you find that two rules are in conflict, changing the order may resolve the issue.

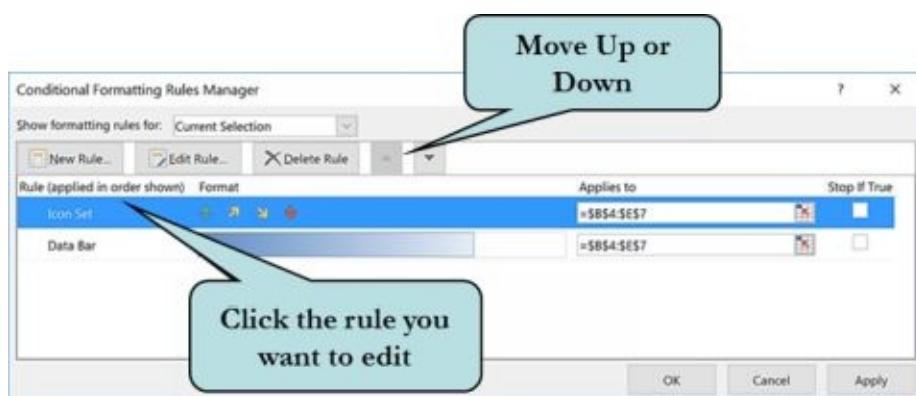


To create a new Formatting Rule, follow these steps:

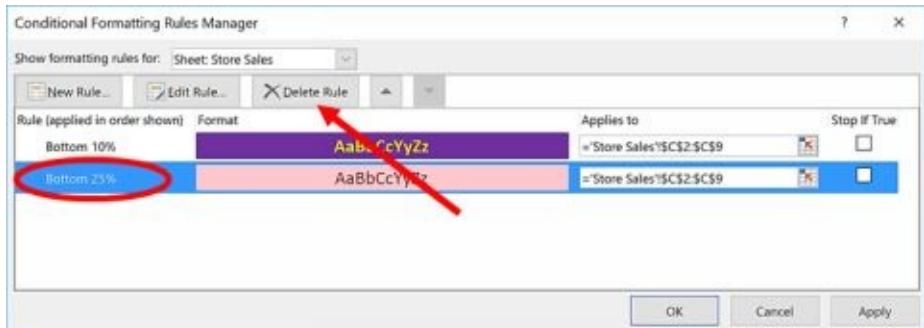
- 1. Select the cell range with the conditional formatting you wish to manage.**
- 2. Click the Home tab on the Ribbon.**
- 3. Click the Conditional Formatting button on the Home Ribbon and click Manage Rules to display the Conditional Formatting Rules Manager dialog box.**
- 4. Click the rule you wish to modify.**



- 5. To move a rule, click the Move Up or Move Down arrow.**



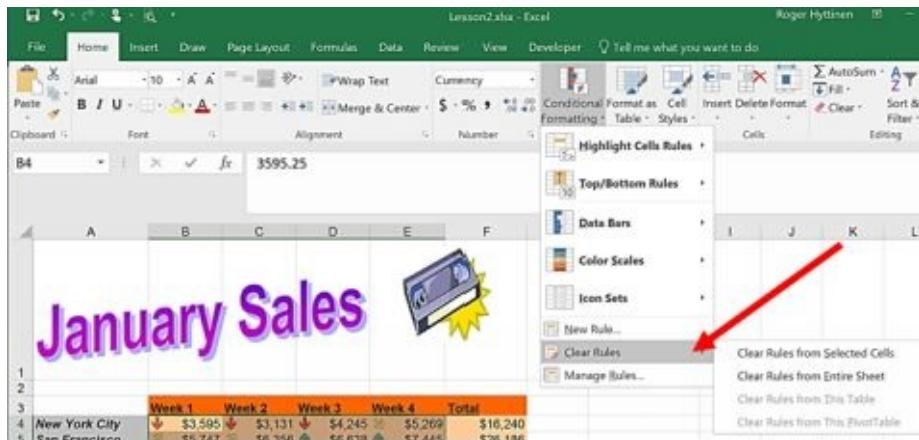
- 6. To delete the selected rule, click the Delete Rule button.**



- 7. To edit the selected rule, click the Edit Rule button and make your changes. Click OK when finished.**
- 8. To stop executing your rules at a specific rule, click the Stop if True check box at the rule where you wish evaluation to stop.**
- 9. When finished, click OK.**

Clearing Conditional Formatting

You can also clear your conditional formatting rules by clicking the Conditional Formatting button, pointing to Clear Rules and making your desired selection from the menu. You can clear conditional formatting for the selected cells, the entire worksheet, the selected Excel table or the selected PivotTable.



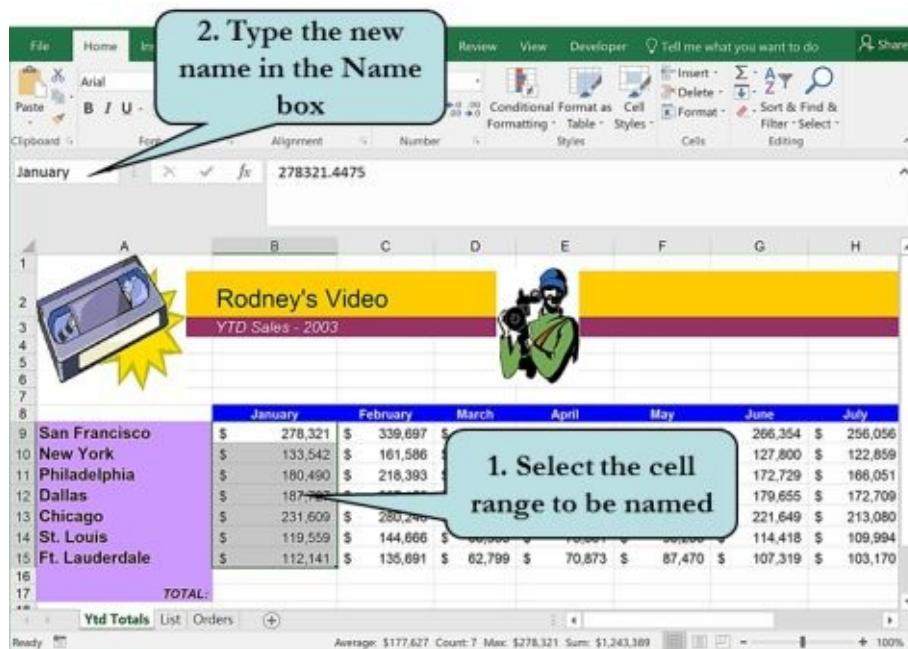
To clear Conditional Formatting, do this:

1. Select the cell range that contains the conditional formatting you want to clear.
2. Click the Conditional Formatting button on the Home Ribbon and point to Clear Rules.
3. Click the desired clear option from the submenu.

Chapter 17 - Working with Ranges

Naming a Range

If you frequently work with entire columns or rows of data, you can provide a range name to the cell range, allowing you to quickly identify a group of cells. Instead of manually selecting a large range of cells everytime you want to use them, using a range name allows you to select the range automatically by referring to its name. Additionally, you can use the range name anywhere where you would normally use a cell range reference, such as a formula. Using named ranges also allows you to quickly apply formatting to an entire range of cells.

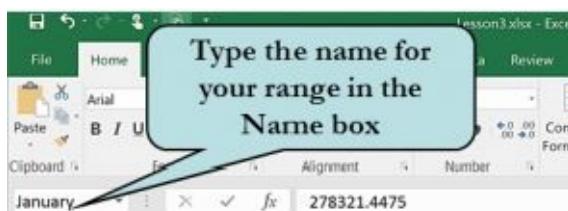


There are some rules for creating range names. Somethings to keep in mind are:

- Range names must be one word – they cannot contain spaces. You can use an underscore (_), a period (.) or a backslash (\) between words. For example: January\2016 is an acceptable range name.
- Hyphens are not allowed.
- Range names are not case sensitive.
- With the exception of the period (.), underscore (_) and backslash (\), punctuation marks and special characters such as *, \$, ?, !, %, etc. are not allowed.

To name a range, follow these steps:

- 1. Select the range of cell you want to name.**
- 2. Type the Name for the Range in the Name Box to the left of the formula bar (Note: Range Names cannot contain spaces).**



3. To adjust the width of the Name box, move your mouse pointer between the Name box and Formula box until the pointer changes into a double arrow. Drag to the left or right.

4. Press the Enter key to confirm the entry.

Or

1. Select the range of cells you want to name.

2. Click the Formulas tab on the Ribbon.

3. Click the Define Name button on the Defined Names group on the Ribbon.

4. Type in a name for your range

5. Type in a description for your range, if desired.

6. Click OK.

7. To view a list of all of your named ranges, click the drop-down arrow on the Name box.



Using a Named Range

Using descriptive named ranges in formulas can make your formulas easier to understand. To use a named range in a formula, simply replace the cell reference you would normally use with the range name. For example, suppose we had the cell range A1:15 named 2011Total and the cell range B1:B15 named 2012Total. To find the sum of those two cell ranges, we could use the formula:

$$=2011Total + 2012Total$$

To use a Named Range, follow these steps:

1. Select the blank cell that will contain the formula.
2. Type the formula, substituting a named range for the cell address where appropriate.

Or

Type: = and then drag-select the range you want to use in your worksheet. Excel will enter in the range name for you.

Or

Click the Use in Formula button on the Defined Names group of the Formulas Ribbon and select the named range you want to use.



3. Press Enter to confirm the entry.

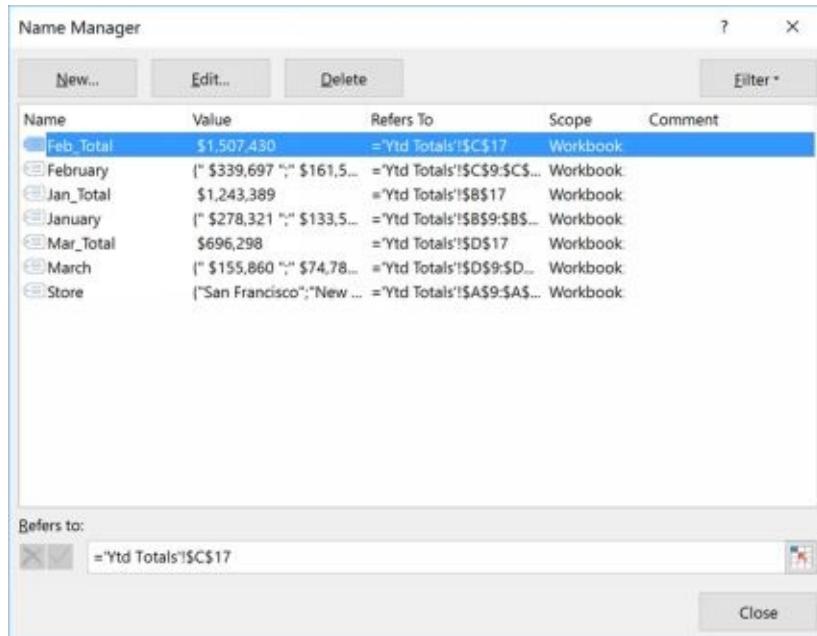
Tip: When beginning to type the name of a range, a small box will appear with the complete range name. This is an example of Excel's AutoComplete feature. Press the **Tab** key to finish inserting the range name.

January	February	March	April
\$ 278,321	\$ 339,697	\$ 155,860	\$ 175,899
\$ 133,542	\$ 161,586	\$ 74,784	\$ 84,399
\$ 180,490	\$ 218,393	\$ 101,075	\$ 114,070
\$ 187,727	\$ 227,150	\$ 105,127	\$
\$ 231,609	\$ 280,246	\$ 129,701	\$
\$ 119,559	\$ 144,666	\$ 66,953	\$
\$ 112,141	\$ 135,691	\$ 62,799	\$
\$ 1,243,389	\$ 1,507,430	=Sum(March)	SUM(number1, [number2], ...)

A screenshot of an Excel spreadsheet showing a table of financial data for January through April. The 'March' column is selected. A callout bubble points to the formula bar with the text: 'Excel automatically inserts the range name in the formula'. The formula bar shows '=Sum(March)'. The tooltip is contained within a light blue rounded rectangle.

Managing Range Names

The Name Manager dialog box provides an easy way to manage all the range names and table names in your workbook from one location. From the Name Manager, you can delete named ranges that you no longer need, edit the name or cell reference of existing names, add new names as well as sort and filter your ranges.

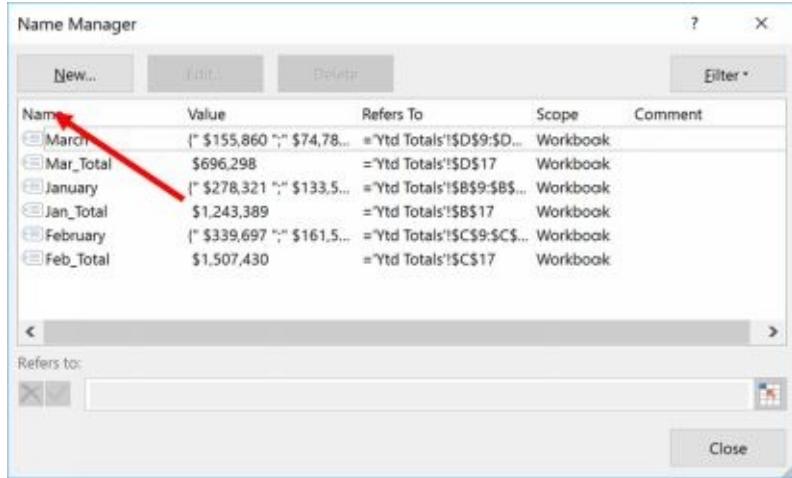


The Name Manager icon is found on the Defined Names group of the Formulas Ribbon.

To manage named ranges, follow these steps:

- 1. Click the Formulas tab on the Ribbon.**
- 2. Click the Name Manager icon on the Defined Names group.**
- 3. To delete a name, select the name you wish to remove and click the Delete button.**
- 4. To modify a name, select the name you wish to modify and make your changes. Click OK when finished.**
- 5. To create a new name, click the New button, type in the name for your range, and enter the cell reference (or use the collapse dialog box to manually select the range).**
- 6. To sort your name list, click the column header to sort the names in ascending or descending order.**



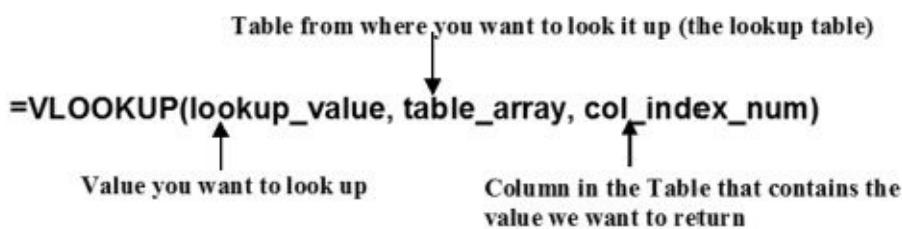


- 7. To filter names, click the Filter button and select the filter option you want.**
- 8. Click OK when finished.**

Using the VLOOKUP Function

The VLOOKUP function allows you to locate data within a defined table, referred to as an array. The VLOOKUP function searches for a value in the leftmost column of a table, and then returns a value in the same row from a column you specify in the table. For instance, suppose in one worksheet we have an order entry list which contains customer name and product ID. In another sheet (our lookup table), we have a list of all products and their corresponding product ID's. Using the VLOOKUP function, we can insert the name of the product in our order entry list by searching the lookup table for the product name that corresponds to the product ID.

The format of the VLOOKUP function is as follows:



In the example above, the first argument, `lookup_value` would be the cell address of the `product_id` number – that is to say, the item we want to look up in our table array.

The second argument, `table_array` is the complete range of our lookup table. This can be a cell address (`A1:F131`) or a named range (such as `mylist`). The table must be sorted in alphabetical order by the leftmost column or you will receive an error in your formula. The table array can be located in the same worksheet or in another worksheet.

The third argument, the `col_index_num` is the column number in the table array to be returned. If the product name column (the column whose value we want to return) was the third column from the left, this argument would be 3.

To use the VLOOKUP function, follow these steps:

- 1. Click in the cell where you want to place the formula.**
- 2. Type: =VLOOKUP(to begin the formula.**
- 3. Type the cell address of the value you want to look up.**
- 4. Type a comma ,**
- 5. Type the cell range or the named range of the lookup table (table array)**
- 6. Type a comma ,**
- 7. Type the column number which contains that value that corresponds to `lookup_value`.**
- 8. Type:) and then press the Enter Key to confirm the formula.**

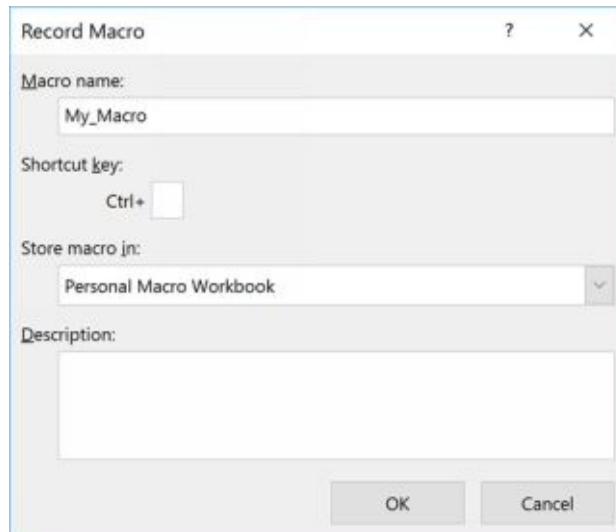
Note: You can also use the Insert Function button rather than typing in the formula manually.

Chapter 18 - Working with Macros

Creating a Macro

If you find yourself performing a task frequently in Excel, you can automate that task with a macro. A macro is a series of actions such as menu command selection or keystrokes that are recorded and can be run or “played back” as one action whenever you need to perform the task. When you record a macro, Excel saves each step that you perform.

When running a macro, Excel will automatically perform all of the actions that you have recorded with as little as a single mouse-click. As every keystroke you make is recorded, it is important to plan the actions you want to record ahead of time so you don’t make a mistake during the recording phase.



Record Macro Dialog Box

You should also decide where you want to store the macro. Macros can be stored in the active workbook file, meaning they will only be available to worksheets in the active workbook or they can be stored in the global workbook file called the Personal Macro Workbook. Any macros stored in the Personal file will be available to all other Excel workbooks.

You can record a macro from either the View tab or the Developer tab. By default, the Developer tab is hidden. To display it, click the File tab, click the Options button, click Customize Ribbon in the left pane and then click the Developer check box in Customize the Ribbon window.

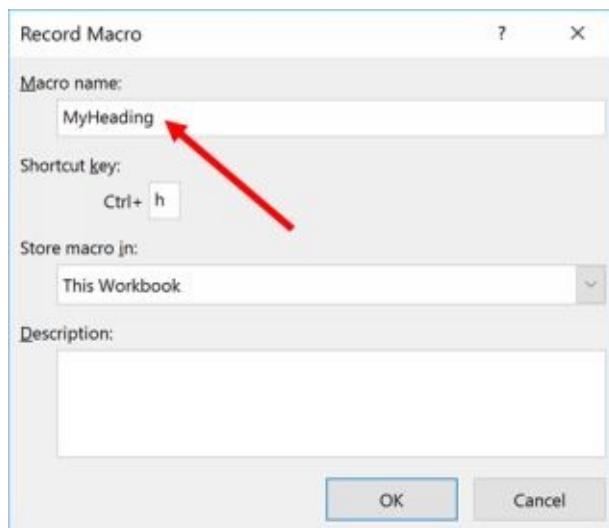
Note that Macro-enabled workbooks (.xslm files) cannot be opened in Excel Online. They can only be opened and run from the desktop version of Excel.

To record a macro, follow these steps:

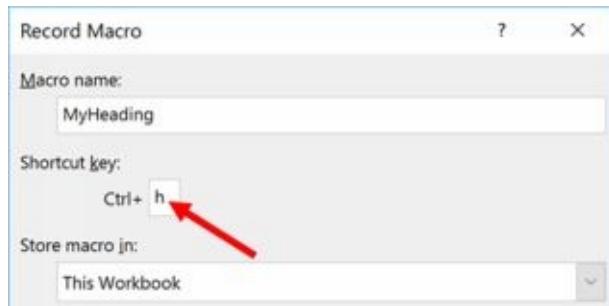
- 1. Click the View tab on the Ribbon.**
- 2. Click the arrow on the Macros icon on the Macros group and select Record Macro.**



3. Type a name for the macro in the Macro Name box. Note that macro names cannot contain spaces.

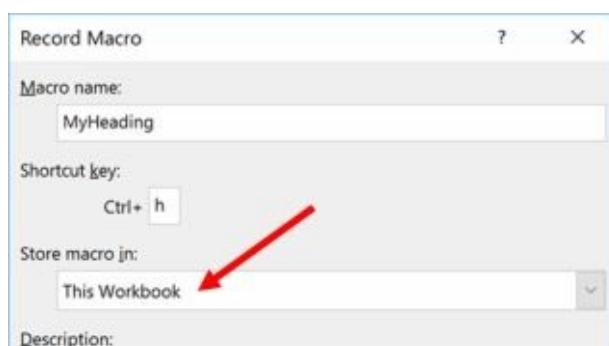


4. If desired, you can assign a shortcut key to the macro by clicking in the Shortcut key box and then typing a letter. Shortcut keys allow macros to be run by pressing a specific keystroke combination.



5. Type a description for the macro if desired.

6. Select the location where you wish to store the macro in the Macros in: drop-down list.



7. Click OK.

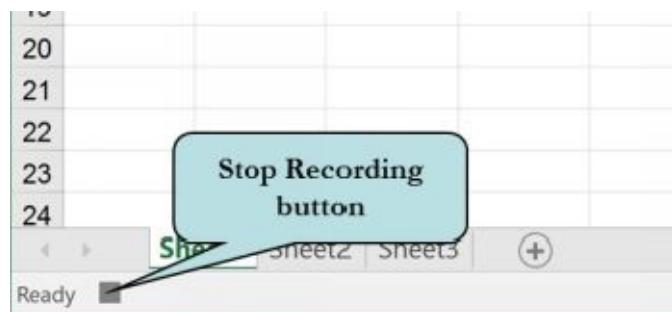
8. You can toggle between relative (the macro will run *relative* to the position of the active cell) or absolute (the macro records the actual cell addresses) by clicking the Macro button arrow and clicking the Use Relative Reference button.

9. Perform the actions to be recorded.

10. Click the arrow on the Macros button on the Macros group and select Stop Recording

Or

Click the Stop Recording button on the left corner of the Status bar.



Running a Macro

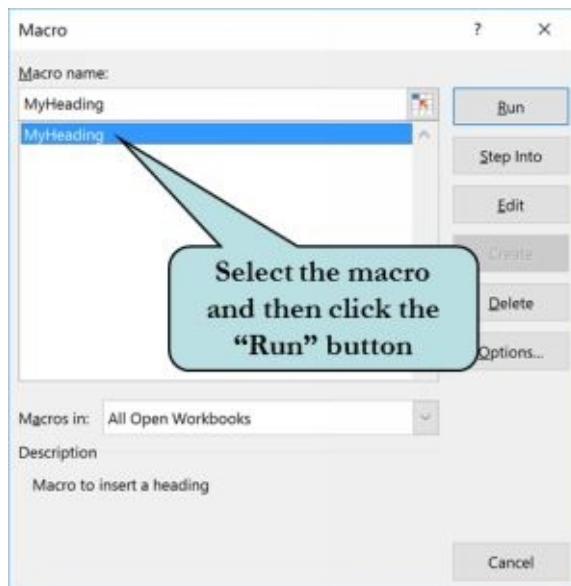
After you have finished recording your macro, you can run it either from the Macros button or, if you established one, by using the shortcut key combination. To run a macro that was saved in the current workbook, you will first need to open the workbook in which the macro was saved. If you saved the macro in the Personal Macro Workbook, the workbook is opened automatically when you launch Excel (it is hidden from view).

