

## Computer Applications Open Edition



# Computer Applications Open Edition

*ALI MACDONALD*

LOYALIST COLLEGE PRESSBOOKS  
BELLEVILLE ONTARIO



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# Contents

Attribution	vii
Copyright Information	
Introduction	viii
Part I. <u>Chapter 1 – Fundamental Skills</u>	
1. 1.5 Chapter Practice	3
2. 1.6 Scored Assessment	5
Part II. <u>Chapter 2 – Mathematical Computations</u>	
3. 2.5 Chapter Practice	9
4. 2.6 Chapter Scored	14
Part III. <u>Chapter 3 – Formulas, Functions, Logical and Lookup Functions</u>	
5. 3.1 More on Formulas and Functions	19
6. 3.2 Logical and Lookup Functions	29
7. 3.3 Conditional Formatting	38
8. 3.5 Chapter Practice	45
9. 3.6 Chapter Scored	48
Part IV. <u>Chapter 4 – Presenting Data with Charts</u>	
10. 4.5 Chapter Practice	53
11. 4.6 Scored Assessment	59
Part V. <u>Chapter 5 – Tables</u>	
12. 5.4 Chapter Practice	65
13. 5.5 Scored Assessment	70
Part VI. <u>Chapter 6 – Multiple Sheet Files</u>	
14. 6.1 Multiple Sheet Basics	75
15. 6.2 Formulas with 3-D References	83
16. 6.3 Templates	87

17. 6.4 Preparing to Print	91
18. 6.5 Chapter Practice	94
Appendix	99
Glossary	100

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# Introduction

This core Microsoft® Excel® text provides students with the skills needed to execute many personal and professional activities. It also prepares them to go on to more advanced skills using the Excel software. The text takes the approach of making decisions using Excel. Personal decisions introduced include important purchases, such as homes and automobiles, savings for retirement, and personal budgets. Professional decisions include budgets for managing expenses, merchandise items to mark down or discontinue, and inventory management. Students are given clear, easy-to-follow instructions for each skill presented and are also provided with opportunities to learn additional skills related to the personal or professional objectives presented. For example, students learn the key terms with respect to home mortgages and understand the impact interest rates have on monthly mortgage payments. This text also places an emphasis on “what-if” scenarios so students gain an appreciation for the computational power of the Excel application. In addition, students learn how Excel is used with Microsoft® Word® and Microsoft® PowerPoint® to accomplish a variety of personal and professional objectives.



## PART I

# CHAPTER 1 – FUNDAMENTAL SKILLS

Microsoft® Excel® is a tool that can be used in virtually all careers and is valuable in both professional and personal settings. Whether you need to keep track of medications in inventory for a hospital or create a financial plan for your retirement, Excel enables you to do these activities efficiently and accurately. This chapter introduces the fundamental skills necessary to get you started in using Excel. You will find that just a few skills can make you very productive in a short period of time.

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# 1. 1.5 Chapter Practice

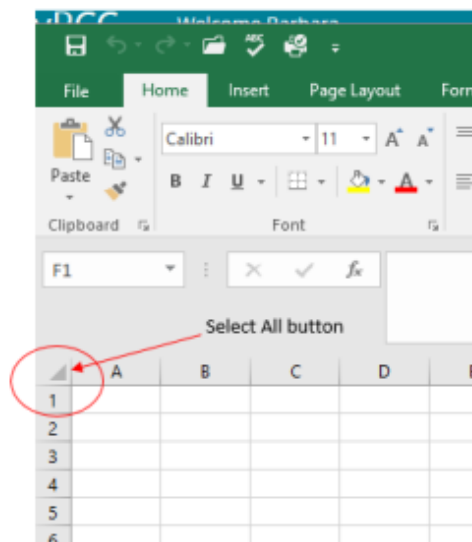
To assess your understanding of the material covered in the chapter, complete the following assignment.

## Basic Monthly Budget for Medical Office

Download Data File: [PR1 Data](#)

Creating and maintaining budgets are common practices in many careers. Budgets play a critical role in helping a business or household control expenditures. In this exercise you will create a budget for a hypothetical medical office while reviewing the skills covered in this chapter.

1. Open the file name **PR1 Data**, then Save As **PR1 Medical Office Budget**.
2. Activate all the cell locations in the Sheet1 worksheet by clicking the Select All button in the upper left corner of



the worksheet.

3. In the Home tab of the Ribbon, set the font style to Arial and the font size to 12 points. Then click any cell to Deselect.
4. Increase the width of Column A so all the entries in the range A3:A8 are visible. Place the mouse pointer between the letter A and letter B of Column A and Column B. When the mouse pointer changes to a double arrow, left click and drag it to the right until the character width is approximately 18.00.
5. Enter **Quarter 1** in cell B2.
6. Use AutoFill to complete the headings in the range C2:E2. Activate cell B2 and place the mouse pointer over the Fill Handle.
7. Select the range B2:E2 and click the Format button in the Home tab of the Ribbon. Click the Column Width option, type 11.57 in the Column Width dialog box, and then click the OK button in the Column Width dialog box.
8. Enter the words **Medical Office Budget** in cell A1.
9. Insert a blank column between Columns A and B by clicking on any cell in Column B. Then, click the drop-down arrow of the Insert button in the Home tab of the Ribbon. Click the Insert Sheet Columns option.
10. Enter the words **Budget Cost** in cell B2.
11. Adjust the width of Column B to approximately 12.0 characters.

12. Select the range A1:F1 and click the Merge & Center button in the Home tab of the Ribbon to merge the cells in that range.
13. Make the following format adjustments to the range A1:F1: bold; italics; change the font size to 14 points; change the cell fill color to Aqua, Accent 5, Darker 50%; and change the font color to white.
14. Increase the height of Row 1 to approximately 24.75 points.
15. Make the following format adjustment to the range A2:F2: bold; and fill color to Tan, Background 2, Darker 10%. Center the column titles so that they are horizontally centered in each cell.
16. Select B2 and choose the Wrap Text button in the Home tab of the Ribbon. Increase the height of Row 2 to approximately 30 points.
17. Copy cell C3 and paste the contents into the range D3:F3.
18. Copy the contents in the range C6:C8 by highlighting the range and clicking the Copy button in the Home tab of the Ribbon. Then, highlight the range D6:F8 and click the Paste button in the Home tab of the Ribbon.
19. Calculate the total budget for all four quarters for the salaries. Click cell B3 and click the down arrow on the AutoSum button in the Formulas tab of the Ribbon. Click the Sum option from the drop-down list. Then, highlight the range C3:F3 and press the ENTER key on your keyboard.
20. Copy the formula in cell B3 and paste them into the range B4:B8.
21. Format the range B3:F8 with Accounting format and zero decimal places.  
If any of the cells display pound symbols (#####), simply widen the column to display the values again.
22. Select the range A1:F8 and click the down arrow next to the Borders button in the Home tab of the Ribbon. Select the All Borders option from the drop-down list.
23. Double click the Sheet1 worksheet tab to change the name of Sheet1 to the word **Budget**, and press the ENTER key. Delete any unnecessary worksheets.
24. Change the orientation of the Budget worksheet so it prints landscape instead of portrait.
25. Use Fit to 1 page so the Budget worksheet prints on one piece of paper, if it does not already.
26. Add a header to the Budget worksheet that shows the date in the upper left corner and your name in the center.
27. Add a footer to the Budget worksheet that shows the page number in the lower right corner.
28. Check the spelling on the worksheet and make any necessary changes. Save **PR1 Medical Office Budget** workbook.
29. Compare your work to the screenshot below and then submit the **PR1 Medical Office Budget** workbook as directed by your instructor.

3/19/2020

Student Name

Medical Office Budget					
Item	Budget Cost	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Salaries	\$ 120,000	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000
Medical Supplies	\$ 60,000	\$ 18,000	\$ 13,800	\$ 9,000	\$ 19,200
Medications	\$ 90,000	\$ 27,000	\$ 20,700	\$ 13,500	\$ 28,800
Rent	\$ 30,000	\$ 7,500	\$ 7,500	\$ 7,500	\$ 7,500
Office Supplies	\$ 12,000	\$ 3,000	\$ 3,000	\$ 3,000	\$ 3,000
Phone & Utilities	\$ 8,400	\$ 2,100	\$ 2,100	\$ 2,100	\$ 2,100

1

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PR 1 Medical Office Budget Solution Screenshot

## 2. 1.6 Scored Assessment

### Sales and Inventory Items

Download Data File: [SC1 Data](#)

A key activity for marketing professionals is to analyze projected sales and inventory information. This is especially important for retail environments. This exercise utilizes the skills covered in this chapter to analyze sales and inventory data.

1. Open the file named **SC1 Data** and then Save As **SC1 Sales and Inventory**
2. In the Sheet1 worksheet, enter the word Totals in cell C14.
3. Format all the cells in Sheet1 to Century font style and a 12-point font size.
4. Set the column width for Columns A through G to 13.5.
5. Edit the entry in cell B2 to read “**Item Number.**”
6. Use AutoFill to fill the Item Numbers from B3 into the range B4:B13. The item numbers should increase by one as they are filled through the range.
7. Copy the contents of cell A3 and paste them into the range A4:A8.
8. Delete Column F.
9. Format the range A1:F2 so the text is Bold.
10. Set the alignment in the range A2:F2 to Wrap Text.
11. Prepare A1:F1 for the title text by changing the fill color of the cells in the range A1:F1 to Red, Accent 2, Darker 25%.
12. Make the following font changes to the range A1:F1: set the font color to white, add italics, and set the font size to 14.
13. Merge and center the cells in the range A1:F1.
14. Enter the title for this worksheet in the range A1:F1. The title should appear on two lines. The first line should read **Status Report**. The second line should read **Sales and Inventory by Item**.
15. Increase the height of Row 1 so the entire title is visible.
16. Format the values in the range C3:C13 with dollar signs and two decimal places.
17. Format the values in the range E3:F13 with comma style, zero decimal places.
18. In cell E14, use AutoSum to calculate the sum of the values in the range E3:E13.
19. In cell F14, use AutoSum to calculate the sum of the values in the range F3:F13.
20. Apply All Borders to the range A1:F14.
21. Add a thick bottom border to row 2; add a thick bottom border to row 13.
22. Add a thick line border around the perimeter of the range A1:F14.
23. Insert a new blank worksheet in the workbook (this will be Sheet4).
24. Delete Sheet3.
25. Move Sheet4 ahead of Sheet2 so the order of the worksheets is Sheet1, Sheet4, and Sheet2.
26. Rename the Sheet1 worksheet tab to “**Status Report.**”
27. Change the orientation of the Status Report worksheet so it prints landscape instead of portrait.
28. Add a header to the Status Report worksheet that shows the date (needs to update) in the upper left corner and your name in the center.
29. Add a footer to the Status Report worksheet that shows the page number in the lower right corner with the word “**Page**” before the number.
30. Center the worksheet both horizontally and vertically on the sheet.

31. Check the spelling of the worksheet and make any necessary changes. Save the **SC1 Sales and Inventory** workbook.
32. Submit the **SC1 Sales and Inventory** workbook as directed by your instructor.

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## PART II

# CHAPTER 2 – MATHEMATICAL COMPUTATIONS

Perhaps the most valuable feature of Excel is its ability to produce mathematical outputs using the data in a workbook. This chapter reviews several mathematical outputs that you can produce in Excel through the construction of formulas and functions. The chapter begins with the construction of formulas for basic and complex mathematical computations. The second section reviews statistical functions, such as SUM, AVERAGE, MIN, and MAX, which can be applied to a range of cells. The last section of the chapter addresses functions used to calculate mortgage and lease payments as well as the valuation of investments. This chapter also shows how you can use data from multiple worksheets to construct formulas and functions. These skills will be demonstrated in the context of a personal cash budget, which is a vital tool for managing your money for long-term financial security. The personal budget objective will also provide you with several opportunities to demonstrate Excel's what-if scenario capabilities, which highlight how formulas and functions automatically produce new outputs when one or more inputs are changed.

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## 3. 2.5 Chapter Practice

### Financial Plan for a Lawn Care Business

Download Data File: [PR2-Data](#)

Running your own lawn care business can be an excellent way to make money over the summer while on break from college. It can also be a way to supplement your existing income for the purpose of saving money for retirement or for a college fund. However, managing the costs of the business will be critical in order for it to be a profitable venture. In this exercise you will create a simple financial plan for a lawn care business by using the skills covered in this chapter.

There are two worksheets in the workbook you will be using.

- **Annual Plan** – provides calculations to determine how much money the lawn care business brings in for one year, based on the average price per lawn cut and the number cut per year, as well as the expenses for the year.
- **Equipment Loans** – calculates the monthly payments for the various lawn care equipment loans.

#### Annual Plan Worksheet

1. Open the file named **PR2 Data** and then Save As **PR2 Lawn Care**.
2. Switch to the Annual Plan worksheet if needed.
3. Enter the following data into cells B14, B15, and B16:
  - Gasoline cost (per cut) = \$10
  - Number of customers = 30
  - Annual lawn cuts per customer = 20
4. In cell B3, enter the average price per lawn cut of \$50.
5. In cell B4, write a formula that calculates the total number of lawns cut in the year. *This is the number of customers multiplied by the annual lawn cuts per customer.*
6. In cell B5, write a formula that calculates the total annual sales. *This is found by multiplying the average price per lawn by the total number of lawn cuts.*
7. In cell B8, write a formula to calculate the total cost of gasoline for the year. *This is found by multiplying the gasoline cost per cut by the total number of lawns cut.*
8. You will finish the rest of this worksheet after completing the Equipment Loans worksheet.

#### Equipment Loans Worksheet

1. Switch to the Equipment Loans worksheet.
2. In cell E3, write a PMT function to calculate the monthly payment for the Commercial Lawn Mower. *Don't forget the negative sign in between the equal sign and the PMT! Remember to convert the interest rate and years to monthly terms and to use cell references.* The arguments of the PMT function should be as follows:
  - RATE: B3/12
  - NPER: C3\*12
  - PV: D3

3. Copy the PMT function from cell E3 to the other equipment items.
4. In cell E10, use the SUM function to calculate the total for the monthly loan payments. Make sure that the blank rows (7 through 9) were included in the range for the SUM function so that you can add more equipment items later if needed.
5. In cell E11, write a formula that calculates the total **annual** loan payments. *This will be the monthly total multiplied by 12 (the number of months in a year).*
6. If needed, apply Accounting format to all of the monetary values so that the placement of the dollar sign is consistent throughout the worksheet.
7. Sort the data in the range A3:E6 first by **Interest Rate** and then by **Loan Amount** using the following steps:
  - Select the range A3:E6.
  - Click the Sort button in the Data tab of the Ribbon.
  - In the Sort dialog box, select the Interest Rate option in the “Sort by” drop-down box. Select Largest to Smallest for the sort order.
  - Click the Add Level button in the Sort dialog box.
  - Select the Loan Amount option in the “Then by” drop-down box. Select Largest to Smallest for the sort order.
  - Click the OK button in the Sort dialog box.
8. Add a header with the date on the left and the worksheet name on the right. Be sure to insert the date and worksheet name so that they will automatically update.
9. Check Print Preview and make any other changes necessary for professional printing.

### Complete the Annual Plan Worksheet

1. Switch back to the Annual Plan worksheet.
2. In cell B9, write a formula that displays the annual monthly payments total from cell E11 in the Equipment Loans worksheet using the following steps:
  - Type an equal sign =
  - Click the **Equipment Loans** worksheet
  - Click cell E11
  - Press the ENTER key
3. In cell B10, calculate the Total Expenses by adding the Gasoline Cost and the Annual Equipment Payments.
4. In cell B12, calculate the Annual Profit by finding the difference between the Total Annual Sales and the Total Expenses. *Hint: This will hopefully be a positive number which shows that your business is making money instead of losing money.*
5. Format all cells that contain monetary amounts in the Annual Plan worksheet for Accounting Number Format (\$) with no decimal places. Format all other numerical values as Comma format with no decimal places.
6. Add a header with the date on the left and the worksheet name on the right. Be sure to insert the date and worksheet name so that they will automatically update.
7. Check Print Preview and make any changes necessary for professional printing.
8. Check the spelling on all of the worksheets and make any necessary changes.

Compare both worksheets with the answer keys below.

Lawn Care Annual Financial Plan					
<b>Annual Sales Plan</b>					
Average Price per Lawn Cut	\$ 50				
Total Number of Lawns Cut	600				
<b>Total Annual Sales</b>	\$ 30,000				
<b>Annual Expenses</b>					
Gasoline	\$ 6,000				
Annual Equipment Payments	\$ 2,321				
<b>Total Expenses</b>	\$ 8,321				
<b>Annual Profit</b>	\$ 21,679				
Gasoline Cost (per cut)	\$ 10				
Number of Customers	30				
Annual Lawn Cuts per Customer	20				

1/30/2020

Equipment Loans

Equipment Purchasing Plan				
Item	Interest Rate	Years	Loan Amount	Monthly Payment
Blower	6.0%	3	\$ 700	\$ 21.30
Commercial Lawn Mower	5.5%	4	\$ 6,000	\$ 139.54
Edger	4.0%	2	\$ 400	\$ 17.37
Trimmer	4.0%	2	\$ 350	\$ 15.20
<b>Monthly Total</b>				\$ 193.40
<b>Annual Total</b>				\$ 2,320.83

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## 4. 2.6 Chapter Scored

### Hotel Occupancy and Expenses

Download Data File: [SC2-Data](#)

The hotel management industry presents a wide variety of career opportunities. These range from running a bed and breakfast to a management position at a large hotel. No matter what hotel management career you choose to pursue, understanding hotel occupancy and costs are critical to running a successful operation. This exercise examines the occupancy rate and expenses of a small hotel.

There are three worksheets in the workbook for this assignment.

- **Occupancy** – calculates and displays the maximum **hotel capacity** for each month (based on the number of rooms, the capacity of each room, and the number of days in the specific month), the **actual occupancy** (how many actually stayed in the hotel that month), and the **occupancy percentage** (what percentage of capacity was the hotel each month).
- **Statistics** – calculates and displays the highest, lowest, and average actual occupancy and occupancy percentages from the Occupancy worksheet.
- **Shuttle Purchase** – calculates three different down payment options for a loan to purchase a shuttle for the hotel.

#### Occupancy Worksheet

1. Open the file named **SC2 Data** and then Save As **SC2 Hotel**.
2. Switch to the Occupancy worksheet if needed.
3. Replace the [Insert Year] in A1 with the year number for last year.
4. You need to calculate the January capacity for the hotel in C5. The capacity shows how many people the hotel can hold during the month. It is calculated by first multiplying the *occupants per room* by the *number of rooms* in the hotel. This **result** is then multiplied by the number of days in the month (cell B5 for January). Create this formula using **absolute references** so that the appropriate cells do not change when the formula is pasted throughout column C. *Hint: two of the cells in the formula need to be absolute references.*
5. Copy the formula in cell C5 and paste it into the range C6:C16. Use a paste method that does not remove the border at the bottom of cell C16.
6. Format the numbers in columns C and D for comma format with zero decimal places.
7. In cell C17, enter a function that finds the sum of the monthly hotel capacity values. Do the same in cell D17 to find the sum of the monthly actual occupancy values.
8. Enter a formula in cell E5 to calculate the Percent Occupied of the hotel (this statistic shows what percentage of the hotel is full or occupied). Your formula should divide the Actual Occupancy by the Hotel Capacity. Then copy and paste the formula into the range E6:E17. Use a paste method that does not remove the borders at the bottom of cell E16 and E17. Format the results in E5:E17 as *percentages with two decimal places*.
9. Format the Totals (C17:E17) as bold.
10. Apply any number formatting that aids in the readability and professionalism of the worksheet.
11. Check Print Preview and make any changes necessary for professional printing.

