



Jefferson Parish Library

EXCEL PART 2: FORMULAS, FUNCTIONS, AND CHARTS

PHONE:
504-838-1144

IT Training Team
Jefferson Parish Library

EMAIL:
jpltrain@jplibrary.net



COURSE OBJECTIVES

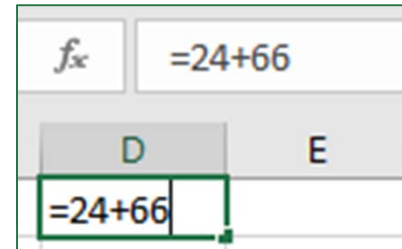
In this course we learn how to do the following:

- Use formulas
- Use the Trace Precedents tool
- Use the Show Formulas tool
- Insert functions
- Insert nested functions
- Insert conditional functions
- Insert line breaks
- Create charts from spreadsheet data

REVIEW: FORMULAS

USING FORMULAS TO PERFORM CALCULATIONS:

- Formulas are mathematical expressions that operate on cell contents.
- They are always preceded by an equals sign (=).
- Formulae can contain cell references (like A1) or numbers (like 23).
- Enter a formula by typing directly into a cell, or use the Formula Bar.



A screenshot of an Excel spreadsheet. The Formula Bar at the top shows the formula $=a2*b2$. The spreadsheet grid has columns A through E and rows 1 through 4. The data is as follows:

	A	B	C	D	E
1	Quantity	Price	Sales		
2	5	\$ 10.00	$=a2*b2$		
3	19	\$ 7.00			
4	11	\$ 18.00			

WORKING WITH CELLS

USE MATHEMATICAL OPERATORS IN FORMULAE

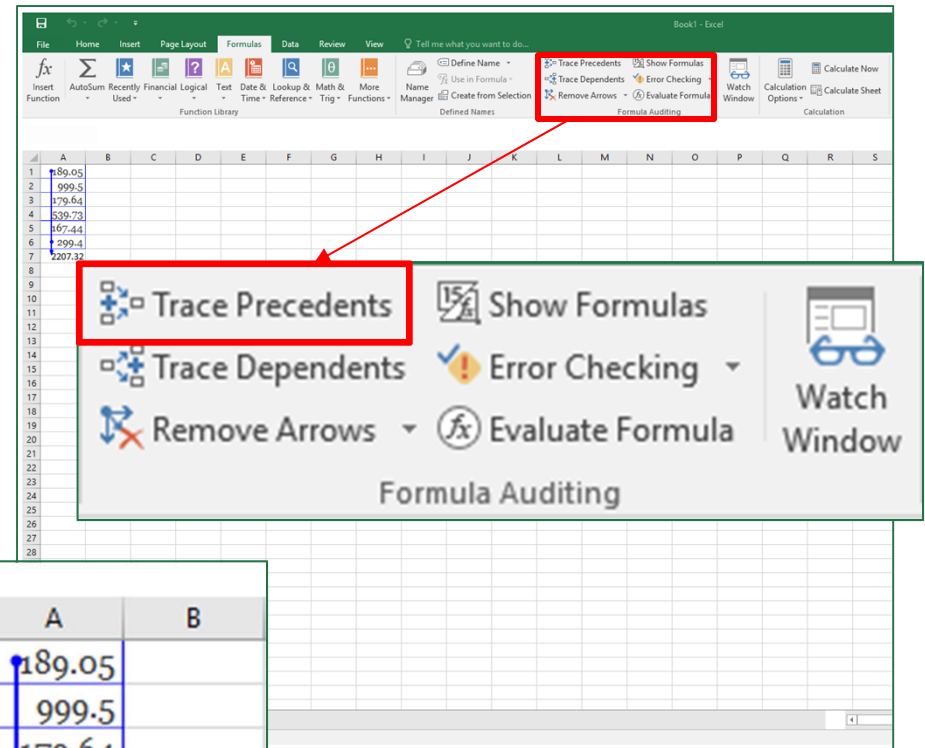
Operator	Description	Precedence (1=top; 3=bottom)	Example
%	The percent operator	1	=90%*M8
^	The exponentiation operator	1	=3^2 =H3^3
*	The multiplication operator	2	=5*2 =D5*C5
/	The division operator	2	=48/8 =G12/10
+	The addition operator	3	=A2+B2 =100+25
-	The subtraction operator	3	=E7-C7 =100-90

Remember order of operations: PEMDAS—Parentheses, Exponents, Multiplication/Division, Addition/Subtraction.

TRACE PRECEDENTS

The **Trace Precedents** command is used to backtrack through all the cells that are used to calculate the current formula. Each blue dot corresponds to a value used in the formula. An arrow points to the end value.

You can remove these arrows by clicking **Remove Arrows** in the Formula Auditing group.

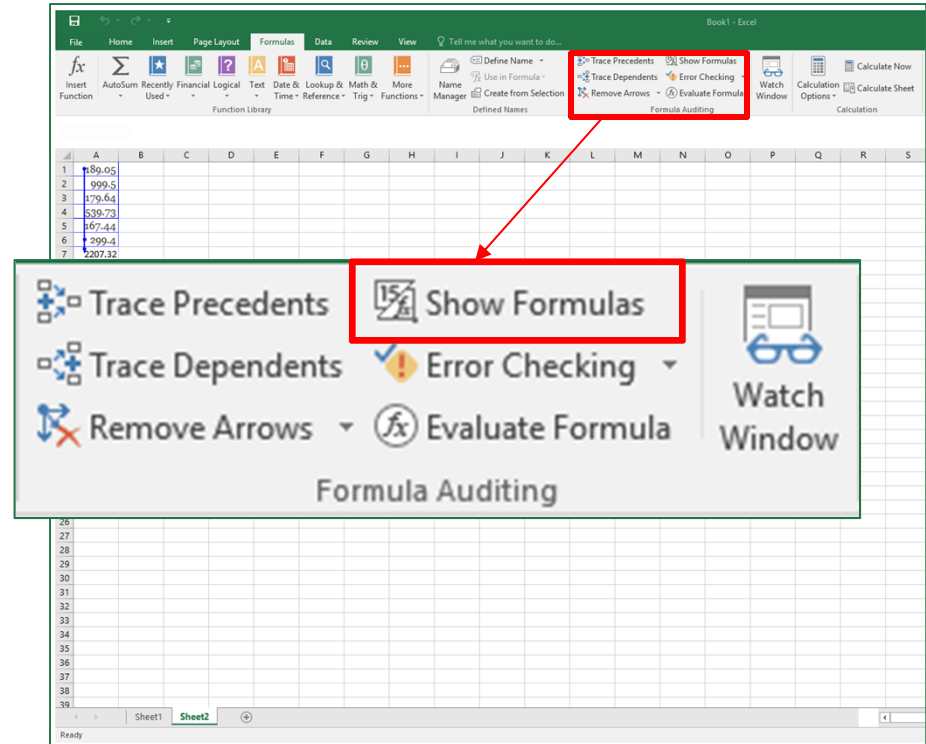


	A	B
1	189.05	
2	999.5	
3	179.64	
4	539.73	
5	167.44	
6	299.4	
7	2207.32	
8		
9		
10		

SHOW FORMULAS

If you ever want to see formulas in a spreadsheet's cells, rather than the calculated answer to the formula, click the **Show Formulas** button in the Formula Auditing group of the Formulas tab.