To run a macro, follow these steps:

- 1. Click the View or Developer tab on the Ribbon.**
- 2. Click the Macros button.**
- 3. From the Macro Name list box, select the macro to be run.**
- 4. Click the Run button.**

Or

- 1. Press the shortcut key combination for the macro.**

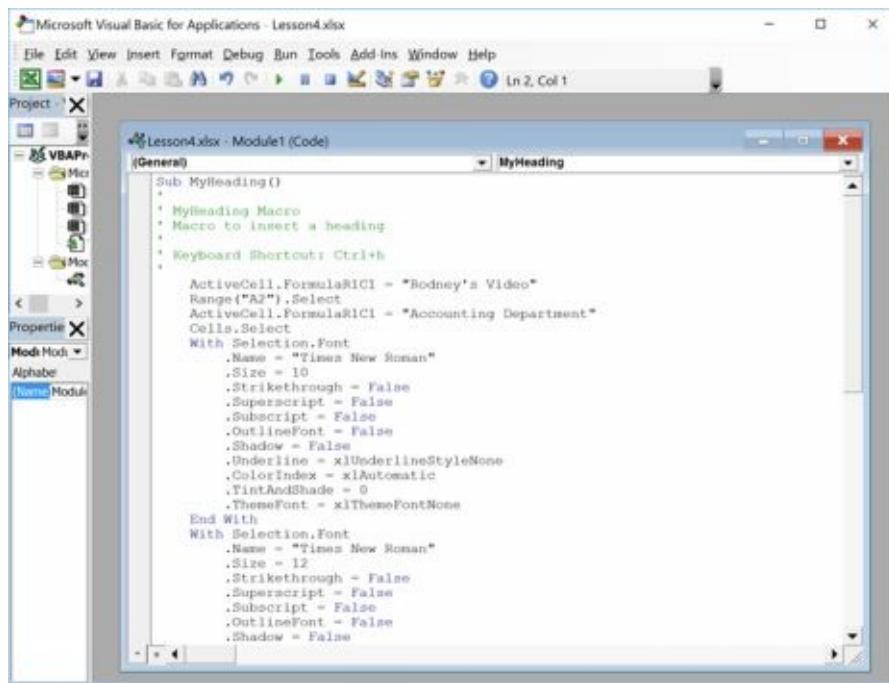


Editing a Macro

When you record a macro, the actions that you perform are written in a programming language called Visual Basic for Applications (VBA). To edit a macro that you recorded, it is helpful to have a little background in the Visual Basic programming language. However, some of the commands are straightforward enough that anyone can make basic changes.

Editing a macro is accomplished through the Visual Basic for Applications Editor, which allows you to directly alter the programming code of the macro.

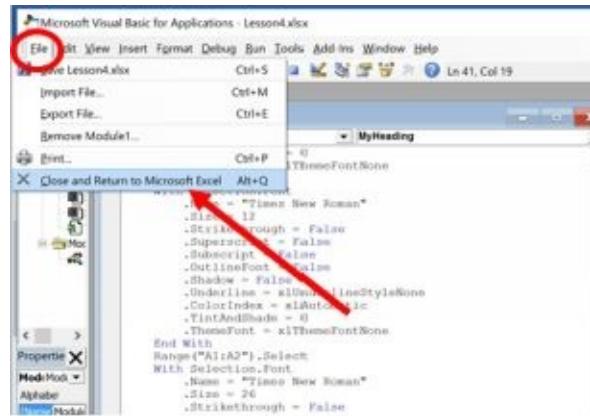
If the macro is stored in the Personal Macro Workbook (the global workbook file) you may first need to unhide the workbook by clicking the Unhide button on the View Ribbon, and then selecting Personal.



Visual Basic Window

To edit a macro, follow these steps:

- 1. Click the View or Developer tab on the Ribbon.**
- 2. Click the Macros button.**
- 3. From the Macro Name list box, select the macro you wish to edit.**
- 4. Click the Edit button.**
- 5. Make any changes to the macro in the Visual Basic for Applications code window.**
- 6. When finished, select File > Close and Return to Microsoft Excel from the Visual Basic for Applications menu.**



Make a Backup of your Macros



The screenshot shows the Microsoft Visual Basic for Applications (VBA) Editor window. The title bar reads "Normal - NewMacros (Code)". The code editor displays the following VBA code:

```
Sub bold()
    ' Bold Macro
    ' 
    ' Selection.Font.Bold = wdToggle
    ' Selection.Font.Color = wdColorBlue
End Sub

Sub normal()
    ' 
    ' Selection.Font.Bold = wdToggle
    ' Selection.Font.Color = wdColorAutomatic
End Sub

Sub shift4()
    ' 
    ' 
    ' With Selection.Cells(1)
    '     TopPadding = InchesToPoints(0.05)
    '     BottomPadding = InchesToPoints(0.05)
    ' End With
End Sub

Sub insert()
    ' 
    ' Insert Macro
    ' 
    ' Selection.InsertRowsAbove 1
End Sub

Sub merge()
    ' 
    ' Merge Macro
    ' 
    ' Selection.Cells.Merge
End Sub

Sub param()
    ' 
    ' passing Macro
    ' 
End Sub
```

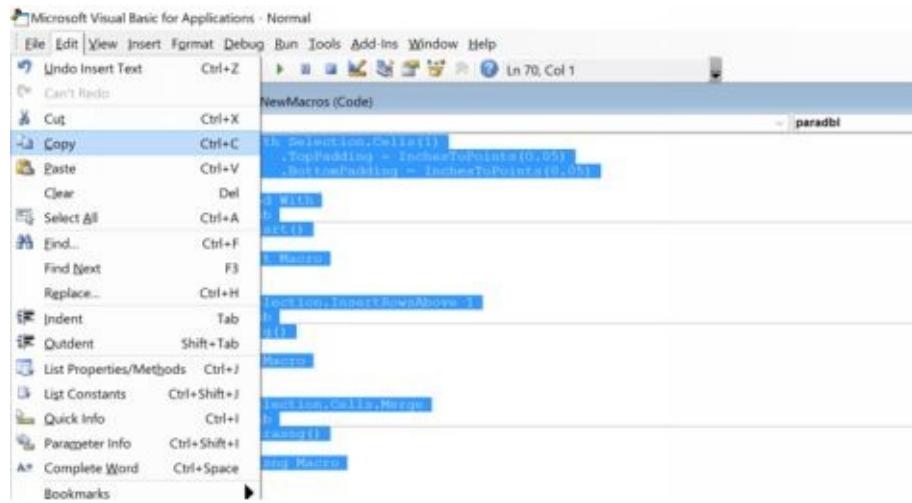
If you are a heavy Excel macro user, you may have experienced this scenario: After a Microsoft Office update, all of your beloved macros are gone. Poof!

This has happened to me more than once and now I've learned to backup up my macros. This is actually a lot easier than you may think. What I do, is display the code for any of my macros, choose Select All from the menu, copy my macros to the clipboard and then paste the code into an external document. This can be and Evernote or OneNote note, a plain text file or even a Word file.

This technique also comes in handy if you use more than once computer and wish to quickly add in your favorite macros.

To make a backup of your macros, follow these steps:

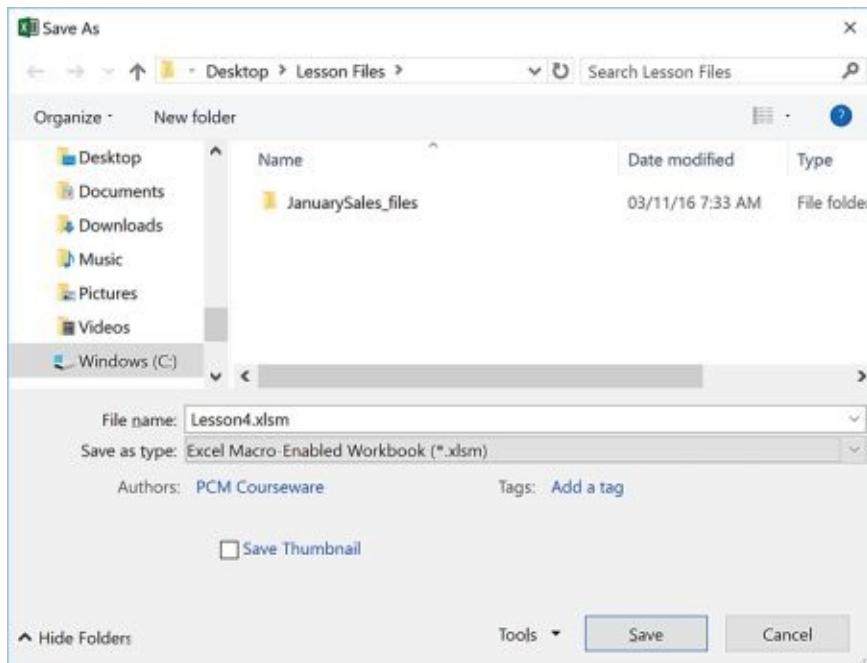
- 1. Click the Developer tab or the View tab on the Ribbon.**
- 2. Click the Macros icon to display the Macros dialog.**
- 3. Click any of your macros and then click Edit. This will open the Visual Basic for Applications window and display all of the macros that you've created.**
- 4. Choose Edit > Select All from the menu or press the Ctrl + A keystroke combination**



5. Choose **Edit > Copy** from the menu or press the **Ctrl + C** keystroke combination.
6. Select **File > Close and Return to Microsoft Excel** from the menu to close the Visual Basic for Applications window.
7. Open the document or note into which you want to paste your macros.
8. Choose **Edit > Paste** from the menu or press the **Ctrl + V** keystroke combination. The code for all of your macros will be inserted into the document. If you move to another computer or your macros mysteriously disappear from Word or Excel, you can paste in any or all of the macros from this document.

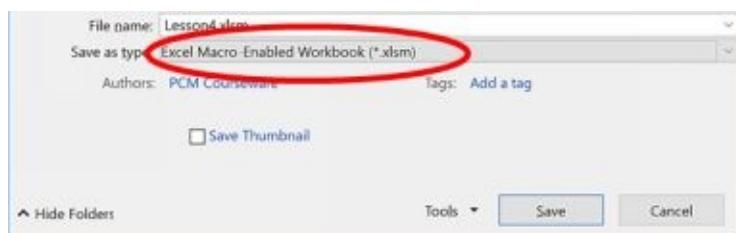
Saving a Workbook with Macros

If you add macros to your workbook, you will need to save it as either an Excel Macro-Enabled Workbook (.xlsm) or an Excel Macro-Enabled Template (.xltm). If you try to save it in a standard Excel format (Workbook, Template, Excel 97-2003 Workbook, etc.), you will receive an alert message informing you that you cannot save your workbook in this format. Standard Excel files cannot contain any Visual Basic code.



To save a workbook with macros, follow these steps:

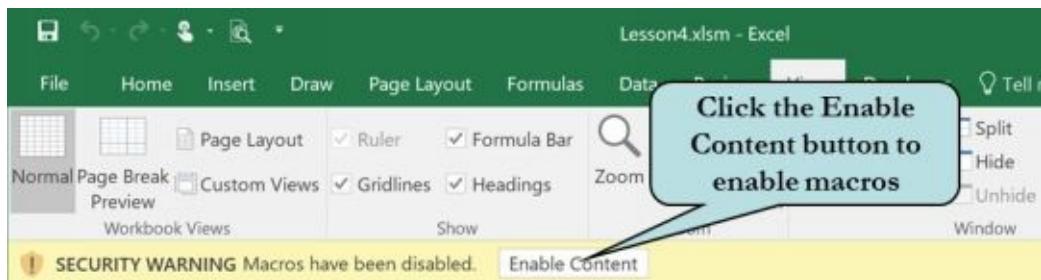
- 1. Click the File tab and click Save as from the File Options pane.**
- 2. Navigate to the location (Computer, OneDrive) where you want to save the workbook.**
- 3. Select Excel Macro-Enabled Workbook from the Save as Type drop-down list.**



- 4. Type a new file name, if desired.**
- 5. To save your file in a different folder, navigate to the desired folder.**
- 6. Click Save.**

Opening a Workbook with Macros

When you open a workbook containing macros, Excel displays a security warning that the workbook contains potentially harmful code and disables the macros in the workbook. If you trust the author of the workbook, click the **Enable Content** button in the Security Warning area. If the document is located on a network, you will be asked if you wish to make the document a Trusted Document. If you choose Yes, you will not be prompted to enable the macros in the future.



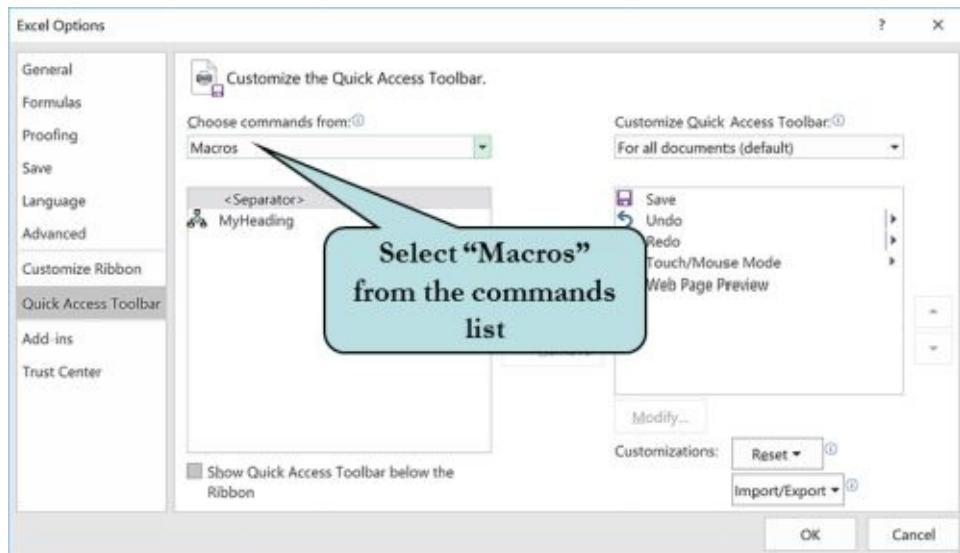
If you want to disable the security alerts, you can change your security settings from the Trust Center of the Excel Options dialog box.

To open a workbook with macros, follow these steps:

1. Click the File tab and click Open.
 2. Navigate to the folder that contains the workbook you wish to open.
 3. Click the Files of Type arrow and select Excel Files.
 4. Select the workbook you wish to open and then click Open.
 5. Click the Enable Content button.
 6. If prompted, choose whether you wish to make the workbook a Trusted Document.
 7. Click OK.

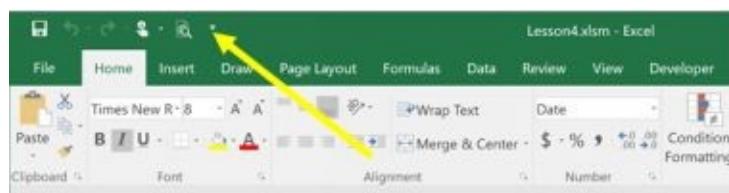
Adding a Macro to the Quick Access Toolbar

In addition to using the Macros command button to run your macros, you can add them to the Quick Access Toolbar for easy access. After you create a macro, it will then appear in the Macros category of available commands that you can add to the toolbar. To make your macro stand out, Excel also allows you to choose from a variety of icons that you can apply to your toolbar macros.



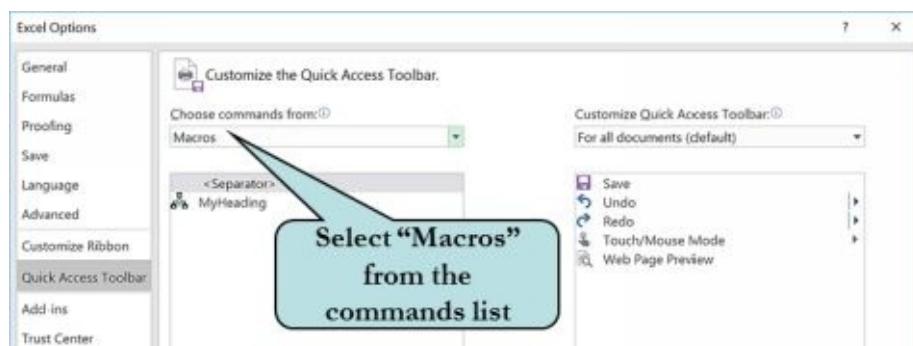
To assign a macro to the Quick Access Toolbar, follow these steps:

1. Click the Customize Quick Access Toolbar arrow to the right of the toolbar.



2. Click More Commands.

3. Click the Choose command from arrow and click Macros to display all available macros.

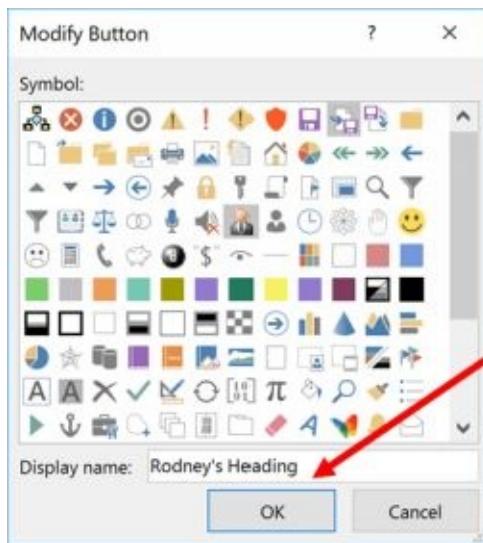


4. Click the macro you wish to add to the toolbar and then click the Add button.

5. To modify its position on the toolbar, click the Move Up or Move Down button on the far right side of the pane.

6. Click the Modify button.

7. Click in the Display name box and type in a name for the macro (when you point to a macro button on the Quick Access toolbar, the name you designate here will appear).



8. Click the icon you wish to use in the Symbol box.

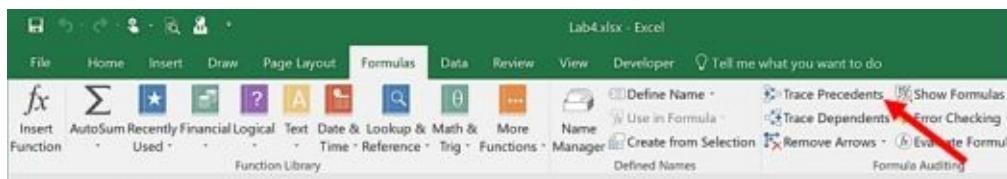
9. Click OK to close the Modify Button dialog box.

10. Click OK to close the Excel Options dialog box.

Chapter 19 - Data Analysis Tools

Tracing Formula Precedents

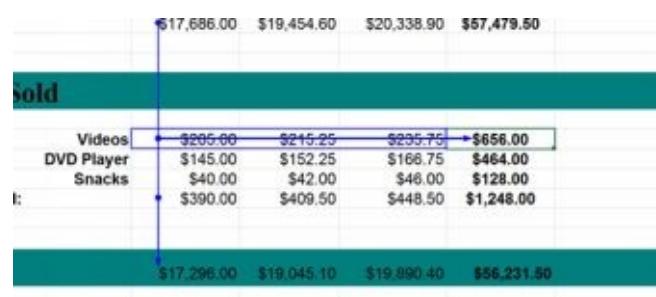
When your worksheet contains a large amount of formulas and cell values, errors can occur. To find the source of these mistakes, Excel provides several auditing tools to help you. One of these is the Trace Precedents tool. A precedent is a cell that's referred to in a formula. For instance, suppose cell I22 contained the formula: G22/F22. If you selected cell I22 and launched the Trace Precedents tool, an arrow would point from cell G22 and F22 to cell I22, as both of these cells are used in the formula.



Tracing precedents also allows you to understand the relationships between the formulas and cells in your worksheet. This can be particularly helpful in a worksheet with many complex formula constructions.

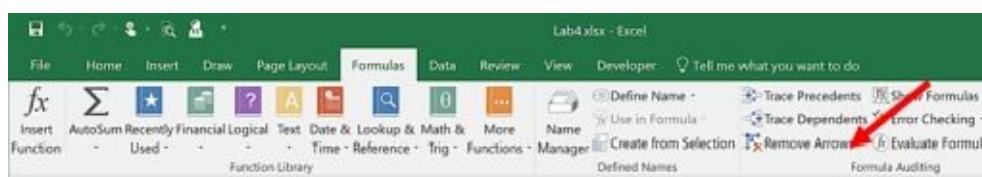
To trace formula precedents, follow these steps:

- 1. Select the cell whose precedents you wish to trace.**
- 2. Click the Formulas tab on the Ribbon.**
- 3. Click the Trace Precedents button on the Formula Auditing group on the Ribbon.**
- 4. Observe the formula arrows.**



To remove precedent arrows, follow these steps:

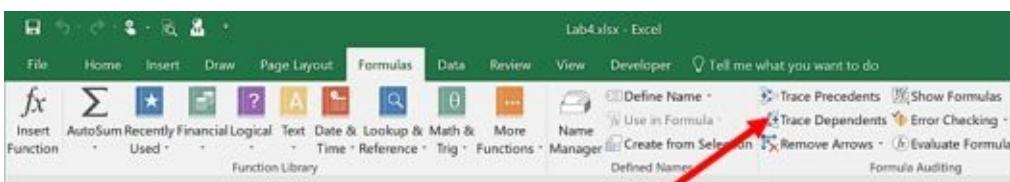
- 1. Click the Formulas tab on the Ribbon**
- 2. Click the arrow on the Remove Arrows button on the Formula Auditing group on the Ribbon and select Remove Precedent Arrows.**



- 3. To remove all arrows on the worksheet, click the Remove Arrows button.**

Tracing Cell Dependents

Another useful auditing tool is the Trace Dependents tool. A dependent cell is a cell whose value changes based on the value of another cell. Using the same example as in the previous lesson, suppose cell I22 contained the formula: G22/F22. If you traced the dependents of cell G22, the auditing arrow would point to cell I22 because the value of I22 depends on the value of G22. Another way to define a dependent cell is any cell that contains a formula.



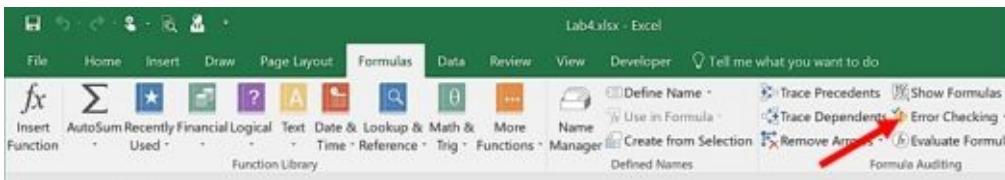
To trace cell dependents, follow these steps:

- 1. Select the cell whose dependents you wish to trace.**
- 2. Click the Formulas tab on the Ribbon.**
- 3. Click the Trace Dependents button on the Formula Auditing group on the Ribbon.**
- 4. Observe the cell dependents arrows.**

Semi-Annual Income Statement						
Revenue						
	April	May	June	Total		
Video Rentals	\$15,266.00	\$16,792.60	\$17,555.90	\$49,614.50		
Video Sales	\$1,235.00	\$1,358.50	\$1,420.25	\$4,013.75		
Investment Interest	\$375.00	\$412.50	\$431.25	\$1,218.75		
DVD Player Sales	\$495.00	\$544.50	\$569.25	\$1,608.75		
Snack Sales	\$315.00	\$346.50	\$362.25	\$1,023.75		
Net Sales	\$17,686.00	\$19,454.60	\$20,338.90	\$57,479.50		

Tracing and Fixing Errors

Excel's Trace Error auditing tool helps you to discover the source of formula errors on your worksheet. The Trace Error tool draws arrows from the cell that causes the error to the active cell that contains the error. Should you have a relatively complex formula, this feature can save you a lot of time in trying to track down formula inaccuracies.



Some typical error values are:

#VALUE - The wrong type of operand or value is used in the formula

#DIV/0! - Occurs when a number is divided by zero.

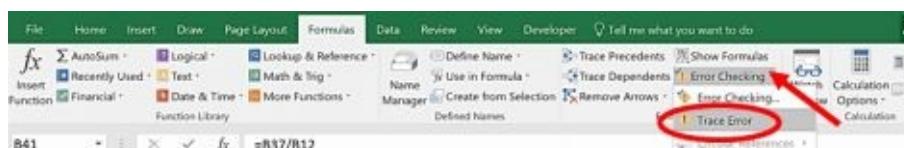
#REF - The cell reference in the formula is not valid.

#N/A - Occurs when a value is not available to a function or formula.

#NAME - Occurs when Excel does not recognize text in a formula.