#### Statistics Worksheet

1. Replace the [Insert Year] in A1 with the year number for last year.
2. Enter a **function** in cell B3 that finds the highest value in the Actual Occupancy column from the Occupancy worksheet.
3. Enter a **function** in cell B4 that finds the lowest value in the Actual Occupancy column from the Occupancy worksheet.
4. Enter a **function** in cell B5 that shows the average value of the Actual Occupancy column on the Occupancy worksheet.
5. Use the Auto Fill handle to copy the formulas in the range B3:B5 to the range C3:C5.
6. Apply any number formatting that aids in the readability and professionalism of the worksheet. The numbers should be formatted similarly to the Occupancy worksheet.
7. Check Print Preview and make any changes necessary for professional printing.

### Shuttle Purchase Worksheet

The hotel is considering buying a car to shuttle customers to and from the airport. You need to decide how much of a down payment to make, so you are going to calculate the monthly payment based on three different down payment percentages. The number of years to pay off the loan will vary for each of the down payment percentage options. Remember, the down payment amount is found by multiplying the price of the car by the down payment percentage. This amount is then subtracted from the price of the car to find the amount of the loan.

1. In cell B5 write a formula that will calculate the **amount of the down payment**. *Be sure to use cell references as much as possible.* Copy the formula to the other down payment options.
2. In cell B6 write a formula to calculate the **amount of the loan**. *Be sure to use cell references as much as possible.* Copy the formula to the other down payment options.
3. In cell B9 create a PMT function to calculate the **monthly payment**. Make sure the arguments in the PMT function are converted into months and that the monthly payment is a positive number. *Be sure to use cell references as much as possible.* Copy the function to the other down payment options.
4. In cell B10 create a formula that calculates **how much will be paid in total** for the vehicle, including the down payment and the total amount paid on the loan in the given number of years. Copy the formula to the other down payment options.
5. In cell A12, write an explanation of which down payment option is the best and why.
6. Apply any number formatting that aids in the readability and professionalism of the worksheet.
7. Make the following page setup changes to the worksheet:
  - Center horizontally on the page
  - Create a footer with the date on the left and the file name on the right. Make sure that both the date and the file name will update automatically.
8. Check the spelling on all of the worksheets and make any necessary changes.
9. Save the **SC2 Hotel** workbook and submit the workbook as directed by your instructor.

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## PART III

# CHAPTER 3 – FORMULAS, FUNCTIONS, LOGICAL AND LOOKUP FUNCTIONS

Excel workbooks are designed to allow you to create useful and complex calculations. In addition to doing arithmetic, you can use Excel to look up data, and to display results based on logical conditions. We will also look at ways to highlight specific results. These skills will be demonstrated in the context of a typical gradebook spreadsheet that contains the results for an imaginary Excel class.

In this chapter, we will:

- Use the **Quick Analysis Tool** to find the Total Points for all students and Points Possible.



(**Note for Mac Users:** the Quick Analysis Tool is not available with Excel for Mac. We have alternate steps for Mac Users)

- Write a division formula to find the Percentage for each student, using an absolute reference to the Total Points Possible.
- Write an **IF Function** to determine Pass/Fail – passing is 70% or higher.
- Write a **VLOOKUP** to determine the Letter Grade using the Letter Grades scale.
- Use the **TODAY** function to insert the current date.
- Review common **Error Messages** using Smart Lookup to get definitions of some of the terms in your spreadsheet.
- Apply **Data Bars** to the Total Points values.
- Apply **Conditional Formatting** to the Percentage, Pass/Fail, and Letter Grade columns.
- **Printing Review** – Change to Landscape, Scale to Fit Columns on One Page and Set Print Area.

**Figure 3-1** shows the completed workbook that will be demonstrated in this chapter. Notice the techniques used in columns O and R that highlight the results of your calculations. Notice, also that there are more numbers on this version of the file than you will see in your original data file. These are all completed using Excel calculations.

Figure 3.1 Completed Gradebook Worksheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	CAS 170 Grades																		
2	Thursday, August 25, 2016																		
3																			
4	Student Name	CH1	CH2	CH3	Test 1	CH4	CH5	CH6	Test 2	CH7	CH8	CH9	Test 3	Final Exam	Total Points	Percentage	Pass/Fail	Letter Grade	
5	Andrews, DeShea	10	10	10	48	10	9	7	50	10	10	10	47		231	59%	Fail	F	
6	Coffey, Amber	8	7	8	38	8	7	7	36	8	8	8	39	113	295	76%	Pass	C	
7	Denson, Edward	9	8	8	35	6	5	0	30	0	0	0	0	0	101	26%	Fail	F	
8	Di, Nina	9	8	9	50	9	8	9	48	8	8	9	45	140	360	92%	Pass	A	
9	Gashi, Moesha	10	9	8	49	10	9	10	43	9	9	8	40	129	343	88%	Pass	B	
10	Gray, Emanuel	10	5	10	39	10	5	9	41	5	5	9	38	115	301	77%	Pass	C	
11	Klein, Tamar	9	10	8	42	9	8	6	33	10	5	0	31	99	270	69%	Fail	D	
12	Mansur, Yusuf	10	7	7	48	10	7	8	50	7	7	0	47	150	358	92%	Pass	A	
13	Naharro, Claudia	10	10	6	44	10	8	7	46	10	10	9	43	130	343	88%	Pass	B	
14	Persson, Thea	6	6	4	26	6	5	4	28	6	6	5	26	78	206	53%	Fail	F	
15	Popov, Olga	9	10	8	47	9	7	0	49	10	10	8	46	139	352	90%	Pass	A	
16	Prinosil, Jonas	7	5	5	30	7	5	7	31	5	5	6	29	88	230	59%	Fail	F	
17	Riley, Jordyn	10	9	9	46	10	6	9	48	9	9	9	45	136	355	91%	Pass	A	
18	Smirnov, Yuri	9	9	9	42	9	5	9	44	9	9	8	41	124	327	84%	Pass	B	
19	Sokolov, Yegor	10	8	10	48	10	7	10	44	8	8	10	41	130	344	88%	Pass	B	
20	Tan, Duong	10	9	8	41	9	9	8	43	9	9	10	40	121	326	84%	Pass	B	
21	Taylor, Jaquoya	9	10	9	50	5	10	9	50	10	10	7	50	148	377	97%	Pass	A	
22	Trong, Nguyen	9	10	7	44	10	0	7	32	0	0	6	29	101	255	65%	Fail	D	
23	Vesely, Katerina	8	6	6	38	8	6	6	40	6	6	0	38	114	282	72%	Pass	C	
24	Weller, Elijah	9	10	10	49	8	10	10	49	10	10	8	46	141	370	95%	Pass	A	
25	Points Possible	10	10	10	50	10	10	10	50	10	10	10	50	150	390				
26																			
27	Letter Grades																		
28	0% F																		
29	60% D																		
30	70% C																		
31	80% B																		
32	90% A																		
33																			

## Attribution

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# 5. 3.1 More on Formulas and Functions

## Learning Objectives

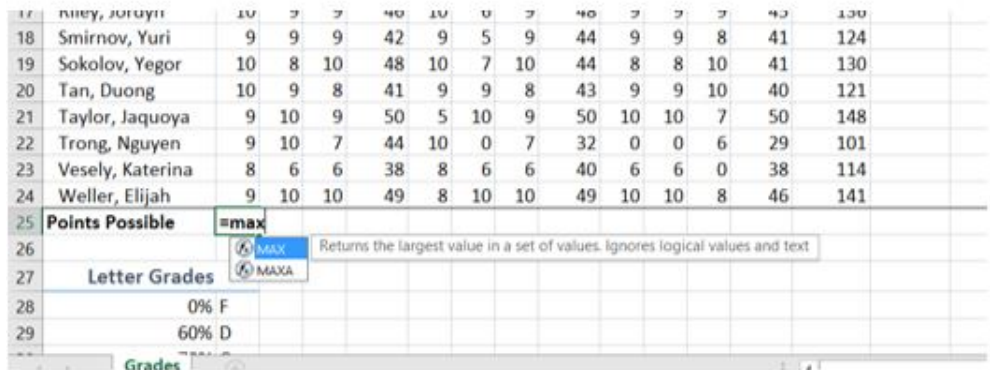
1. Review the use of the =MAX function.
2. Examine the Quick Analysis Tool to create standard calculations, formatting, and charts very quickly.
3. Create Percentage calculation.
  - Use the Smart Lookup tool to acquire additional information about percentage calculations.
  - Review the use of Absolute cell reference in a division formula.

## Another use for =MAX

Before we move on to the more interesting calculations we will be discussing in this chapter, we need to determine how many points it is possible for each student to earn for each of the assignments. This information will go into Row 25. The **=MAX** function is our tool of choice.

Download Data File: [CH3 Data](#)

1. Open the data file **CH3 Data** and save the file to your computer as **CH3 Gradebook and Parks**.
2. Make B25 your active cell.
3. Start typing **=MAX** (See **Figure 3.2**) Note the explanation you see on the offered list of functions. You can either keep typing ( or double click MAX from the list.



17	Smirnov, Yuri	10	9	9	40	10	5	9	40	9	9	8	41	130
18	Smirnov, Yuri	9	9	9	42	9	5	9	44	9	9	8	41	124
19	Sokolov, Yegor	10	8	10	48	10	7	10	44	8	8	10	41	130
20	Tan, Duong	10	9	8	41	9	9	8	43	9	9	10	40	121
21	Taylor, Jaquoya	9	10	9	50	5	10	9	50	10	10	7	50	148
22	Trong, Nguyen	9	10	7	44	10	0	7	32	0	0	6	29	101
23	Vesely, Katerina	8	6	6	38	8	6	6	40	6	6	0	38	114
24	Weller, Elijah	9	10	10	49	8	10	10	49	10	10	8	46	141
25	Points Possible	=max												
26		MAX Returns the largest value in a set of values. Ignores logical values and text												
27	Letter Grades	MAXA												
28	0% F													
29	60% D													

Figure 3.2 Entering a function

4. Select the range of numbers above row 25. Your calculation will be: **=MAX(B5:B24)**.
5. Press Enter after selecting the range.
6. Now, use the Fill Handle to copy the calculation from Column B through Column N.  
Note that as you copy the calculation from one column to the next, the cell references change. The calculation in

column B reads: **=MAX(B5:B24)**. The one in column N reads: **=MAX(N5:N24)**. These cell references are relative references.

By default, the calculations that Excel copies change their cell references **relative** to the row or column you copy them to. That makes sense. You wouldn't want column N to display an answer that uses the values in column L.


Want to see all the calculations you have just created? Press **Ctrl ~** (See **Figure 3.3**.) **Ctrl ~** displays your calculations (formulas). Pressing **Ctrl ~** a second time will display your calculations in the default view – as values.

15	Popov, Olga	9	10	8	47	9	7	0	49	10	10	8	46	139
16	Prinosil, Jonas	7	5	5	30	7	5	7	31	5	5	6	29	88
17	Riley, Jordyn	10	9	9	46	10	6	9	48	9	9	9	45	136
18	Sminov, Yuri	9	9	9	42	9	5	9	44	9	9	8	41	124
19	Sokolov, Yegor	10	8	10	48	10	7	10	44	8	8	10	41	130
20	Tan, Duong	10	9	8	41	9	9	8	43	9	9	10	40	121
21	Taylor, Jaquoya	9	10	9	50	5	10	9	50	10	10	7	50	148
22	Trong, Nguyen	9	10	7	44	10	0	7	32	0	0	6	29	101
23	Vesely, Katerina	8	6	6	38	8	6	6	40	6	6	0	38	114
24	Weller, Elijah	9	10	10	49	8	10	10	49	10	10	8	46	141
25	Points Possible	<b>=MAX(B5:)=MAX(C5:)=MAX(D5:)=MAX(E5:E24)=MAX(F5:)=MAX(G5:)=MAX(H5:)=MAX(I5:I24)=MAX(J5:)=MAX(K5:)=MAX(L5:)=MAX(M5:M2)=MAX(N5:N24)</b>												
26														

Figure 3.3 Relative References – Displayed as calculations.

## Quick Analysis Tool

The Quick Analysis Tool allows you to create standard calculations, formatting, and charts very quickly. In this exercise we will use it to insert the Total Points for each student in Column O.

 **Mac Users:** the Quick Analysis Tool is not available with Excel for Mac. We have alternate steps for Mac Users below. Skip down below Figure 3.5 to continue.)

Be sure to press **Ctrl ~** to return your spreadsheet to the normal view (the formula results should display, not the formulas themselves).

1. Select the range of cells **B5:N25**
2. In the lower right corner of your selection, you will see the Quick Analysis tool (see **Figure 3.4**).



Figure 3.4 Quick Analysis Tool

3. When you click on it, you will see that there are a number of different options. This time we will be using the **Totals** option. In future exercises, we will use other options.
4. Select **Totals**, and then the **SUM** option that highlights the right column (see **Figure 3.5**). Selecting that SUM option places **=SUM()** calculations in column O.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1																		
2																		
3																		
4	Student																	
5	Name	CH1	CH2	CH3	Test 1	CH4	CH5	CH6	Test 2	CH7	CH8	CH9	Test 3	Final Exam	Total Points	Percentage	Pass/Fail	Letter Grade
6	Andrews, A	10	10	10	48	10	9	7	50	10	10	10	47	142	373			
7	Coffey, A	8	7	8	38	8	7	7	36	8	8	8	39	113	295			
8	Denson, I	9	8	8	35	6	5	0	30	0	0	0	0	0	101			
9	Di, Nina	9	8	9	50	9	8	9	48	8	8	9	45	140	360			
10	Gashi, M	10	9	8	49	10	9	10	43	9	9	8	40	129	343			
11	Gray, Emi	10	5	10	39	10	5	9	41	5	5	9	38	115	301			
12	Klein, Tar	9	10	8	42	9	8	6	33	10	5	0	31	99	270			
13	Mansur, Y	10	7	7	48	10	7	8	50	7	7	0	47	150	358			
14	Naharro, J	10	10	6	44	10	8	7	46	10	10	9	43	130	341			
15	Persson, S	6	6	4	26	6	5	4	28	6	6	5	26	78	206			
16	Popov, OI	9	10	8	47	9	7	0	49	10	10	8	46	139	352			
17	Prinosil, J	7	5	5	30	7	5	7	31	5	5	6	29	88	230			
18	Riley, Jori	10	9	9	46	10	6	9										
19	Smimov, S	9	9	9	42	9	5	9										
20	Sokolov, Y	10	8	10	48	10	7	10										
21	Tan, Duor	10	9	8	41	9	9	8										
22	Taylor, Ja	9	10	9	50	5	10	9										
23	Trong, Ng	9	10	7	44	10	0	7										
24	Vesely, K	8	6	6	38	8	6	6										
25	Weller, E	9	10	10	49	8	10	10										
26	Points Pos	10	10	10	50	10	10	10										

Figure 3.5 Quick Analysis Tool – Totals, Sum Column

This option places the =SUM() calculations in Column O



#### Alternate steps for Mac Users:

1. Select the range B5:O25 then click the AutoSum button on the Ribbon (Home tab or Formulas tab)
2. Select the range O5:O25 and click the Bold button.

## Percentage calculation

Column P requires a Percentage calculation. Before we launch into creating a calculation for this, it might be handy to know precisely what it is we are looking for. If you are connected to the internet and are using Excel 365, you can use the **Smart Lookup** tool to get some more information about calculating percentages.

In general, the Smart Lookup tool allows you to get more information and definitions about unfamiliar terms or features. This tool is available in all of the Microsoft Office applications.

1. Select cell P4.
2. Find the **Smart Lookup** tool on the **Review** tab (see **Figure 3.6**) and click it. You can also “Right-click” the specific cell and choose **Smart Lookup**.



**Mac Users:** The **Smart Lookup** tool is only on the **Review** tab in the latest versions of Excel for Mac. If you can't find the **Smart Lookup** tool on the **Review** tab, you will find it by clicking on the “**Tools**” menu bar option.

**Note for all users:** there is a keyboard shortcut for using the Smart Lookup tool. You can hold down the Control key and click in the specific cell (in this case, P4)

3. If this is the first time you have used the Smart Lookup tool, you may need to respond to a statement about your privacy. Press the **Got it** button. We think the Wikipedia article does a pretty good job explaining the calculation, don't you?
4. Close the Smart Lookup pane after reading through the definitions.

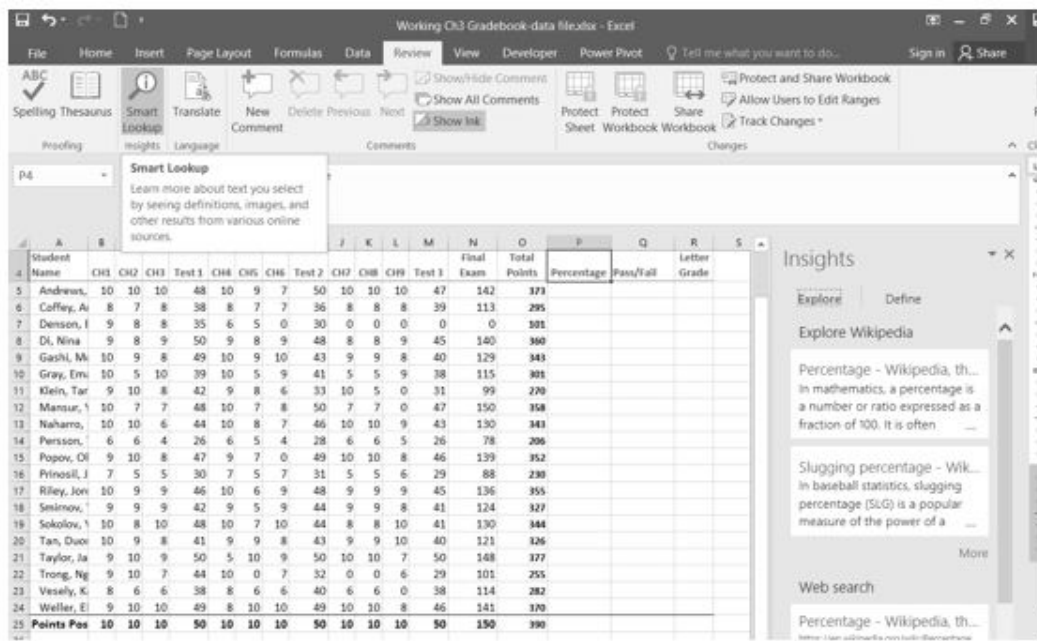


Figure 3.6 Smart Lookup tool

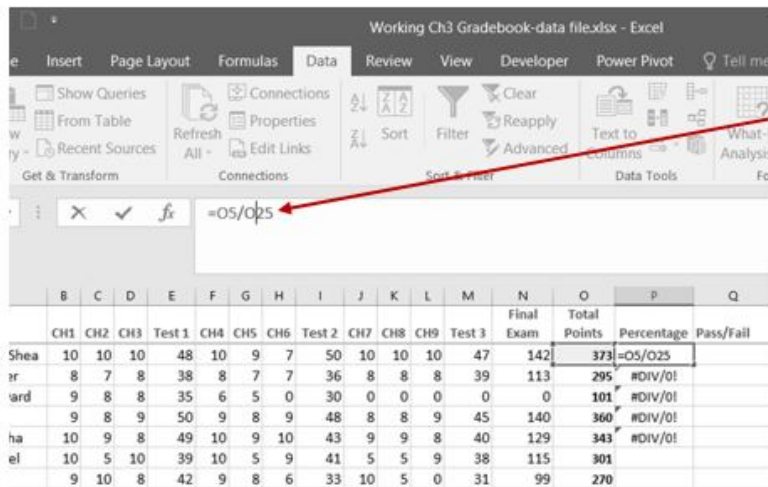
Now that we know what is needed for the Percentage calculation, we can have Excel do the calculation for us. We need to divide the **Total Points** for each student by the **Total Points** of all the **Points Possible**. Notice that there is a different number on each row – for each student. But, there is only one **Total Points Possible** – the value that is in cell **O25**.