Formulas will appear in the spreadsheet. Click the button again to return to normal view.

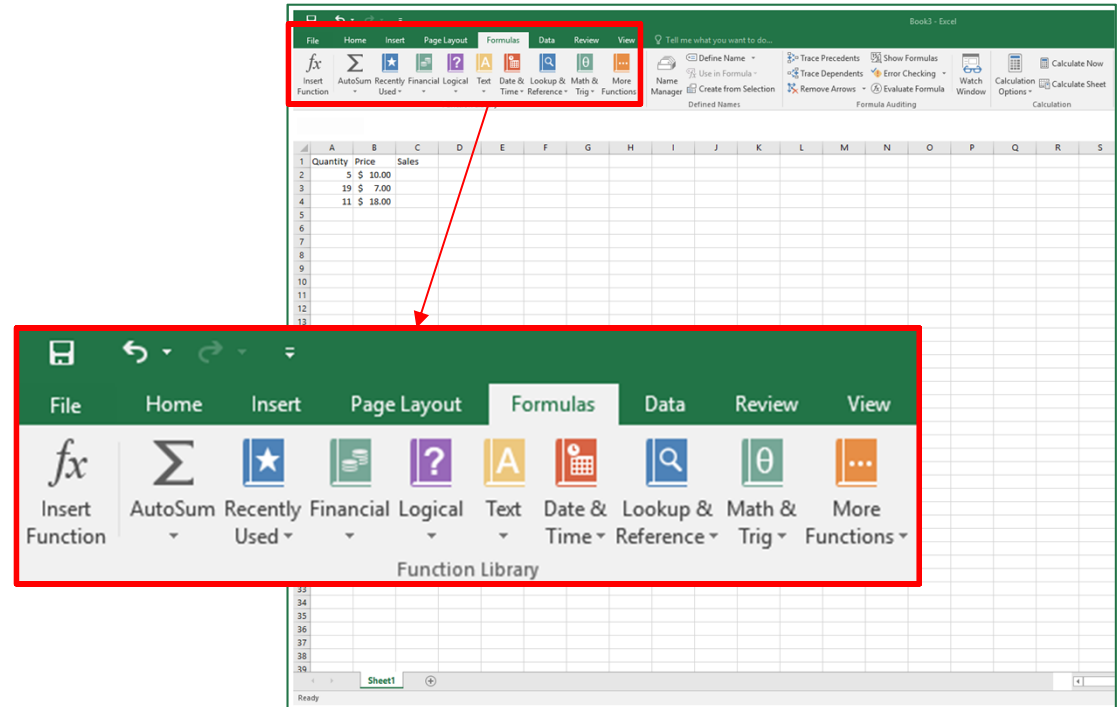


FUNCTIONS

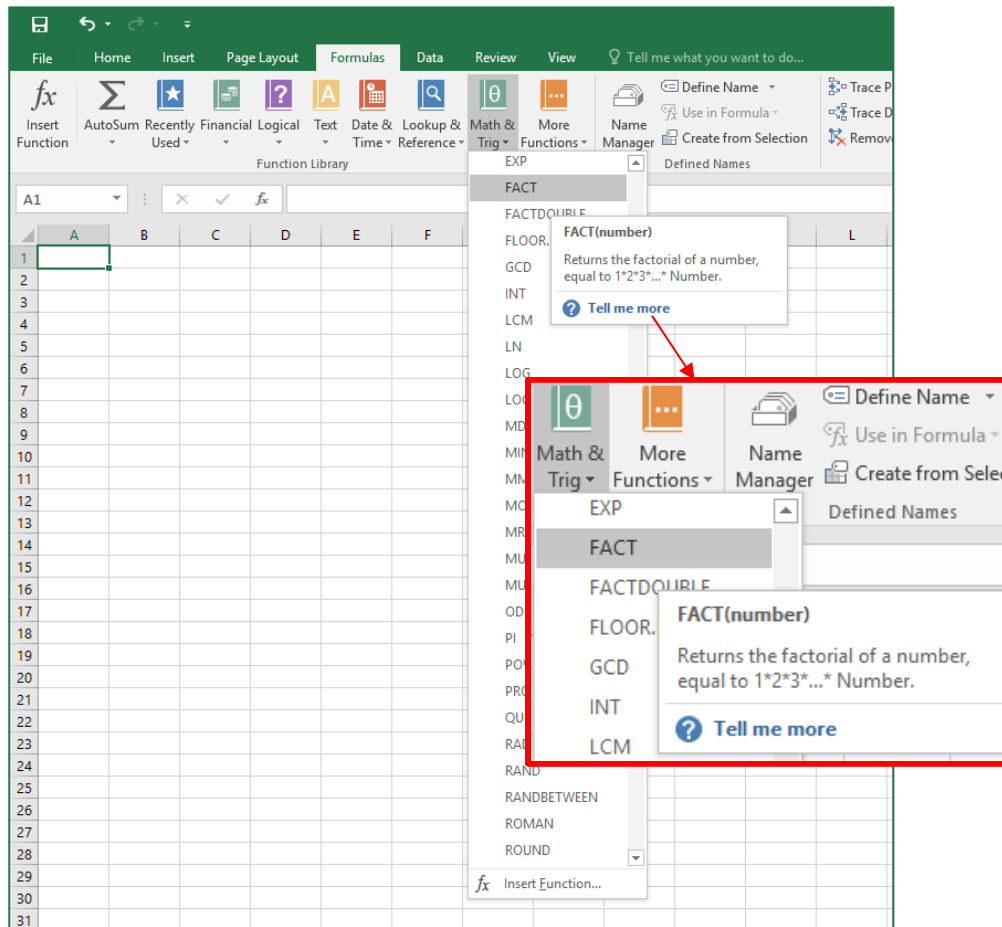
A **function** is a preset formula designed to make calculations easier.

There are 9 main categories of functions in the Function Library on the Formulas tab.

AutoSum, Math & Trig, and Financial are the most commonly used categories.