To trace errors, follow these steps:

- 1. Select the cell that contains the error.**
- 2. Click the Formulas tab on the Ribbon.**
- 3. Click the arrow next to the Error Checking button on the Formula Auditing group on the Ribbon.**
- 4. Click Trace Errors.**



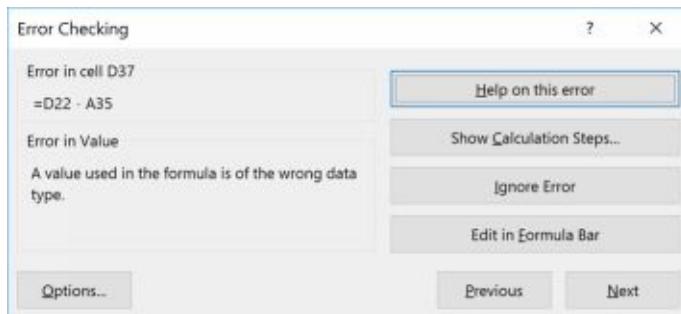
- 5. Modify the formula to fix any errors.**

To remove error arrows, do this:

- 1. Click the Remove Arrows button on the Formula Auditing group on the Ribbon.**

Error Checking a Worksheet

Another tool for finding and fixing errors is the Error Checking tool, which checks your worksheet for errors and displays the Error Checking dialog box when an error is found. You can then choose to trace the error (as we did in the last section), search for help on the particular error, show the calculation steps, edit the formula in the Formula Bar or ignore the error.



To search a worksheet for errors, follow these steps:

- 1. Click the Formulas tab on the Ribbon.**
- 2. Click the Error Checking button on the Ribbon. If an error is found, the Error Checking dialog box will display.**
- 3. Click the desired button to help correct the problem:**
 - a. Click Help on this Error for a detailed description of the error.**
 - b. Click Show Calculation Steps to evaluate the formula step by step.**
 - c. Click Trace Error (if available) to display arrows to the cell that is causing the error.**
 - d. Click Edit in Formula Bar to set the insertion point in the Formula Bar where you can correct the error.**
 - e. Click Ignore Error to ignore the current error and continue checking the worksheet.**
- 4. Click Next to continue error checking.**

Tip: You change how Excel checks for errors by setting Error Checking Options in the Formulas category of the Excel Options dialog box.

Creating a PivotTable

PivotTables allow you to analyze complex data of related totals and compare several facts about each total. Data for PivotTables is usually in large lists such as the sales figures for a company. Perhaps the greatest advantage of using PivotTables is their flexibility — you can easily change the way the data is summarized.

A	B	C	D	E	F	G	H	I	J
1 City	(All)								
2	Sum of Purchase Amount	Column Labels							
3	Row Labels	CA	CO	FL	GA	MI	TX	WI	WY
4	Dan Baker	785.33	976.45					3630.99	634.22
5	Jill Clarke	1680.07			897.33		762.42	2333.55	5673.37
6	Larry Knox	821.22	982.44	202.44	532.33		788.22	892.22	4218.87
7	Mark Petersen	906.25	1288.55			534.33			2729.13
8	Sally Hardy			1369.44		235.33	711.99		2316.76
9	Grand Total	3407.54	3056.32	2548.33	532.33	1666.99	1500.21	5285.63	2967.77
10									20965.12
11									
12									
13									

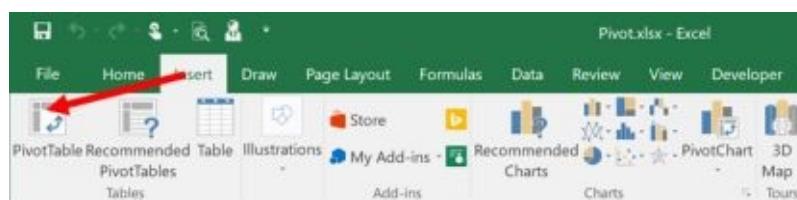
The PivotTable tool provides a blank framework for your PivotTable and allows you to drag row fields, column fields, and body fields (numerical data) to the appropriate boxes in the PivotTable Field List task pane. After the creation of your PivotTable, you can then drag the items to new locations to reorganize your data. Note however, that the data in the PivotTable is read-only – you can only change the values in the source list of data.

When adding fields to your report, you drag the fields directly to the PivotTable Field List task pane. From here, you can copy fields to 4 regions:

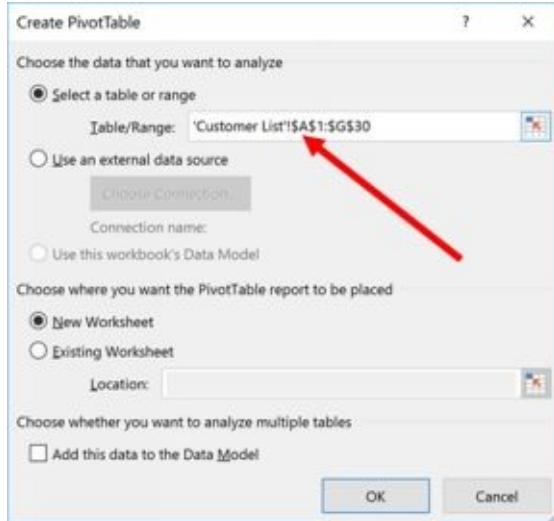
- **Filters (Page Fields on the blank layout)** – Used to filter the entire report.
- **Columns (Column Fields on the blank layout)** – Used to display fields as columns across your report.
- **Rows (Row Fields on the blank layout)** – Displays row labels on the left side of your report
- **Values (Data Items on the blank layout)** – the numerical data that composes the body of your PivotTable report.

To create a PivotTable, follow these steps:

1. **Select a cell in your data range**
2. **Click the Insert tab on the Ribbon.**
3. **Click the PivotTable button on the Tables group of the Ribbon.**



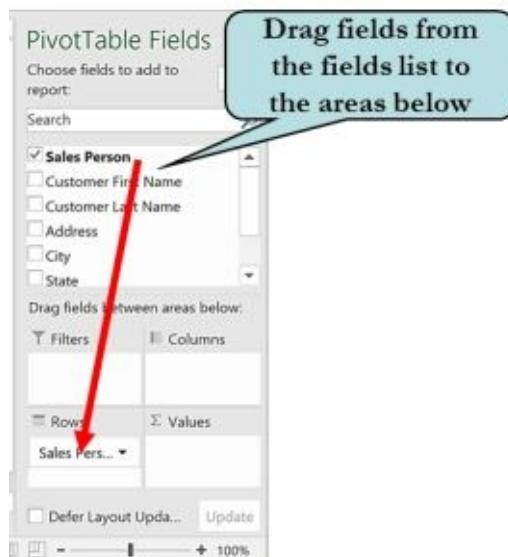
4. **Specify the range where your data is located if necessary. The default selection is the data range that you have selected.**



5. Click New Worksheet or Existing Worksheet depending where you want to place your PivotTable.

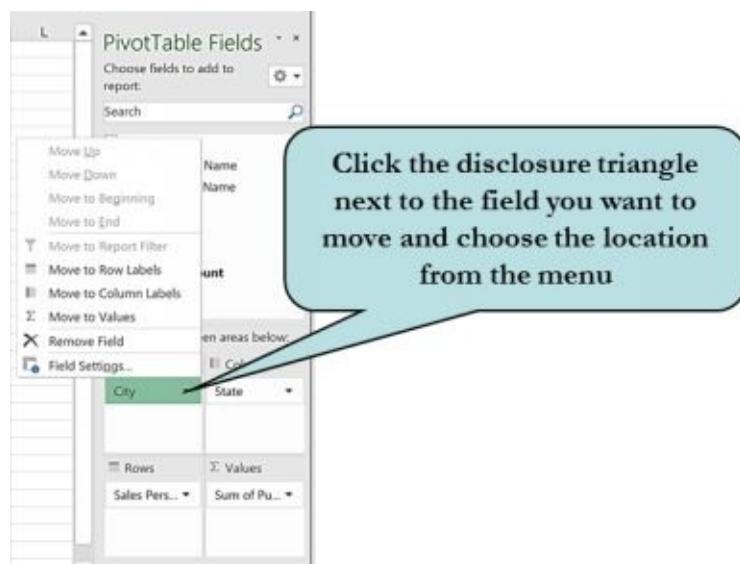
6. Click OK. A blank PivotTable layout is inserted in your workbook.

7. In the PivotTable Field List task pane, click and drag any fields you want to add to your report from the Choose Fields to Add to Report box to one of the four regions below: Report Filter, Column Labels, Row Labels or Values.



Rearranging a PivotTable

The flexibility of PivotTables allows you to easily rearrange the rows and columns of your data. For instance, if the Salesperson field is in the row location and the City field is in the column location, you can change the layout of your PivotTable to display Salesperson in the column location and City and in the row location. To rearrange the fields on the PivotTable, drag the field from the Choose fields to add to report pane to the appropriate region box below. You can also quickly drag fields from one region box to another.



To rearrange a PivotTable, follow these steps:

- 1. In the PivotTables field list task pane, click the field you want to move.**
- 2. Click and drag the field to the Filters, Columns, Rows, or Values area below.**



- 3. Release the mouse button.**

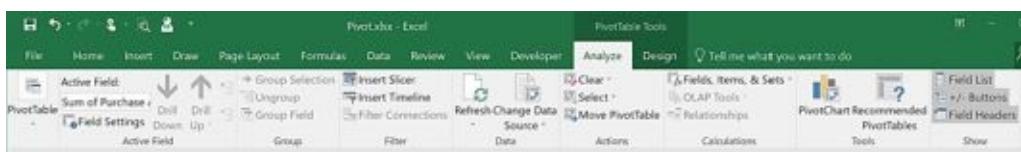
Or

Click the disclosure triangle next to the field you want to move in the Drag fields to areas below: section and choose the desired region from the pop-up menu.

Setting PivotTable Options

Whenever you select any part of your PivotTable, the contextual Analyze tab appears on the Ribbon, from where you can modify your PivotTable. You can set a variety of options:

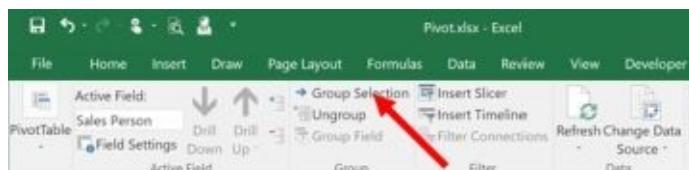
- Change the data source of the PivotTable
- Group and ungroup PivotTable elements
- Move the PivotTable to another worksheet
- Show or hide the field list
- Show or hide column and row field headers
- Clear filters or clear all PivotTable data
- Insert and modify formulas
- Show or hide group buttons



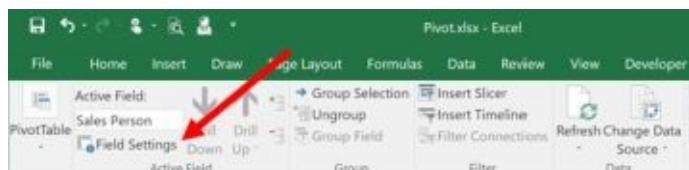
You can also right-click on your PivotTable and choose PivotTable options to display the PivotTable dialog box, from where you can set additional options.

To change PivotTable options, follow these steps:

1. Click any field in your PivotTable.
2. Click the contextual Analyze tab on the Ribbon.
3. To group PivotTable elements, select the items and then click the Group Selection button. To remove the grouping, click Ungroup.



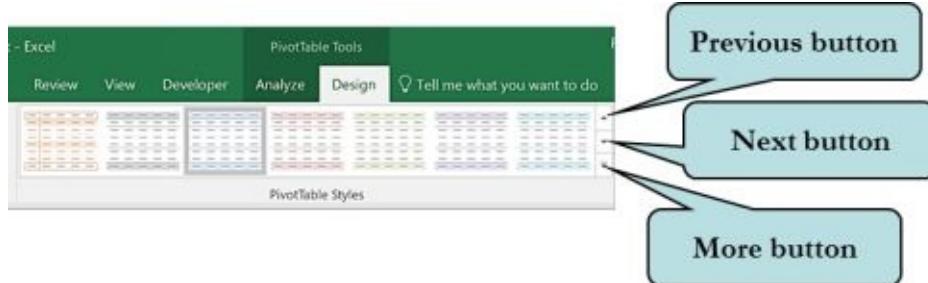
4. To show or hide buttons, click the desired button on the Show/Hide group on the Ribbon.
5. To change how data is summarized, click the Field Settings icon on the Active Field group.



6. Click the Formulas button to insert calculated fields or calculated items.
7. To clear all items from the PivotTable, click the Clear button.
8. Click the Options button to display the PivotTable options dialog box.

Formatting a PivotTable

From the contextual Design tab, you can modify the appearance of your PivotTable. Excel provides several predefined PivotTable Styles that you can use to quickly and easily format a PivotTable. PivotTable styles include professional looking combinations of fill colors, fonts, borders, font colors and patterns. If none of the predefined table styles meet your needs, you can create your own custom styles.

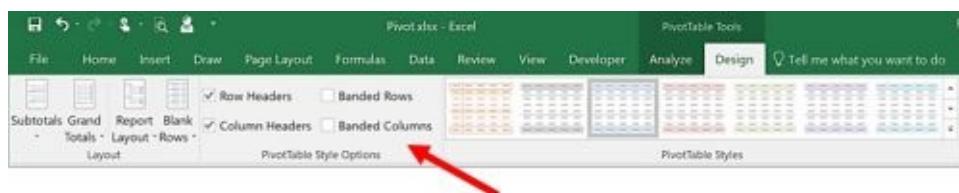


The Ribbon displays only a few of the available styles. To scroll the style gallery, click the previous or next buttons. To display the entire styles gallery, click the More button.



PivotTable Styles Gallery

You can further modify the formatting of your table by changing options such as hiding or displaying the header row, displaying banded rows or columns (in which the even rows or columns are formatted differently from the odd rows and columns, much like an accounting greenbar report), displaying subtotals and grand totals, and modifying the report layout.



To remove a PivotTable style, click the More button on the PivotTable Styles group and choose Clear from the menu. The PivotTable will display in the default format.

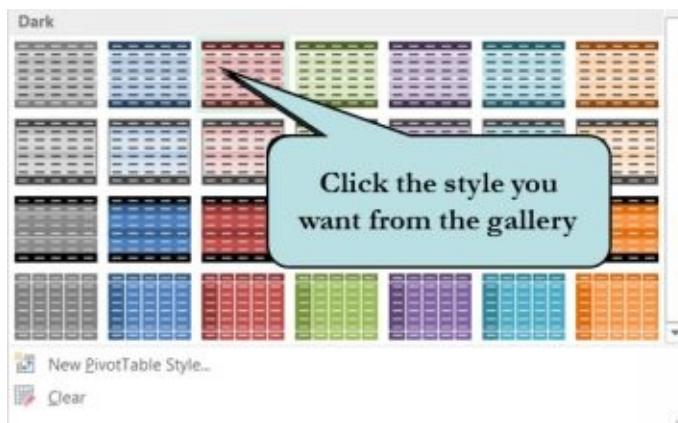
To format a PivotTable, follow these steps:

1. Click anywhere within the PivotTable to activate it.

2. Click the contextual Design tab under PivotTable Tools on the Ribbon.
3. Click the More button on the PivotTable Styles group to display the styles gallery.



4. Move your mouse pointer over any of the styles to display a preview of the style.
5. Click the style that you want.



6. To remove a PivotTable style, click the More button on the PivotTable Styles group and click Clear on the menu.

To format PivotTable elements, follow these steps:

1. Click anywhere within the PivotTable to activate it.
2. Click the contextual Design tab under PivotTable Tools on the Ribbon.
3. On the PivotTable Style Options group, do one of the following:
 - a. To turn the header rows on or off, select or clear the Row Headers or Column Headers check box.
 - b. To display odd and even rows with different formatting, select the Banded Rows check box.
 - c. To display odd and even columns with different formatting, select the Banded Columns check box.
 - d. Click the Report Layout button to change the report layout to compact, outline or tabular.
 - e. To insert or remove a blank row after each item, click the Blank Rows button.

Filtering PivotTable Data with Slicers

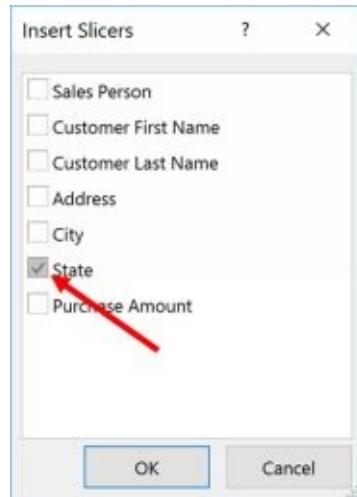
Slicers are an easy-to-use filtering component in Excel that enables you to quickly filter your data. A slicer provides buttons enabling you to choose what information to display without the need to scroll through drop-down lists in order to find the data you want. When you select an item in a Slicer, that item is included in the filter and the data is then displayed in your PivotTable. You can easily drag-select to choose more than one item (or hold down the Ctrl to choose non-adjacent items). To redisplay all items in your PivotTable, click the Clear Filter button or press the Alt + C keystroke combination.



You can also format the Slicer window. Select the Slicer you want to modify, click the contextual Options tab on the Ribbon and then choose a Slicer style from the Slicer Styles gallery. You can modify additional Slicer options, such as sorting, whether or not to display a header, visually indicating items with no data and showing items deleted from the data source. Note that all of these options only apply to the Slicer window, not to the PivotTable.

To show and hide items in a PivotTable using Slicers, follow these steps:

- 1. Click anywhere in the PivotTable for which you want to create a Slicer.**
- 2. Click the contextual Analyze tab.**
- 3. Click the Insert Slicer button to display the Insert Slicer dialog box.**
- 4. Click the checkbox next to each PivotTable field for which you want to create a Slicer. Click OK when finished.**



5. In each Slicer window, click on the items that you want to display in your PivotTable. To choose more than one item, click the Multi-Select icon on top of the Slicer window and then select your items.



6. To redisplay all items, click the Clear Filter button on the top right corner of the Slicer window or press the Alt + C keystroke combination.



7. To change the style of a Slicer, select the Slicer you want to modify, click the contextual Options tab and then choose a Slicer style from the Slicer Styles gallery.

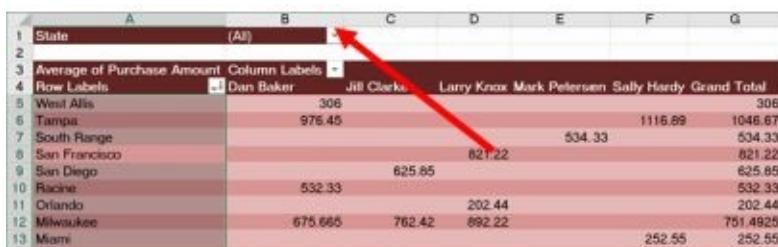
8. For additional Slicer options, click the Slicer Settings button on the Slicer group on the Ribbon and make your selections.

Filtering A PivotTable Inline

You can also choose what information to display in your PivotTable by clicking the drop-down arrow on the row field, column field or report filter field within your PivotTable and then selecting which items to show or hide. The drop-down arrows on the row and column fields display all items in that field with a check box next to each item. To hide a particular item from view, deselect the check box. The drop-down arrows on the page field allow you to display all items or only one item. Simply choose the item for which you want to filter from the list.

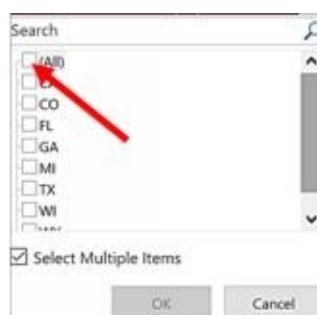
To show and hide items in a PivotTable, follow these steps:

1. For row and column fields, click the drop-down arrow in the field.

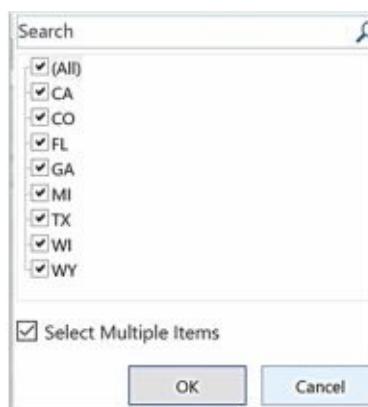
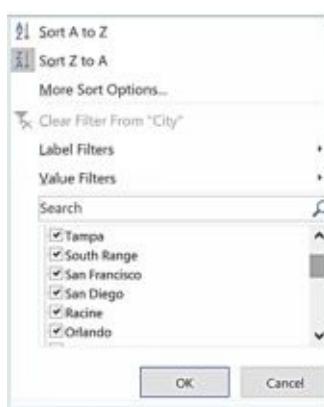


A	B	C	D	E	F	G
1 State	(All)					
2						
3 Average of Purchase Amount	Column Labels					
4 Row Labels	Dan Baker	Jill Clarke	Larry Knox	Mark Petersen	Sally Hardy	Grand Total
5 West Allis	306					306
6 Tampa	976.45					1046.67
7 South Range			534.33			534.33
8 San Francisco		821.22				821.22
9 San Diego		625.85				625.85
10 Racine	532.33		202.44			532.33
11 Orlando				202.44		202.44
12 Milwaukee	675.665	762.42	892.22			751.4925
13 Miami					252.55	252.55

2. Deselect the check box next to any of the items you do not wish to display. Click (All) to select/deselect all items.



3. For Report Filter fields, select the drop-down arrow in the field and select All to display all items or select an individual item to display only that field. To select more than one item, click the Select Multiple Items box and then click the check box next to any of the items you want to display.



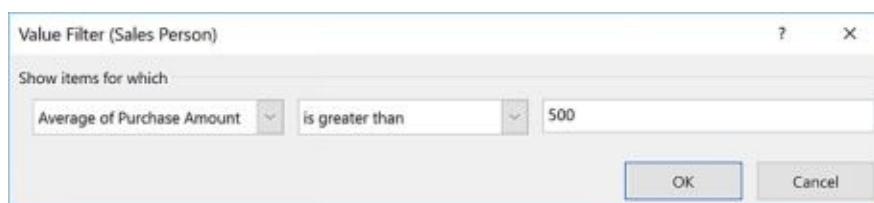
Row & Column Fields Report Filter Fields

Creating Custom Filters

In addition to displaying or hiding specific items, you can also create complex criteria using comparison operators such as:

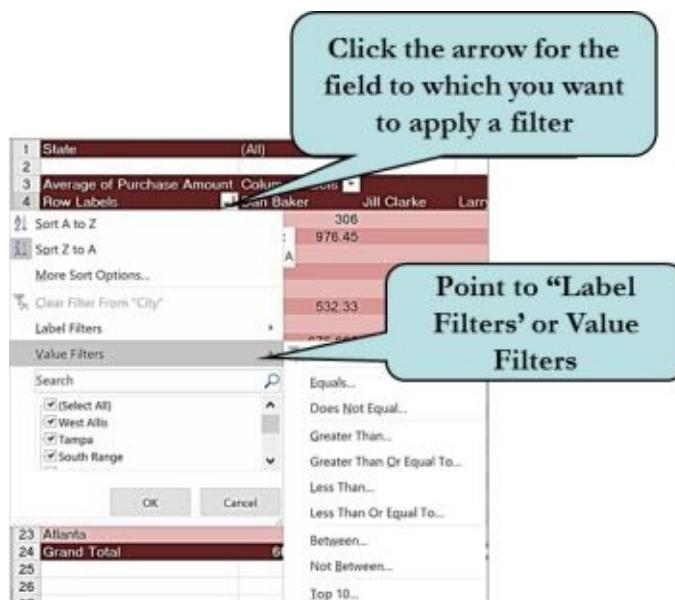
- Equals/does not equal
- Is greater than/is less than
- Is greater than or equal to
- Is less than or equal to
- Begins with/does not begin with
- Ends with/does not end with
- Contains/does not contain

To create a custom filter, click the drop-down arrow on the row field, column field or report filter field, point to Label Filters (to filter text data) or Value Filters (to filter numerical data), select the desired comparison operator and then enter your criteria.