1. Make sure that P5 is your active cell.
2. Press = then select cell **O5**. Press /, then cell **O25**. Your calculation should look like this: **=O5/O25**. The result of the formula should be **0.95641026**. (So far, so good. DeShea Andrews is doing well in this class – with a percentage grade of almost 96%. Definitely an “A”)
3. Next use the Fill handle to copy the calculation down through row 24 to calculate the other students’ grades. You should get the error message **#DIV/0!**. This error message reminds us that you can’t divide a number by 0 (zero). And that is just what is happening. If you look at the calculation in P9, the calculation reads: **=O9/O29**. The first cell reference is correct – it points to Moesha Gashi’s total points for the class. But the second reference is wrong. It points to an empty cell – O29.

Before copying the calculation, we have to make the second reference (O25) an **absolute cell reference**. That way, when we copy the formula down, the cell reference for O25 will be locked and will not change.

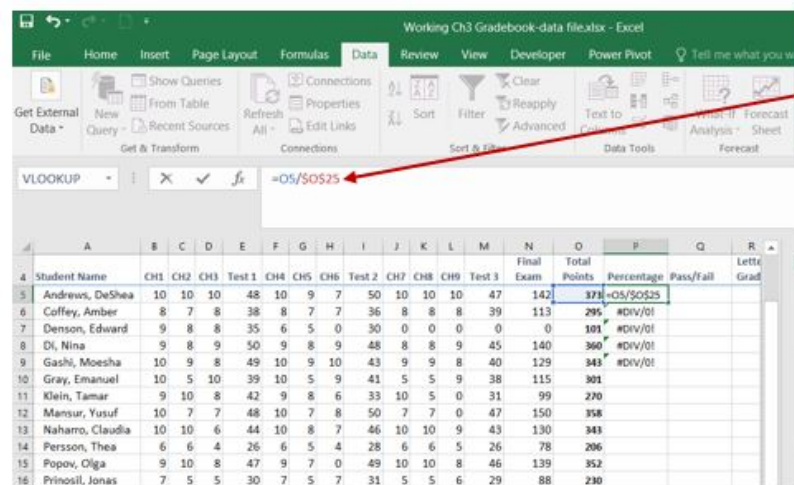
1. Make P5 your active cell. In the Formula Bar click on O25 (see **Figure 3.7**).
2. Press F4 (on the function keys at the top of your keyboard). That will make the O25 reference absolute. It will not change when you copy the calculation (see **Figure 3.8**). (If you are working on a laptop and do not have an F4 function key, you can type in a \$ before the O and another one before the 25.)
3. The calculation now looks like this: **=O5/\$O\$25**.
4. Use the Fill Handle to copy the formula down through P24 again. Now, when you copy the formula, you will get correct values for all of the students.





Place your insertion point in the reference to O25.

Figure 3.7 Editing a formula



Press F4 to make this an absolute cell reference.

Figure 3.8 Absolute Cell reference – press F4

Those long decimals are a bit nonstandard. Let's change them to % by applying cell formatting.

1. Select the range P5:P24.
2. On the Home tab, in the Number Group, select the % (Percent Style) button.

## Skill Refresher


### Absolute References

1. Click in front of the column letter of a cell reference in a formula or function that you do not want altered when the formula or function is pasted into a new cell location.

2. Press the F4 key or type a dollar sign (\$) in front of the column letter and row number of the cell reference.

## *Keyboard Shortcuts*

### **Smart Lookup Tool**

- Hold down the CTRL key and click the specific cell that you are working with. Then choose “**Smart Lookup**”
-  **Mac Users:** Same as above

## *Key Takeaways*

- Functions can be created using cell ranges or selected cell locations separated by commas. Make sure you use a cell range (two cell locations separated by a colon) when applying a statistical function to a contiguous range of cells.
- To prevent Excel from changing the cell references in a formula or function when they are pasted to a new cell location, you must use an absolute reference. You can do this by placing a dollar sign (\$) in front of the column letter and row number of a cell reference or by using the F4 function key.
- The #DIV/0 error appears if you create a formula that attempts to divide a constant or the value in a cell reference by zero.

## **More functions:**

### **Create the Sample Worksheet**

This section uses a sample worksheet to illustrate Excel built-in functions. Consider the example of referencing a name from column A and returning the age of that person from column C. To create this worksheet, enter the following data into a blank Excel worksheet.

You will type the value that you want to find into cell E2. You can type the formula in any blank cell in the same worksheet.



	A	B	C	D	E
1	Name	Dept	Age		Find Value
2	Henry	501	28		Mary
3		201	19		
	Stan				
4	Mary	101	22		
5	Larry	301	29		

Term	Definition	Example
Table Array	The whole lookup table	A2:C5
Lookup_Value	The value to be found in the first column of Table_Array.	E2
Lookup_Array -or- Lookup_Vector	The range of cells that contains possible lookup values.	A2:A5
Col_Index_Num	The column number in Table_Array the matching value should be returned for.	3 (third column in Table_Array)
Result_Array -or- Result_Vector	A range that contains only one row or column. It must be the same size as Lookup_Array or Lookup_Vector.	C2:C5
Range_Lookup	A logical value (TRUE or FALSE). If TRUE or omitted, an approximate match is returned. If FALSE, it will look for an exact match.	FALSE
Top_cell	This is the reference from which you want to base the offset. Top_Cell must refer to a cell or range of adjacent cells. Otherwise, OFFSET returns the #VALUE! error value.	
Offset_Col	This is the number of columns, to the left or right, that you want the upper-left cell of the result to refer to. For example, "5" as the Offset_Col argument specifies that the upper-left cell in the reference is five columns to the right of reference. Offset_Col can be positive (which means to the right of the starting reference) or negative (which means to the left of the starting reference).	
CONCAT	This is used for text that needs to be merged into one cell. You can type data into cells, then by using the CONCAT function and the range or cells you want to use, the data will be merged into the cell reference. For example, if you have the words "Red" in cell C2 and "Cat" in cell C3, by using CONCAT in cell C4, you can have the words Red Cat appear in that cell.	

## Functions

### LOOKUP()

The **LOOKUP** function finds a value in a single row or column and matches it with a value in the same position in a different row or column.

The following is an example of LOOKUP formula syntax:

**=LOOKUP(Lookup\_Value,Lookup\_Vector,Result\_Vector)**

The following formula finds Mary's age in the sample worksheet:

**=LOOKUP(E2,A2:A5,C2:C5)**

The formula uses the value "Mary" in cell E2 and finds "Mary" in the lookup vector (column A). The formula then

matches the value in the same row in the result vector (column C). Because “Mary” is in row 4, LOOKUP returns the value from row 4 in column C (22).

**NOTE:** The **LOOKUP** function requires that the table be sorted.

For more information about the **LOOKUP** function, click the following article number to view the article in the Microsoft Knowledge Base:

[How to use the LOOKUP function in Excel](#)

## VLOOKUP()

The **VLOOKUP** or Vertical Lookup function is used when data is listed in columns. This function searches for a value in the left-most column and matches it with data in a specified column in the same row. You can use **VLOOKUP** to find data in a sorted or unsorted table. The following example uses a table with unsorted data. The following is an example of **VLOOKUP** formula syntax: **=VLOOKUP(lookup\_value,table\_array,col\_index\_num,range\_lookup)**

The following formula finds Mary’s age in the sample worksheet:

**=VLOOKUP(E2,A2:C5,3,FALSE)**

The formula uses the value “Mary” in cell E2 and finds “Mary” in the left-most column (column A). The formula then matches the value in the same row in Column\_Index. This example uses “3” as the Column\_Index (column C). Because “Mary” is in row 4, **VLOOKUP** returns the value from row 4 in column C (22).

For more information about the **VLOOKUP** function, click the following article number to view the article in the Microsoft Knowledge Base:

[How to Use VLOOKUP or HLOOKUP to find an exact match](#)

## INDEX() and MATCH()

You can use the **INDEX** and **MATCH** functions together to get the same results as using **LOOKUP** or **VLOOKUP**. The following is an example of the syntax that combines **INDEX** and **MATCH** to produce the same results as **LOOKUP** and **VLOOKUP** in the previous examples: **=INDEX(table\_array,match(lookup\_value,lookup\_array,0),col\_index\_num)**

The following formula finds Mary’s age in the sample worksheet:

**=INDEX(A2:C5,MATCH(E2,A2:A5,0),3)**

The formula uses the value “Mary” in cell E2 and finds “Mary” in column A. It then matches the value in the same row in column C. Because “Mary” is in row 4, the formula returns the value from row 4 in column C (22).

**NOTE:** If none of the cells in Lookup\_Array match Lookup\_Value (“Mary”), this formula will return #N/A.

For more information about the **INDEX** function, click the following article number to view the article in the Microsoft Knowledge Base:

[How to use the INDEX function to find data in a table](#)

## OFFSET() and MATCH()

You can use the **OFFSET** and **MATCH** functions together to produce the same results as the functions in the previous example. The following is an example of syntax that combines **OFFSET** and **MATCH** to produce the same results as **LOOKUP** and **VLOOKUP**: **=OFFSET(top\_cell,match(lookup\_value,lookup\_array,0),offset\_col)**

This formula finds Mary’s age in the sample worksheet:

**=OFFSET(A1,MATCH(E2,A2:A5,0),2)**

The formula uses the value “Mary” in cell E2 and finds “Mary” in column A. The formula then matches the value in the same row but two columns to the right (column C). Because “Mary” is in column A, the formula returns the value in row 4 in column C (22).

For more information about the **OFFSET** function, click the following article number to view the article in the Microsoft Knowledge Base:

[Using the OFFSET function](#)

To complete this assignment, you will be required to use this data file: [SC\\_EX\\_3.1b](#)

- Start Excel and open the workbook in the datafile3.1b.xlsx. This workbook contains loan information for which you will create a loan payment calculator.
- Select the range b4:c9, Use the “Create from Selection button (Formulas tab | Defined Names group) to create names for the cells in range C4:C9 using the row titles in the range B4:B9.
- Enter the formulas shown in the table below

Cell	Formula
C8	=Price-Down_Payment
C9	=-PMT(Interest_Rate/12, 12*Years, Loan_Amount)
F4	=Monthly_Payment
G4	=12*Monthly_Payment*Years=Down_Payment
H4	=G4-Price

- Use the Data Table button in the What-If Analysis gallery (Data tab | Forecast group) to define the range E4:H19 as a one-input data table. Use the Interest Rate in the Laon Payment Calculator as the column input cell.
- Use the Page Setup dialog box to select the Fit to and “Black and White” options. Select the range B2:C9 and then use the “Set Print Area” command to set a print area. Use the Print button on the Print Screen in Backstage view to print the worksheet. Use the “Clear Print Area” command to clear the print area.
- Name the following ranges: B2:C9-Calculator; E2:H19-Raqte\_Scheudle; and B2:H19-All\_Section. Print each range by selecting the name in the Name box and using the print Selection optoin on the Print screen in backstage view.
- Unlock the range C3:C7. Protect the worksheet so that the user can select only unlocked cells (challenge).
- Press CTRL+` and then print the formulas version in landscape orientation. Press CTRL+` again to return to the values version.
- Hide and then unhide the Laon Payment Calculator workshee4t. Hide and then unhide the workbook.

Delete the extra worksheet you made so you can hide the loan payment Calculator worksheet. Unprotect the worksheet and then hide columns E through H. Select columns D and I and reveal the hidden columns. Hide rows 11 through 19. Print the worksheet (Use print screen or create a print screen PDF from the Print options). Select rows 10 and 20 and unhide rows 11 through 19. Protect the worksheet.

- Copy the data from the car worksheet to a new worksheet. Determine the monthly payment and print the worksheet for each data set and set each to a new worksheet: (a) Item=Motorhome; Down payment = \$75,000.00; Price = \$225,000; Years = 7; Interest rate = 8.00; (b) Item=Debt Consolidation Loan; Down Payment – \$0.0; Price = \$40,000.00; Years =5; Interest rate = 11.35. Label each sheet tab with an appropriate label for each calculations set and add your initials to each worksheet tab.
- Save the workbook with the file name, SC\_EX\_4\_Loan+ your initials and upload to the assignment specified by your instructor.

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## 6. 3.2 Logical and Lookup Functions

### *Learning Objectives*

- Use an IF Function to make logical comparisons between a value and what you expect.
- Create a VLOOKUP calculation to look up information in a table.
- Understand error messages.
- Understand how to enter and format Date/Time Functions.

In addition to doing arithmetic, Excel can do other kinds of functions based on the data in your spreadsheet. In this section, we will use an **=IF** function to determine whether a student is passing or failing the class. Then, we will use a **=VLOOKUP** function to determine what grade each student has earned.

### IF Function

The IF function is one of the most popular functions in Excel. It allows you to make logical comparisons between a value and what you expect. In its simplest form, the IF function says something like:

If the value in a cell is what you expect (true) – do this. If not – do that.

The IF function has three arguments:

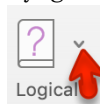
- **Logical test** – Here, we can test to see if the value in a selected cell is what we expect. You could use something like “B7=14” or “B7>12” or “B7<6”
- **Value\_if\_true** – If the requirements in the logical test are met – if B7 is equal to 14 – then it is said to be true. For this argument, you can type text – “True”, or “On budget!” Or you could insert a calculation, like B7\*2 (If B7 does equal 14, multiply it by 2). Or, if you want Excel to put nothing at all in the cell, type “” (two quotes).
- **Value\_if\_false** – If the requirements in the logical test are not met – if B7 does not equal 14 – then it is said to be false. You can enter the same instructions here as you did above. Let’s say that you type the double quotes here. Then, if B7 does not equal 14, nothing will be displayed in this cell.

In column Q we would like Excel to tell us whether a student is passing – or failing the class. If the student scores **70%** or better, he/she will pass the class. But, if he/she scores less than 70%, he/she is failing.

1. Make sure that Q5 is your active cell.
2. On the Formulas tab, in the Function Library group, find the IF function on the Logical pulldown menu (see **Figure 3.9**).



**Mac Users:** There is no “Function Library” group for Excel for Mac. Mac Users should click on the



Formulas tab, then click the “Logical” tool list arrow, and choose IF (see **Figure 3.9**).

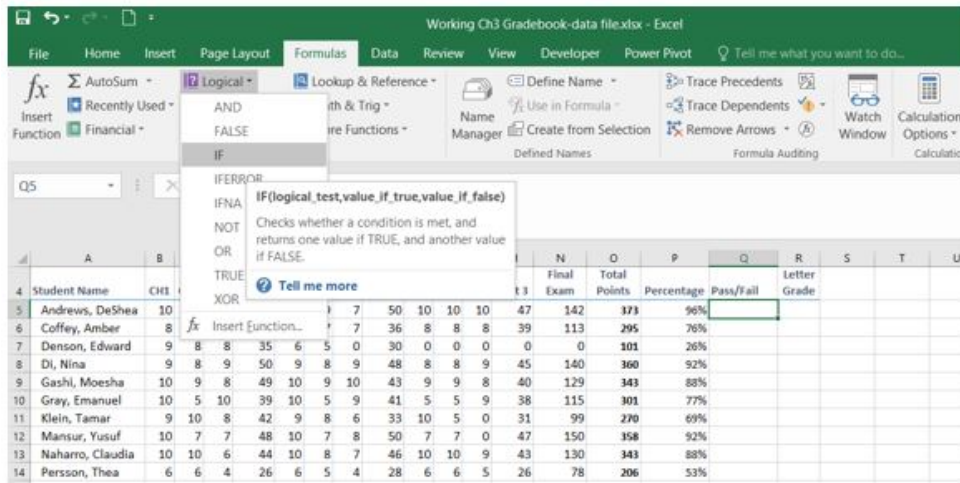



Figure 3.9 IF Function

Now you will see the IF Function dialog box, with a place to enter each of the three arguments.

 **Mac Users:** There is no “dialog box”. The “Formula Builder” pane will display at the right side of the Excel window. It has the same layout as Figure 3.10 below.

1. Click in the box for **Logical Test**. We need to test whether a student's score is less than .7. So, in this box, type **P5<.7**
2. Click in the box for **Value\_if\_true**. If the student's score is less than .7, then they are failing the class. In this box, type **Fail**.
3. Click in the box for **Value\_if\_false**. If the student's score is NOT less than .7, then they are passing the class. In this box, type **Pass**.
4. Make sure that your dialog box matches **Figure 3.10**.

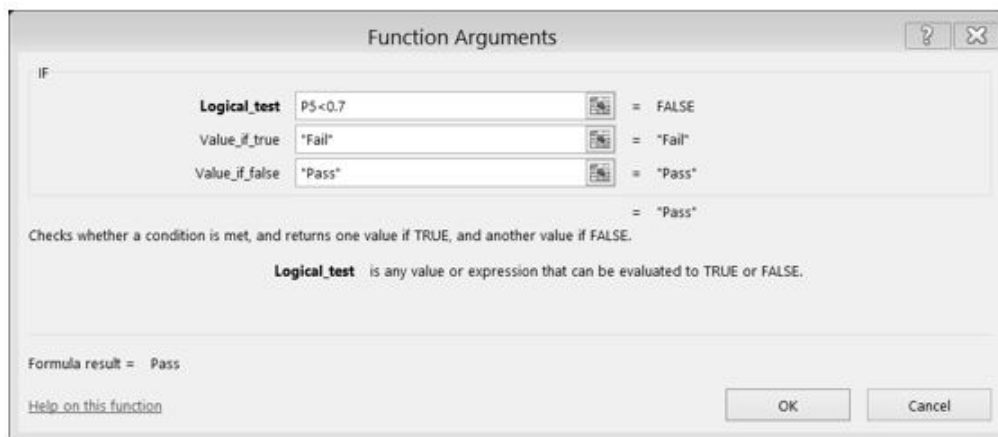



Figure 3.10 IF Function Dialog Box

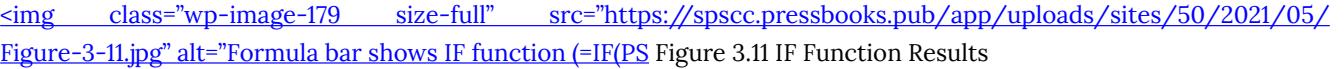
While we are here, let's take a look at the dialog box. Notice that as you click in each box, Excel gives you a brief explanation of the contents (in the middle below the boxes.) In the lower left-hand corner, you can see the results of the calculation. In this case, DeShae is passing the class. Below that is a link to **Help on this function**. Selecting this link will take you to the Excel help for this function – with detailed information on how it works.