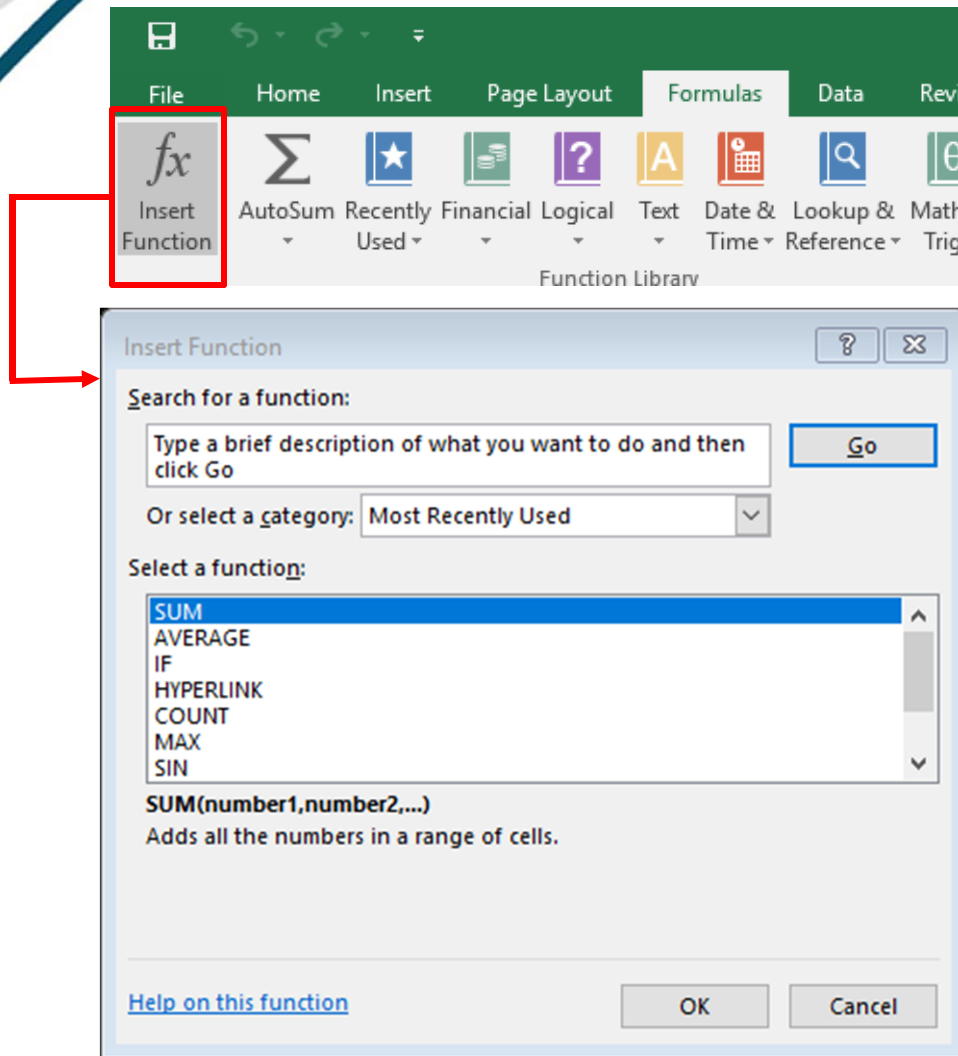
FUNCTIONS



TO INSERT A FUNCTION FROM THE FUNCTION LIBRARY

- Click on one of the function categories.
- Hover your mouse over the different options for a screen tip describing what each function does.
- Click to select.

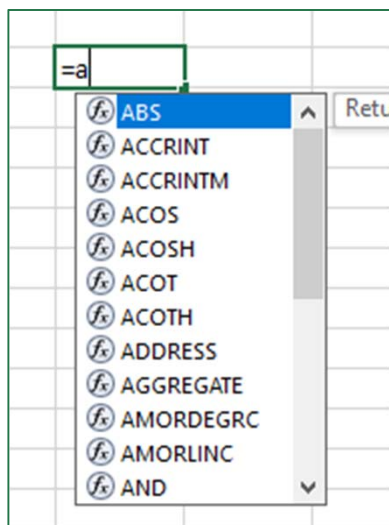
FUNCTIONS



TO INSERT A FUNCTION FROM THE RIBBON

- Click **Formulas** → **Insert Function** to open the Insert Function window.
- Type a description of what you're looking for in the search box.
- Select a function and click **OK**.

FUNCTIONS



TO INSERT A FUNCTION WITH THE KEYBOARD

- Type an equals sign, then start typing the name of the function.
- Double-click the option you want from the menu.

FUNCTIONS

	A	B	C	D
1	189.05			
2	999.5			
3	179.64			
4	539.73			
5	167.44			
6	299.4			
7	=SUM(A1:A4,A6			
8	SUM(number1, [number2], [number3], ...)			
9				

- After you have inserted a function, insert the **arguments**— i.e., the cell values you want to use in your calculation.
- You can type the cell references or you can click and drag over the cell range.
- A colon reads as “through”—e.g., A1:A4 means A1 through A4.
- Separate nonadjacent cell references with a comma.

COMMON FUNCTIONS

SUM

Returns the sum of the cell references.

AVERAGE

Returns the average of the cell references.

COUNT

Returns the number of cells that contain a non-zero value.

MAX

Returns the largest value.

MIN

Returns the smallest value.

PI

Returns the number π up to a certain decimal.

NOW

Returns current date and time.

IF FUNCTIONS

IF functions are called **conditional functions** because the return value depends on certain conditions.

Ex: **IF (F2<70,“Fail”,“Pass”)**

If the value in F2 is less than 70, “Fail” is returned; if more, “Pass” is returned.

IF is located under Logical in the Function Library.

=IF(F2<70,"Fail","Pass")

	E	F	G	H	I	J
Name		Score	Result			
Bartleby		52	=IF(F2<70,"Fail","Pass")			
Ferdinand		91			Passing Score: 70	
Helen		68				
Ivan		75				
Jenny		88				
Nan		94				
Valerius		60				

	E	F	G	H	I	J
Name		Score	Result			
Bartleby		52	Fail			
Ferdinand		91	Pass		Passing Score: 70	
Helen		68	Fail			
Ivan		75	Pass			
Jenny		88	Pass			
Nan		94	Pass			
Valerius		60	Fail			

RANK FUNCTION

The **RANK** function returns the argument's rank in a list of other numeric values.

First, provide the cell reference for the number whose rank you want to know. Add a comma, then the column that contains the other numbers.

Ex: **=RANK(F2,F:F)**

This will return the rank of F2 compared to the other values in the F column.

=RANK(F2,F:F

E	F	G	H	I
Name	Score	Rank		
Bartleby	52	=RANK(F2,F:F		
Ferdinand	91	RANK(number, ref, [order])		
Helen	68			
Ivan	75			
Jenny	88			
Nan	94			
Valerius	60			

E	F	G	H	I
Name	Score	Rank		
Bartleby	52	7		
Ferdinand	91	2		
Helen	68	5		
Ivan	75	4		
Jenny	88	3		
Nan	94	1		
Valerius	60	6		

NESTED FUNCTIONS

- A **nested function** is a function within a function.
- Order of operations determines the order in which calculations are done. The innermost parentheses will be calculated first.
- Separate nested functions with a comma.
- Be sure that you have a closing parenthesis to match every open parenthesis. Otherwise your function will return an error.

The image shows an Excel spreadsheet with a formula bar at the top containing the formula `=AVERAGE(MAX(E3:E9),MAX(G3:G9))`. Below the formula bar is a grid of cells. Columns E, F, G, H, and I are visible. Rows 3 through 9 contain data for Team A and Team B. Team A's scores are in column E (85, 92, 95, 81, 79, 90, 98) and Team B's scores are in column G (94, 93, 85, 83, 90, 90, 88). A red box highlights the Team A data, and a red box highlights the Team B data. A red arrow points from the first bullet point in the text to the formula bar. A green box highlights the formula bar, and a red arrow points from the second bullet point in the text to the formula bar.