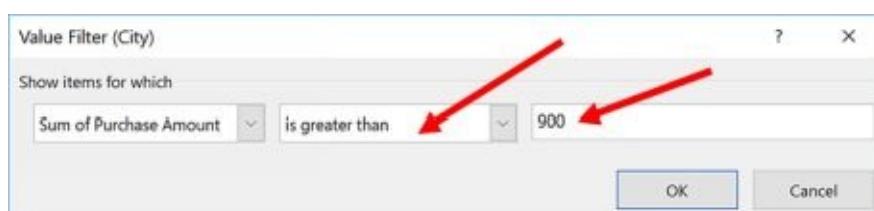


To create a Custom Filter, follow these steps:

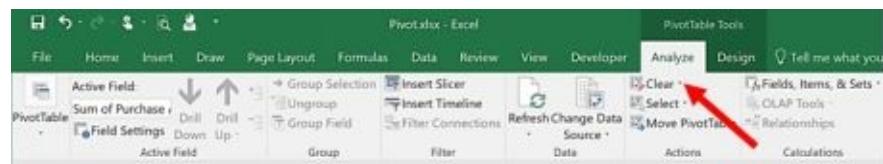
- 1. Activate any cell in PivotTable.**
- 2. Click the arrow next to the field name to which you want to apply a filter.**



- 3. Point to Label Filters or Value Filters to display a menu of comparison operators.**
- 4. Click the comparison operator you want to use from the list.**



- 5. Enter your criteria in the right-most text box.**
- 6. Click OK when finished.**
- 7. To clear filters, Click the Clear button on the Actions group of the Analyze Ribbon.**



Filtering PivotTable Data Using Timeline

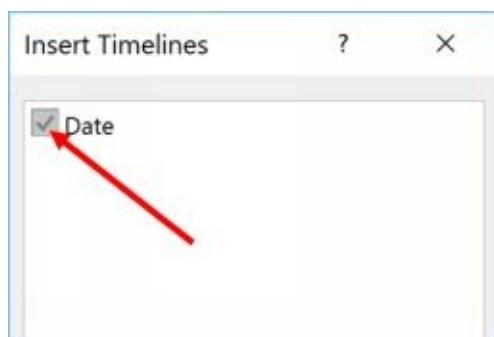
Timeline is an easy-to-use filtering component in Excel that enables you to analyze your data based upon a specific time period. When applying a Timeline filter to a PivotTable, data is displayed in a small floating graphical object from where you can change the time period upon which your PivotTable or PivotChart is displayed. Click the drop-down list on the top right corner and select the date range by which to group your data (years, quarters., months or days). You can then drag the bars in the Timeline box to filter even further.



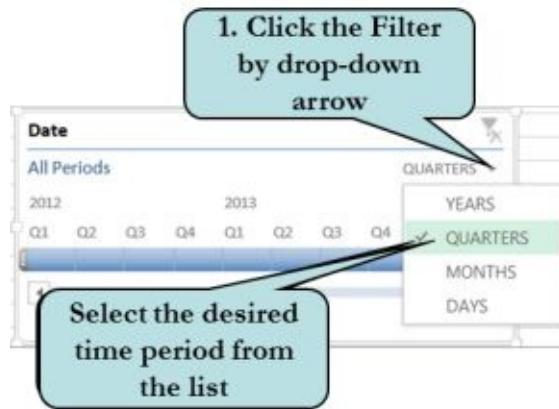
The Timeline feature is located on the Filter group of the Analyze Ribbon. Once the Timeline feature is active, you can then click the contextual Options Ribbon to apply styles to your Timeline object.

To filter in a PivotTable using Timeline, follow these steps:

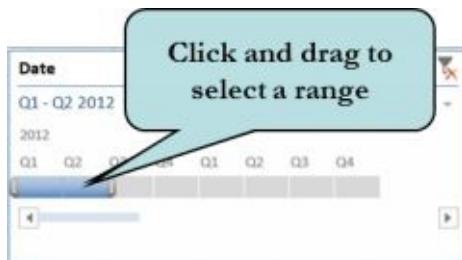
- 1. Click anywhere in the PivotTable for which you want to create a timeline.**
- 2. Click the contextual Analyze tab.**
- 3. Click the Insert Timeline button on the Filter group of the Ribbon to display the Insert Timelines dialog box.**
- 4. Click the checkbox next to the field for which you want to create a Timeline. Click OK when finished.**



- 5. To filter the data by Years, Quarters, Months or Day, click the drop-down list on the top right of the Timeline box and choose how to group your data.**



6. Click on the desired range in the Timeline box to filter data by that range.
7. To change the range that is displayed, click the graphical element in the Timeline box and drag-select to choose the range.



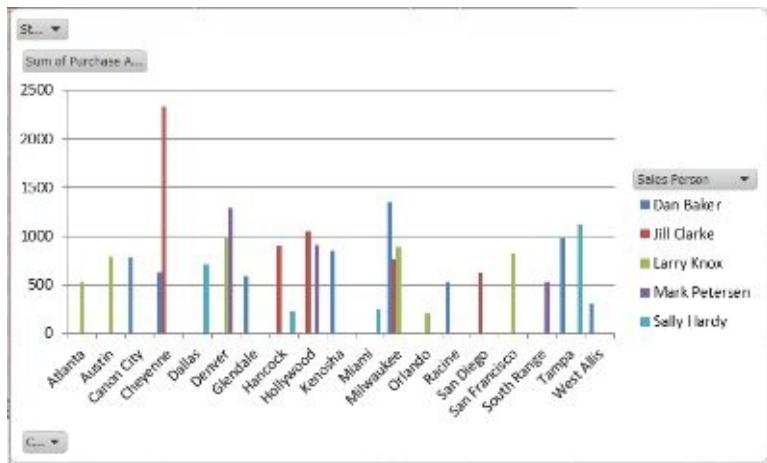
8. To clear the filter, click the Clear Filters icon on the top right corner of the Timeline box.



9. To delete the Timeline box, click the border of the box to select it and then press the Delete key.

Creating a PivotChart

A PivotChart is just as flexible as a PivotTable and can be arranged to organize your data in any manner you wish. Additionally, the same filtering options that exist for PivotTables are available for PivotCharts. You can format your PivotChart (such as chart type and chart options) just as you would a standard chart. The best of all, you can generate a PivotChart with a couple of easy steps.



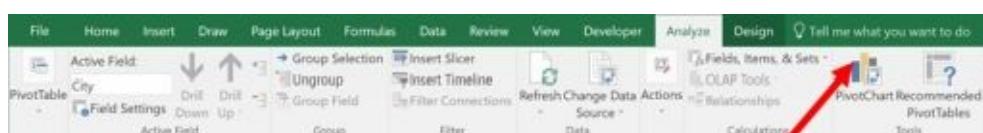
A PivotChart

To insert a PivotChart, follow these steps:

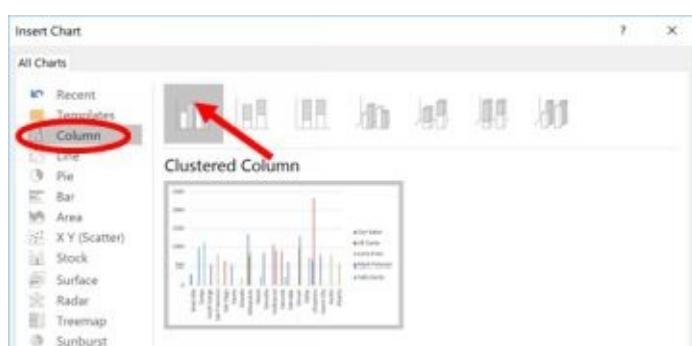
1. Click anywhere within the PivotTable.
2. Click the contextual Analyze tab on the Ribbon and click the click the PivotChart button on the Tools group of the Ribbon

Or

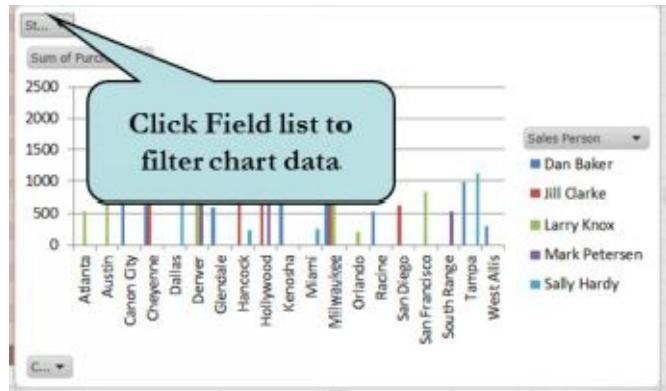
Click the Insert tab on the Ribbon and click the PivotChart button on the Charts group of the Ribbon.



3. Select the desired chart type.



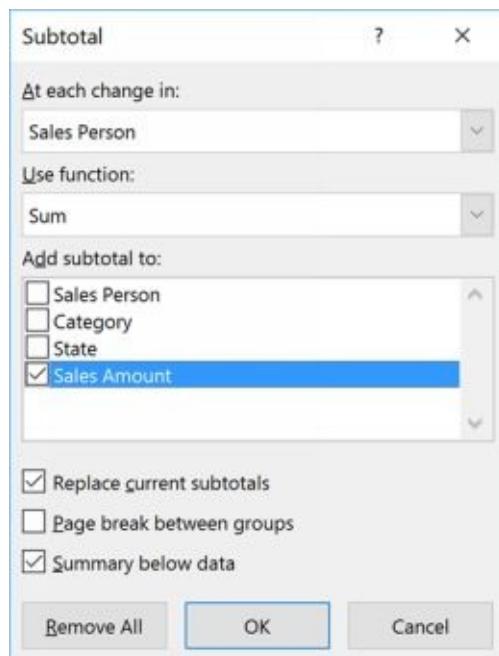
4. Select any filtering options from the PivotChart Filter Pane.



Chapter 20 - Summarizing Data

Adding Subtotals to a List

You can subtotal lists of data by using Excel's Subtotal feature located on the Data Ribbon. The Subtotal feature inserts a subtotal for each change in a specified field (for each new salesperson, for example). You also have the option of choosing from a variety of functions to use for the subtotal (sum, count, average, min, max). Note that this field must be formatted as a numerical field and not a label. Other options include specifying the location of the subtotal (above or below the data), replacing existing subtotals and inserting a page break between each change in group.

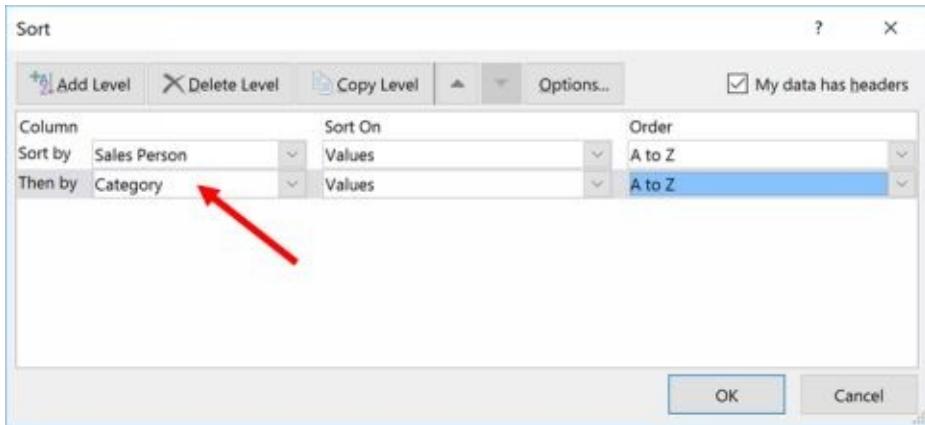


Before you insert a subtotal, your list must be sorted in the order by which you wish to apply the subtotals. For instance, if you wanted to add a subtotal for each salesperson, and then a subtotal of the category field for each salesperson, you would need to first sort your list by Salesperson and then by category. If you want to add more than one subtotal to a list (nesting subtotals), you need to ensure that the Replace Current Subtotals is deselected.

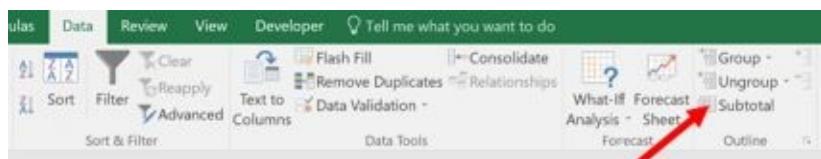
If you have converted your range to a table, you will first need to convert the list back to a range from the contextual Design tab (under Table Tools) before being able to use the Subtotal feature.

To subtotal a data list, follow these steps:

- 1. Sort the data list by the columns to which you want to add a subtotal.**



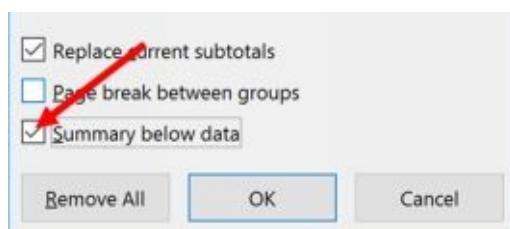
2. Click anywhere within in the list.
3. Click the Data tab on the Ribbon.
4. Click the Subtotal button on the Outline group on the Ribbon to display the Subtotal dialog box.



5. From the At each change in: drop-down list, choose the field you wish to subtotal.



6. Select the desired Function from the function drop-down list.
7. Choose the numerical field you wish to subtotal from the Add Subtotal to: list.
8. To replace existing subtotals, check the Replace current subtotals box.
9. Click the Page break between groups box to insert a new page for each change in group.
10. To place the summary field below the data, check the Summary below data check box.



11. To remove all existing subtotals from the list, click the Remove All button.
12. Click OK.

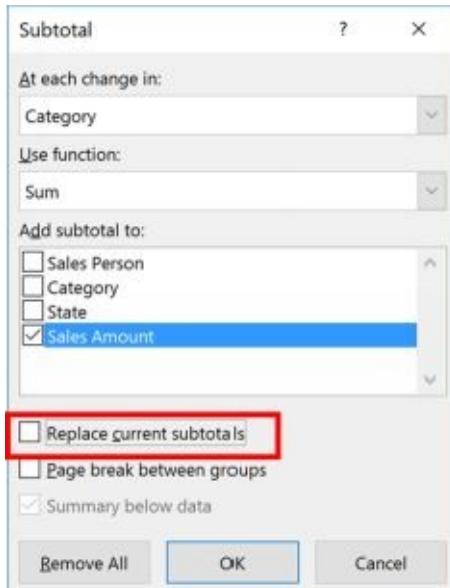
Nesting Subtotals

A nested subtotal is simply a subtotal within a subtotal in a data list. Using the example in the previous lesson, we subtotalized the Sales Amount field for each sales person. We could then add an additional subtotal that sums each Category for each Salesperson.

	A	B	C	D
9	Sales Person	Category	State	Sales Amount
10	Dan Baker	Book	CO	\$785.33
11	Dan Baker	Book	WI	\$592.00
12	Dan Baker	Book	NY	\$849.33
13	Dan Baker	Book	PA	\$572.35
14	Dan Baker	Book	NH	\$532.33
15	Dan Baker	Book	IL	\$306.00
16	Dan Baker	Book	IN	\$825.72
17	Dan Baker	Book	IA	\$324.36
18	Book Total			\$4,787.42
19	Dan Baker	Music	CO	\$832.45
20	Dan Baker	Music	WI	\$1,035.04
21	Dan Baker	Music	NY	\$900.29
22	Dan Baker	Music	PA	\$564.27
23	Dan Baker	Music	NH	\$634.22
24	Music Total			\$3,966.27
25	Dan Baker	Video	IL	\$976.45
26	Dan Baker	Video	IN	\$778.98
27	Dan Baker	Video	IA	\$627.52
28	Dan Baker	Video	RH	\$606.69
29	Dan Baker	Video	MA	\$672.27
30	Video Total			\$3,661.91
31	Dan Baker Total			\$12,415.60
32	Jill Clarke	Book	CO	\$1,054.22
33	Jill Clarke	Book	WI	\$625.85
34	Jill Clarke	Book	NY	\$663.40
35	Jill Clarke	Book	MI	\$897.33
36	Jill Clarke	Book	WY	\$951.17

Subtotal by Salesperson, then by Category

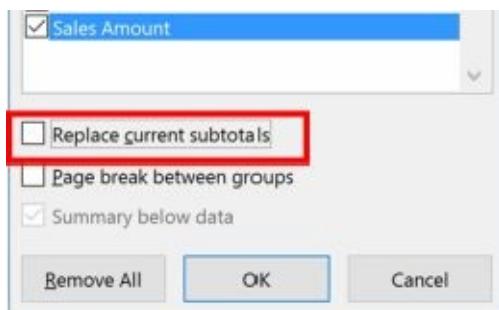
To accomplish this, we need to create another subtotal following the steps outlined in the previous lesson. Make sure, however, that you uncheck the Replace current subtotals checkbox — otherwise, your original subtotals will be replaced by the new ones.



To nest a subtotal, follow these steps:

- 1. Sort the data list by the columns to which you want to add a nested subtotal.**
- 2. Click anywhere within in the list.**
- 3. Click the Data tab on the Ribbon.**
- 4. Click the Subtotal button on the Outline group on the Ribbon to display the Subtotal dialog box.**

- 5. Create the subtotals for the first group by selecting your desired options.**
- 6. Click OK.**
- 7. Click the Subtotal button on the Outline group on the Ribbon to create subtotals for the second group.**
- 8. From the At each change in: drop-down list, choose the second field you wish to subtotal.**
- 9. Uncheck the Replace current subtotals box.**



- 10. Click the Page break between groups box to insert a new page for each change in group if desired.**
- 11. To place the summary field below the data, check the Summary below data check box.**
- 12. Click OK.**

Applying Advanced Filters

Advanced filters allow you to view only those records that meet a specific criteria. Unlike AutoFilters where you select the data you wish to hide from a drop-down list, with Advanced Filters you enter the criteria into the worksheet. While Advanced Filters are somewhat cumbersome, they are the only way to accomplish certain tasks such as defining three or more criteria for a single column. With Advanced Filters, you can specify much more complex criteria than with AutoFilters. The Advanced Filter takes two arguments:

- 1. List Range** – the range of the actual list where the data you wish to filter is located.
- 2. Criteria Range** – the range where you have typed in your criteria.

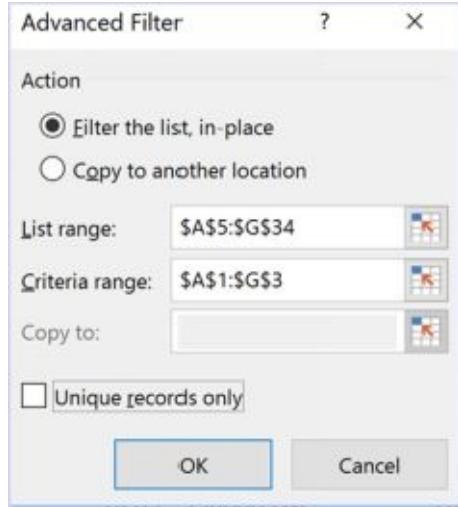
To use an advanced filter, you should insert several blank rows above the data list. Copy the **column headings** of the data list and then paste them in the first blank row of the worksheet. Under the column headings, type in the desired criteria.

Customer First Name		Customer Last Name		Address	City	State	Purchase Amount
Sales Person	Name	Sales Person	Name				
Jill Clarke					CA	>750	
Customer First Name		Customer Last Name		Address	City	State	Purchase Amount
Mark Petersen	Larry	Campbell			CA	\$906.25	
Jill Clarke	Leo	Lenke			CA	\$1,054.22	
Larry Knox	Debbie	Brickman			San Francisco	CA	\$821.22
		Reddick			Los Angeles	CA	\$625.85
		Harris	387 N. Pine St.		Denver	CO	\$785.33
		Wyler	6212 Huck St.		Denver	CO	\$456.33
		Juntinen	2006 W. Center		Denver	CO	\$982.44

Once you have entered the criteria by which you wish to filter the list, click the Advanced button on the Data Ribbon under the Sort & Filter group to display the Advanced Filter dialog box. From here, enter the List Range and Criteria Range. You also have the option of filtering the list in its current position (hiding the rows that do not meet your criteria) or copying the filtered records to another location in the active sheet.

To use an Advanced Filter, follow these steps:

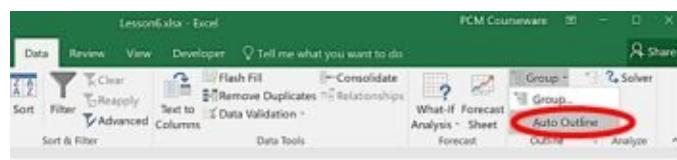
- 1. Ensure that there are at least three blank rows above the list.**
- 2. Copy and paste the Column Headings of the list to the first blank row of the worksheet.**
- 3. Underneath the column headings you just pasted, enter in the desired criteria.**
- 4. Click in any cell in the list range.**
- 5. Click the Advanced button on the Data Ribbon.**
- 6. Ensure that the range in the List Range box reflects the actual range of the list you wish to filter.**



7. In the Criteria range box, enter the range, including the headings, of the criteria you entered in the worksheet.
8. To hide records that do not match your criteria, select Filter the list, in place.
9. To copy the records that match your criteria to a new location on the active worksheet, select Copy to another location.
10. To choose only unique records (no duplicates) select Unique records only.
11. Click OK.

Adding Group and Outline Criteria to Ranges

Grouping and Outlining your worksheet allows you to display only the rows or columns that provide summaries or totals. Any other non-summary or non-total rows are hidden from view. Like the Subtotal feature, your data should be in a list format and sorted so that the rows to be grouped are located together. Subtotals should be manually added for each group of rows to be outlined. By manually inserting subtotals, you can provide a customized description of each group.

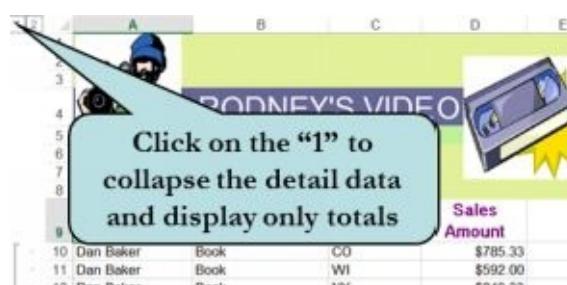


To Outline a worksheet, follow these steps:

- 1. Sort the data in the order that you want to group them.**
- 2. Manually insert subtotals for each group of data.**

23 Dan Baker	Video	IL	\$910.40
24 Dan Baker	Video	IN	\$778.98
25 Dan Baker	Video	IA	\$627.52
26 Dan Baker	Video	RH	\$606.69
27 Dan Baker	Video	MA	\$672.27
28 Dan Baker Total			\$12,884.00
29 Jill Clarke	Book	CO	\$1,054.22
30 Jill Clarke	Book	WI	\$625.85
31 Jill Clarke	Book	NY	\$683.40
32 Jill Clarke	Book	MI	\$897.33
33 Jill Clarke	Book	WY	\$851.17
34 Jill Clarke	Book	GA	\$808.17
35 Jill Clarke	Book	FL	\$1,925.33
36 Jill Clarke	Music	WY	\$2,040.85
37 Jill Clarke	Video	CA	\$1,117.47
38 Jill Clarke	Video	WI	\$762.42
39 Jill Clarke	Video	MI	\$406.22
40 Jill Clarke	Video	FL	\$432.71
41 Jill Clarke Total			\$11,687.14
42 Larry Knot	Book	CA	\$821.22
43 Larry Knot	Book	MI	\$870.49

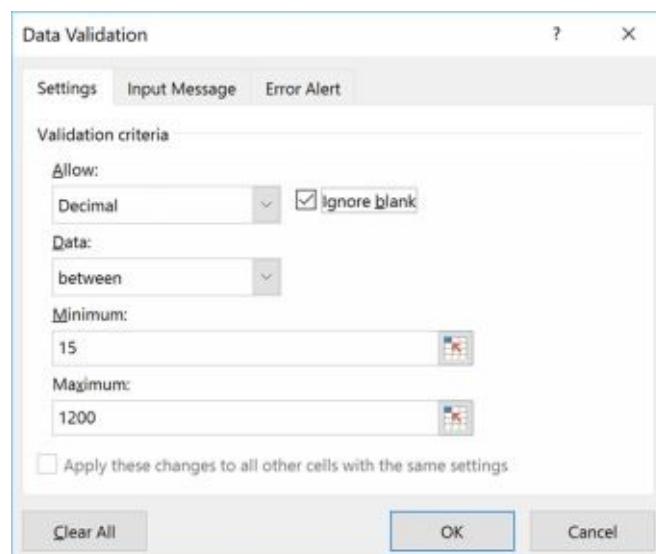
- 3. Enter descriptive text for each subtotal.**
- 4. Activate the list by clicking any cell within the list.**
- 5. Click the Data tab on the ribbon.**
- 6. Click the Group button arrow on the Outline group and click AutoOutline.**
- 7. Click the number 1 button to collapse your outline and number 2 to expand the outline.**



Using Data Validation

Data Validation allows you to control the type and range of data that is entered into cells. For example, you could designate a cell to allow only numerical entries between 15 and 500. This way, you control the accuracy of the data that is entered into your worksheet. Some of the options for Data Validation are:

- Whole numbers only between a specific range
- Decimal numbers between a specific range
- Allow list values from a particular cell range
- Date values only between a particular date range
- Time values only between a particular time frame
- Text values only between a specified text length
- Custom Values

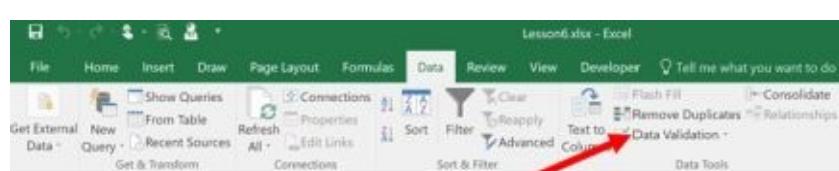


After you designate what constitutes acceptable criteria, you can customize the error message the user receives when data that does not meet the specified criteria is entered. You can also specify an informational input message that appears when the cell containing a validation rule is activated.