5. Once you have typed in the required arguments and reviewed to make sure they are correct, press OK.

 **Mac Users** should click the “Done” button, then close the Formula Builder pane.

(The text Pass should be displayed in Q5 because DeShae is passing the class.)

6. Use the Fill handle to copy the IF function down through row 24.
7. Click on Q5. When you look in the formula bar, you will see the IF calculation: `=IF(P5<0.7,"Fail","Pass")` (see **Figure 3.11**).

 <https://spscc.pressbooks.pub/app/uploads/sites/50/2021/05/Figure-3-11.jpg> alt="Formula bar shows IF function (=IF(P5<0.7,\"Fail\",\"Pass\"))" data-bbox="93 161 917 194"/> Figure 3.11 IF Function Results

## VLOOKUP Function

You need to use a VLOOKUP function to look up information in a table. Sometimes that table is on a different sheet in your workbook. Sometimes it is in another file entirely. In this case, we need to know what grade each student is getting based on their percentage score. You will find the table that defines the scores and the grades in **A28:B32**.

There are four pieces of information that you will need in order to build the VLOOKUP syntax. These are the four arguments of a VLOOKUP function:

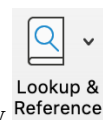
- The value you want to lookup, also called the **Lookup\_value**. In our example, the lookup value will be the student's percentage score in column P.
- The **Table\_array** is the range (table) where the lookup values and the values you want returned by the function are located. In our example, this is the table of percentages and corresponding letter grades in the range A28:B32. The lookup value should always be in the first column in the table array for VLOOKUP to work correctly. For example, in our table\_array the lookup value is in cell A28, so the range should start with A.
- The **Col\_index\_num** is the column number in the range that contains the value to return. In our example, when you specify A28:B32 as the Table\_array range, you should count A as the first column (1), B as the second column (2), and so on. You will enter the appropriate column number in this box as 1, 2, or 3 and so on.
- In the **Range\_lookup**, you can optionally specify TRUE if you want an approximate match or FALSE if you want an exact match of the return value. If you leave this blank, the default value will always be TRUE, or approximate match.

Let's create the VLOOKUP to display the correct Letter Grade in column R.

1. Make sure that R5 is your active cell.
2. On the Formulas tab, in the Function Library, find the **VLOOKUP** function on the Lookup & Reference pull-down menu (see **Figure 3.12**).



**Mac Users** should click the Lookup and Reference tool list arrow



to find the **VLOOKUP** function.

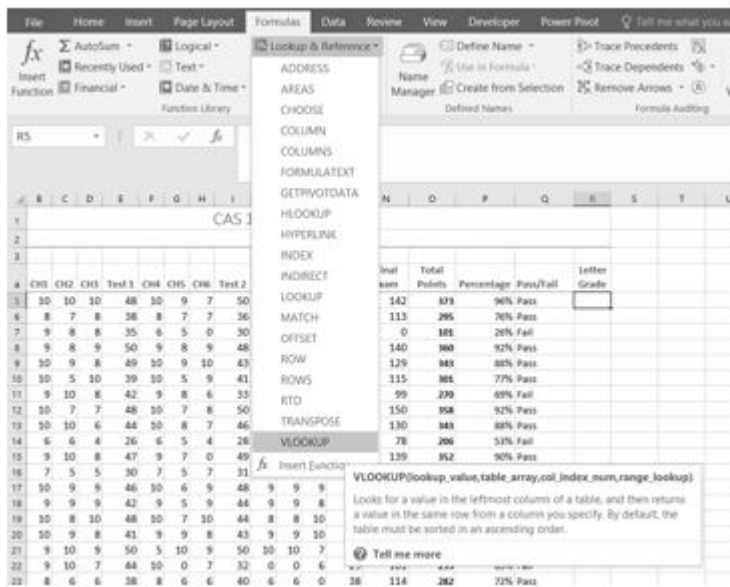


Figure 3.12 VLOOKUP Function

- Fill in the dialog box so that it looks like the image in **Figure 3.13**.



**Mac Users** will use the “Formula Builder” pane at the right side of the Excel Window.

- **Lookup\_value** – In this case, we will use the Percentage score. So, **P5** for the first lookup value.
- **Table\_array** – This is the range that contains the value you want returned by the function. In this case, that range is A28:B32. Note that this range does NOT include the label in row 27; just the actual data. The cell references for the Table\_array need to be absolute – \$A\$28:\$B\$32. When we copy this function to the other cells, we do not want these cell references to change. It should always be \$A\$28:\$B\$32. **This is very important! They must have the absolute reference symbols or the calculations will not work.**
- **Col\_index\_number** – This is the column in the table array range that includes the information that we are looking up. In our case, the actual grades are in the 2nd column of the range. So, the column index will be 2.
- **Range\_lookup** – In some cases, you will need something in the Range\_lookup box. Since we are looking for an approximate match for the percentages, we want the default value of TRUE, so we do not need to enter anything for this argument.

- While you are in the dialog box, be sure to look at all the helpful definitions that Excel offers.
- When you have filled in the dialog box, press OK.



**Mac Users** should click the “Done” button, then close the Formula Builder pane.

- The calculation you will see in the formula bar is: =VLOOKUP(P5,\$A\$28:\$B\$32,2)
- Use the fill handle to copy the function down through row 24. The results displayed should match **Figure 3.14**.



**Function Arguments**

VLOOKUP

**Lookup\_value** P5 = 0.956410256

**Table\_array** \$A\$28:\$B\$32 = {0,"F";0.6,"D";0.7,"C";0.8,"B";0.9,"A"}

**Col\_index\_num** 2 = 2

**Range\_lookup** = logical

= "A"

Looks for a value in the leftmost column of a table, and then returns a value in the same row from a column you specify. By default, the table must be sorted in an ascending order.

**Table\_array** is a table of text, numbers, or logical values, in which data is retrieved. Table\_array can be a reference to a range or a range name.

Formula result = A

[Help on this function](#)

OK Cancel

Figure 3.13 VLOOKUP completed dialog box

=VLOOKUP(P5,\$A\$28:\$B\$32,2)

F	G	H	I	J	K	L	M	N	O	P	Q	R	S
CAS 170 Grades													
CH4	CH5	CH6	Test 2	CH7	CH8	CH9	Test 3	Final Exam	Total Points	Percentage	Pass/Fail	Letter Grade	
10	9	7	50	10	10	10	47	142	373	96%	Pass	A	
8	7	7	36	8	8	8	39	113	295	76%	Pass	C	
6	5	0	30	0	0	0	0	0	101	26%	Fail	F	
9	8	9	48	8	8	9	45	140	360	92%	Pass	A	
10	9	10	43	9	9	8	40	129	343	88%	Pass	B	
10	5	9	41	5	5	9	38	115	301	77%	Pass	C	
9	8	6	33	10	5	0	31	99	270	69%	Fail	D	
10	7	8	50	7	7	0	47	150	358	92%	Pass	A	
10	8	7	46	10	10	9	43	130	343	88%	Pass	B	
6	5	4	28	6	6	5	26	78	206	53%	Fail	F	
9	7	0	49	10	10	8	46	139	352	90%	Pass	A	
7	5	7	31	5	5	6	29	88	230	59%	Fail	F	
10	6	9	48	9	9	9	45	136	355	91%	Pass	A	
9	5	9	44	9	9	8	41	124	327	84%	Pass	B	
10	7	10	44	8	8	10	41	130	344	88%	Pass	B	
9	9	8	43	9	9	10	40	121	326	84%	Pass	B	
5	10	9	50	10	10	7	50	148	377	97%	Pass	A	
10	0	7	32	0	0	6	29	101	255	65%	Fail	D	
8	6	6	40	6	6	0	38	114	282	72%	Pass	C	
8	10	10	49	10	10	8	46	141	370	95%	Pass	A	
10	10	10	50	10	10	10	50	150	390				

Figure 3.14 VLOOKUP Complete

**Note:** What if it didn't work? What if you get a result different from the one predicted? In this case, either you have made a previous error, resulting in different % scores than this exercise anticipated, or you made a mistake entering your VLOOKUP function.

To make repairs in the function, make sure that R5 is your active cell. On the Formula bar, press the Insert Function button (see **Figure 3.15**). That will reopen the dialog box so you can make your repairs. Did you forget to make the cell

references for the Table\_array absolute? Did you use the wrong cell for the Lookup\_value? Press OK when you are done and recopy the corrected function.

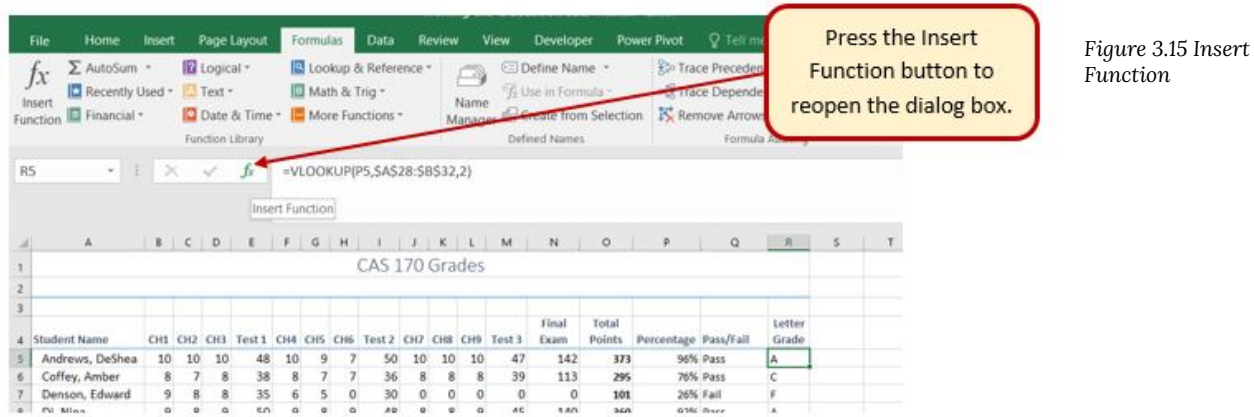


Figure 3.15 Insert Function

## Error Messages

Sometimes Excel notices that you have made errors in your calculations before you do. In those cases Excel alerts you with some slightly mysterious error messages. A list of common error messages can be found in **Table 3.1** below.

Table 3.1 – Common Error Messages

Message	What Went Wrong
#DIV/0!	You tried to divide a number by a zero (0) or an empty cell.
#NAME	You used a cell range name in the formula, but the name isn't defined. Sometimes this error occurs because you type the name incorrectly.
#N/A	The formula refers to an empty cell, so no data is available for computing the formula. Sometimes people enter N/A in a cell as a placeholder to signal the fact that data isn't entered yet. Revise the formula or enter a number or formula in the empty cells.
#NULL	The formula refers to a cell range that Excel can't understand. Make sure that the range is entered correctly.
#NUM	An argument you use in your formula is invalid.
#REF	The cell or range of cells that the formula refers to aren't there.
#VALUE	The formula includes a function that was used incorrectly, takes an invalid argument, or is misspelled. Make sure that the function uses the right argument and is spelled correctly.

This table was copied from the internet. Look here for additional information.

<http://www.dummies.com/software/microsoft-office/excel/how-to-detect-and-correct-formula-errors-in-excel-2016/>

## Date Functions

Very often dates and times are an important part of Excel data. Numbers that are correct today may not be accurate tomorrow. So, it is frequently useful to include dates and times on your spreadsheets.

These dates and times fall into two categories – ones that:

- **Remain the same.** For instance, if a spreadsheet includes data for May 15th, you don't want the date to change each time you re-open the spreadsheet.
- **Change to reflect the current date/time.** When it is important to have the current date or time on a spreadsheet, you want Excel to update the information regularly.

Take a look at the list of Date and Time functions offered in the Function Library on the Formulas tab (see **Figure 3.16**).



Figure 3.16 Date & Time Functions

For our gradebook, we want the date and time to be displayed in A2, and it needs to update whenever the workbook file is opened.

1. Make A2 your active cell. Notice that A2 extends all the way from column A to Column R. Previously, someone has used the Merge & Center tool on this cell to make it match the title above.
2. On the Formulas tab, in the Function Library, select **NOW** from the Date & Time drop-down list and then click OK.



**Mac Users** click the “Done” button in the “Formula Builder” pane at the right side of the Excel window; then close the pane.

3. The result you will see in the formula bar is: =NOW(). The result you will see in A2 depends on the current date and time. The NOW function is a very handy function. It takes no arguments and is Volatile! That is not as alarming as it may seem. This just means that you don't need to give it any more information to do its job and that your results will change frequently. You can update the date and time whenever you want – you don't have to wait until you open the workbook again.
4. Make sure that A1 is your active cell and press the **F9** function key (along the top of your keyboard.) The time will update.

Excel will update this field independently whenever you save and re-open the file, or print it. It may happen more frequently than that – depending on how you have set this up in your installation of Excel.

Another variation of the current date is the **TODAY** function. Let's try that one next.

1. Make sure A2 is your active cell. Press Delete to remove the NOW function.
2. From the Date & Time drop-down list in the Function Library on the Formulas tab (see **Figure 3.16**), select TODAY and then click OK.

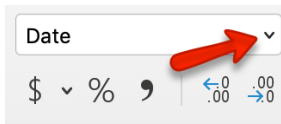


**Mac Users** click the “Done” button in the “Formula Builder” pane; then close the pane.

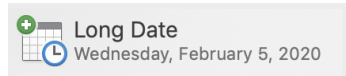
3. The result you will see in the formula bar is: =TODAY(). The result you will see in A2 depends on the current date. Since we haven't asked for the time, the time you are seeing is likely 12:00. That is not very helpful so we need to change the format of the date.
4. On the Home tab, in the Number group, press the Number Format Launcher button (see **Figure 3.17**).
5. In the **Format Cells** dialog box, click the Number tab. Choose the **Date** category and select **Wednesday, March 14, 2012** (this format is called **Long Date**).



**Mac Users:** there is no Number Format Launcher button or “Format Cells” dialog box.



Click the list arrow next to “Date” and choose “**Long Date**”



6. The current day and date will display in A2.

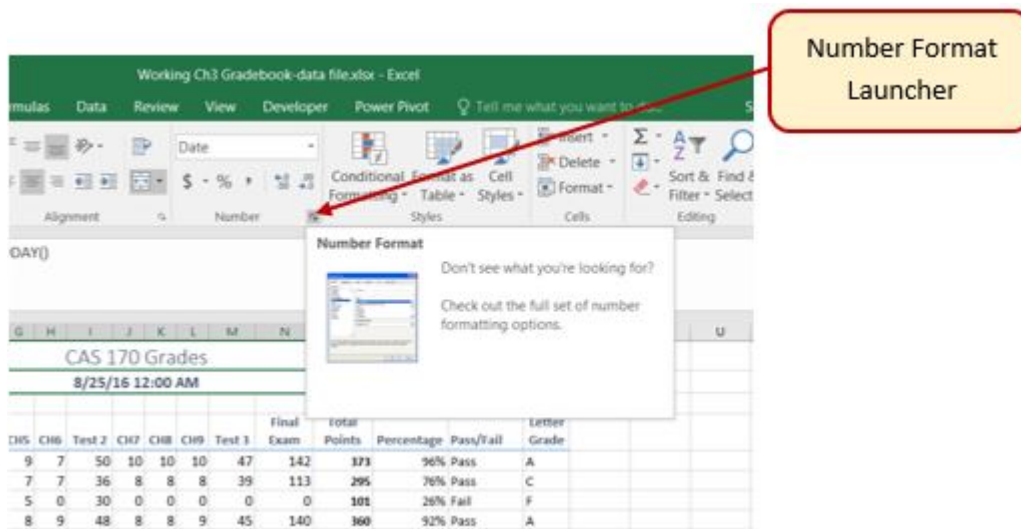


Figure 3.17 Number Format Launcher

## Keyboard Shortcuts

Sometimes you want the date or the time to show up in your spreadsheet, but you don't want it to change. You can simply type in the date or time. Or, you can use shortcut keys.

- CTRL ; (semi colon) will bring you the current date



**Mac Users:** same as above

- CTRL : (colon or CTRL SHIFT ; ) will bring you the current time.



**Mac Users:** SHIFT COMMAND :

## Key Takeaways

- Functions don't always have to be about arithmetic. Excel provides functions that will help you perform logical evaluations, look things up, and work with dates and times.
- Excel displays error messages when your formulas and functions are not constructed properly.

## Attribution

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## 7. 3.3 Conditional Formatting

### Learning Objectives

- Use Conditional Formatting techniques to provide flexible highlighting, applying specified formatting only when certain conditions are met. Techniques include:
  - Data bars — to make it easy to visualize values in a range of cells.
  - Cells Rules — to highlight values that match the requirements you specify.

You now have all the calculations you need in your CAS 170 Grades spreadsheet. There is a lot of data here. To make it easier to pick out the most important pieces of data, Excel provides **Conditional Formatting**. The best thing about Conditional Formatting is that it is flexible, applying specified formatting only when certain conditions are met.

1. Select the values in the Total Points column (**O5:O24**).
2. At the bottom of your selection, click on the Quick Analysis Tool. On the Formatting tab, select Data Bars (see **Figure 3.18**).



**Mac Users:** as stated previously, there is no Quick Analysis Tool for Excel for Mac. Use the alternate steps as shown below.

Excel places blue bars on top of your values; long blue bars for larger numbers, shorter ones for smaller numbers. This makes it easier to see how well each student did in the class – without having to look at the specific numbers.

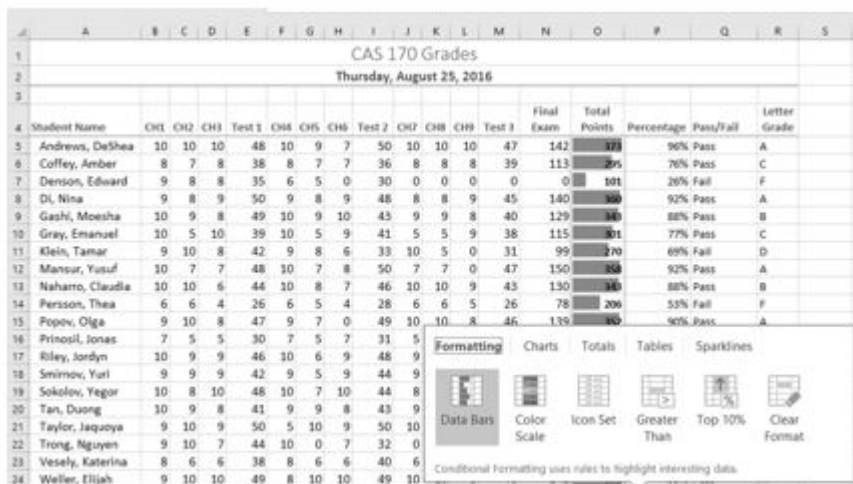


Figure 3.18 Data Bars on the Quick Analysis tool

Another way to apply Data Bars is to:

- Select the range that needs data bars

- On the Home tab, in the Styles group, select Data Bars from the Conditional Formatting tool.
- From there you can select data bars of different colors and opacities (see **Figure 3.19**).