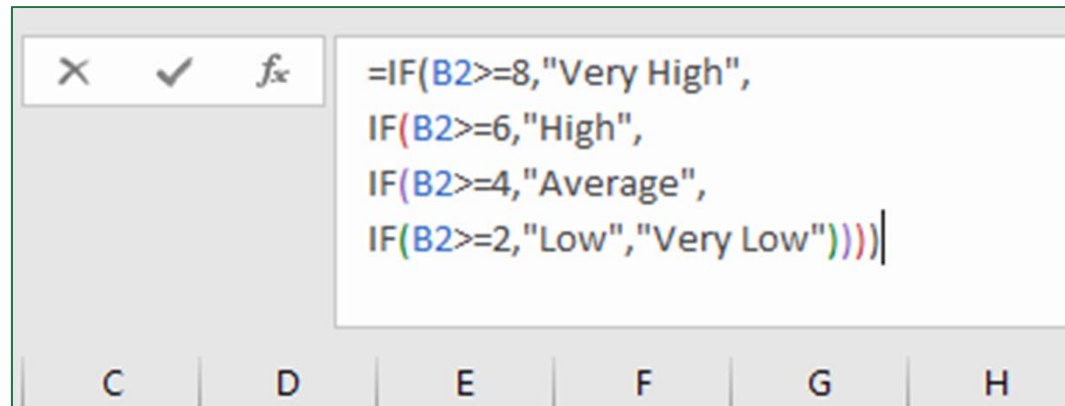
	E	F	G	H	I
Team A			Team B		
	85		94		
	92		93		
	95		85		
	81		83		
	79		90		
	90		90		
	98		88		

LINE BREAKS

Line breaks can make it easier to read a long, complicated formula.

To add line breaks, click and drag the divider between the formula bar and the cells down a bit.

Then press Alt + Enter to add a line break at various points within the formula.



CHARTS

To create a chart, **select the data** that you want to use in the chart. This data should include some **identifiers** such as the row headings shown here.

Click on the Charts tab in your exercise file. Then select cells A3:B7.

The screenshot shows the Microsoft Excel interface. The main window displays a spreadsheet with the following data:

Unit Sales per Region				
	North	South	East	West
Product1	\$12,000.00	\$	\$500.00	\$400.00
Product2	\$2,200.00	\$	\$700.00	\$400.00
Product3	\$13,000.00	\$	\$200.00	\$4,000.00
Product4	\$12,050.00	\$	\$300.00	\$1,000.00
Product5	\$1,600.00	\$	\$800.00	\$1,000.00

A red arrow points from the 'Product1' row in the main spreadsheet to a zoomed-in view of the selected data range (A3:B7) shown in a separate window. The zoomed-in view shows the following data:

	A	B
1		
2		North
3	Product1	\$12,000.00
4	Product2	\$2,200.00
5	Product3	\$13,000.00
6	Product4	\$12,050.00
7	Product5	\$1,600.00

CHARTS (cont.)

Now click **Insert** → **Insert Pie or Doughnut Chart** to view a list of possible pie charts. Select the one you want.

We'll do the **3-D Pie**.

The screenshot shows the Microsoft Excel interface. The 'Insert' tab is active, and the 'Charts' group is expanded to show 'Pie' and 'Doughnut' options. A red box highlights the 'Pie' group, and a red arrow points to the '3-D Pie' option. A callout window is open, showing the '2-D Pie' and '3-D Pie' options. The '3-D Pie' option is selected, and the 'Doughnut' option is also visible. The callout window also shows a 'More Pie Charts...' link.

Unit Sales per Region					
	North	South	East	West	
Product1	\$12,000.00	\$ 45.00	\$ 500.00	\$ 400.00	
Product2	\$ 2,200.00	\$ 3,000.00	\$ 700.00	\$ 400.00	
Product3	\$14,000.00	\$ 2,000.00	\$ 500.00	\$4,000.00	
Product4	\$12,000.00	\$ 2,500.00	\$ 500.00	\$1,000.00	
Product5	\$ 1,000.00	\$ 1,000.00	\$ 400.00	\$1,000.00	

CHARTS (cont.)

This action creates a chart in the spreadsheet, showing comparative slices for the sales per region.

Note that the data that was used to create the chart has been highlighted in the worksheet.

Also notice the contextual tabs in the ribbon.

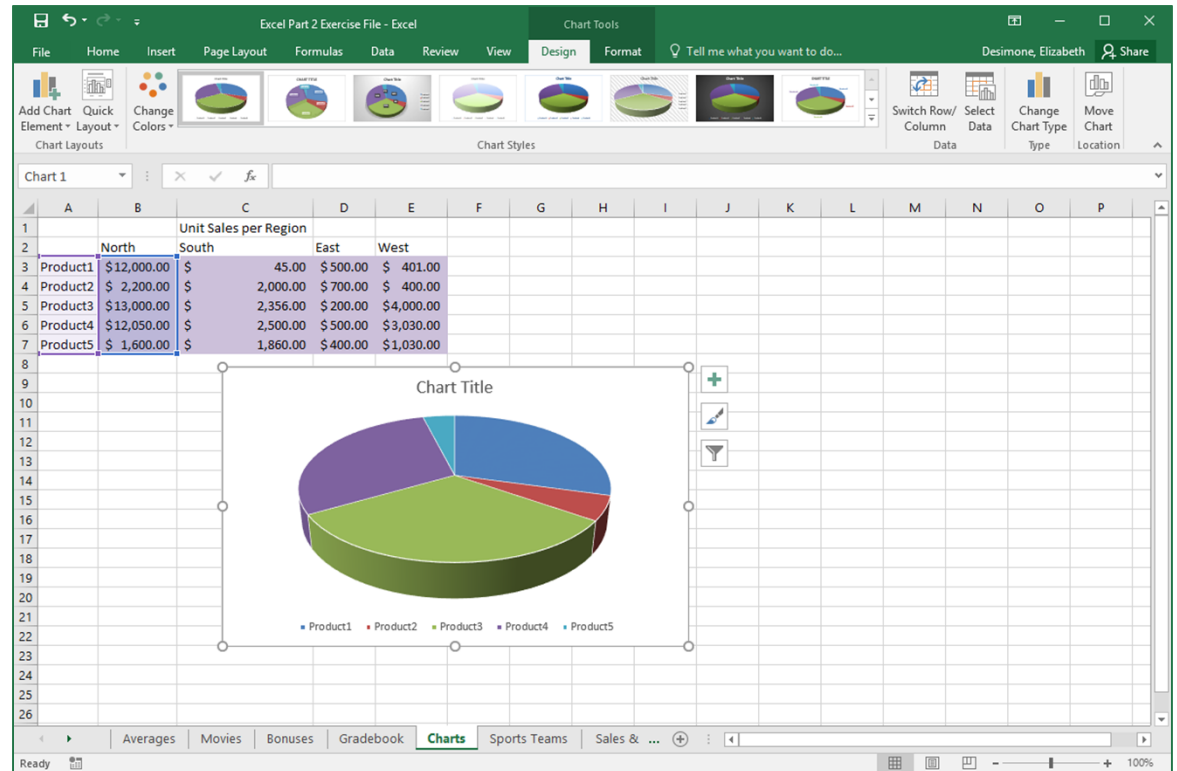
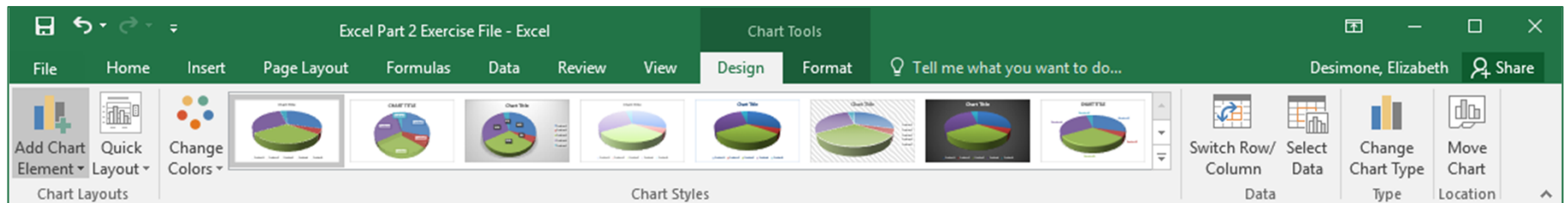