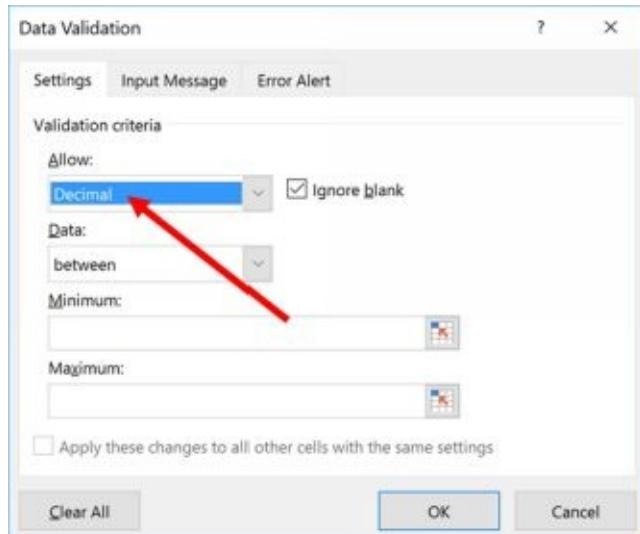
Note however, that Data Validation has some flaws. For instance, users can bypass your validation rules by pasting data using the copy and paste features. Also, existing data is not checked when you create a validation rule. To ensure that your data meets your specified criteria, you can choose Circle Invalid Data from the Data Validation Button arrow. Any values that are outside your data validation rules are circled in red.

To use Data Validation, follow these steps:

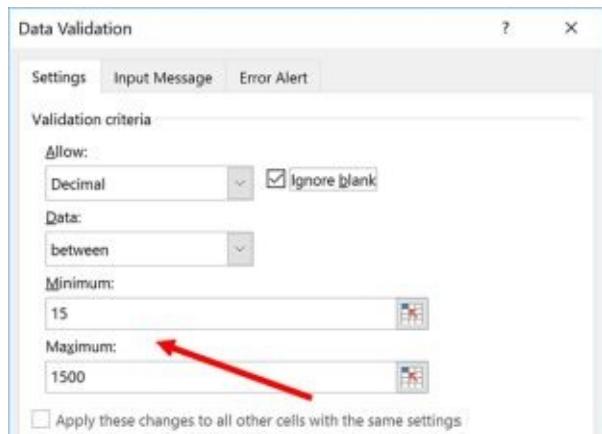
- 1. Select the cell or cell range to which you wish to apply validation.**
- 2. Click the Data tab on the Ribbon.**
- 3. Click the Data Validation button on the Data Tools group.**



4. On the Settings Tab, select the data type you wish to allow from the Allow drop-down list.

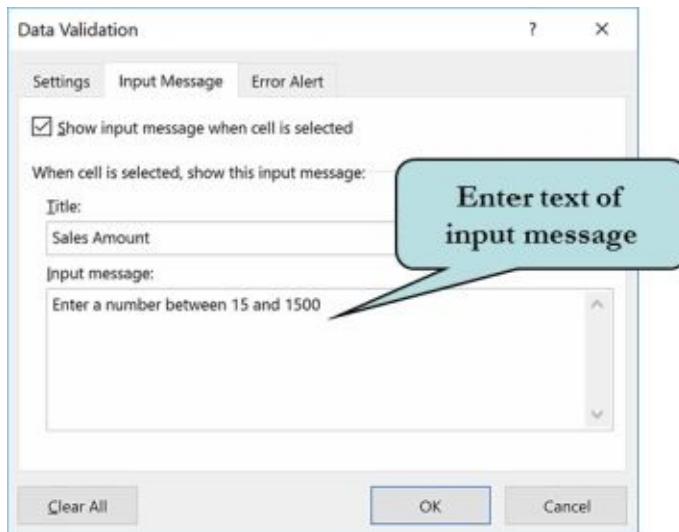


5. Enter any ranges and other settings as needed.



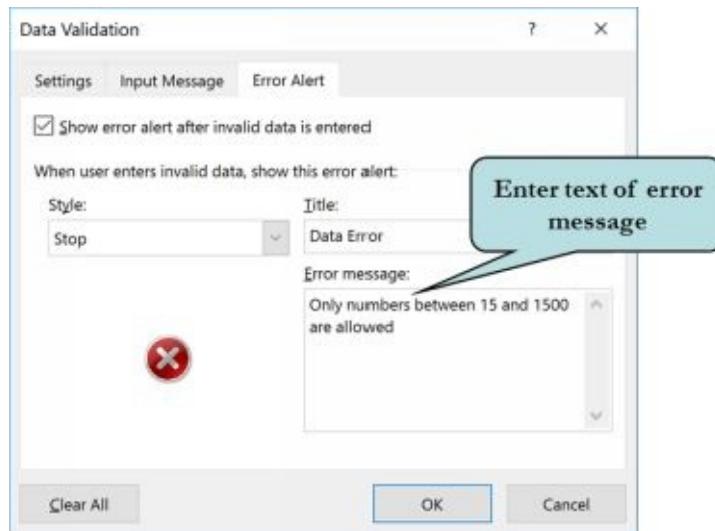
6. To disable the validation rules for blank cells, select Ignore Blank.

7. To activate an Input message, click the Input Message tab and then enter the Title and the Input Message text to be displayed to the user.

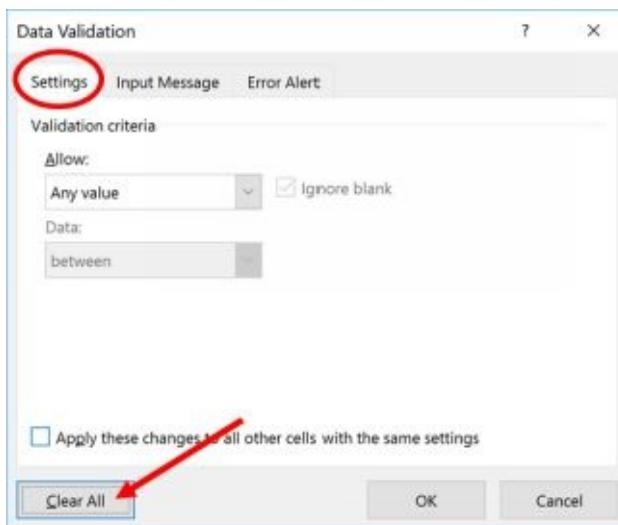


8. To display an error message when the validation rule is violated, click the Error Alert tab and then enter the Title and the Error Message to be displayed. Ensure

that the Show error alert after invalid data is entered check box is checked.

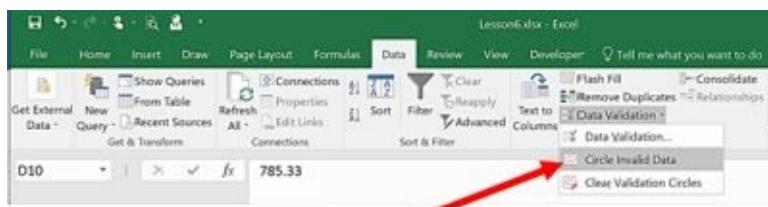


9. To clear all data validation rules, click the Data Validation button and on the Settings tab, click the Clear All button.



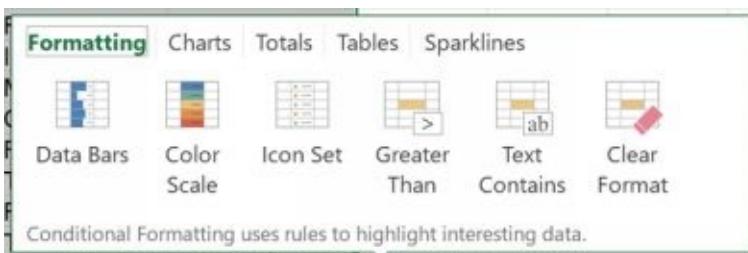
10. Click OK.

11. To flag any data that is outside of your validation rules, click the Data Validation button arrow and click Circle Invalid Data.



Previewing Data using Quick Analysis

The Quick Analysis feature allows you to analyze and preview data quickly on the fly before you make a selection. As you move your mouse pointer over the different options, a data preview displays, so you can see what the data would look like if you click that feature. There are several analysis categories to choose from: Formatting Charts, Totals, Tables and Sparklines, with each category containing several analysis tools such as Data Bars, Color Scale, and Icon Sets. You may find this new feature to be a real timesaver.

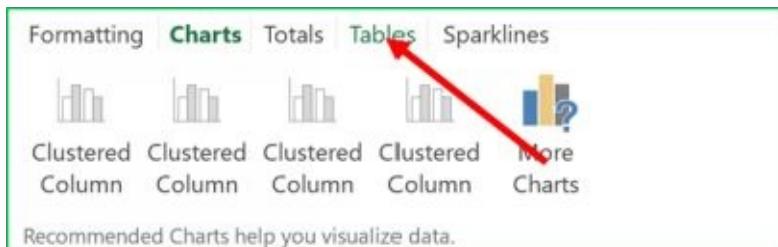


To access the quick analysis feature, select the desired data in your worksheet. When you are finished selecting, the Quick Analysis icon appears on the lower right corner of your data. Click the icon to display the different options you can analyze quickly.

	Sales Person	Category	State	Sales Amount
9	Dan Baker	Book	CO	\$785.33
10	Dan Baker	Book	WI	\$592.00
11	Dan Baker	Book	NE	
12	Dan Baker	Book	P	
13	Dan Baker	Book	N	
14	Dan Baker	Book	IL	
15	Dan Baker	Book	IN	
16	Dan Baker	Book	IA	
17	Dan Baker	Book		\$324.72
18		Book Total		\$4,787.42
19	Dan Baker	Main	CO	\$932.45

To analyze data using Quick Analysis, follow these steps:

1. Select the cell range that you want to include in the analysis.
2. Click the Quick Analysis icon when it appears.
3. Click the desired category on top of the window (Formatting Charts, Totals, Tables or Sparklines).



4. Move your mouse pointer over any of the analysis tools to see a preview.

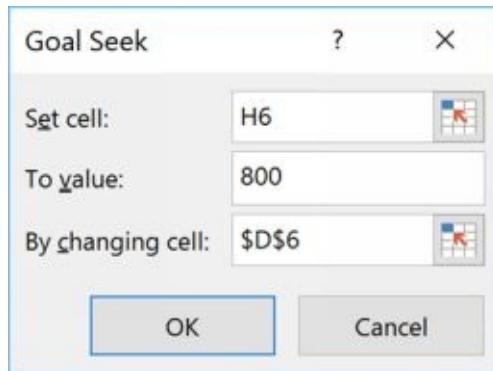


5. To apply it to your spreadsheet, click the desired icon.

Chapter 21 - Analyzing Your Data

Using Goal Seek

Goal Seek allows you to resolve a problem when you know the target result by changing a value in a specific cell that directly affects the formula. Suppose you want to obtain a home loan but can only afford \$800 a month. With Goal Seek, you could determine the maximum home purchase price that you could afford.

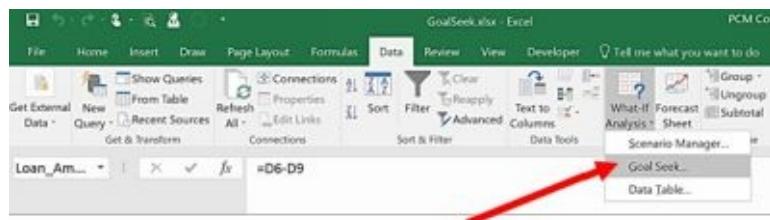


You must provide three parameters for Goal Seek:

1. **The cell you want to change.** In the example above, this would be the loan amount.
2. **The value to which you want to change the target cell.** In the example above, this would be \$800.
3. **The cell you want to change to achieve the target amount.** In the example above, this would be the price of the home.

To use Goal Seek, follow these steps:

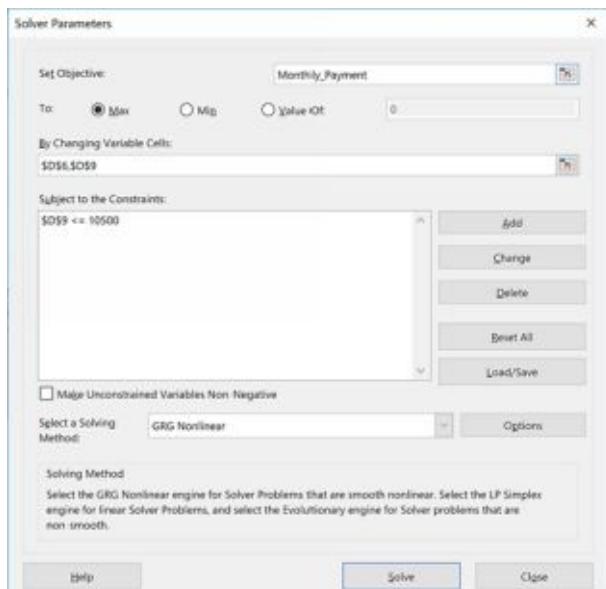
1. Click the Data tab on the Ribbon.
2. Click the What-if Analysis button on the Data Tools group of the Ribbon and click Goal Seek from the menu.



3. In the Set Cell Box, type the cell reference of the cell that contains the formula you want to change.
4. In the To Value box, type in the value to which you want to change the cell.
5. In the By changing cell box, enter the cell reference of the cell that contains the value you want to adjust.
6. Click OK.
7. Click OK.

Using Solver

Solver allows you to resolve problems where you know your target but two or more variables remain unknown. It is used to help find an optimal solution to a problem. For example, you might want to purchase a home but can only afford \$800 a month. Solver can figure out how to best adjust the variables – price of the home, downpayment, etc. to help you reach your goal. To use Solver to help you find an optimal solution, define the formula you want to change (the target) and then tell Solver which cells it can adjust in order to reach your goal. Solver will then present you with a solution that you can either keep or discard. If you choose to discard the solution, your original values will be restored.

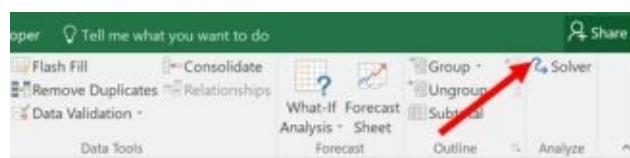


When choosing the cells you want to adjust in order to reach your target, you have the option of setting constraints which limit the values that Solver can set. In the Example above, we set a constraint of a down payment less than or equal to \$10,000.

Note: If you do not see the Solver button on the Data Ribbon, it is not yet installed. **To install Solver**, click File tab, click Options, click the Add-ins category, click Solver Add-in from the View and Manage combo box and then click the Go button. Click the Solver Add-in and then click OK to install it.

To use Solver, follow these steps:

- 1. Click the Data tab on the Ribbon.**
- 2. Click the Solver button on the Analysis group of the Ribbon. If you don't see it, you'll need to install it, following the instructions above.**

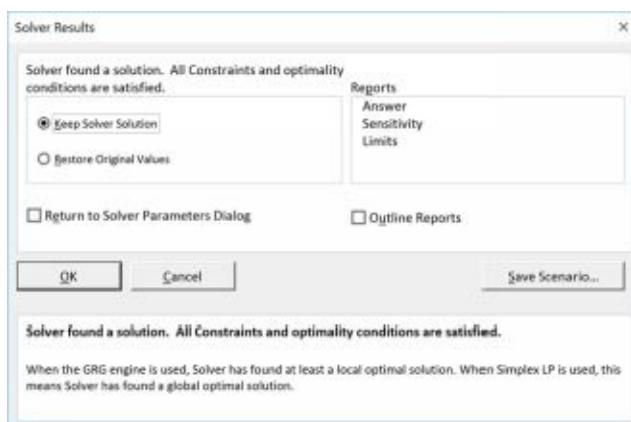


- 3. Click in the Set Objective box and then select (or type in) the cell that contains the formula of your target.**
- 4. Select the Max, Min or Value of radio button.**

5. If you chose “Value of” in Step 4, type your desired result in the Value of: text box.
6. Click in the By Changing Variable Cells: text box, select the cells in your worksheet whose values Solver can adjust to reach your target goal. Use the Ctrl key to select more than one cell.
7. To add constraints, click Add, select the cell to constrain, select the appropriate comparison operator, and then type in the constraint.



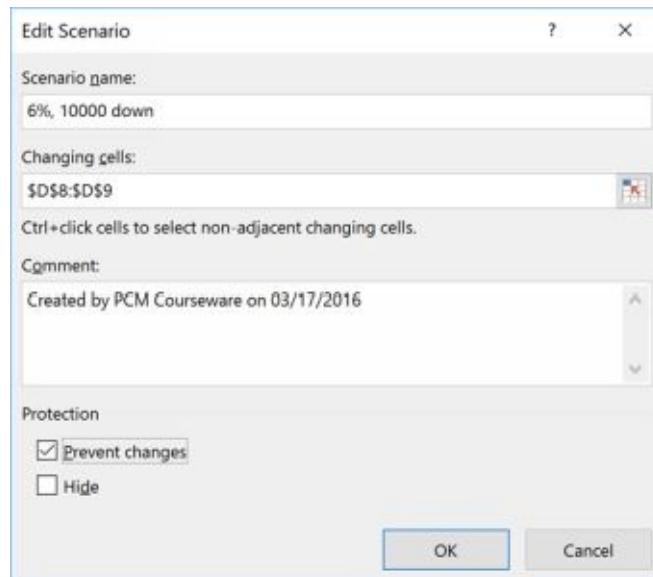
8. To add another constraint, click Add.
9. Click the desired Solving Method from the Select a Solving Method drop-down list.
10. Click OK when finished.
11. Click Solve.



12. Select Keep Solver Solution to accept Solver’s changes and then click OK. To ignore Solver’s solution, click Cancel. (Note: if you click Restore Original Values, the formula in your target cell will be replaced by the actual value of the formula).

Creating & Displaying Scenarios

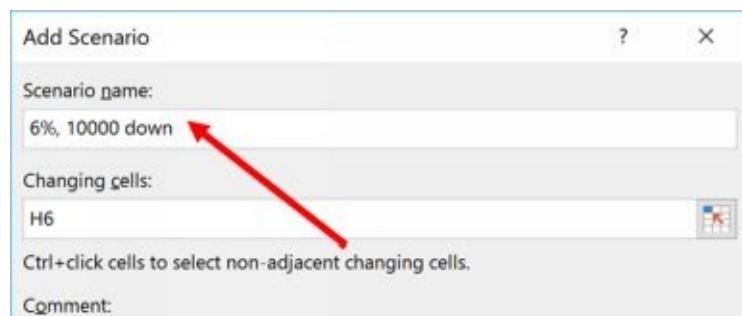
Scenarios allow you to create and save several versions of your worksheet and enable you to see how changing one or more of your worksheet's values affects the other values in the worksheet. Using our previous example of purchasing a home, we could create several different scenarios to see how changing the interest rate and downpayment would affect the value of our monthly payment.



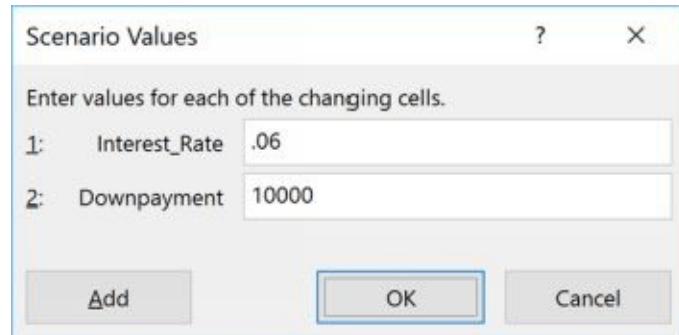
Once you have chosen the cells whose data you want to change and saved your scenario for later review, you can easily display and/or print the scenario when needed. You also have the option of printing a Summary Report to view your current values and your scenarios side-by-side.

To use Scenarios, follow these steps:

- 1. Click the Data tab on the Ribbon.**
- 2. Click the What-if Analysis button and click Scenario Manager from the menu.**
- 3. Click the Add button.**
- 4. Enter a name for your scenario in the Scenario Name box.**



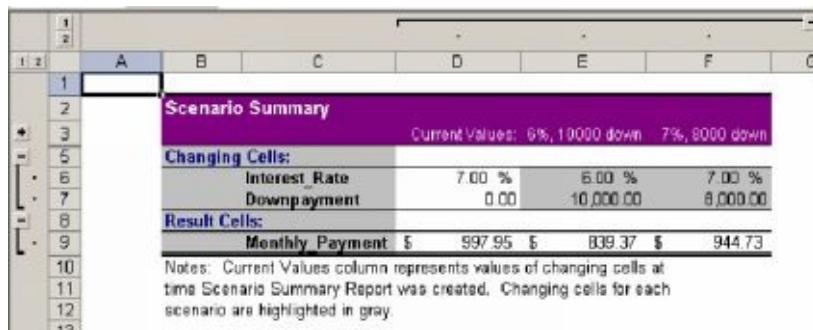
- 5. Click in the Changing Cells box.**
- 6. Hold down the Ctrl key and select the cells in your worksheet that you wish to change.**
- 7. In the Scenario Values dialog box, enter in the new values.**



- 8. Click OK.**
- 9. To Apply a Scenario to your worksheet, select the desired Scenario and then click Show.**
- 10. Click Close.**

Creating a Scenario Summary Report

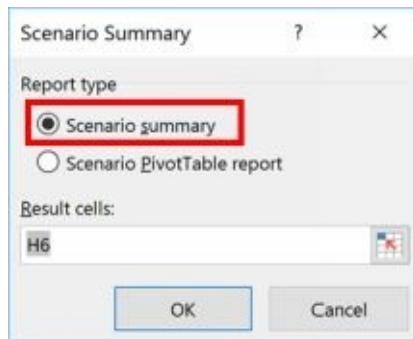
Once you have created your scenarios, you can create side-by-side Summary reports to compare your scenarios. Two types of summary reports are available: the Scenario Summary and Summary PivotTable Report (that you can arrange to your liking). Summary reports are a good way to quickly see the results of several scenarios together. The Scenario Summary report displays the current values for the cells affected by the change and the scenario values.



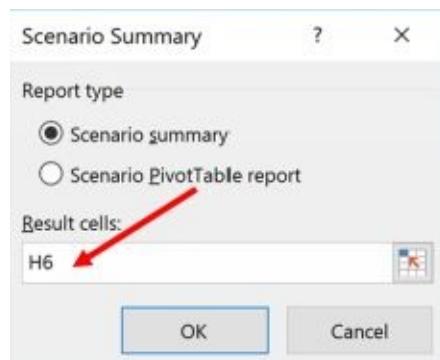
A Scenario Summary Report

To create a Scenario Summary Report, follow these steps:

1. Click the What-if Analysis button on the Data Ribbon and click Scenario Manager from the menu.
2. Click the Summary button.
3. Under Report Type, click the radio button next to Scenario Summary or Scenario PivotTable Report.



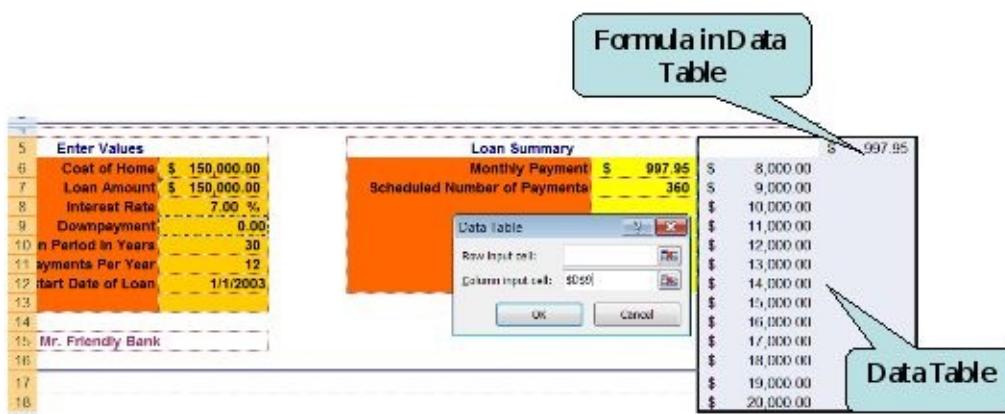
4. Click in the Result Cells box and type in the value you want to change based upon your scenario.