**Mac Users:** Alternate Steps:

- On the Home tab select Data Bars from the Conditional Formatting tool
- From there you can select data bars of different colors and opacities (see **Figure 3.19**).

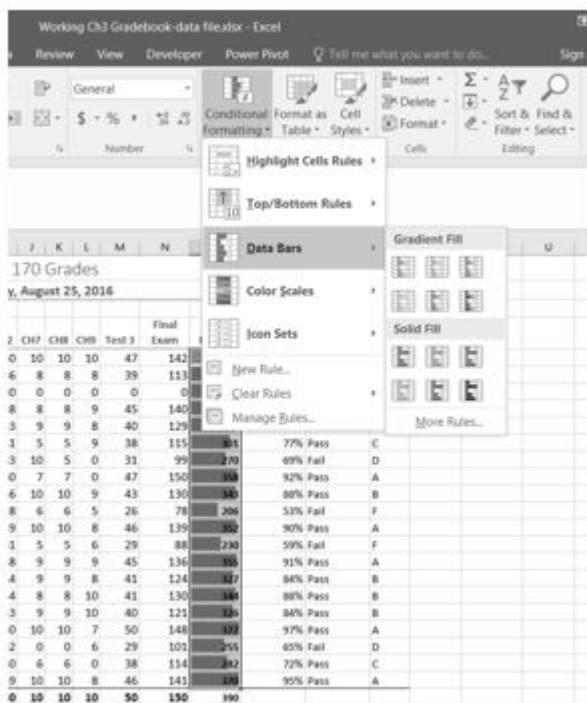


Figure 3.19 Data Bars on the Conditional Formatting tool

It is even more important to highlight the students who are failing in the class. To practice further with Conditional Formatting we will do that in two places, in the Percentages column and on the Letter Grade column. To start with, we want any **F** letter grades to be formatted with a light red fill color and dark red text.

1. Select the Letter Grades (**R5:R24**).
2. On the Home tab, in the Styles group, select **Highlight Cell Rules** from the Conditional Formatting tool (see **Figure 3.20**).
3. Select **Equal To**
4. Fill out the Equal to dialog box so that cells that are equal to: **F** have **Light Red Fill with Dark Red Text** (see **Figure 3.21**).

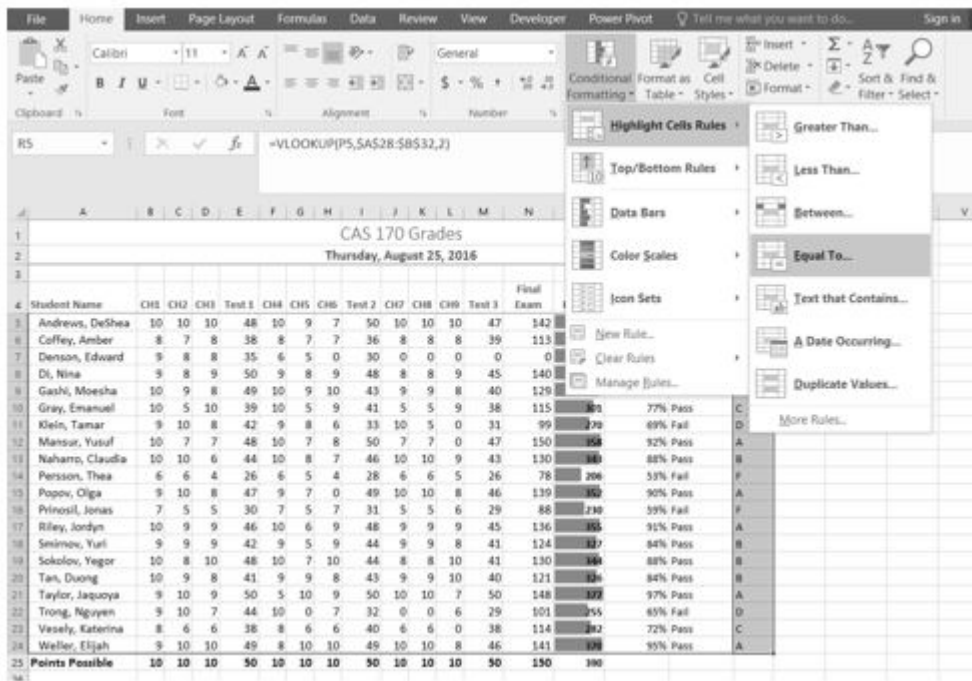


Figure 3.20 Conditional Formatting Equal To

Test 1	CH4	CH5	CH6	Test 2	CH7	CH8	CH9	Test 3	Exam	Points	Percentage	Pass/Fail	Grade
48	10	9	7	50	10	10	10	47	142	373	96%	Pass	A
38	8	7	7	36	8	8	8	39	113	295	76%	Pass	C
35	6	5	0	30	0	0	0	0	0	101	26%	Fail	F
50	9	8	9	48	8	8	9	45	140	360	92%	Pass	A
49	10	9	10	43	9	9	8	40	129	343	88%	Pass	B
39	10	5	9	41	5	5	9	38	115	301	77%	Pass	C
42	9	8	6	33	10	5	0	31	99	270	69%	Fail	D
48	10	7	8	50	7	7	0	47	150	358	92%	Pass	A
44	10	8	7	46	10	10	9	43	130	343	88%	Pass	B
26	6	5	4	28	6	6	5	26	78	206	53%	Fail	F
4													A
30													F
40													A
42													B
48													B
4													B
50													A
4													D
38	8	6	6	40	6	6	0	38	114	282	72%	Pass	C
49	8	10	10	49	10	10	8	46	141	370	95%	Pass	A

Figure 3.21 Conditional Formatting Equal To Dialog Box

Let's try that one more time – to highlight those students who are passing the class. This time we will use the Pass/Fail text in the Pass/Fail column. If the text for a student is Pass we want the cell to be formatted with a yellow fill with dark yellow text.

1. Select the Pass/Fail grades (Q5:Q24).



2. On the Home tab, in the Styles group, select **Highlight Cell Rules** from the Conditional Formatting tool (see **Figure 3.20**).
3. Select **Equal To**
4. Fill out the Equal to dialog box so that cells that are equal to: **Pass** have **Yellow Fill with Dark Yellow Text**. (To find the Yellow Fill with Dark Yellow text option, click the the down arrow at the end of the last (with) box).

You do not have to use the default styles to make your data stand out. You can set any formatting you want. When you do, it is probably a good idea to include other styling in addition to color. Your spreadsheet might be printed in black and white. You would hate to lose your Conditional formatting. Now we are going to use conditional formatting to display any Percentages that are less than 60% with red text formatted in bold and italic.

1. Select the Percentage grades (**P5:P24**).
2. On the Home tab, in the Styles group, select Highlight Cell Rules from the Conditional Formatting tool (see **Figure 3.20**).
3. Select **Less Than**
4. Fill out the Less Than dialog box so that cells that are less than **.6** will be have conditional formatting. But, instead of using the default red text on a light red fill, press the down arrow at the end of that box and select **Custom Format**.
5. On the **Font** tab of the Format Cells dialog box, in the Font style box, select **Bold Italic**. In the Color box, select **Red** (see **Figure 3.22**).
6. Press OK. Then press OK again.

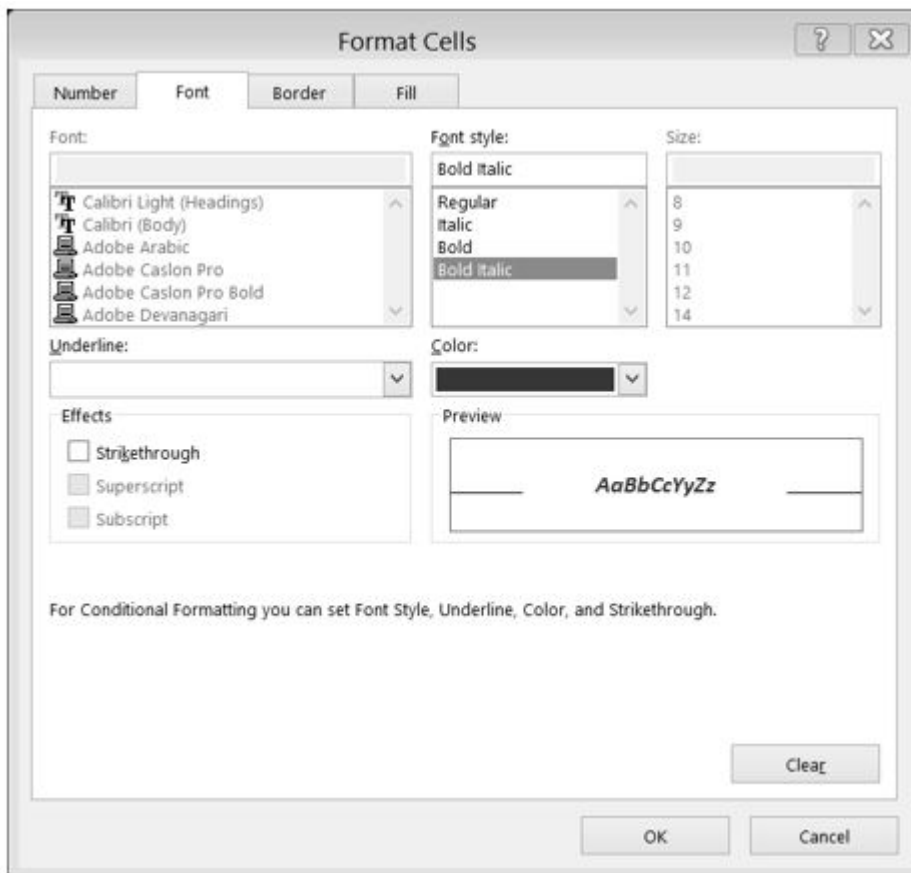


Figure 3.22 Conditional Formatting Custom Format Cells Dialog box

Conditional Formatting is valuable in that it reflects the current data. It changes to reflect changes in the data. To test this, delete DeShea's final exam score. (Select N5. Press Delete on your keyboard.) Suddenly, DeShae is failing the course and the Conditional Formatting reflects that. This is a little unfair to DeShae – who has worked so hard this quarter. Let's give him back his grade. Press CTRL Z (Undo). His test score reappears and the Conditional formatting reflects that as well.

## Making Changes

What if you have made a mistake with your Conditional Formatting? Or, you want to delete it altogether? You can use the **Conditional Formatting Manage Rules** tool. In our example, we want to remove the conditional formatting rule that formats the **Pass** text with yellow. We are also going to modify the minimum passing percentage for the conditional formatting rule that is applied to the percentages.

1. On the Home Tab, in the Styles Group, select **Manage Rules** at the very bottom of the Conditional Formatting drop-down list.
2. Show formatting rules for: **This Worksheet** (see **Figure 3.23**).
3. We don't really need to highlight the students who are passing the class, so select that rule in the Rules Manager and press the **Delete Rule** button. 🍏 Mac Users should click the minus symbol – at bottom left corner to delete the rule.

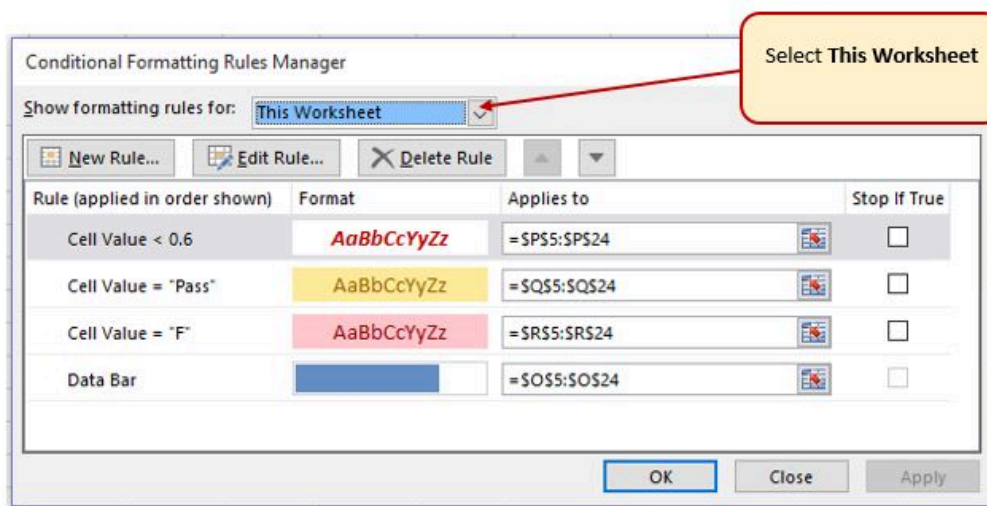


Figure 3.23 Conditional Formatting Manage Rules

In a previous exercise (the IF function), we decided that students were failing if they got a percentage score of less than 70%, so the Conditional Formatting rule in the Percentage column needs repair.

4. Select the rule that reads Cell Value <0.6.
5. Select the Edit Rule button, and change the .6 to .7 (see **Figure 3.24**).
6. Click OK (or Apply) twice. Double check that your completed workbook matches **Figure 3.25**.

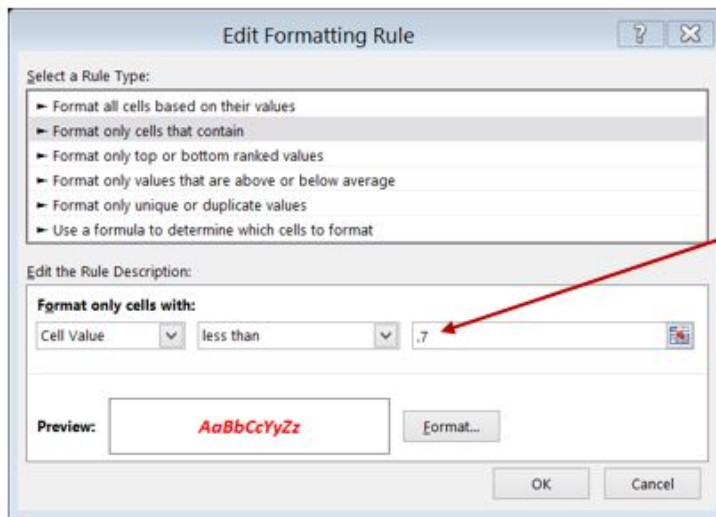


Figure 3.24 Conditional Formatting Edit Formatting Rule Dialog box

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	
1	CAS 170 Grades																		
2	Wednesday, September 28, 2016																		
3																			
4	Student Name	CH1	CH2	CH3	Test 1	CH4	CH5	CH6	Test 2	CH7	CH8	CH9	Test 3	Final Exam	Total Points	Percentage	Pass/Fail	Letter Grade	
5	Andrews, DeShea	10	10	10	48	10	9	7	50	10	10	10	47	142	373	96%	Pass	A	
6	Coffey, Amber	8	7	8	38	8	7	7	36	8	8	8	39	113	295	76%	Pass	C	
7	Denson, Edward	9	8	8	35	6	5	0	30	0	0	0	0	0	101	26%	Fail	F	
8	Di, Nina	9	8	9	50	9	8	9	48	8	8	9	45	140	360	92%	Pass	A	
9	Gashi, Moesha	10	9	8	49	10	9	10	43	9	9	8	40	129	343	88%	Pass	B	
10	Gray, Emanuel	10	5	10	39	10	5	9	41	5	5	9	38	115	301	77%	Pass	C	
11	Klein, Tamar	9	10	8	42	9	8	6	33	10	5	0	31	99	270	69%	Fail	D	
12	Mansur, Yusuf	10	7	7	48	10	7	8	50	7	7	0	47	150	358	92%	Pass	A	
13	Naharro, Claudia	10	10	6	44	10	8	7	46	10	10	9	43	130	343	88%	Pass	B	
14	Persson, Thea	6	6	4	26	6	5	4	28	6	6	5	26	78	206	53%	Fail	F	
15	Popov, Olga	9	10	8	47	9	7	0	49	10	10	8	46	139	352	90%	Pass	A	
16	Prinosil, Jonas	7	5	5	30	7	5	7	31	5	5	6	29	88	230	59%	Fail	F	
17	Riley, Jordyn	10	9	9	46	10	6	9	48	9	9	9	45	136	355	91%	Pass	A	
18	Smirnov, Yuri	9	9	9	42	9	5	9	44	9	9	9	41	124	327	84%	Pass	B	
19	Sokolov, Yegor	10	8	10	48	10	7	10	44	8	8	10	41	130	344	88%	Pass	B	
20	Tan, Duong	10	9	8	41	9	9	8	43	9	9	10	40	121	326	84%	Pass	B	
21	Taylor, Jaquoya	9	10	9	50	5	10	9	50	10	10	7	50	148	377	97%	Pass	A	
22	Trong, Nguyen	9	10	7	44	10	0	7	32	0	0	6	29	101	255	65%	Fail	D	
23	Vesely, Katerina	8	6	6	38	8	6	6	40	6	6	0	38	114	282	72%	Pass	C	
24	Weller, Elijah	9	10	10	49	8	10	10	49	10	10	8	46	141	370	95%	Pass	A	
25	Points Possible	10	10	10	50	10	10	10	50	10	10	10	50	150	390				
26																			
27	Letter Grades																		
28	0% F																		
29	60% D																		
30	70% C																		
31	80% B																		
32	90% A																		
33																			
34																			

Figure 3.25 Completed Ch3 Gradebook

## Setting the Print Area

Before you consider this workbook finished, you need to prepare it for printing. The first thing you will do is set the Print Area so that the table of Letter Grades in A27:B32 does not print.

1. Select A1:R25. This is the only part of the worksheet that you want to have print.

2. On the **Page Layout** ribbon, click the **Print Area** button. Choose **Set Print Area** from the menu.

Next you will preview the worksheet in Print Preview to check that the print area setting worked, as well as make sure it is printing on one page.

1. View the workbook in Print Preview.



**Mac Users** should choose **Print** from the **File** menu to view Print Preview.

2. Set the page orientation to **Landscape**.
3. Change the page scaling if needed so that the entire worksheet prints on one page.
4. Save the **CH3 Gradebook and Parks** workbook.

## Attribution

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## 8. 3.5 Chapter Practice


### Household Budget



Download Data File: [PR3 Data](#)

Etta and Lucian Redding are a recently married couple living in Portland, Oregon. Lucian works part time and attends the local community college. Etta works as a marketing manager at a clothing company in North Portland. They are trying to decide if they can afford to move to a better apartment, one that is closer to work and school. They want to use Excel to examine their household budget. They have started their budget spreadsheet, but they need your help with it.