CHART TOOLS DESIGN TAB

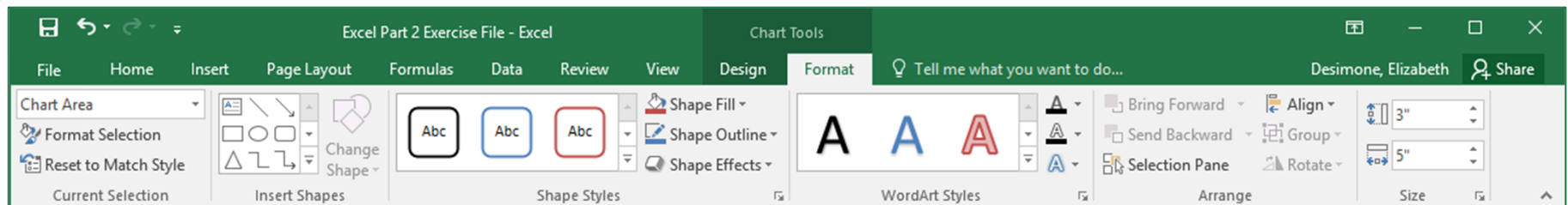
When a chart is inserted into the spreadsheet, the Chart Tools contextual tabs appear in the ribbon. There are two Chart Tools tabs. Each tab is further subdivided into groups.



There are five groups on the Chart Tools Design tab.

- Chart Layouts
- Chart Styles
- Data
- Type
- Location

CHART TOOLS FORMAT TAB



There are seven groups in the Chart Tools Layout tab:

- Current Selection
- Insert Shapes
- Shape Styles
- Word Art Styles
- Arrange
- Size

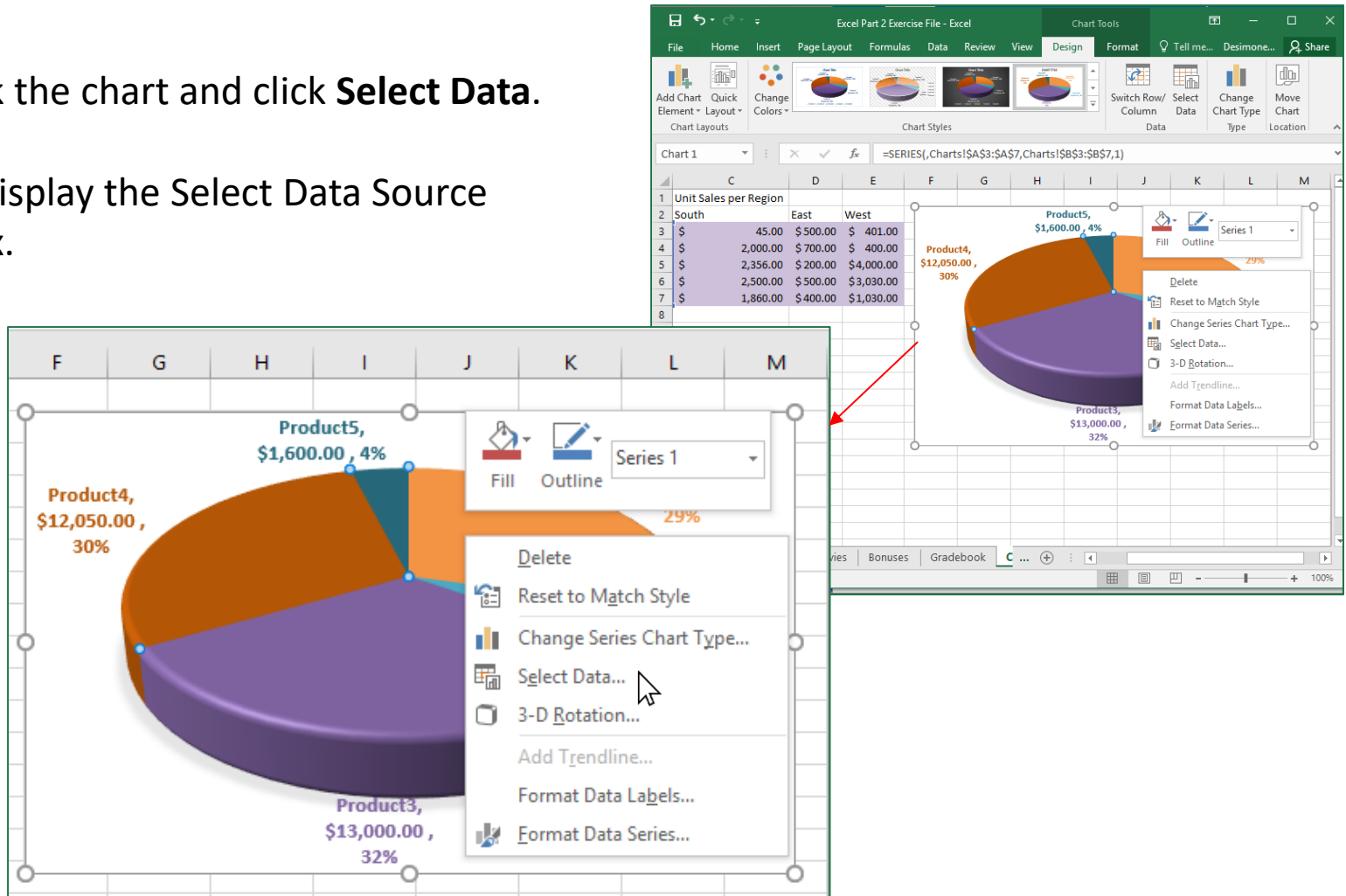
The next few slides are better illustrated in the video at this link:

<https://my.nicheacademy.com/JPL/course/26119/lesson/93767>

CHANGE THE DATA SOURCE

Right-click the chart and click **Select Data**.