5. Click OK.

Using Data Tables

Data Tables allow you to see how changing certain values in your formulas affects the results. A data table is a range of cells that displays the results of substituting different values. You can create one-variable or two-variable data tables, depending on the number of variables that you wish to test. With a one-input table, you enter the values in row or column format for one variable to see how it affects your formulas. With a two-input table, you enter the values for two variables.

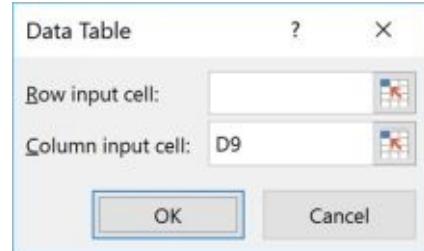


To use One-Input Data Tables, follow these steps:

1. Type the list of values you want to substitute in the input cell either down one column or across one row.
2. Enter the formula you want to use. If the data table is in column format, enter the formula in the first blank cell above and to the right of the top of the table. If the data table is in row format, type the formula in a blank cell to the left of the first value and one cell below the row that contains the values.
3. Select the data table, including the formula.



4. Click the Data tab on the Ribbon.
5. Click the What-if Analysis button on the Data Tools group and select Data Table from the menu.
6. Enter the input cell (the value that you want to substitute with the values from your data table). If the data table is in a column, enter the cell reference in the Column Input text box. If the data table is in a row, enter the cell reference in the Row Input text box.



7. Click OK.

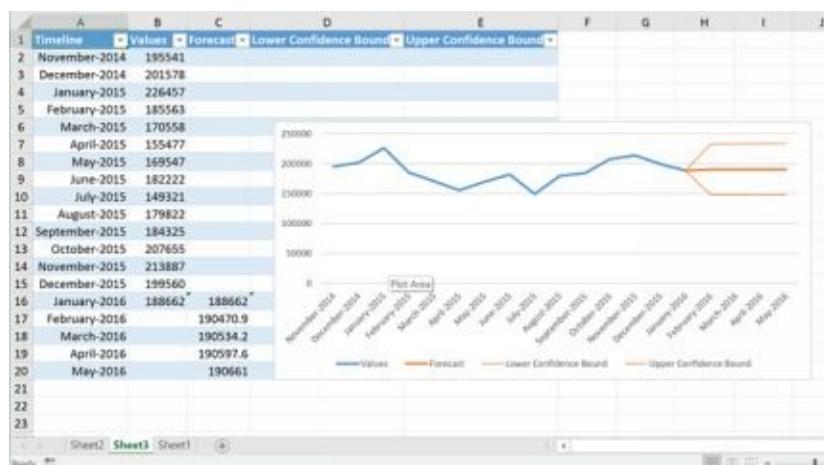
8. Observe the completed Data Table.

Loan Summary		\$997.95		
Monthly Payment	\$ 997.95	\$ 8,000.00	944.73	
Scheduled Number of Payments	360	\$ 9,000.00	938.08	
		\$ 10,000.00	931.42	
		\$ 11,000.00	924.77	
		\$ 12,000.00	918.12	
		\$ 13,000.00	911.46	
		\$ 14,000.00	904.81	
		\$ 15,000.00	898.16	
		\$ 16,000.00	891.51	
		\$ 17,000.00	884.85	
		\$ 18,000.00	878.20	
		\$ 19,000.00	871.55	
		\$ 20,000.00	864.89	

The Completed Data Table

Forecasting Future Values

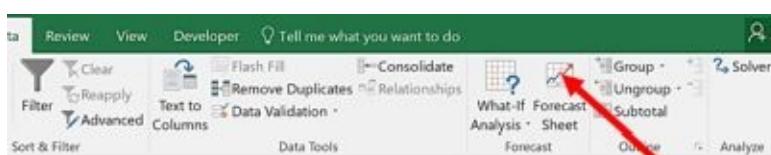
Forecasting refers to the process of predicting future values based on historical values. For instance, you might want to predict this year's sales based upon the past two years. When providing financials for a company, it is standard to include actual data (actuals) and predicted data (forecast). With the Forecast Sheet feature in Excel, you can quickly create a visual financial forecast of your sales data or view trends in any time-based data, such as inventory or number of customers.



The Forecast Sheet feature is on the Forecast group of the Data Ribbon. Once you click Create, Excel inserts a new worksheet containing a table and a chart, containing actual values and forecasted values.

To create a Forecast, follow these steps:

- 1. Select that data range you want to use.**
- 2. Click the Data tab on the Ribbon.**
- 3. Click the Forecast Sheet icon on the Forecast group of the Ribbon.**



- 4. To view additional setting, click Options on the bottom of the window. Make any desired choices.**



- 5. Click Create.**
- 6. Observe the Forecast Sheet.**



Chapter 22 - Collaborating with Others

E-mailing a Workbook

Emailing a workbook allows you to share it with others for their review and comments. With Excel, you can route your workbook as an attachment via e-mail by clicking the File tab, clicking Share and then clicking E-mail.



You then have several options for sending your workbook:

Send as an attachment – the workbook is attached to the e-mail message, with each recipient receiving a separate copy of the file.

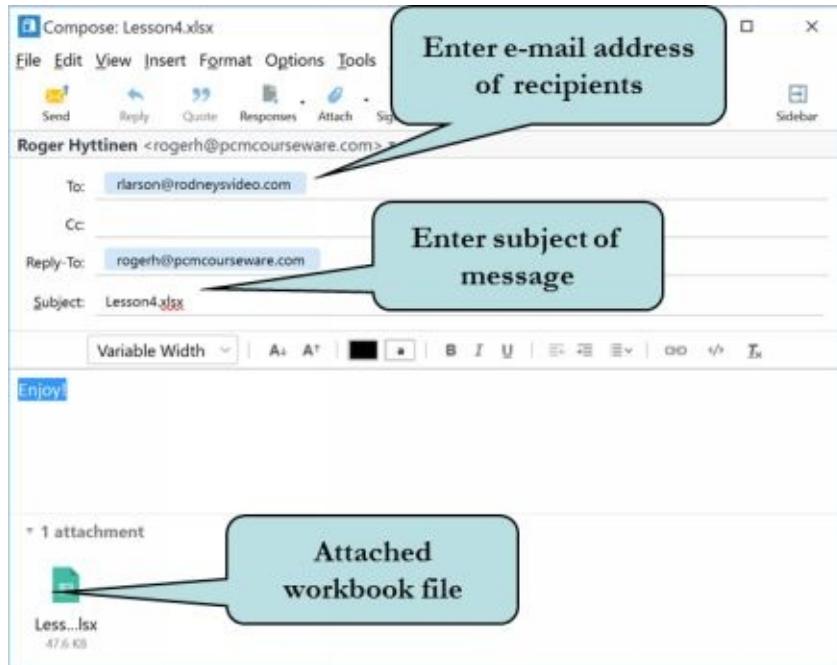
Send a Link – the e-mail message contains a link to the file. This way, everyone can see/work on the same file. In order for this option to be active, the workbook must be saved in a shared location.

Send as PDF – the file is attached in PDF format to the e-mail message, with each recipient receiving a separate file. This format prevents the content from being easily changed.

Send as XPS – the file is attached in XPS format to the e-mail message with each recipient receiving a separate file. Contents of documents in this format cannot be easily changed.

Send as Internet Fax – Sends the document as a fax to the recipient. Requires a fax service provider.

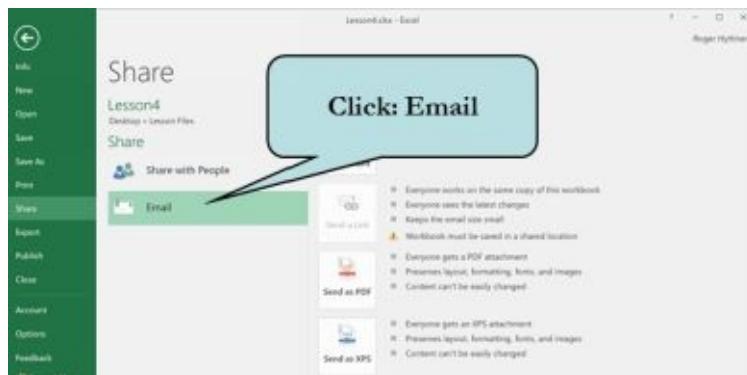
When sharing a file via e-mail, your default e-mail program will launch and will create a blank message with the active workbook as an attachment. You will need to fill in the e-mail addresses of the recipients, the message subject, and any message text that you would like to include with the message.



You can also send your workbook as an .xps or .pdf attachment, or as an Internet Fax if you are registered with such a service.

Here's how to email a workbook to others:

- 1. Open the workbook file that you would like to send as an e-mail attachment.**
- 2. Click the File tab, click Share and then click E-mail.**



- 3. Click one of the following option buttons: Send as an attachment, Send a Link (file must be saved in shared location), Send as PDF, Send as XPS or Send as Internet Fax (fax service provider required).**
- 4. Enter the e-mail addresses of the recipients.**
- 5. Enter a message subject.**
- 6. Type any other desired message text.**
- 7. Send your message.**

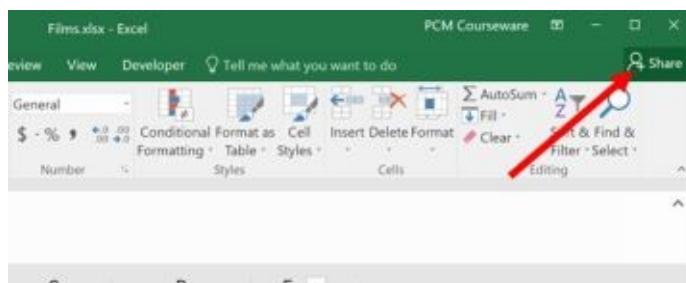
Tip: You can also send your document to your OneDrive account. Click the **Share With People** button instead of Email.

Sharing a Workbook with Others

Excel allows you share your workbooks with others right from within the application using the new **Share** icon on the Ribbon. In order to use this feature, you'll need to save your workbook to OneDrive or SharePoint. Once you do, you can invite people to work on it or you can send a copy of your workbook as an attachment or send it as a PDF.

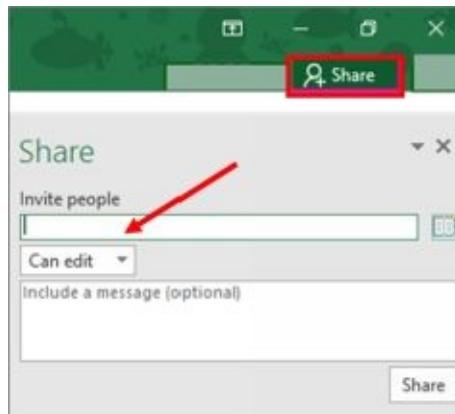
To share your workbook with others, follow these steps:

- 1. Click the Share icon on the top-right corner of the Ribbon.**



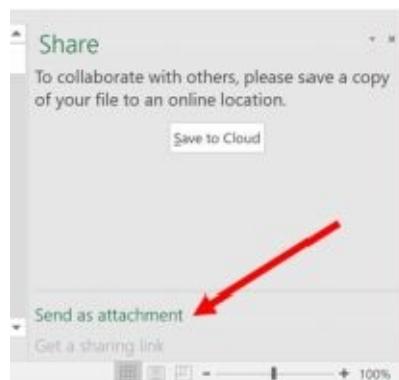
- 2. If you haven't saved your workbook to the OneDrive or SharePoint, click Save to Cloud and then choose a location to save your workbook.**

- 3. Once your workbook is saved to a shared location, enter in the e-mail address of the recipients and then click the Share button.**



To share your workbook as an attachment or as a PDF, follow these steps:

- 1. Click the Share icon on the top-right corner of the Ribbon.**
- 2. Click Send as Attachment on the bottom of the Share pane.**



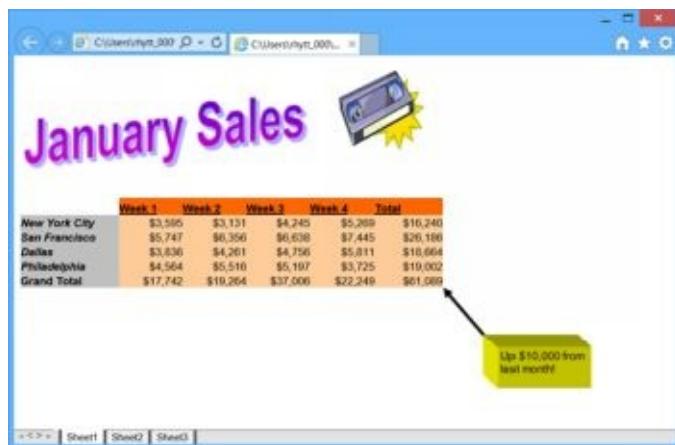
- 3. Select either Send a Copy or Send a PDF.**



- 4. Excel will launch your email application and attach your file to a new message. Fill in the recipient's details (including a short message), and click Send.**

Web Page Preview

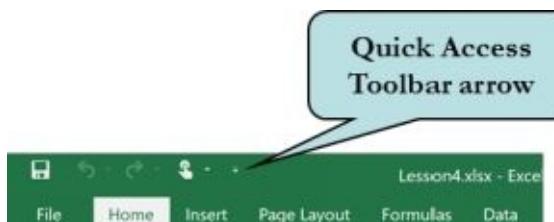
One of the strengths of Excel is the ability to save your worksheets and workbooks as Web Pages that can be accessed via the World Wide Web. The Excel document is saved in HTML (Hypertext Markup Language) format, allowing anyone with a Web browser to view the worksheets.



Before saving your document as a Web page, you should preview it in a Web browser to see what it will look like once saved in HTML format. As this feature is not displayed by default on the Excel Ribbon, you will need to add it to the Quick Access Toolbar. Once it has been added, you can click the Web Page Preview button to automatically display the workbook in your default Web browser. The worksheet tabs will appear at the bottom of your screen, allowing you to navigate from one worksheet page to another.

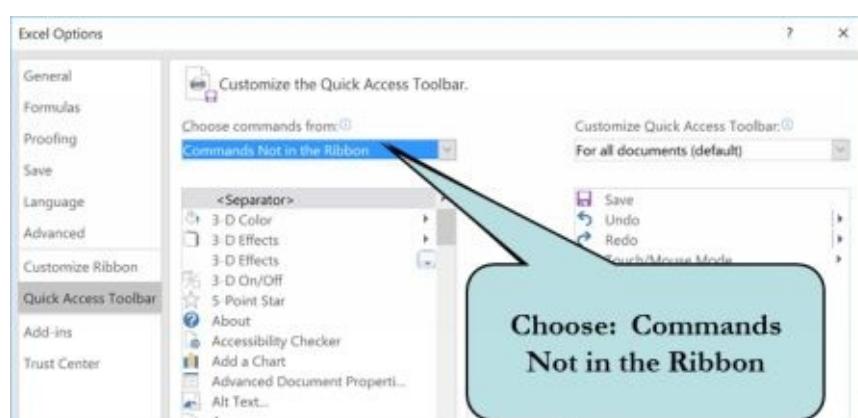
Here's how to add the Web Page Preview command to the Quick Access Toolbar:

1. Click the drop-down arrow to the right of the Quick Access Toolbar.

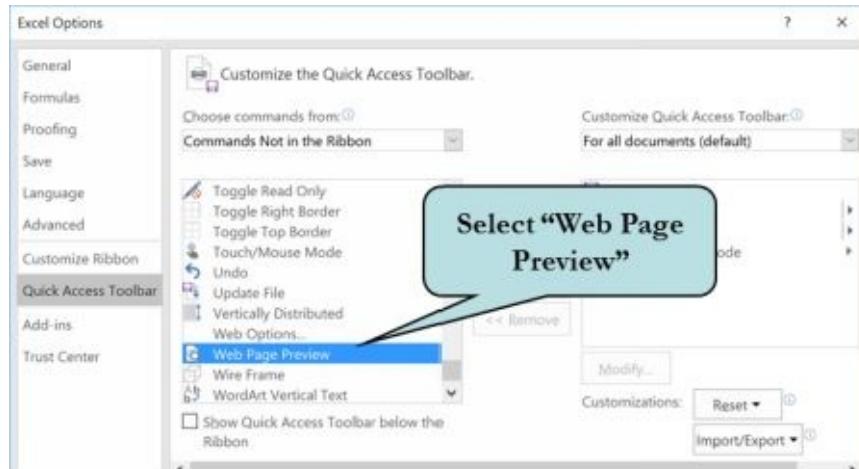


2. Select More Commands from the menu.

3. Select Commands Not in the Ribbon from the Choose Command from: drop-down list.



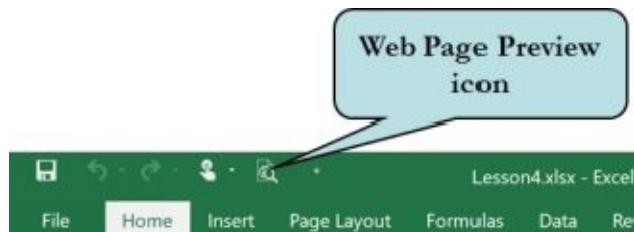
- 4. Click the Web Page Preview command in the list box and then click the Add button.**



- 5. Click OK.**

Here's how to view a Workbook in Web Page Preview:

- 1. Click the Web Page Preview button on the Quick Access Toolbar.**



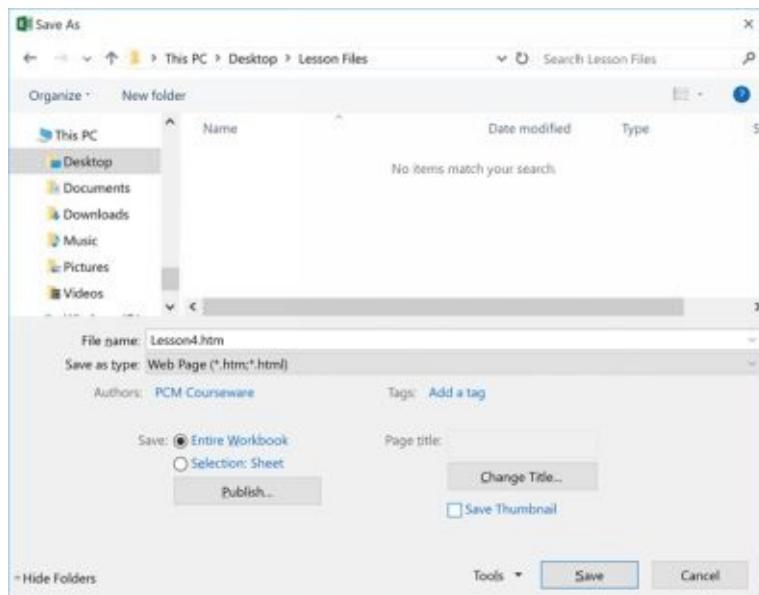
- 2. Click the sheet tabs at the bottom of the browser window to navigate from one sheet to the next.**

- 3. Click the browser's Close button to close the Web browser.**

Converting Worksheets into Web Pages

Once you have previewed your document in a Web browser and are happy with the display, you can then save it in HTML format. Click the File tab, click Save As and then choose Web Page from the Save as Type drop-down list to display the Save As dialog box, which provides additional Web options such as:

- Changing the page title of the Web page
- Changing the file name of the Web page
- Choosing the folder where the Web page is to be saved
- Saving the entire workbook or just the active worksheet
- Publishing options



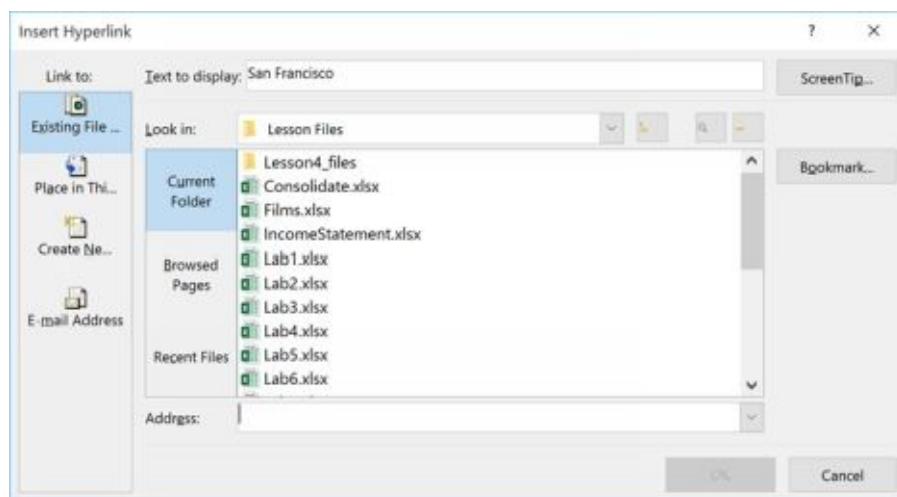
To save a workbook as a Web page, follow these steps:

1. If you want to only save a particular sheet as a Web page, click the desired sheet tab.
2. Click the File tab.
3. Click Save As from the File Options pane.
4. Click the Browse icon.
5. Choose Web Page from the Save as Type drop-down list.
6. Select either Entire Workbook or Selection: Sheet.
7. Navigate to the folder where you want the Web page to be stored.
8. To change the Web Page title of the page, click the Change Title button and make your changes.
9. Click Save.

Tip: You can also use the Save As command to save a workbook as a Single File Web Page (.mhtml). Single File Web Page format saves all the elements of a Web site, including text and graphics, into one single file. Note however, that .mhtml files may not display correctly in all browsers.

Inserting Hyperlinks

Hyperlinks are links in a document that when clicked, open another document, another workbook or move to another location in the current document. Often, hyperlinks are used to open another Web page although the destination can also be an e-mail address or another software application. The destination document or application can be on your local hard drive, network server, Web pages on the Internet or simply another worksheet in your workbook.



A hyperlink is represented by underlined blue text although you can add a hyperlink to graphical objects and clip art as well. In Excel, you may wish to create hyperlinks that jump you to another worksheet, another workbook or another file. For example, if you link to a PowerPoint file, the PowerPoint application will launch automatically on the user's machine and display the document when the user clicks the hyperlink.

If you link to a Web Page on the Internet, the user's default Web browser launches and displays the Web page.

To insert a hyperlink to a file or Web page, follow these steps:

- 1. Activate the cell containing the text or select the graphic where you want to insert a hyperlink.**
- 2. Click the Insert tab on the Ribbon.**
- 3. Click the Hyperlink button on the Links group**

Or

Press the **Ctrl + K** keystroke combination.



- 4. Click the Existing File or Web Page button.**

5. To link to an existing file, navigate to the folder and then highlight the desired file.
6. To link to a Web page, type the Web address in the Address text box.
7. Click OK.

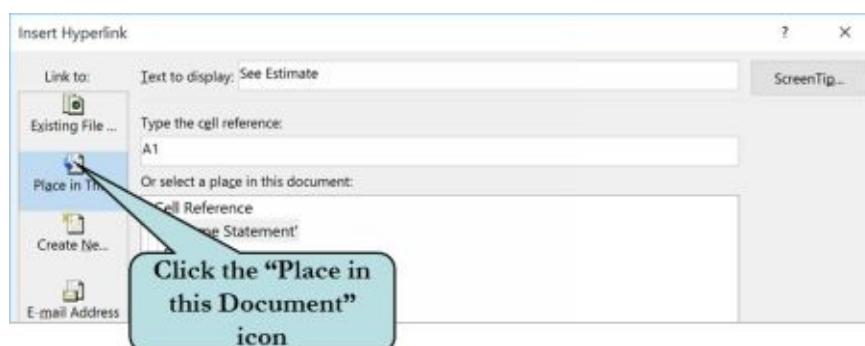
To insert a hyperlink to a location in an open document, follow these steps:

1. Activate the cell containing the text or select the graphic where you want to insert a hyperlink.
2. Click the Insert tab on the Ribbon.
3. Click the Hyperlink button on the Links group

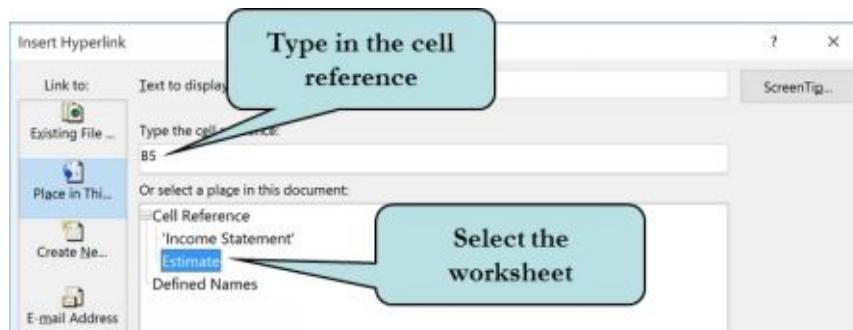
Or

Press the **Ctrl + K** keystroke combination.