1. Open the file named **PR3 Data** and then save it as **PR3 Redding**.
2. Insert two new rows at the top of the worksheet.
3. Enter the following text:

A2	Category
B2	Item
C2	January
O2	Yearly Total (adjust column width as needed to fit this text)

1. Using the text in cell C2, use Autofill to fill in the months February through December in cells D2:N2. Adjust column widths as needed to fit the names of the months in these columns.
2. Bold and center align all of the headings in Row 2.
3. Type **"Redding Family Budget"** in A1. Merge & Center A1:O1. Make this text 22 point **bold**.
4. Next you need to complete the monthly values for some of the income and expense items. In the rows for Income #1, Income #2, Mortgage/Rent, Homeowners/Rent Insurance, Car Insurance, Car Payment, and Gym Fees/Memberships, copy the values for January to the cells for February through December.
5. Use the Totals tab in the Quick Analysis tool to add the SUM to Column O. Delete the formulas from O7, O17, O24, O32, and O38.  
 Mac Users should use the AutoSum tool to calculate the totals in Column O. Since you are using the AutoSum tool, you may not have to delete any formulas in the cells listed in Step 5 above. Also, the Quick Analysis tool will automatically bold the values in Column O. Mac Users should bold cells O3:O45.
6. In C6: N6, use the SUM function to calculate the Total Income for each month.
7. Similar to step 6, use the SUM function to calculate the Total Home Expenses, Total Daily Living Expenses, Total Transportation Expenses, Total Entertainment Expenses, and Total Personal Expenses for each month.
8. Use the SUM function to calculate the Yearly Total Personal Expenses in cell O45.
9. Format the numerical data in Row 3 as Currency with no decimal places, and with a top border. Format all the total rows as Currency with no decimal places and with a top border (Rows 6, 16, 23, 31, 37, and 45).
10. Apply the Comma format with no decimal places in all the other rows.
11. In A47, type **"Total Expenses"**.
12. In C47, enter a formula that adds together all of the **expense category totals** for January. Copy the formula in C47 to D47:O47.
13. In A49, type **"Net Income"**. Bold and indent this text. Also bold C49:N49
14. In C49, enter a formula that calculates the difference between Total Income and Total Expenses (=Total Income-Total Expenses) for January. Copy this formula to D49:O49.

15. Format the data in Rows 47 and 49 as Currency with no decimal places. Bold O47 and O49. Add a Top and Double Bottom Border to the data in Row 49.
16. Select C49:N49. Use the Quick Analysis tool to add data bars to this data.  Mac Users should use the Conditional Formatting tool on the Ribbon. The negative values should automatically have a red data bar and the positive values will have a blue data bar.
17. In B50, type “**New Home?**”. Enter an IF statement in C50 that displays the word “No” if the amount in C49 is less than or equal to zero and “Maybe” if the amount is greater than zero. Copy C50 to D50:N50.
18. Check to see if your IF statement worked correctly in row 50. If the cells say “No” when the data bar in the cell above it is red and “Maybe” when the data bar in the cell above it is blue, your IF statement is correct.
19. Review the worksheet in Print Preview. Make any changes needed to make the worksheet print on one page with landscape orientation.
20. Rename the “**Sheet 1**” sheet tab:
  - Double-click the “Sheet 1” tab
  - Type: **Budget** and press Enter
21. Change the color of the sheet tab:
  - Right-click the “Budget” sheet tab
  -  Mac Users should hold down the **CTRL key** and click the Budget sheet tab
  - Point to “Tab Color”, choose a **green** color
22. Check the spelling on all of the worksheets and make any necessary changes. Save the **PR3 Redding** workbook.
23. Compare your work with the self-check answer key **below** and then submit the **PR3 Redding** workbook as directed by your instructor.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	<b>Redding Family Budget</b>															
2	<b>Category</b>	<b>Item</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>April</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>September</b>	<b>October</b>	<b>November</b>	<b>December</b>	<b>Yearly Total</b>	
3	Income	Income #1	\$1,645	\$1,645	\$1,645	\$1,645	\$1,645	\$1,645	\$1,645	\$1,645	\$1,645	\$1,645	\$1,645	\$1,645	\$19,740	
4		Income #2	2,010	2,010	2,010	2,010	2,010	2,010	2,010	2,010	2,010	2,010	2,010	2,010	24,120	
5		Other Income													-	
6	Total Income		\$3,655	\$3,655	\$3,655	\$3,655	\$3,655	\$3,655	\$3,655	\$3,655	\$3,655	\$3,655	\$3,655	\$3,655	\$43,860	
7																
8	Home	Mortgage/Rent	920	920	920	920	920	920	920	920	920	920	920	920	11,040	
9		Homeowners/Rent Insurance	8	8	8	8	8	8	8	8	8	8	8	8	96	
10		Utilities	255	230	200	195	150	165	175	165	160	160	200	235	2,290	
11		Cable/Internet													-	
12		Trash													-	
13		Home Maintenance													-	
14		Misc. House Stuff													-	
15		Lawn/Garden													-	
16	Total Home Expenses		\$1,183	\$1,158	\$1,128	\$1,123	\$1,078	\$1,093	\$1,103	\$1,093	\$1,088	\$1,088	\$1,128	\$1,163	\$13,426	
17																
18	Daily Living	Groceries	875	730	795	825	855	815	885	920	942	875	975	1,050	10,542	
19		Clothing													-	
20		Books & Supplies	2,115					2,419		3,275					7,809	
21		Child Care													-	
22		Pets													-	
23	Total Daily Living Expenses		\$2,990	\$730	\$795	\$825	\$855	\$3,234	\$885	\$4,195	\$942	\$875	\$975	\$1,050	\$18,351	
24																
25	Transportation	Car Insurance	265	265	265	265	265	265	265	265	265	265	265	265	3,180	
26		Car Maintenance													-	
27		Car Payments	210	210	210	210	210	210	210	210	210	210	210	210	2,520	
28		Bus/Train Fair													-	
29		Gas (Car)													-	
30		Parking													-	
31	Total Transportation Expenses		\$475	\$475	\$475	\$475	\$475	\$475	\$475	\$475	\$475	\$475	\$475	\$475	\$5,700	
32																
33	Entertainment	Travel													-	
34		Movies													-	
35		Special Occasions													-	
36		Gifts													-	
37	Total Entertainment Expenses		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
38																
39	Personal	Subscriptions													-	
40		Phone	120	131	125	138	120	145	140	135	145	135	165	175	1,674	
41		Gym Fees/Memberships	60	60	60	60	60	60	60	60	60	60	60	60	720	
42		Salon/Barber													-	
43		Eating Out													-	
44		Miscellaneous	200	250	120	180	250	120	150	135	200	250	270	350	2,475	
45	Total Personal Expenses		\$380	\$441	\$305	\$378	\$430	\$325	\$350	\$330	\$405	\$445	\$495	\$585	\$4,869	
46																
47	Total Expenses		\$5,028	\$2,804	\$2,703	\$2,801	\$2,838	\$5,127	\$2,813	\$6,093	\$2,910	\$2,883	\$3,073	\$3,273	\$42,346	
48																
49	Net Income		\$1,573	\$851	\$952	\$854	\$817	\$1,472	\$842	\$2,638	\$745	\$772	\$582	\$382	\$1,514	
50		New Home?	No	Maybe	Maybe	Maybe	Maybe	No	Maybe	No	Maybe	Maybe	Maybe	Maybe		
51																

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## 9. 3.6 Chapter Scored

### MidasCoffee Company

Download Data File: [SC3 data](#)

**MidasCoffee:** Ruth Kobran owns a coffee supply company named MidasCoffee. She needs some help writing the formulas for the order form she uses to invoice customers. You will need to write the formulas for all of the calculations on the form. Some of the more complex parts are determining if the customer will get a discount (based on the customer status) as well as the shipping charge (orders over \$199 get free shipping). You will use IF functions for both of those calculations.

1. Open the **SC3 Data** workbook and save the workbook as **SC3 MidasCoffee**.
2. Enter the following order information:  
Order #: **56894**  
Order Date: use a function that displays the current date
3. Enter the following Billing Information:  
**Samantha Raitt**  
**4270 SW Cooper Ln, Portland, OR 97225**  
**503-674-1632**  
**samantha.raitt@zmail.com**
4. For the Shipping Information, create formulas using cell references to display the corresponding information from the Billing Information section. For example, the Customer cell will display the name of the customer in cell C11.
5. In the range B19:E22, enter the following item orders:

Item #	Description	Qty	Unit Price
K56	Dark Mocha K-Cups (12 pack)	1	11.99
G03	Decaf Dark Roast – Ground (1 lb.)	3	12.99
B07	Organic Dark Roast – Whole Bean (1 lb.)	2	14.99
K52	Chai Latte K-Cups (12 pack)	3	10.99

6. In cell F19, enter an IF function that tests whether the order quantity in cell D19 is greater than 0 (zero). If it is, return the value of the Qty (in D19) multiplied by the Unit Price (in E19); otherwise, return no text by entering “”.  
*Hint: You will need to use a formula for the Value if True argument.*
7. Copy/fill this formula into the other cells in the range F19:F25. *Hint: be sure to copy the formula to all of the Item Total cells, even if it is a blank row. You want the worksheet to be prepared for orders with more items in the future.*
8. In cell F26, calculate the sum of all of the Item Total cells.
9. In cell F27, use an IF function to calculate the discount amount for this order based on the customer’s status (which is found in F16). If the customer’s status is Preferred, the discount amount will be the Order Subtotal times the discount percentage found in cell B29; otherwise the discount amount will be 0 (zero). *Hint: You will need to use a formula for the Value if True argument.*
10. Test your IF function to make sure that it still works if the customer is NOT preferred by deleting the word Preferred in F16. Make sure you do not end up with an error message! If you get an error message, check the IF function and make the changes needed.
11. Calculate the Discounted Total for this order in cell F28. *Hint: Use a simple subtraction formula.*



12. In cell F29, use an IF function to display the correct Shipping Charge, based on the amount of the Discounted Total. If the Discounted Total is greater than or equal to the Free Shipping Minimum found in cell B28, the Shipping Charge is 0 (zero); otherwise, the Shipping Charge is 5% of the Discounted Total. *Hint: You will need to use a formula for the Value if False to calculate what 5% of the Discounted Total will be.*
13. Calculate the Invoice Total in cell F31. *Hint: This will be the total of the Discounted Total and the Shipping Charge.*
14. Take a critical look at your worksheet to ensure that all of the number and cell formatting is professional.
15. Review the worksheet in Print Preview. Make any changes needed to make the worksheet print on one page.
16. Check the spelling on all of the worksheets and make any necessary changes. Save the **SC3 MidasCoffee** workbook.
17. Submit the **SC3 Midas Coffee** workbook as directed by your instructor.

**After reading the advanced section on using Power Tools and creating Macros, complete the next section:**

18. Reopen the **SC3 Midas Coffee assessment**. Apply a Power Tool of your choice to the assessment. Include your rationale for using this tool for your assessment. Save it as Assessment 3B with your name and turn it in as directed by your instructor.
19. Reopen the **SC3 Midas Coffee assessment**. Record a macro that changes the item numbers to the color red.

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## PART IV

# CHAPTER 4 – PRESENTING DATA WITH CHARTS

One of the most important things to consider when using charts in Excel is that they are intended to be used for communicating an idea to an audience. Your audience can be reading your charts in a written document or listening to you in a live presentation. In fact, Excel charts are often imported or pasted into Word documents or PowerPoint slides, which serve this very purpose of communicating ideas to an audience. Although there are no rules set in stone for using specific charts for certain data types, some chart types are designed to communicate certain messages better than others. This chapter explores numerous charts that can be used for a variety of purposes. In addition, we will examine formatting charts and using those charts in Word and PowerPoint documents.

## Attribution

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## 10. 4.5 Chapter Practice

To assess your understanding of the material covered in the chapter, please complete the following assignments.

Although Excel is primarily used in business and scientific applications, you will find it useful in other areas of study as well. In these exercises, we will use Excel to create charts using historical, and health data.

### Charting Historical Data (Comprehensive Review)

Download Data File: [PR4 Data](#)

Excel is an excellent tool for helping display historical data. In this exercise, we will be examining ways to display information on minimum wage data and life expectancy.

#### Task1 – National Minimum Wages Changes in The United States 2019-2020

Since the beginning of the previous century, the United States has set a minimum wage, in order to set a “floor” beneath which wages cannot fall. Most states have set their own minimum wages, but none are lower than the national minimum wage. Follow the below steps to insert a Map Chart outlining what the current minimum wage is per state.

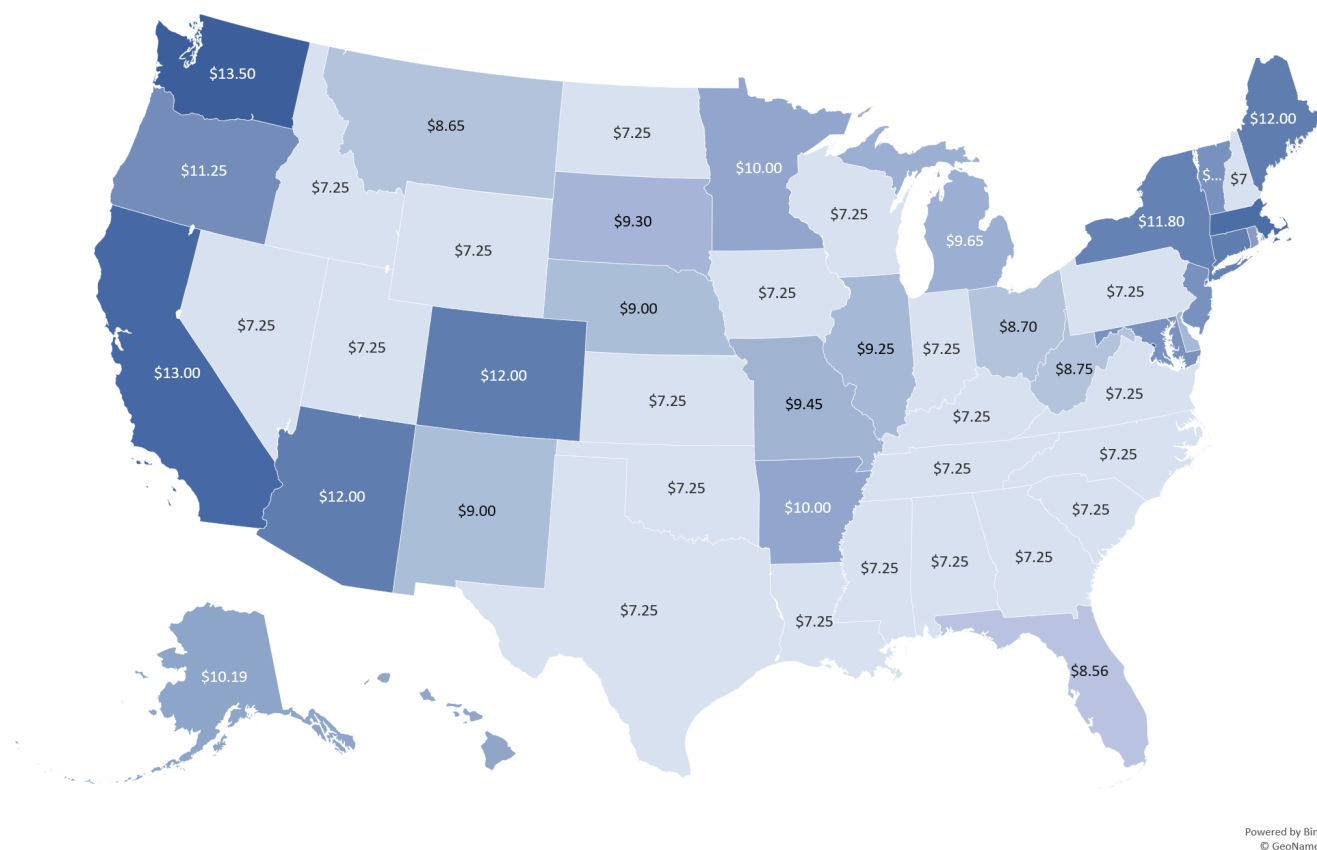
1. Open the file named **PR4 Data** and then Save As **PR4 Historical Data**.
2. On the **Minimum Wage** worksheet, select the range **B4:B55**. Press and hold the **CTRL** key and select **D4:D55**.



Mac Users: hold down the “**Command**” key **not** the **CTRL** key

3. Select the **Insert** tab, then the **Map Chart** tool in the **Charts** group.
4. Move the Chart as a **New Sheet**. Rename the sheet **Map**.
5. Update the Chart Title to **US Minimum Wage 2020**.
6. From the **Charts Element** menu choose to display the **Data Labels**.
7. From the Charts Element menu, turn off the **Legend**.
8. Prepare the **Minimum Wage** worksheet for printing by changing the scaling to **Fit Sheet on One Page**.
9. Save your work.

## US Minimum Wage 2020



Powered by Bing  
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Figure 4.32 Map Chart

### TASK 2 – OREGON: PROJECTED LIFE EXPECTANCY AT BIRTH

In the past 40 years, between 1970 and 2010, life expectancy for Oregon men improved by 8.7 years and for women by 5.5 years. Oregon's life expectancy has remained slightly higher than the U.S. average. The life expectancy will continue to improve for both men and women. However, the gain for men has been outpacing the gain for women. Consequently, the difference between men's and women's life expectancies has continued to shrink.

[https://www.oregon.gov/das/OEA/Documents/OR\\_pop\\_trend2012.pdf](https://www.oregon.gov/das/OEA/Documents/OR_pop_trend2012.pdf)

1. On the **Life Expectancy** sheet, select **A5:B11**.
2. From the Insert tab choose Recommend Charts. Select the second option, Clustered Column chart.
3. Move the chart to a new sheet. Name the sheet **Men**.

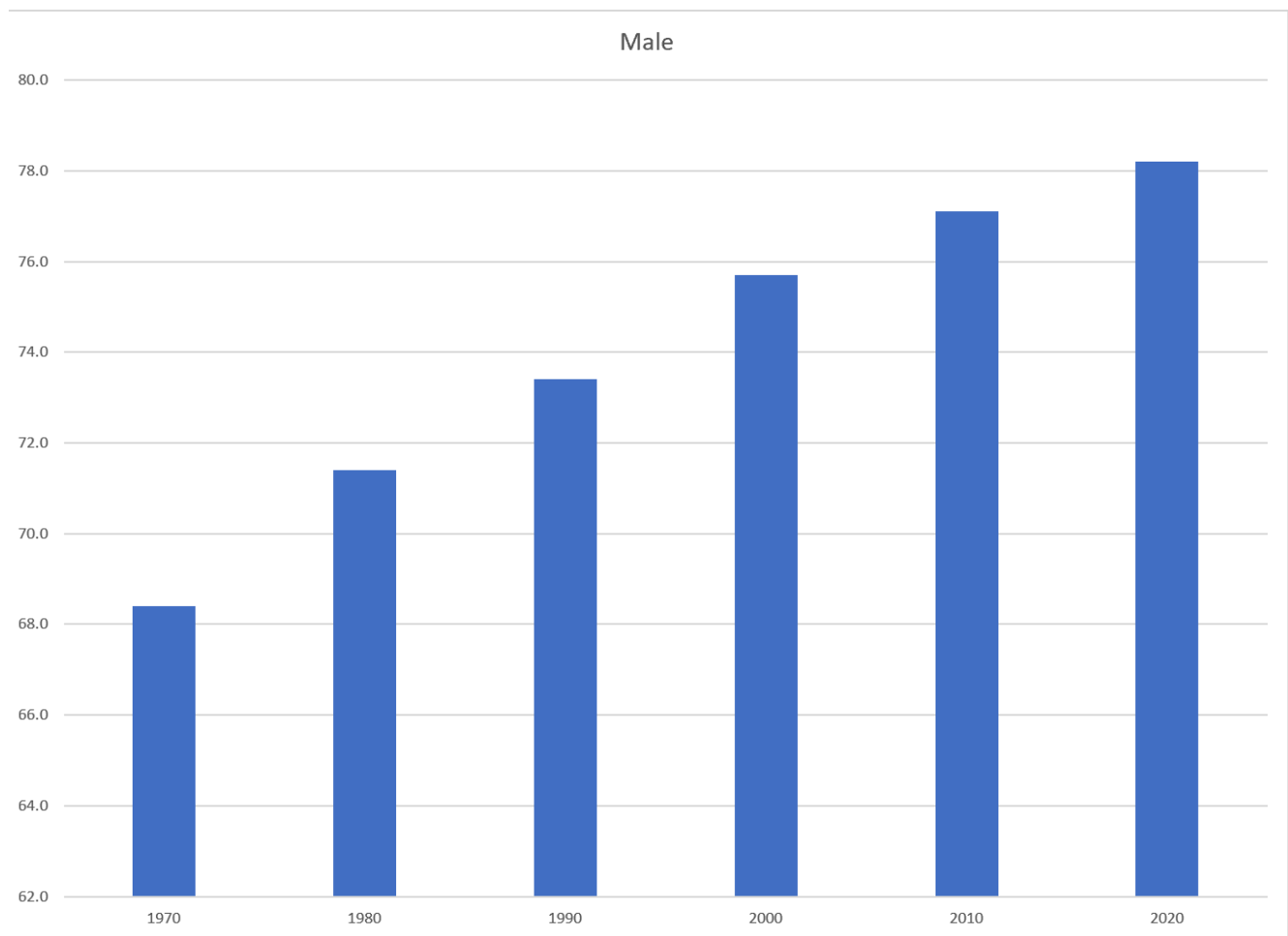


Figure 4.33 Male Bar Chart Solution

4. Repeat steps above to create a matching chart for **Life Expectancy for Oregon Women**, by selecting **A5:A11**. Press and hold the CTRL key and select **C5:C11**.