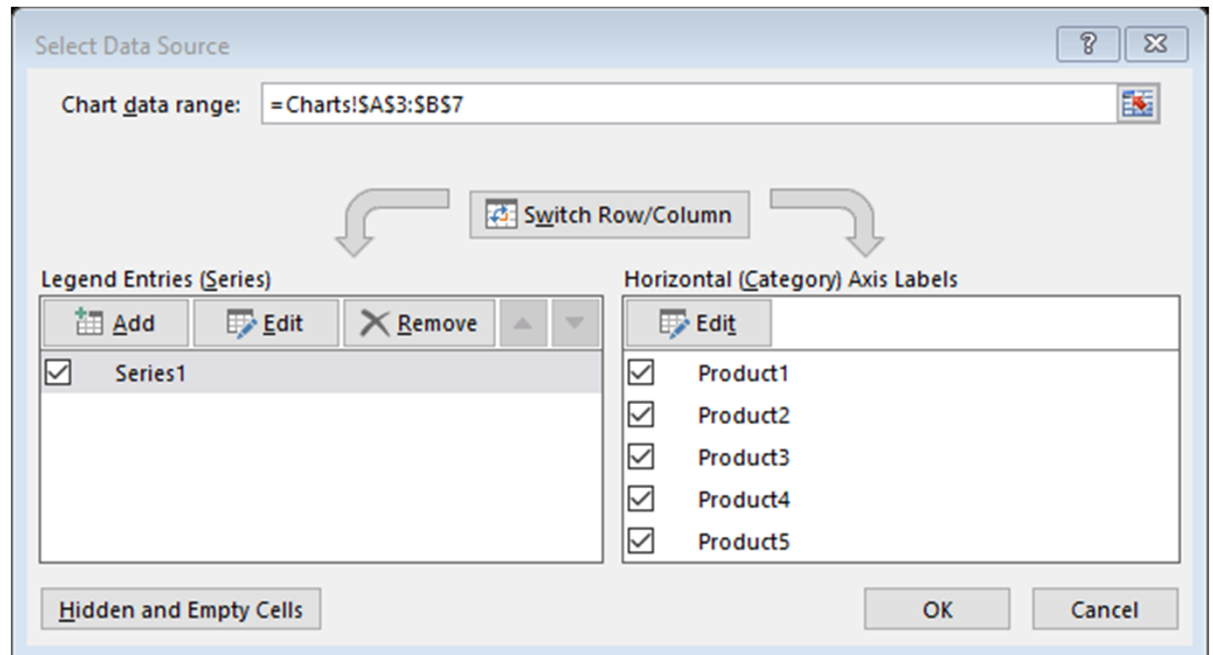
This will display the Select Data Source dialog box.



CHANGE THE DATA SOURCE (cont.)

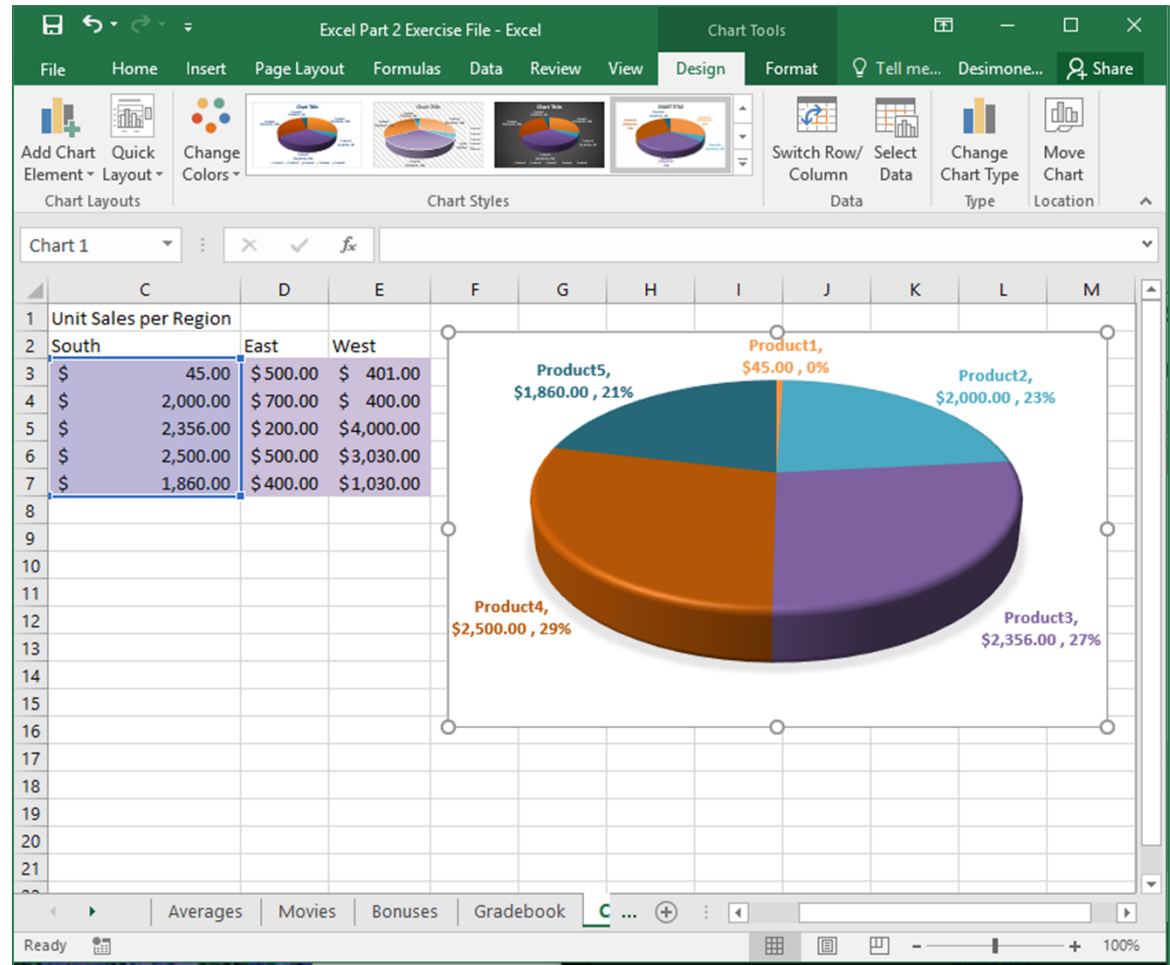
At the top of the dialog box, the Chart data range field shows the range of cells that serve as the current chart data: cells A1:D5.

To change the data source, use your mouse to select the new data range from the spreadsheet (A3:A7, C3:C7).



CHANGE THE DATA SOURCE (cont.)

You will see the new range entered into the Chart data range field. The chart itself will also change.



CHANGE THE CHART TYPE

Excel Part 2 Exercise File - Excel

Chart Tools

File Home Insert Page Layout Formulas Data Review View Design Format Tell me... Desimone... Share

Add Chart Quick Element Layout Change Colors Chart Layouts Chart Styles Switch Row/Column Data Select Data Change Chart Type Move Chart Location

Chart 1

	C	D	E
1	Unit Sales per Region		
2	South	East	West
3	\$ 45.00	\$ 500.00	\$ 400.00
4	\$ 2,000.00	\$ 700.00	\$ 1,860.00
5	\$ 2,356.00	\$ 200.00	\$ 400.00
6	\$ 2,500.00	\$ 500.00	\$ 3,156.00
7	\$ 1,860.00	\$ 400.00	\$ 1,860.00

Change Chart Type

Recommended Charts All Charts

- Recent
- Templates
- Column
- Line
- Pie
- Bar
- Area
- XY (Scatter)
- Stock
- Surface
- Radar
- Treemap
- Sunburst
- Histogram
- Box & Whisker
- Waterfall
- Combo

3-D Pie

Product1, \$41.00, 8%

Product2, \$2,000.00, 21%

Product3, \$2,356.00, 21%

Product4, \$2,500.00, 27%

Product5, \$2,500.00, 27%

OK Cancel

Click **Chart Tools – Design**
→ **Change Chart Type**.