4. Click the Place in This Document button



5. Enter the cell reference in the Type the Cell Reference text box.



6. Choose the worksheet where the reference is located under the Or Select a Place in this Document area.

7. Click OK.

Tip: To delete a hyperlink, right-click the hyperlink and choose Remove Hyperlink to remove only the hyperlink or Clear Contents to remove the hyperlink and the text.

Viewing and Editing Comments

You can add informational comments to particular cells in your worksheet in order to explain the meaning of data, clarify complex formulas or perhaps provide instructions to the end-user. A small red triangle appears in the top right-hand corner of cells that contain comments. To display an attached comment, position your mouse pointer over the cell that contains the comment. A small text box containing the comment text will then appear on your screen. To display all comments on the worksheet, select Show All Comments on the Comments group of the Review Ribbon.

To add a comment to a cell, follow these steps:

- 1. Activate the cell to which you wish to attach a comment.**
- 2. Click the Review tab on the Ribbon.**
- 3. Click the New Comment button on the Comments group on the Ribbon.**

Or

Right-click and then choose Insert Comment from the contextual menu.

- 4. Type your comment in the comment box.**
- 5. Click outside the comment box.**



The screenshot shows a portion of an Excel spreadsheet. Row 3 contains column headers: Week 1, Week 2, Week 3, Week 4, and Total. Rows 4 through 8 list cities: New York City, San Francisco, Dallas, Philadelphia, and Grand Total. The cell for Dallas in the Week 2 column (C6) contains the value \$3,836 and has a small red triangle in its top right corner, indicating a comment is attached. A yellow tooltip box is overlaid on this cell, containing the placeholder text "Type here to attach comment". The rest of the table shows similar data for the other cities.

	Week 1	Week 2	Week 3	Week 4	Total
New York City	\$3,595	\$3,131	\$4,245	\$5,269	\$16,240
San Francisco	\$5,747			\$7,445	\$26,186
Dallas	\$3,836			\$5,811	\$18,664
Philadelphia	\$4,564			\$3,725	\$19,002
Grand Total	\$17,742			\$22,249	\$61,089

Editing Comments

Once you have created a comment, you can edit the comment text by clicking the Edit Comment button on the Comment group of the Review Ribbon. Then, make any desired changes to the text inside of the comment box.

To delete a comment, click in the cell containing the comment and click the Delete button on the Comment group of the Review Ribbon.

To edit an existing comment, follow these steps:

- 1. Click in the cell containing the comment.**
- 2. Click the Review tab on the Ribbon.**
- 3. Click the Edit Comment button on the Comments group on the Ribbon.**

Or

Right-click and then choose Edit Comment from the pop-up menu.

- 4. Type your changes in the comment box.**
- 5. Click outside the comment box.**

Here's how to delete an existing comment:

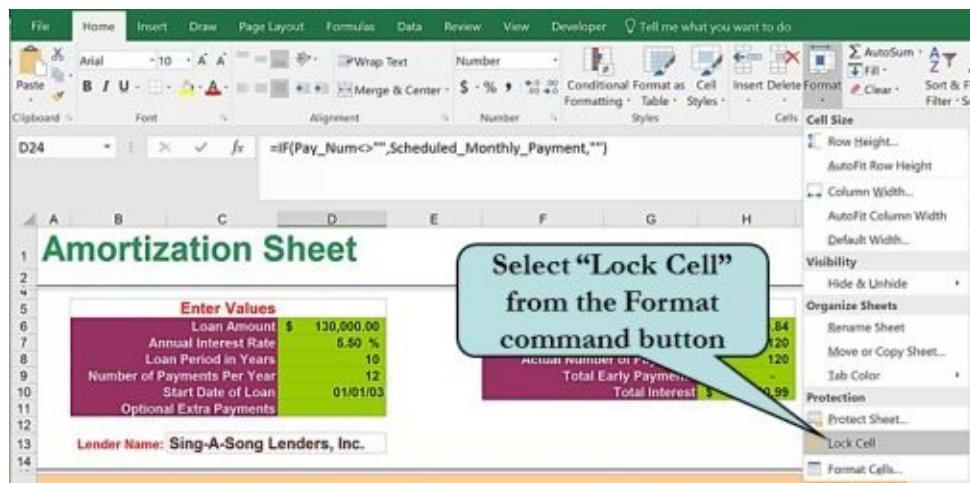
- 1. Click in the cell containing the comment.**
- 2. Click the Review tab on the Ribbon.**
- 3. Click the Delete button on the Comments group on the Ribbon.**

Or

Right-click and then choose Delete Comment from the pop-up menu.

Locking/Unlocking Cells in a Worksheet

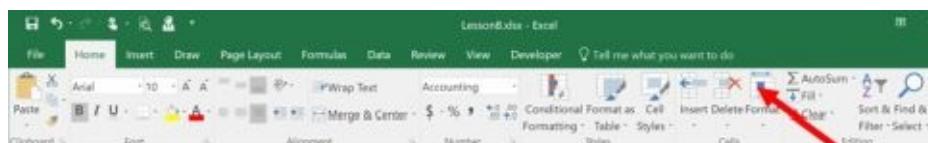
When sharing workbooks with others, you may in certain instances need to protect particular areas of your worksheets from edits. For example, you may want to lock any cells containing formulas to prevent accidental changes. Once worksheet protection is in place, the locked data in a cell or cell range cannot be changed or deleted.



In order to protect a cell or cell range from data changes, you will first need to ensure that any cells in which you want to allow changes are in an unlocked state. By default, all cells are locked and once you protect a worksheet, locked cells are no longer editable. Once the cells that you want users to be able to access are unlocked, then you can apply protection to the desired area, either the active worksheet or the entire workbook.

To unlock cells, follow these steps:

1. Click the Home tab on the Ribbon.
2. Select the cell or cell range you wish to unlock.
3. Click the Format button on the Cells group.

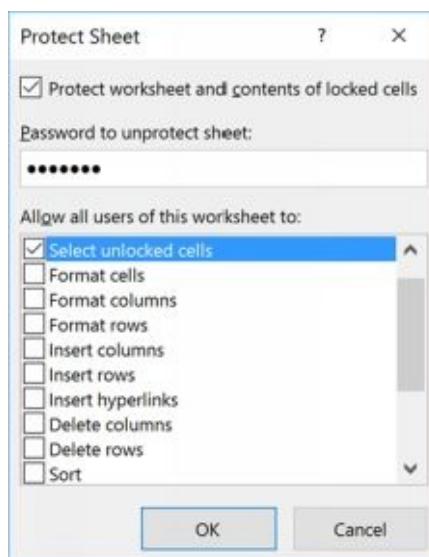


4. Click the Lock Cell command on the menu. This is a toggle command that locks or unlocks a selected cell range.

Tip: You can also lock and unlock cells from the Protection tab of the Format Cells dialog box.

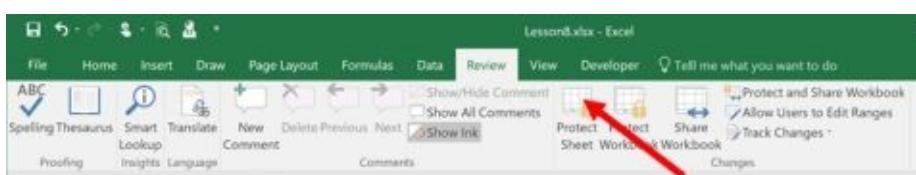
Protecting a Worksheet

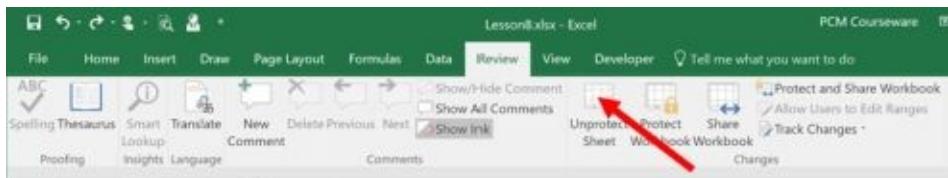
Once you have unlocked any cells that you want to allow the user to edit, you are now ready to apply protection to your worksheet. Once protection is in place, you will not be able to make any changes to locked cells without first turning off protection. However, when applying protection to a worksheet, you can set certain options such as allowing users to format, insert, or delete cells, columns and rows, sorting data, etc. Additionally, you can set a password for the protected worksheet. This is an optional (but recommended!) setting that allows anyone who knows the password to turn off sheet protection. If no password is set, anyone can unprotect your worksheet.



To protect a worksheet, follow these steps:

- 1. Click the Review tab on the Ribbon.**
- 2. Click the Protect Sheet button on the Changes group.**
- 3. Type a password in the Password To Unprotect Sheet text box.**
- 4. Select any options from the Allow Users Of This Worksheet To: list to specify options that you want protected from edits.**
- 5. Click OK.**
- 6. Confirm the password in the Confirm Password dialog box.**
- 7. Click OK.**
- 8. To unprotect a sheet, click the Unprotect icon on the Changes group of the Review Ribbon and then enter in the password.**



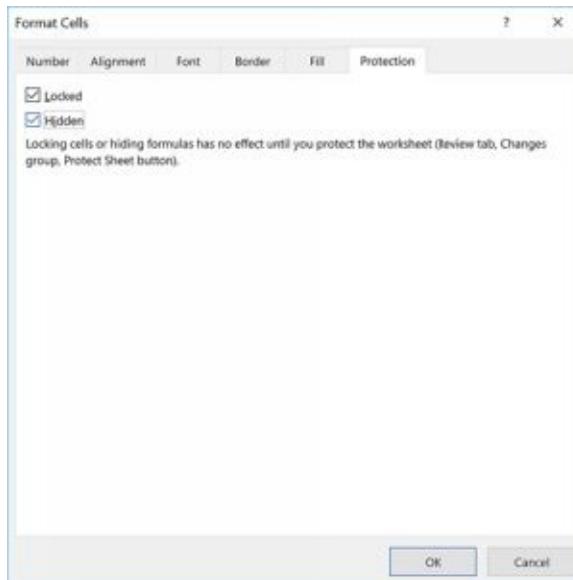


Tip: Another way to protect a worksheet is by clicking the Protect Workbook button in Backstage view and choosing Protect Current Sheet from the menu. Set any desired options.

A screenshot of the Excel Backstage view, specifically the 'Info' section. On the left, there's a sidebar with various options like Info, New, Open, Save, etc. The 'Protect Workbook' section is expanded, showing options such as 'Protect Current Sheet' (which is highlighted with a red box and a red arrow), 'Mark as Final', 'Encrypt with Password', and 'Add a Digital Signature'. To the right, there are sections for Properties, Related Dates, Related People, and Related Documents. The 'Protect Current Sheet' option is described as controlling what types of changes people can make to the current sheet.

Showing or Hiding Formulas

For security reasons, you may want to hide your formulas from view in unprotected cells. To do this, click the Hidden check box under the Protection tab of the Format Cells dialog box. Once you have hidden your formulas, you will then need to protect your worksheet.



To hide or show formulas, follow these steps:

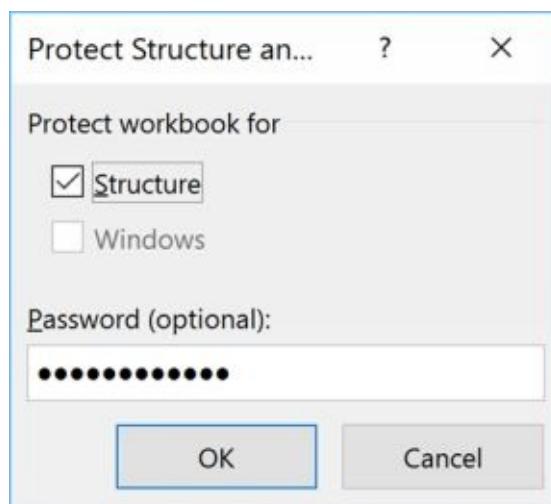
- 1. Select the cell range with the formulas that you want to hide or show.**
 - 2. Click the Home tab on the Ribbon.**
 - 3. Click the Format button on the Ribbon and click Format Cells from the menu**
- Or**
- Right-click on the selected range and click Format Cells from the contextual menu.**
- 4. Click the Protection tab.**
 - 5. Check the Hidden checkbox to hide formulas or uncheck it to display formulas.**



- 6. Click OK.**

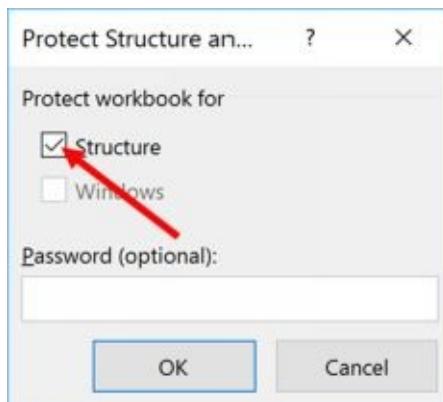
Protecting a Workbook

We have seen that with worksheet protection, you can prevent cells from being edited or deleted. You can also protect the structure of your workbook from being altered by applying Workbook Protection. For example, you can prevent users from adding, hiding, deleting, renaming, unhiding, moving or copying worksheets. Additionally, you can set an option that locks the window size and location of a worksheet so that it cannot be altered by users.



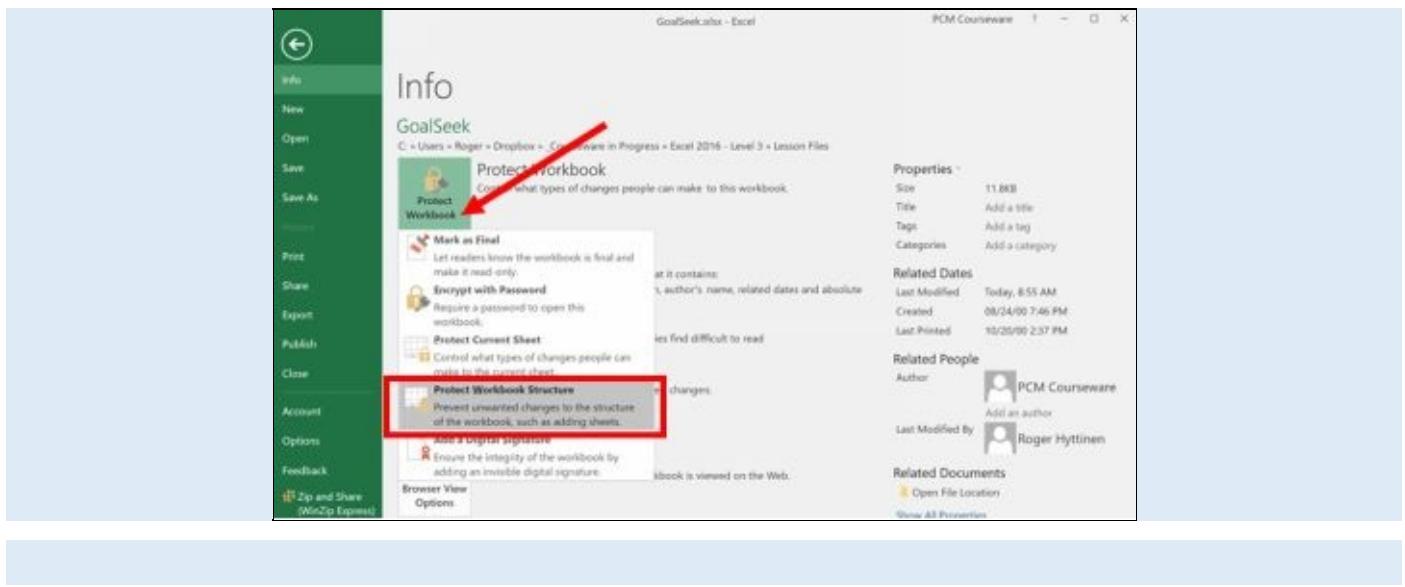
To protect a workbook, follow these steps:

- 1. Click the Review tab on the Ribbon.**
- 2. Click the Protect Workbook button on the Changes group.**
- 3. Select Structure to prevent the physical modification of the workbook.**



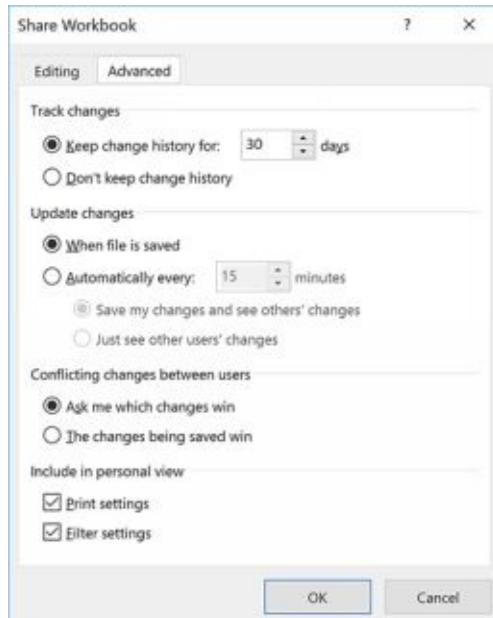
- 4. Select Windows to prevent changes to the size and position of the workbook window.**
- 5. Enter a password in the Password text box.**
- 6. Click OK.**
- 7. Reenter password in the confirm password box.**
- 8. Click OK**

Tip: There is another way to password protect the structure workbook, which allows you to specify a password necessary to modify the workbook. Click the **File tab** > **Info**, click the **Protect Workbook** icon in the center pane and then click **Protect Workbook Structure**. Enter the password necessary to modify the file.



Creating a Shared Workbook

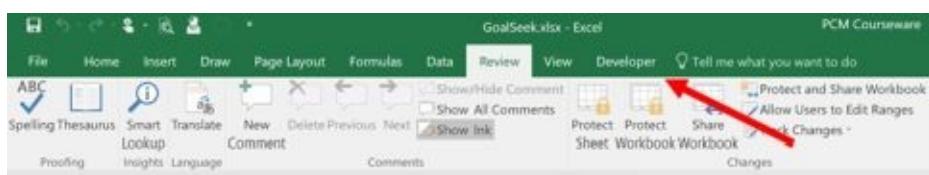
When working in a network environment, you can set your Excel workbook for **sharing** so that multiple users can work on the data simultaneously. Excel will keep track of all changes made to the workbook as well as the user who made them. Additionally, you can set such advanced options as deciding how long to keep the change history file, how often changes are saved, and how Excel is to handle conflicting changes.



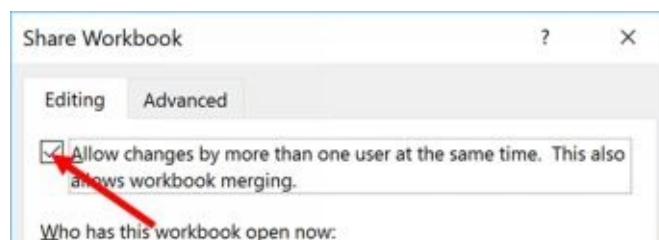
When a workbook is opened for shared access, you are limited to the structural changes that you can perform on the workbook. For instance, users cannot delete worksheets, modify worksheet or workbook protection, create, edit or view macros, use the subtotal or outline features or merge and split cells. In order to make any of the above changes, you will need to turn off workbook sharing. Note that once workbook sharing is removed, the change history file is automatically deleted.

To share a workbook, follow these steps:

- 1. Click the Review tab on the Ribbon.**
- 2. Click the Share Workbook button on the Changes group.**

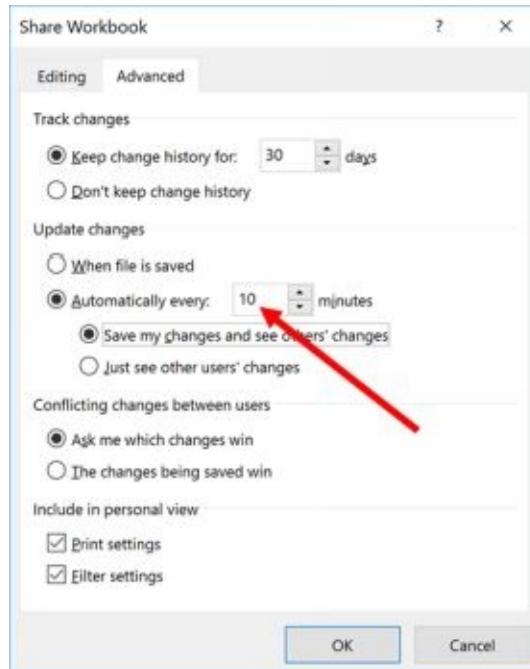


- 3. Select the Allow Changes By More Than One User At The Same Time check box.**



- 4. To automatically update changes made by others, click the "Automatically Every"**

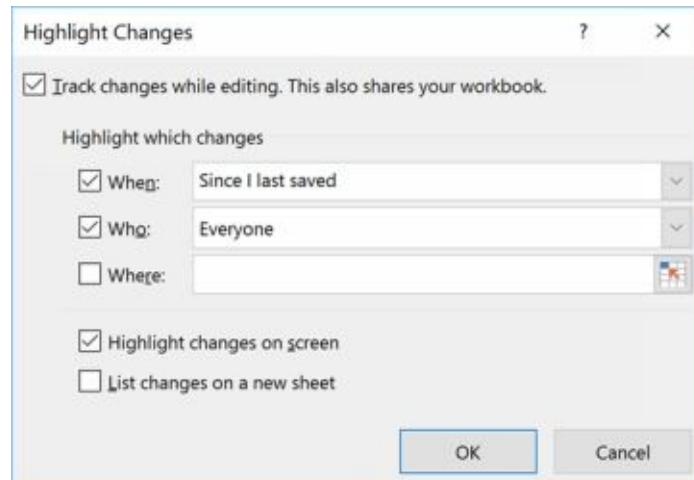
radio button on the Update Changes area and enter in the amount of time, in minutes.



5. Choose how conflicting changes are to be handled under the “*Conflicting changes between users*: area.
6. Choose how long to keep the change history under the “*Track Changes*” area.
7. Set any other desired Advanced options.
8. Click OK.
9. Click OK again to save the workbook for shared access.

Tracking Changes to a Workbook

Excel allows you to track the changes each person makes to your workbook and provides you the option of either accepting or rejecting those changes. Changes that are made by others are highlighted in a different color for each user, thus making it easy to see who did what. Changes are recorded in the change history log, allowing you to see when a change was made, who made the change and what the previous data was before the change. Note however, that not all changes are highlighted. Changes not highlighted include formatting changes (font, size, etc.), comment modifications, the hiding/unhiding of rows or columns and new or deleted worksheets.