Mac Users hold down the **Command** key

5. Use the Recommended Charts and select the Clustered Column chart.

6. Move the chart to a new sheet. Name the sheet **Women**.

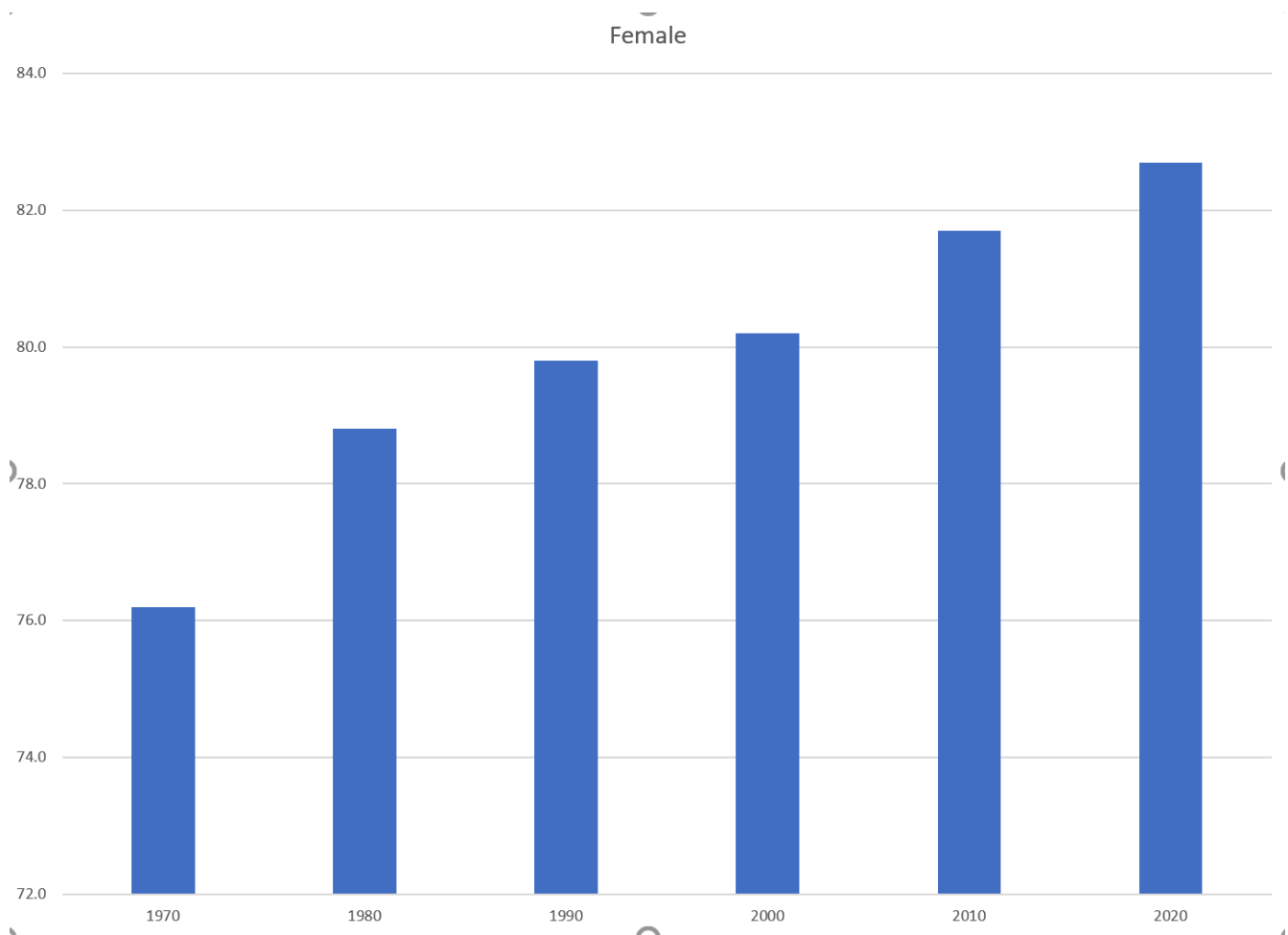


Figure 4.34 Female Bar Chart

7. Notice on the men's and women's vertical axis the min and maximum bounds do not match. To ensure data is comparable, adjust the min and max bounds of both the Mens and Womens chart to match:

**Axis Options**

Bounds

Minimum

68.0

Reset

Maximum

84.0

Auto

Units

Major

2.0

Auto

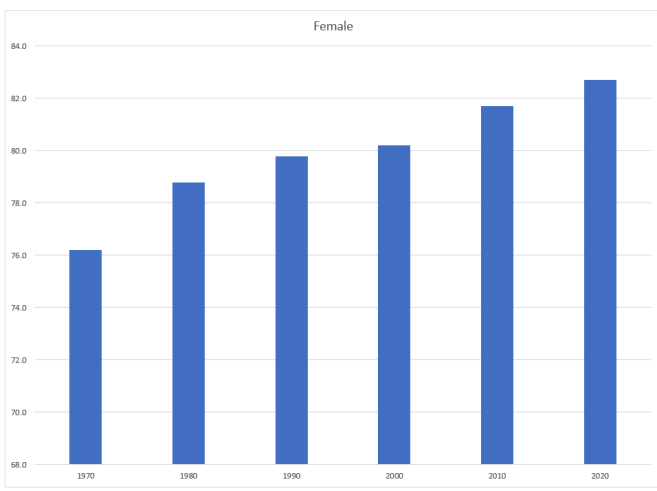
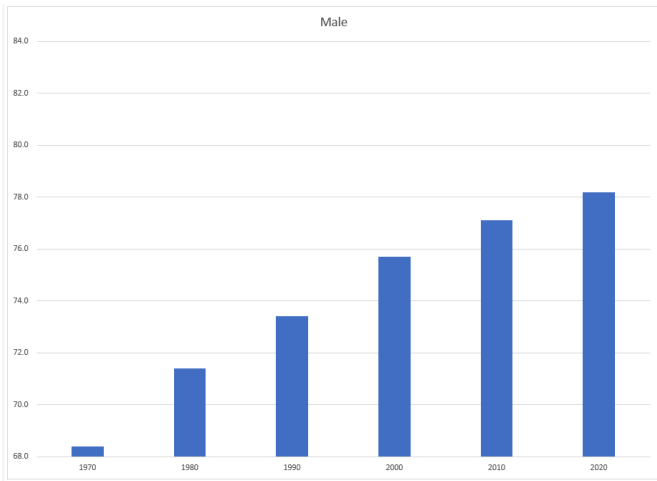
Minor

0.4

Auto

Figure 4.35 Axis Bounds





8. Return to the **Life Expectancy** tab, select **A5:D11**.
9. Use the **Recommended Charts** tool to create a simple line chart.
10. Change the Chart Title to **Oregon: Projected Life Expectancy at Birth**.
11. Leave the chart embedded in the worksheet. Move and resize it accordingly.
12. The line across the bottom of the chart represents the difference between men's and women's life expectancy. It is not very helpful as it is. Right-click on the line to open the pop-up menu. Select **Format Data**

**Series**. In the **Format Data Series** pane, under the **Series Options** tab, select the radio button in front of **Secondary Axis**.



Mac Users should hold down the **CTRL** key and click the line at the bottom.

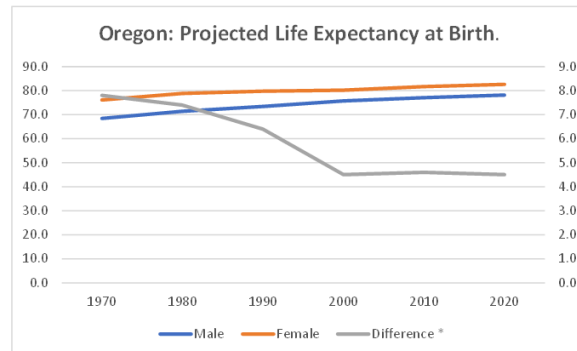
Select **Format Data Series**. In the **Format Data Series** pane, under the **Series Options** tab, select the radio button in front of **Secondary Axis**.

13. Close the **Format Data Series** pane.
14. Use the **Chart Styles** tools to change your chart to something a bit more dramatic.
15. Preview the **Life Expectancy** worksheet in Print Preview and make any necessary changes. The solutions are shown in below in Figure 4.35.
16. Check the spelling on all of the worksheets and make any necessary changes. Save the **PR4 Historical Data** workbook.
17. Submit the **PR4 Historical Data** workbook as directed by your instructor.

## OREGON: Projected Life Expectancy at Birth

[https://www.oregon.gov/das/OEA/Documents/OR\\_pop\\_trend2012.pdf](https://www.oregon.gov/das/OEA/Documents/OR_pop_trend2012.pdf)

Birth Year	Male	Female	Difference *
1970	68.4	76.2	7.8
1980	71.4	78.8	7.4
1990	73.4	79.8	6.4
2000	75.7	80.2	4.5
2010	77.1	81.7	4.6
2020	78.2	82.7	4.5



Difference: \* Female minus Male

In the past 40 years, between 1970 and 2010, life expectancy for Oregon men improved by 8.7 years and for women by 5.5 years. Oregon's life expectancy has remained slightly higher than the U.S. average. The life expectancy will continue to improve for both men and women. However, the gain for men has been outpacing the gain for women. Consequently, the difference between men's and women's life expectancies has continued to shrink.

Sources: 1970 & 1980: U.S. Department of Health and Human Services,  
National Center for Health Statistics.  
1990 to 2020: Oregon Office of Economic Analysis

Figure 4.36 Projected Life Expectancy Line Chart

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## II. 4.6 Scored Assessment

### Charting Sales Data

Download Data File: [SC4 Data](#)

An effective way to communicate findings in Excel is by graphing data. Graph the attached sales information, visualizing profit margin trends, and production patterns, and the sales pipeline; enabling decision-makers to grasp concepts of current business practices.

#### Task 1 Revenue & Profit Margin

Following the directions below create the below charts. Note to **match each chart exactly**, including the chart styles, and axis bounds.

1. Open the file named **SC4 Data** and then Save As **SC4 Sales**.
2. From the **Revenue & Profit Margin** sheet, create the below Combination Chart.
3. Move the chart to a new sheet. Name the sheet **Combo**.
4. Save your work.

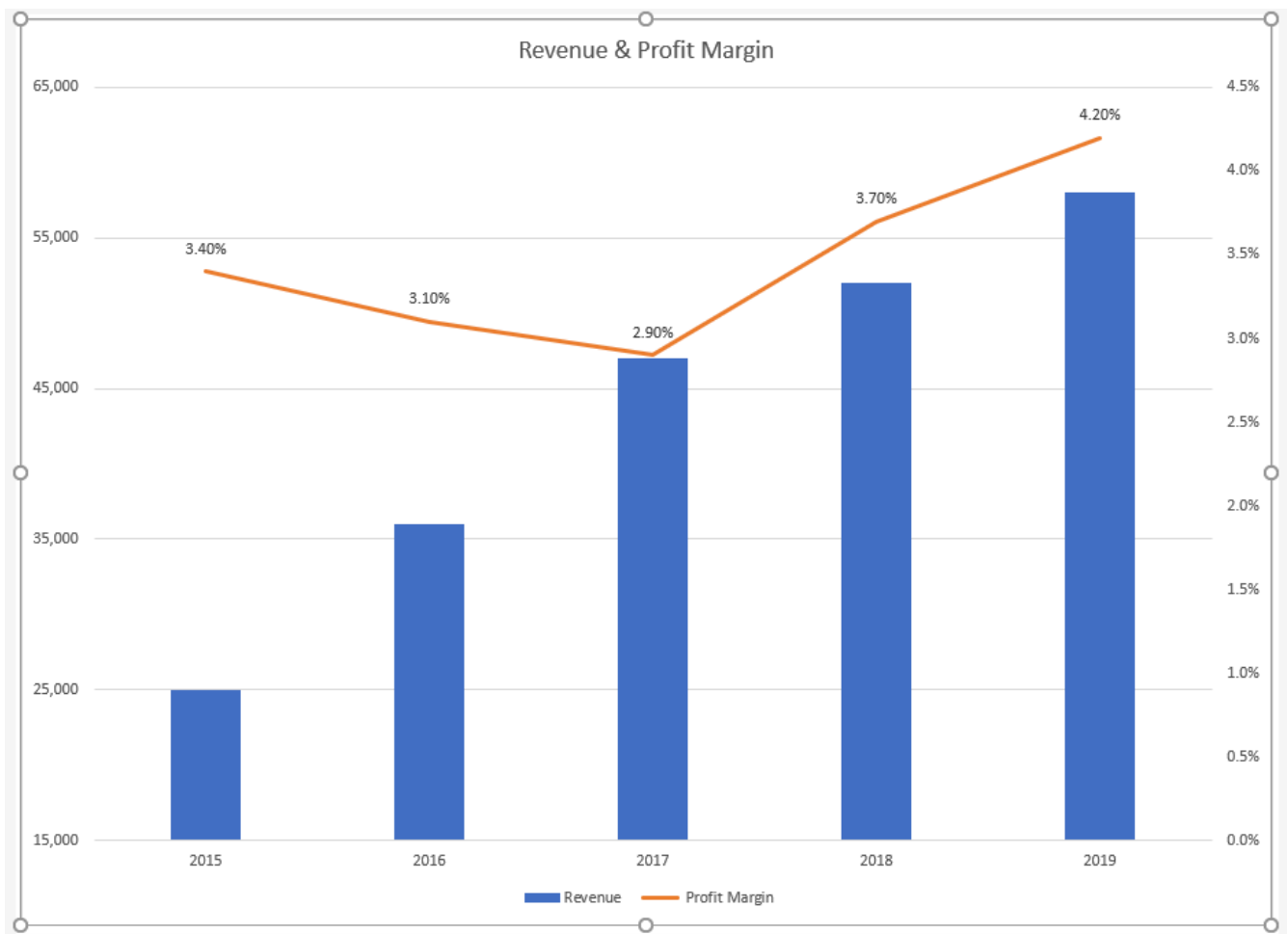


Figure 4.36 Combination Chart

## Task 2 Quarterly Production Data

Create the below Pie Chart showing how many locations will be producing products in the North, South, East and West Regions.

1. From the **Products sheet** create the below chart.
2. Move the chart to a new sheet. Name the sheet **Doughnut**.
3. Save your work.

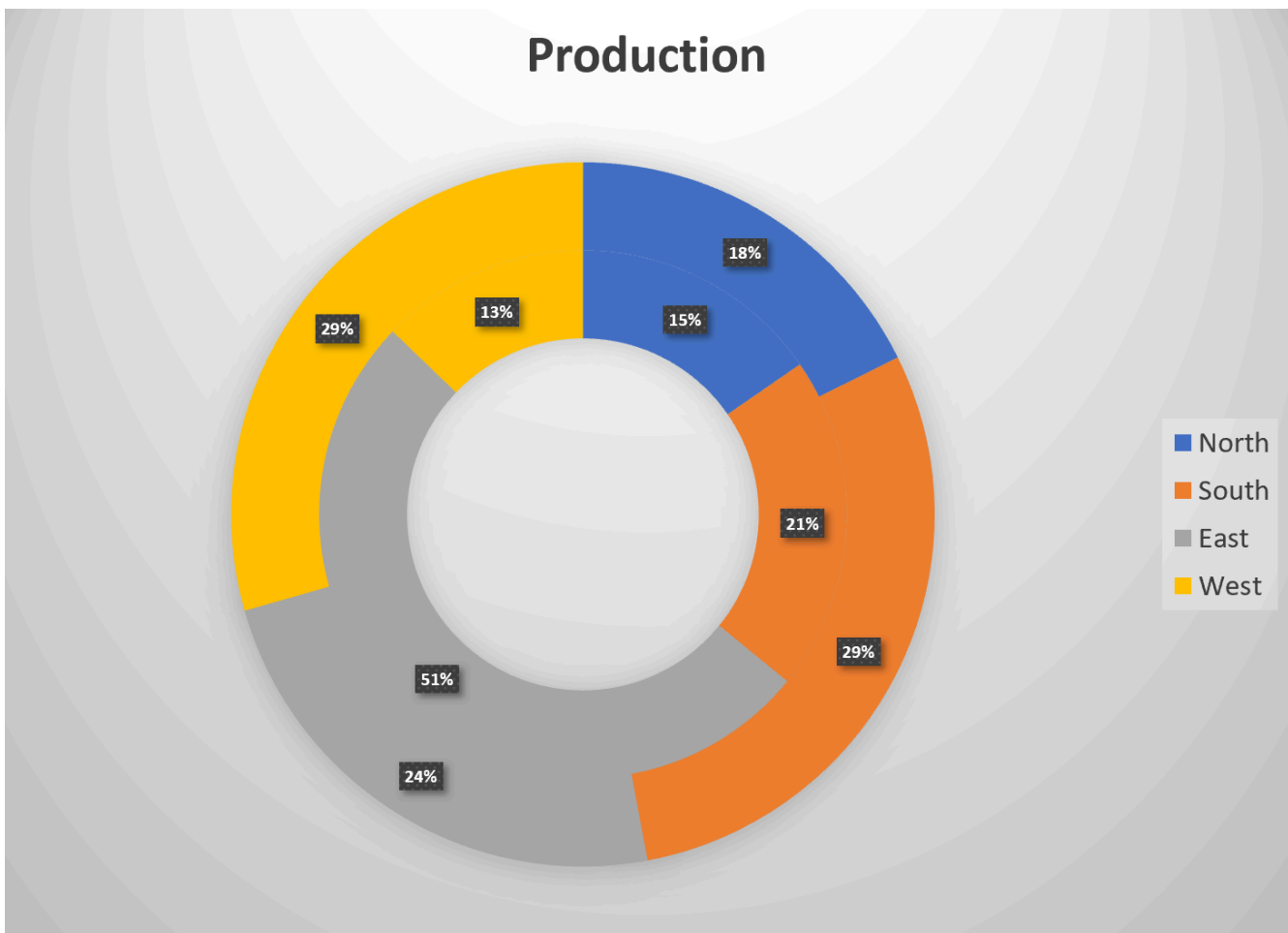


Figure 4.37 Doughnut Chart

## Task 3 Sales Pipeline

Create the below Funnel Chart to provide our sales team a visual snapshot of the company's **sales** process, outlining deals that are expected to close within the month.