Select the chart type you
want, then click OK.



COMMON KEYBOARD SHORTCUTS

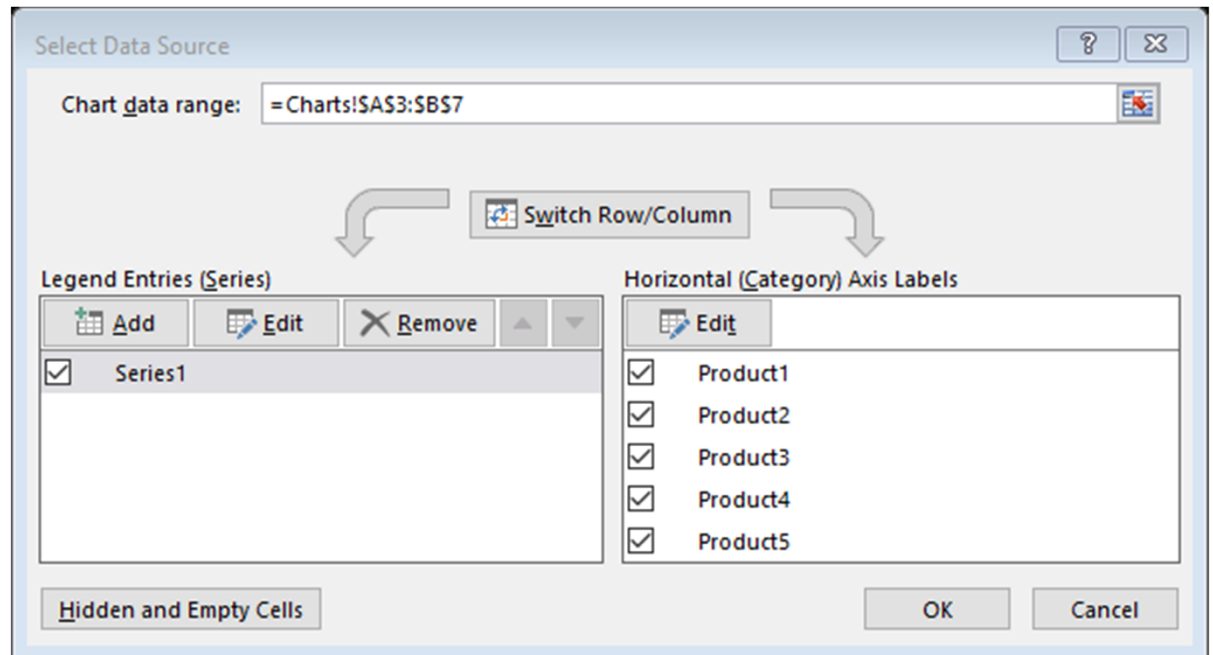
CTRL + A	Select entire document/page
CTRL + C	Copy selected text/object
CTRL + X	Cut selected text/object
CTRL + V	Paste selected text/object
CTRL + Z	Undo your last action
CTRL + F	Find specific text in the current document
CTRL + S	Save the current document
CTRL + P	Print the current document
CTRL + B	Bolds the selected text
CTRL + I	Italicizes the selected text
CTRL + U	Underlines the selected text
CTRL + N	Create a new document

CHANGE THE DATA SOURCE (cont.)

At the top of the dialog box, the Chart data range field shows the range of cells that serve as the current chart data: cells A1:B7.

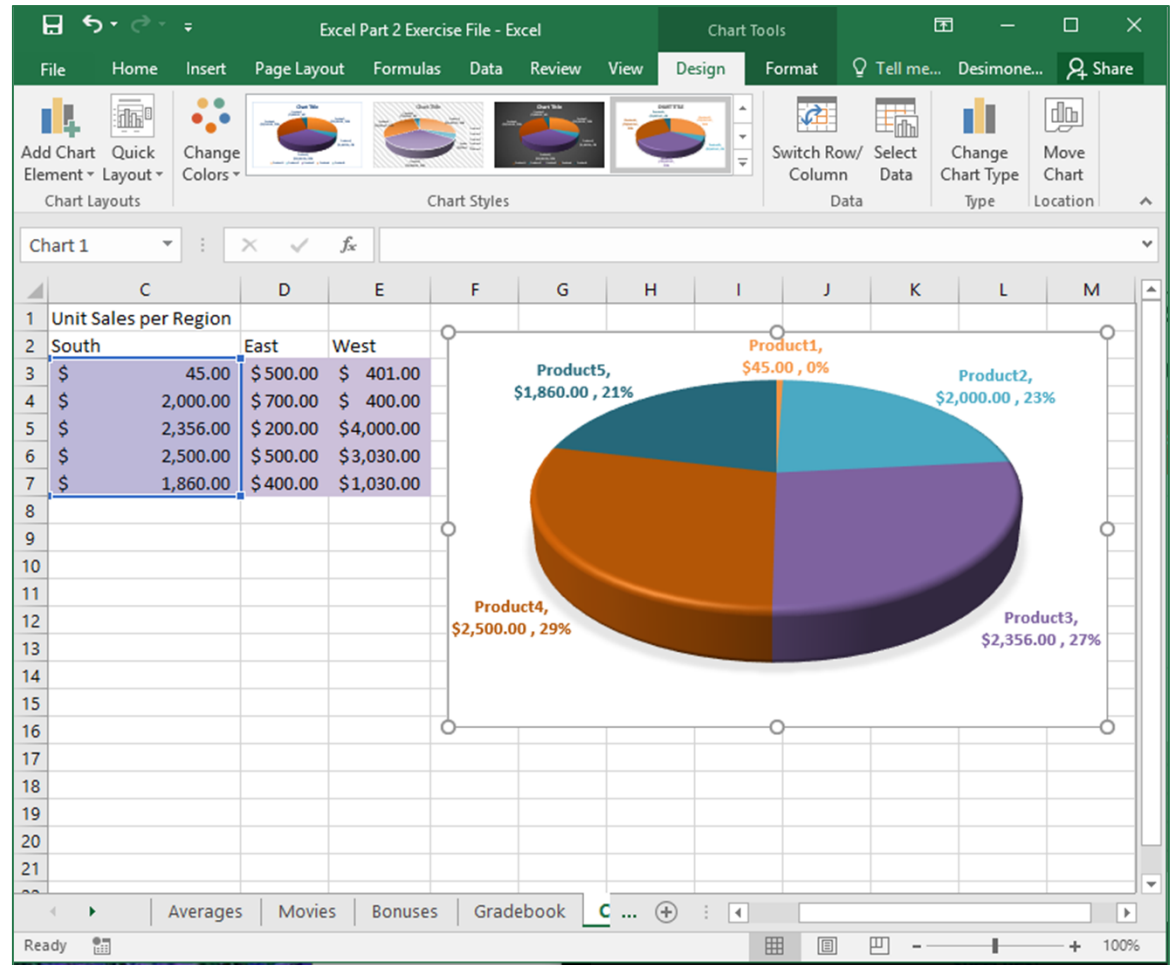
To change the data source, use your mouse to select the new data range from the spreadsheet (A3:A7, C3:C7).