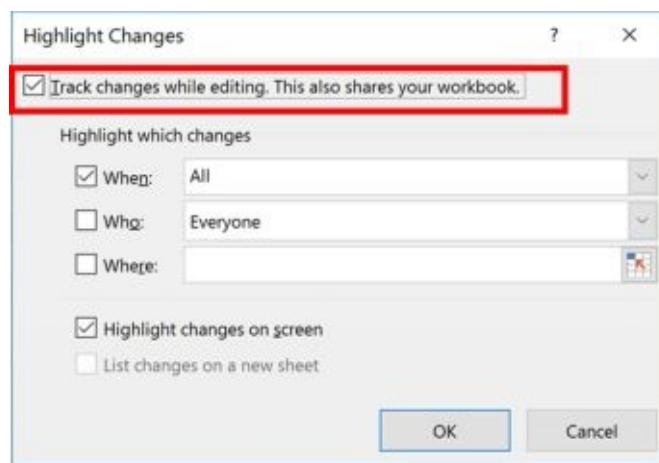
Highlight Changes Dialog Box

Here's how to track changes:

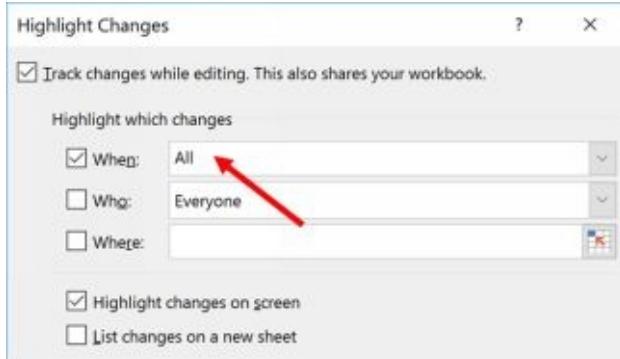
- 1. Click the Review tab on the Ribbon.**
- 2. Click the Track Changes button on the Changes group and then click Highlight Changes from the menu.**



- 3. Select the Track Changes While Editing checkbox.**



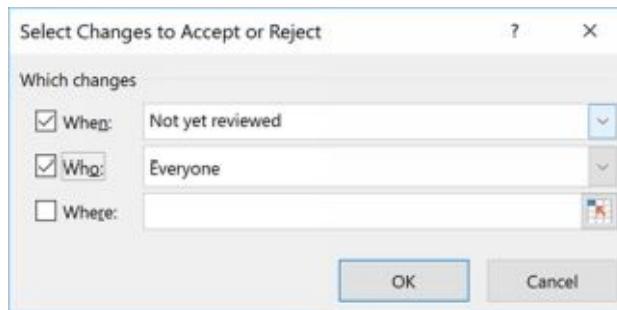
- 4. Select any desired options from the When drop-down list.**



5. Select any desired options from the Who drop-down list.
6. If desired, enter a cell range for which you want to track changes in the Where box.
7. To highlight cells that have been changed, select Highlight Changes On Screen.
8. To list changes in a new worksheet, select List Changes On A New Worksheet.
9. Click OK.
10. Click OK again.

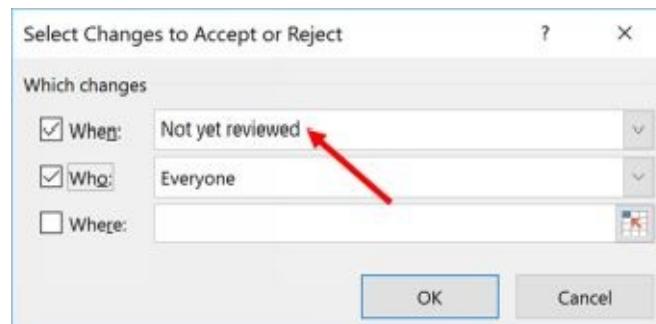
Accepting and Rejecting Changes to a Workbook

Once you have turned on change tracking, you have the option as the reviewer, of either accepting or rejecting the changes made by other users. You can accept or reject each change one at a time or choose the Accept All or Reject All option to accept or reject all changes without reviewing them.

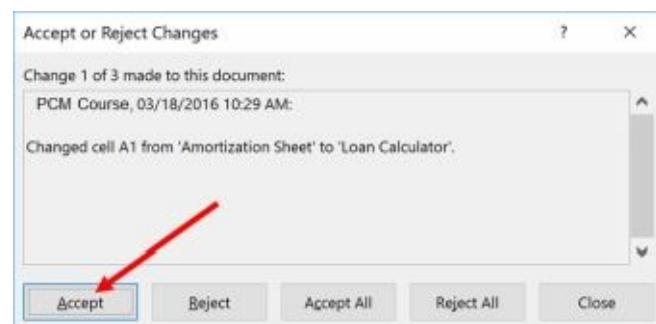


To accept or reject changes, follow these steps:

1. Click the Review tab on the Ribbon.
2. Click the Track Changes button on the Changes group and click Accept or Reject Changes from the menu.
3. Click the When box and then select the type of changes to be reviewed from the drop down list.



4. Select the Who box and then make the desired choice.
5. Click OK.
6. Click Accept or Reject change to Accept or Reject a change and then move on to the next change.

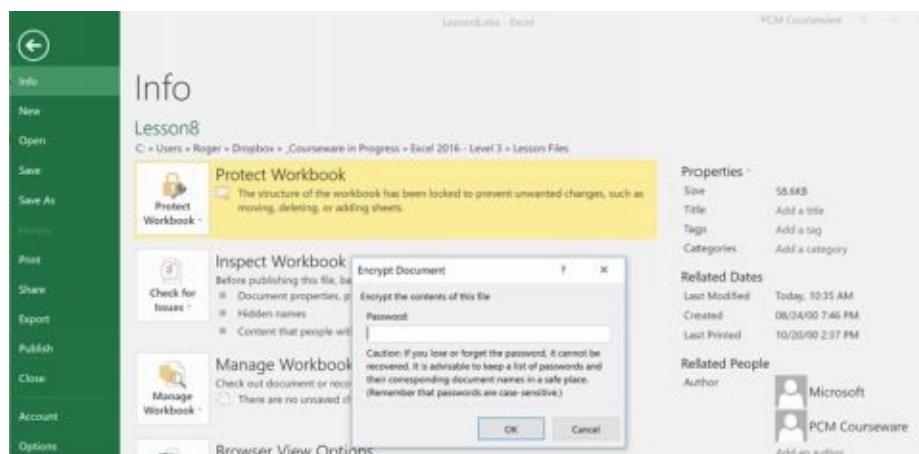


7. Select Accept All or Reject All to accept or reject all remaining changes without reviewing them.

8. Click Close.

Encrypting a Workbook

Workbook encryption restricts access to only those people who know the password. They are intended to keep unauthorized users from accessing your workbooks and from viewing and/or changing your data. You can assign passwords to any workbook, requiring users to enter the correct password in order to open a workbook. If your workbook is set for shared access, you will first need to remove shared access before being able to set a workbook password.



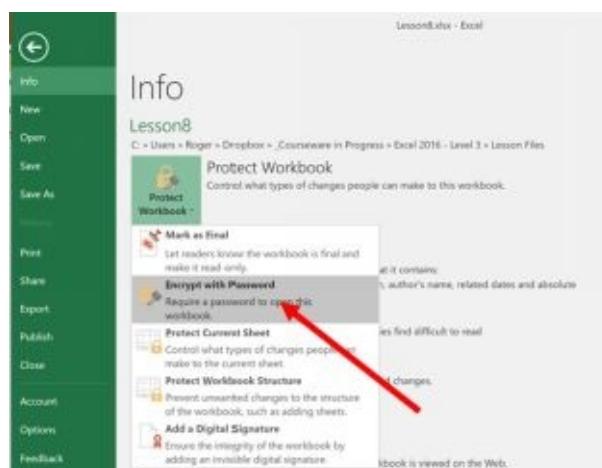
To encrypt a workbook, follow these steps:

1. Click the File tab on the Ribbon and then click Info.



2. Click the Protect Workbook icon in the center pane.

3. Click Encrypt with Password from the list.



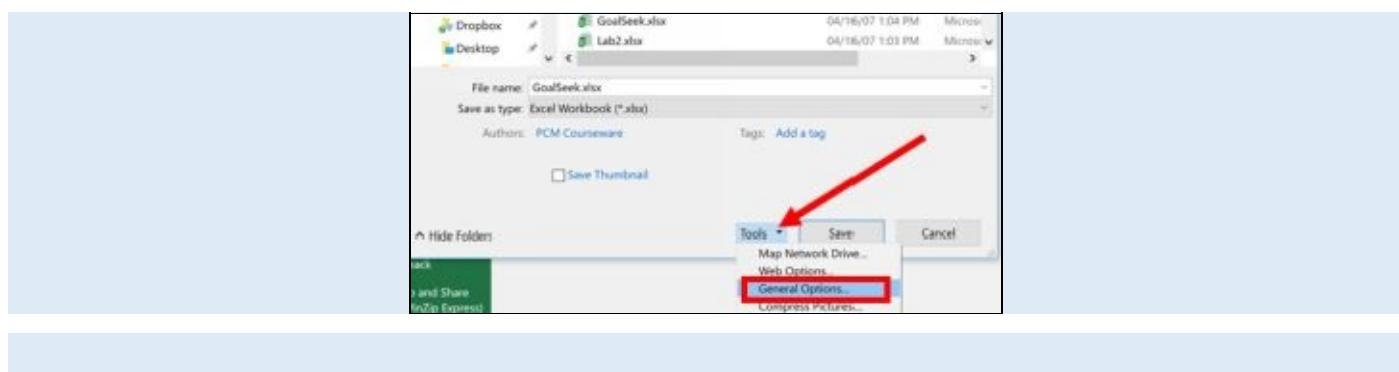
4. Click in the Password box.

5. Type in the password necessary to open the file and then click OK.
6. Type in the again when prompted and click OK.
7. Click Save in the left pane.

To remove encryption from a workbook, follow these steps:

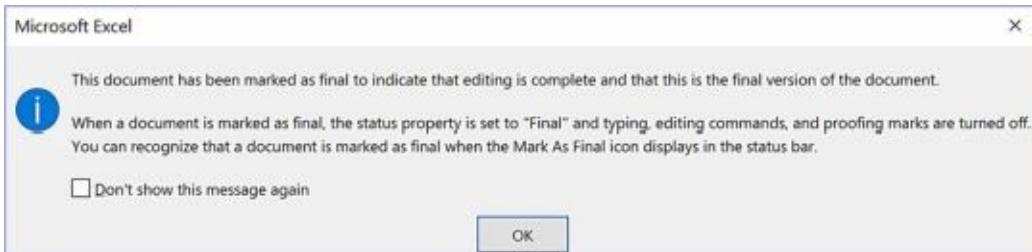
1. Click the File tab on the Ribbon and then click Info.
2. Click the Protect Workbook icon in the center pane.
3. Click Encrypt with Password from the list.
4. Delete the existing password in the Password box.
5. Click OK.

Tip: There is another way to password protect a workbook, which allows you to specify a password necessary to open or to modify the workbook. Click **File > Save As** from the menu, click **Browse**, click the Tools drop-down list on the bottom of the window and choose **General Options**. Then, enter the password necessary to open the file and/or the password to modify the file.



Marking a Workbook as Final

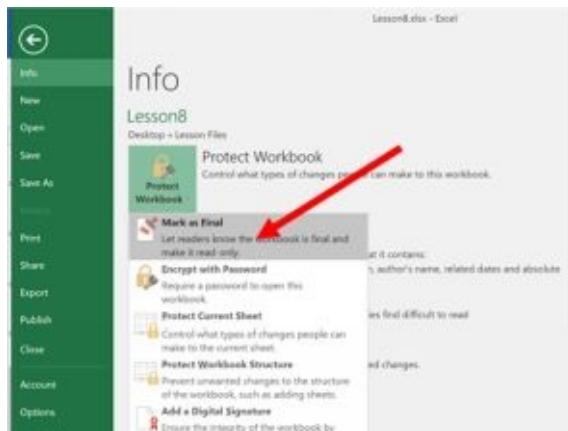
Another way to prevent changes to a workbook is by marking the workbook file as final. This sets the file to read-only format and displays a yellow banner on top of the page letting the user know that this is the final version of the workbook and that it shouldn't be edited. That doesn't mean they can't edit it however. There is an Edit Anyway button that allows the user to make changes.



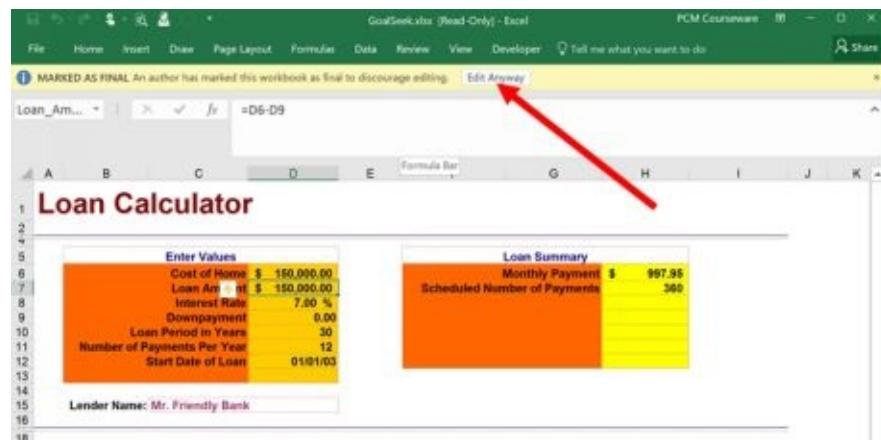
Once the Edit Anyway button is clicked, you will have to have to repeat the steps to set the file as final.

To mark a workbook as Final, follow these steps:

- 1. Click the File tab on the Ribbon and then click Info.**
- 2. Click the Protect Workbook icon in the center pane.**
- 3. Click Mark as Final from the list.**



- 4. Click OK to mark the file as final and then save it. The workbook then becomes read-only.**
- 5. To edit a workbook, open it and then click the Edit Anyway button on top of the screen.**



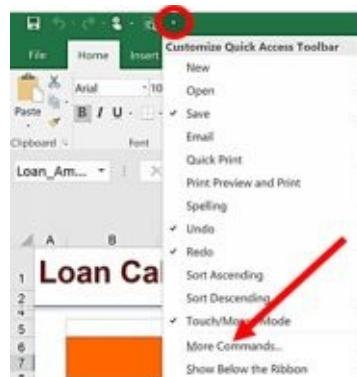
Merging Copies of Shared Workbooks

You can distribute copies of a shared workbook and then merge them together with the original workbook file, incorporating all of the changes into one workbook. In order to merge workbooks, each workbook must be a copy of the original (use the Save As command), must have been set for shared access and have had change tracking turned on at the time the copies were made. Setting each workbook to shared access allows Excel to track the history of the changes. Once the shared workbooks are merged, use the Accept or Reject changes command to review the changes.

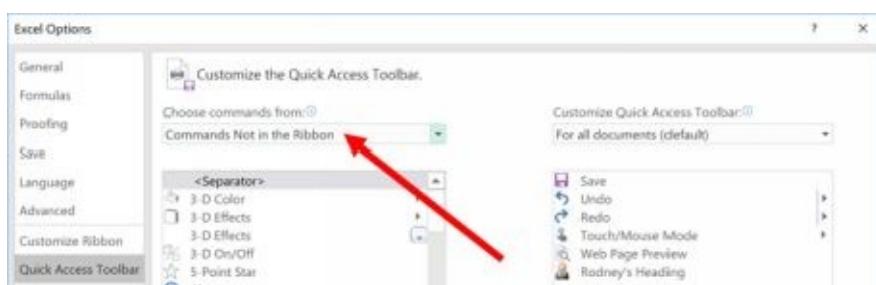
To merge workbooks, you use the Compare and Merge Workbooks command. Note that this command is not available on the Ribbon. You will need to add it to the Quick Access Toolbar.

To add the Compare and Merge Workbooks command to the Quick Access Toolbar, follow these steps:

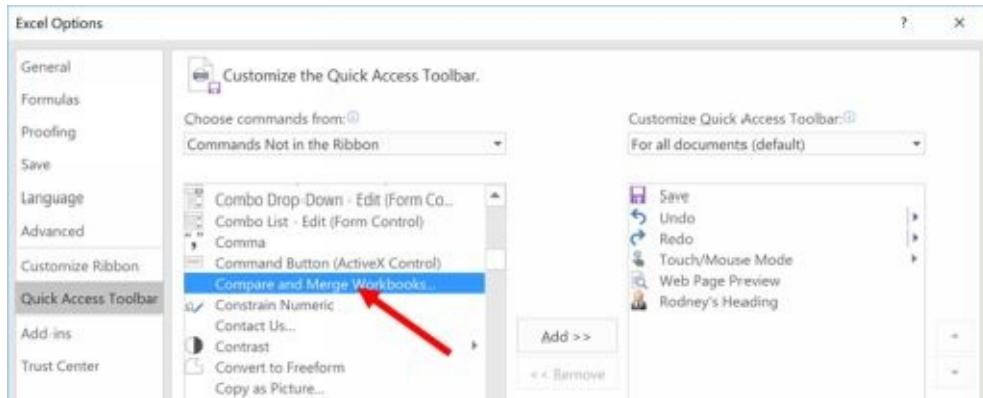
- 1. Click the Quick Access Toolbar arrow and choose More Commands from the menu.**



- 2. Click the Choose Commands From arrow and click Commands Not In The Ribbon.**



- 3. Click the Compare and Merge Workbooks command in the left pane and click the Add button.**



4. Click OK.

To merge shared workbooks, follow these steps:

- 1. Open the main workbook file into which you wish to merge changes.**
- 2. Click the Compare and Merge Workbooks button on the Quick Access toolbar.**

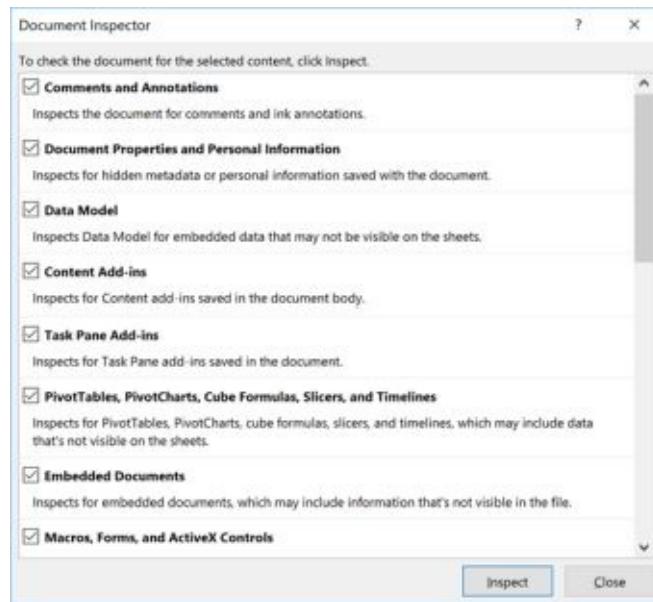


- 3. Navigate to the folder where the copies of the original file are located and select the workbook(s) that you wish to merge into the original.**

4. Click OK.

Inspecting Workbooks

As you make changes to your workbook, Excel records a variety of personal and hidden data. This can include the document author, comments and revision marks, document server properties, document metadata and other details about your company that you may not wish to share publicly. Thus, you might want to remove this hidden information before sharing your workbook with others.



The Document Inspector can remove hidden data and personal information from your Excel file. Note however, that once you remove this information, you may not be able to retrieve it so you should make a backup copy of your original workbook. You will also need to remove Shared access before running the Document Inspector.

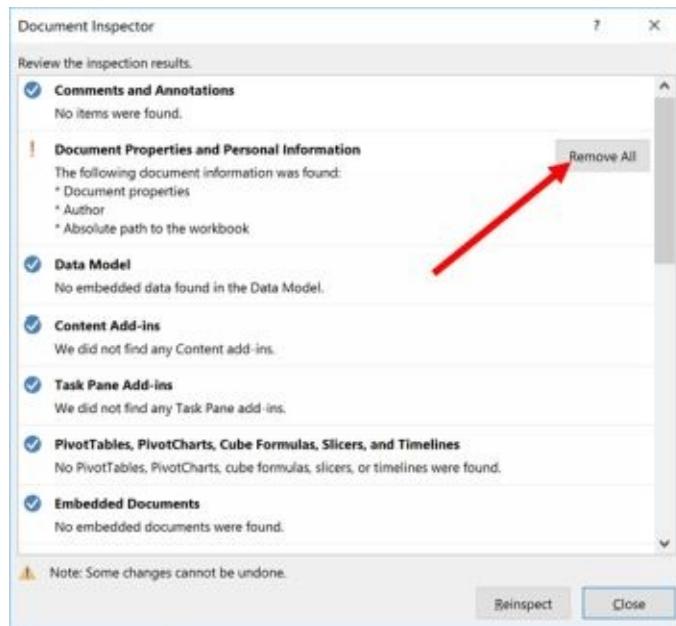
To inspect a workbook, follow these steps:

- 1. Click the File tab and click Info.**
- 2. In the center pane, click the Check for Issues button and then click Inspect Document.**



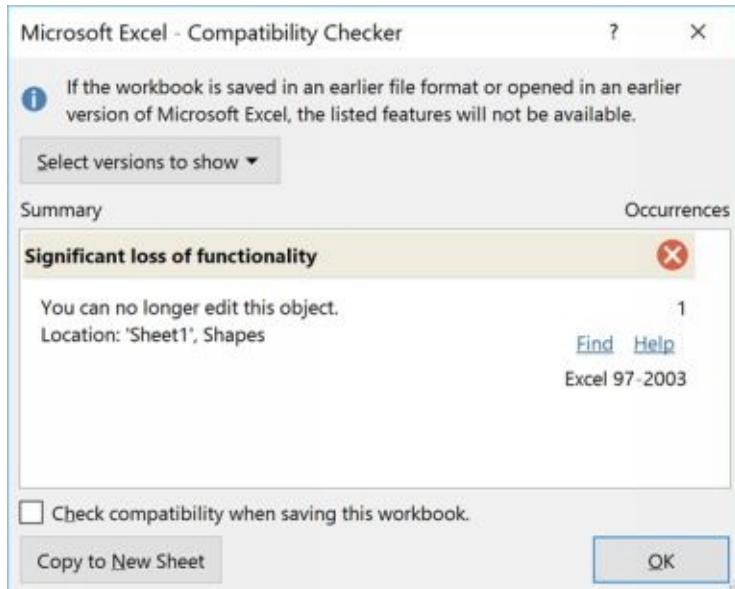
- 3. Select the check boxes next to the types of information you want to be inspected.**
- 4. Click the Inspect button.**

5. Click the Remove All button next to the types of information you want removed from your document.



Checking Document Compatibility

If you are using Excel 2016 and are working with a partner who may not have upgraded, it is a good idea to do a compatibility check, as functionality between older versions of Excel and Excel 2016 is quite different. A compatibility check will highlight any areas of your document that are incompatible with previous versions, allowing you to make any necessary changes to your document before sending it to others.

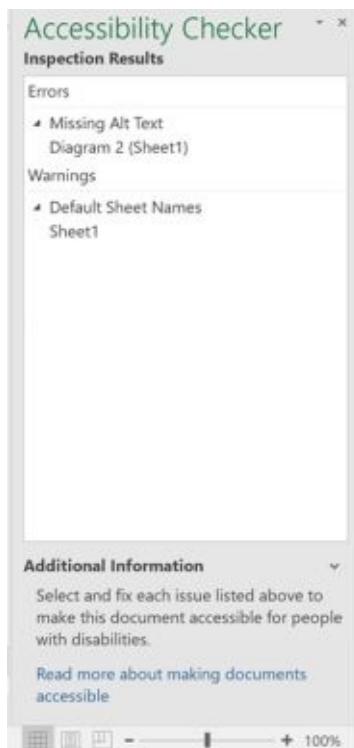


To check a document for compatibility, follow these steps:

- 1. Click the File tab and click Info.**
- 2. In the center pane, click the Check for Issues button.**
- 3. Click Inspect Document.**
- 4. Click the Select Versions to Show arrow and then select which Excel versions you would like to check against.**
- 5. Any incompatibility issues will display in the Summary box.**

Checking Document Accessibility

Accessibility refers to making your documents accessible to everyone, including people with disabilities. This means that people with disabilities should be able to navigate, understand and interact with your document. Of course, your workbooks should be flexible enough to meet various user needs and situations – whether or not they have disabilities. One way to make your documents accessible is to add Alternative Text (Alt Text) descriptions to the tables, charts and graphics in your documents. Alternative Text is read out loud by Audible Screen Readers, making your page accessible by persons who, for whatever reason, are unable to physically view your documents.



Excel 2016 comes with an Accessibility checker, to make sure your objects contain Alternative Text. Additionally, the Accessibility checker will check for unnamed worksheets, blank table cells, repeated whitespace and other issues which may render content difficult to read. The Accessibility Pane displays on the right side of the screen and offers information on how to fix any issues that the checker deemed inaccessible.

To check a document for Accessibility, follow these steps:

- 1. Click the File tab and click Info.**
- 2. In the center pane, click the Check for Issues button.**
- 3. Click Check Accessibility.**
- 4. The Accessibility Pane will display on the right side of the screen. If issues are found, view the Additional Information area for instructions on how to make your document more accessible.**
- 5. Click the Close button on top of the Accessibility Pane to close it.**