These two ranges are not adjacent, so you must hold down the Control key to select the second range, C3:C7.



CHANGE THE DATA SOURCE (cont.)

You will see the new range entered into the Chart data range field. The chart itself will also change.



CHANGE THE CHART TYPE

Click **Chart Tools – Design**
→ **Change Chart Type**.

Select the chart type you
want, then click OK.

The screenshot displays the Microsoft Excel interface. The 'Chart Tools' ribbon is active, with the 'Design' tab selected. The 'Change Chart Type' button is highlighted with a red box. The 'Change Chart Type' dialog box is open, showing a list of chart types on the left and a preview of a 3-D Pie chart on the right. The background spreadsheet shows unit sales data for South, East, and West regions.

	C	D	E
1	Unit Sales per Region		
2	South	East	West
3	\$ 45.00	\$ 500.00	\$ 1,000.00
4	\$ 2,000.00	\$ 700.00	\$ 1,500.00
5	\$ 2,356.00	\$ 200.00	\$ 4,000.00
6	\$ 2,500.00	\$ 500.00	\$ 3,000.00
7	\$ 1,860.00	\$ 400.00	\$ 1,000.00

ADDITIONAL RESOURCES

Additional helpful resources can be accessed through our homepage www.jplibrary.net

- From the JPL homepage, click on the **Digital Content Tutorials** (blue rectangle) next scroll bar.

- After the course menu opens, click Full Screen at the top of the course menu to view tutorials.

The screenshot shows the Jefferson Parish Library homepage. At the top, there is a navigation bar with the JPL logo, search bar, and language selector. Below the navigation bar, there are several sections: a left sidebar with links like 'Find Books, DVDs, CDs, and more in the Catalog Search', 'JPL Digital Content', 'Log in to your account', 'Computer Classes @ Your Library', 'Text-a-Librarian', 'Get email reminders for due dates', 'Search the collection of the American Italian Research Library', and 'Become a Teen Volunteer'. A central notice box states: 'NOTICE: Repairs require temporary entrance at East Bank Regional. Users of East Bank Regional Library must enter through the administration entrance on the right side of the library. Click here for more information.' Below the notice is a large box titled 'Information for all Jefferson Parish Libraries' containing three bullet points about library hours, meeting rooms, and reservations. On the right side, there is a vertical sidebar with a blue button labeled 'Digital Content Tutorials' and a list of resources including 'Online Databases', 'Ask a Librarian (e-mail)', 'Homework Help with Free Online Tutors (Brainfuse)', 'Adult Learning Resources (Brainfuse)', 'Free Online Tutoring for K-12 and College Students (HomeworkLouisiana)', 'Annotated Online Children's Books (Tumblekit)', 'Learn one or more languages or phrases (English as a Second Language (Pronunciator))', and 'Learn Languages Online - including ESL (Mango)'. At the bottom right, there is a 'Safer at Home Jefferson Parish Covid Emergency Rental Assistance Program' banner.

The screenshot shows the 'JPL Digital Content Tutorials' menu. At the top, there is a search bar and a 'Full Screen' button with a red arrow pointing to it. Below the search bar, there is a list of tutorials with right-pointing arrows: 'The Great Job Hunt at JPL', '**Click and Learn JPL Digital Content Apps', '**JPL's Basic Computer Skills Learning Guide', '*Homework Louisiana (Tutor.com) Tutorial -- Real experts, waiting to help you now', '*Internet Basics', '*Joining Cisco Webex Meetings', '*Learn to Use Your Chromebook', '*Zoom - Let's learn to use it!', 'Advanced Internet Search Techniques', 'Ancestry Library Edition Tutorial -- Access Billions of Genealogical Records', 'AtoZ World Food', and 'Auto Repair Source - Automotive Information'.

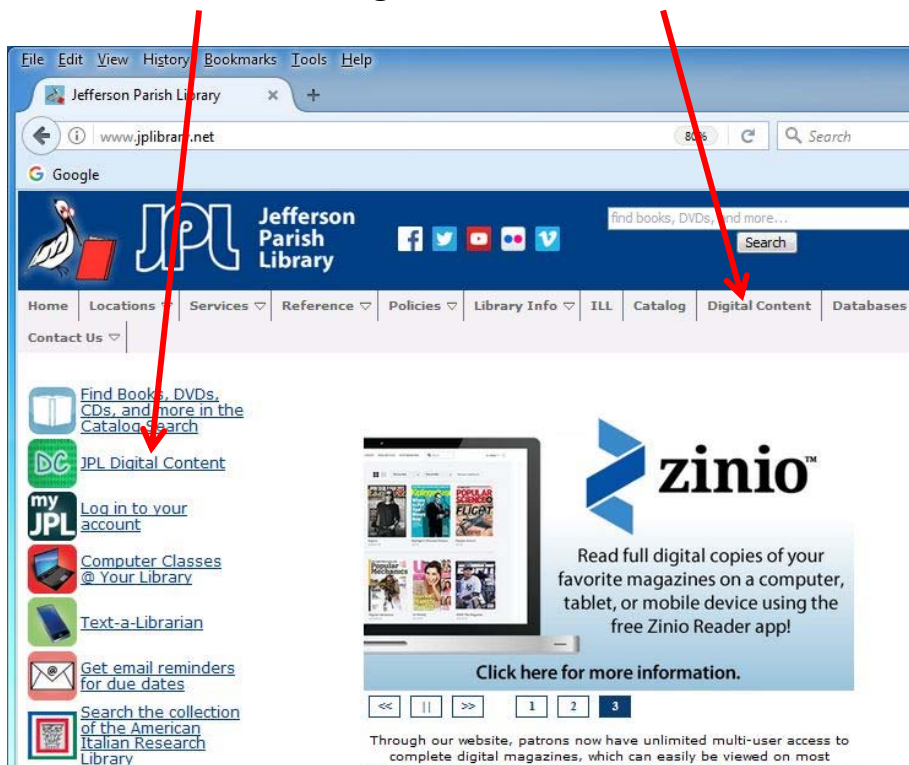


ADDITIONAL RESOURCES

Additional helpful resources can be accessed through our homepage www.jplibrary.net

- From the library's homepage, click on the **JPL Digital Content** link or the **Digital Content** menu tab.

- Then click on the **LinkedIn Learning** icon to access online training using your library card number and pin.



Lynda.com is now LinkedIn Learning.



NOTES

Jefferson Parish Library authorizes you to view and download materials such as this handout at our web site (www.jpilibrary.net) only for your personal, non-commercial use, provided that you retain all copyright and other proprietary notices contained in the original materials on all copies of the materials. You may not modify the materials at this site in any way or reproduce, publicly display, perform, distribute or otherwise use them for any public or commercial purpose. The materials at this site are copyrighted and any unauthorized use of any materials at this site may violate copyright, trademark, and other laws. If you breach any of these Terms, your authorization to use any materials available at this site automatically terminates and you must immediately destroy any such downloaded or printed materials.