1. From the **Sales** sheet, create the below Funnel Chart.
2. Note to leave the chart embedded in the sheet. Resize, and move the chart accordingly.
3. Check the spelling on all of the worksheets and make any necessary changes. Save your work and submit **SC4 Sales** as directed by your instructor.

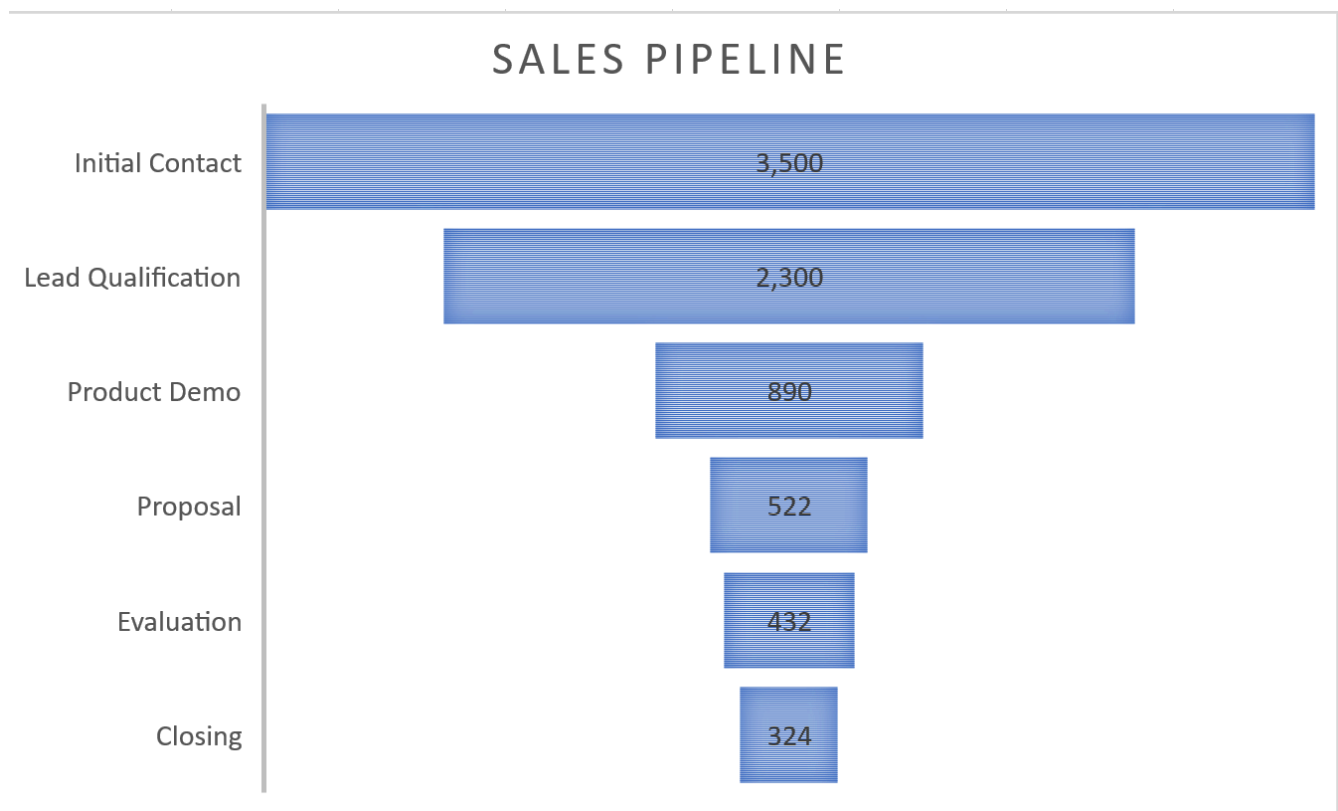


Figure 4.38 Funnel Chart

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## PART V

# CHAPTER 5 – TABLES

Excel is the leading application for storing, managing and analyzing data. In Chapter 5, you will explore how to import, organize, and analyze data effectively. To manage and analyze a group of related data, users can turn a range of cells into an Excel table.

A table, also called a database, is an organized structure of rows and columns of related data in a worksheet; for example, a list of employee information. In a table of employees, each employee would have a separate record; as shown below, each record might include several fields, such as the Employee ID Number, their Last Name, and First Name, etc. Each row of a table stores records, and each column stores one field for the record. A record also can include fields that contain references, formulas, and functions. Additionally, a row of column headings at the top of the table stores field names that identify the data being collected and stored.

Excel has a vast collection of database and tabling tools that allow users to import, clean, sort, filter, total, subtotal, analyze, visualize, and report. This chapter explores how to import, insert, edit, and examine data with Excel table and PivotTable tools. Demonstrate skills by studying the provided 2017-2018 employee database. Examine employee relations, payroll, benefits, and training options.

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## 12. 5.4 Chapter Practice

### Tables for a Tourism Company

Download Data File: [PR5 Data](#)

Travel and tour companies need to keep track of client data, as well as, travel/tour options and tour guides. Keeping up-to-date, accurate records is essential to their bottom line. To run a tour company, employees must be able to manipulate their data quickly and easily. This exercise illustrates how to use the skills presented in this chapter to generate the data needed on a daily basis by a tourism company.


1. Open the data file **PR5 Data** and save the file to your computer as **PR5 Canyon Trails**.
2. Click Sheet 1. Choose cell B3.
3. From the Home tab, choose Format as Table. Choose the Orange, Table Style Medium 3.
4. In J4, calculate Total Cost (number of Guests \*Per Person Cost). Note Excel will add the formula to the entire column. (If prompted, choose to overwrite the formula to the cells below.)
5. Format Columns I and J with Accounting format, no decimal places.
6. Center all headings in Row 3.
7. Adjust column widths within the table so that all the headings are completely visible.
8. Rename Sheet 1 **Current Tours**. Sort this sheet alphabetically (A to Z) by Last Name.

### Tours By Canyon



First Name	Last Name	Guests	Average Age	Home Country	Tour Canyon	Tour State	Days	Per Person Cost	Total Cost
Santos	Albert	2	58	Brazil	Grand Canyon National Park	Arizona	5	550	\$ 1,100
Ian	Armstrong	2	62	United States	Cedar Breaks National Monument	Utah	5	550	\$ 1,100
Laurie	Black	2	66	Canada	Fall Canyon Death Valley National Park	California	7	900	\$ 1,800
Richard	Branson	2	65	United Kingdom	Zion National Park	Utah	7	900	\$ 1,800
Vanessa	Burleigh	4	30	United Kingdom	Grand Canyon National Park	Arizona	7	900	\$ 3,600
Jim	Carrey	1	54	Canada	Canyon de Chelly National Monument	Arizona	5	550	\$ 550
Jennifer	Connelly	2	45	United States	Canyon de Chelly National Monument	Arizona	5	550	\$ 1,100
Ellen	Cronan	2	68	Canada	Bryce Canyon National Park	Utah	7	900	\$ 1,800
James	Doug	2	50	United Kingdom	Zion National Park	Utah	7	900	\$ 1,800
Marianne	Eliot	2	50	United States	Yellowstone National Park	Wyoming	5	550	\$ 1,100
Jonas	Finamore	2	45	United Kingdom	Yellowstone National Park	Wyoming	3	450	\$ 900
James	Gardipee	1	46	United States	Grand Canyon National Park	Arizona	5	550	\$ 550
Sharon	Glatz	2	63	Australia	Cedar Breaks National Monument	Utah	3	450	\$ 900
Sofia	Guthenberg	1	60	Canada	Glen Canyon National Recreation Area	Arizona	3	450	\$ 450
Yoko	Hanamoto	2	29	Japan	Black Canyon of the Gunnison National Park	Colorado	7	900	\$ 1,800
Charles	Hector	2	56	United States	Zion National Park	Utah	7	900	\$ 1,800
Scarlett	Johansson	3	31	United States	Fall Canyon Death Valley National Park	California	7	900	\$ 2,700
Sally	Kee	4	57	Canada	Glen Canyon National Recreation Area	Arizona	3	450	\$ 1,800
Frank	Kee	3	58	United States	Zion National Park	Utah	7	900	\$ 2,700
Rosella	Kim	2	40	United States	Zion National Park	Utah	7	900	\$ 1,800
Deborah	Klein	2	65	Germany	Fall Canyon Death Valley National Park	California	5	550	\$ 1,100
Nick	Kopec	2	65	United Kingdom	Black Canyon of the Gunnison National Park	Colorado	5	550	\$ 1,100
Grace	Kruger	2	56	Germany	Black Canyon of the Gunnison National Park	Colorado	7	900	\$ 1,800
Erik	Laarson	2	63	Canada	Black Canyon of the Gunnison National Park	Colorado	5	550	\$ 1,100
Samuel	Larocca	2	59	Brazil	Cedar Breaks National Monument	Utah	7	900	\$ 1,800

Figure 5.70 Current Tours

9. Make a copy of the Current Tours sheet and rename it **Tours by Canyon**. One way to make a copy of a worksheet is to right-click on the worksheet tab (  **Mac Users:** Ctrl+click) and select Move or Copy. Be sure to check the **Create a Copy** box. Place the Tours by Canyon sheet to the right of the Current Tours sheet.
10. Sort the Tours by Canyon sheet by **Tour Canyon**, **Home Country**, and then **Last Name** all in Ascending order (A to Z).

Tours By Canyon									
First Name	Last Name	Guests	Average Age	Home Country	Tour Canyon	Tour State	Days	Per Person Cost	Total Cost
Erik	Laarson	2	63	Canada	Black Canyon of the Gunnison National Park	Colorado	5	550 \$	1,100
Grace	Kruger	2	56	Germany	Black Canyon of the Gunnison National Park	Colorado	7	900 \$	1,800
Ingrid	Schultz	2	57	Germany	Black Canyon of the Gunnison National Park	Colorado	7	900 \$	1,800
Yoko	Hanamoto	2	29	Japan	Black Canyon of the Gunnison National Park	Colorado	7	900 \$	1,800
Nick	Kopec	2	65	United Kingdom	Black Canyon of the Gunnison National Park	Colorado	5	550 \$	1,100
Analise	Wendle	2	58	United States	Black Canyon of the Gunnison National Park	Colorado	7	900 \$	1,800
Brian	Lawson	2	66	Australia	Bryce Canyon National Park	Utah	5	550 \$	1,100
Ellen	Cronan	2	68	Canada	Bryce Canyon National Park	Utah	7	900 \$	1,800
Miguel	Piggott	2	70	United Kingdom	Bryce Canyon National Park	Utah	7	900 \$	1,800
Skye	Quillin	2	45	United States	Bryce Canyon National Park	Utah	7	900 \$	1,800
Gil	Thompson	1	62	United States	Bryce Canyon National Park	Utah	7	900 \$	900
Darlene	Welsh	2	63	United States	Bryce Canyon National Park	Utah	5	550 \$	1,100
Jim	Carrey	1	54	Canada	Canyon de Chelly National Monument	Arizona	5	550 \$	550
Jennifer	Connelly	2	45	United States	Canyon de Chelly National Monument	Arizona	5	550 \$	1,100
Alfred	Yankovic	2	56	United States	Canyon de Chelly National Monument	Arizona	7	900 \$	1,800
Sharon	Glatz	2	63	Australia	Cedar Breaks National Monument	Utah	3	450 \$	900
Samuel	Larocca	2	59	Brazil	Cedar Breaks National Monument	Utah	7	900 \$	1,800
John	Lawrence	2	52	Canada	Cedar Breaks National Monument	Utah	7	900 \$	1,800
Omar	Rafael	2	59	United Kingdom	Cedar Breaks National Monument	Utah	3	450 \$	900
Ian	Armstrong	2	62	United States	Cedar Breaks National Monument	Utah	5	550 \$	1,100
Laurie	Black	2	66	Canada	Fall Canyon Death Valley National Park	California	7	900 \$	1,800
Jolene	Terry	2	67	Canada	Fall Canyon Death Valley National Park	California	7	900 \$	1,800
Deborah	Klein	2	65	Germany	Fall Canyon Death Valley National Park	California	5	550 \$	1,100
Scarlett	Johansson	3	31	United States	Fall Canyon Death Valley National Park	California	7	900 \$	2,700
Sofia	Guthenberg	1	60	Canada	Glen Canyon National Recreation Area	Arizona	3	450 \$	450
Sally	Kee	4	57	Canada	Glen Canyon National Recreation Area	Arizona	3	450 \$	1,800

Figure 5.71 Tours by Canyon

11. Make another copy of the Current Tours sheet and rename it **US Guests**. Place the US Guests sheet to the right of the Tours by Canyon sheet.
12. Filter the **US Guests** sheet to display customers who live in the United States. Sort the filtered data alphabetically (A to Z) by Tour State. Add a Total Row that sums the Guests and Total Cost columns.

## Tours By Canyon



First Name	Last Name	Guests	Average Age	Home Country	Tour Canyon	Tour State	Days	Per Person Cost	Total Cost
Jennifer	Connelly	2	45	United States	Canyon de Chelly National Monument	Arizona	5	550	\$ 1,100
James	Gardipee	1	46	United States	Grand Canyon National Park	Arizona	5	550	\$ 550
Vince	Shad	3	69	United States	Grand Canyon National Park	Arizona	7	900	\$ 2,700
Rod	Vanderzee	2	58	United States	Grand Canyon National Park	Arizona	7	900	\$ 1,800
Alex	Wigham	2	70	United States	Grand Canyon National Park	Arizona	7	900	\$ 1,800
Alfred	Yankovic	2	56	United States	Canyon de Chelly National Monument	Arizona	7	900	\$ 1,800
Scarlett	Johansson	3	31	United States	Fall Canyon Death Valley National Park	California	7	900	\$ 2,700
Analise	Wendle	2	58	United States	Black Canyon of the Gunnison National Park	Colorado	7	900	\$ 1,800
Ian	Armstrong	2	62	United States	Cedar Breaks National Monument	Utah	5	550	\$ 1,100
Charles	Hector	2	56	United States	Zion National Park	Utah	7	900	\$ 1,800
Frank	Kee	3	58	United States	Zion National Park	Utah	7	900	\$ 2,700
Rosella	Kim	2	40	United States	Zion National Park	Utah	7	900	\$ 1,800
Skye	Quillin	2	45	United States	Bryce Canyon National Park	Utah	7	900	\$ 1,800
Gil	Thompson	1	62	United States	Bryce Canyon National Park	Utah	7	900	\$ 900
Darlene	Welsh	2	63	United States	Bryce Canyon National Park	Utah	5	550	\$ 1,100
Marianne	Eliot	2	50	United States	Yellowstone National Park	Wyoming	5	550	\$ 1,100
Lucas	Lee	2	42	United States	Yellowstone National Park	Wyoming	3	450	\$ 900
Sierra	Sloane	2	33	United States	Yellowstone National Park	Wyoming	7	900	\$ 1,800
Total		37							\$ 29,250

Figure 5.72 US Guests

13. Make another copy of the Current Tours sheet and rename it, **European Guests**. Place the European Guests sheet to the right of the US Guests sheet.
14. Insert a slicer in the **European Guests** sheet for Home Country. Move the top left corner of the slicer to the top left-hand corner of cell L3. Resize the slicer so all buttons display. Format the slicer to match the table.
15. Using the slicer, filter the data to display customers from Germany and the United Kingdom.
16. Sort the filtered data by the Home Country, and Last Name fields displaying both in Ascending order (A to Z).

## Tours By Canyon



First Name	Last Name	Guests	Average Age	Home Country	Tour Canyon	Tour State	Days	Per Person Cost	Total Cost
Deborah	Klein	2	65	Germany	Fall Canyon Death Valley National Park	California	5	550	\$ 1,100
Grace	Kruger	2	56	Germany	Black Canyon of the Gunnison National Park	Colorado	7	900	\$ 1,800
Pat	Rhinehart	2	73	Germany	Grand Canyon National Park	Arizona	7	900	\$ 1,800
Ingrid	Schultz	2	57	Germany	Black Canyon of the Gunnison National Park	Colorado	7	900	\$ 1,800
Richard	Branson	2	65	United Kingdom	Zion National Park	Utah	7	900	\$ 1,800
Vanessa	Burleigh	4	30	United Kingdom	Grand Canyon National Park	Arizona	7	900	\$ 3,600
James	Doug	2	50	United Kingdom	Zion National Park	Utah	7	900	\$ 1,800
Jonas	Finamore	2	45	United Kingdom	Yellowstone National Park	Wyoming	3	450	\$ 900
Nick	Kopec	2	65	United Kingdom	Black Canyon of the Gunnison National Park	Colorado	5	550	\$ 1,100
Anna	Macpherson	2	38	United Kingdom	Yellowstone National Park	Wyoming	7	900	\$ 1,800
Miguel	Piggott	2	70	United Kingdom	Bryce Canyon National Park	Utah	7	900	\$ 1,800
Omar	Rafael	2	59	United Kingdom	Cedar Breaks National Monument	Utah	3	450	\$ 900
Indira	Singh	2	55	United Kingdom	Glen Canyon National Recreation Area	Arizona	7	900	\$ 1,800

Home Country
Australia
Brazil
Canada
Germany
Japan
United Kingdom
United States

Figure 5.73 European Guests

17. Click the Advanced Filter sheet. Using the Advanced Filter option, filter the Current Tours table based on the criteria given. Determine how many guests from Canada are taking tours in Arizona and Utah between the costs indicated in the criteria table. Place the results in A10.

18. Turn the results into a table. Format the table to match the criteria area. Turn on the total row and show the Sum of the Total Cost column.

Tours By Canyon											
Tour State	Home Country	Total Cost	Total Cost								
Arizona	Canada	>=1350	<=2750								
Utah	Canada	>=500	<=6300								
First Name	Last Name	Guest	Average Age	Home Country	Tour Canyon	Tour State	Days	Per Person Cost	Total Cost		
Ellen	Cronan	2	68	Canada	Bryce Canyon N	Utah	7	900	\$ 1,800		
Sally	Kee	4	57	Canada	Glen Canyon Na	Arizona	3	450	\$ 1,800		
John	Lawrence	2	52	Canada	Cedar Breaks N	Utah	7	900	\$ 1,800		
Total									\$ 5,400		

Figure 5.74 Advanced Filter

19. Select the Current Tours sheet. Click in the table area and insert a PivotTable as a new sheet. Name the sheet **ToursPT**. Run a report to show the Total Cost per Home Country, for each available Tour States. Format the numbers in currency format, zero decimal places. Choose a PivotStyle format to match the current orange theme.

Sum of Total Cost Column Labels						
Row Labels	Arizona	California	Colorado	Utah	Wyoming	Grand Total
Australia	\$1,800			\$2,000	\$2,200	\$6,000
Brazil	\$2,900			\$1,800		\$4,700
Canada	\$3,900	\$3,600	\$1,100	\$3,600	\$2,200	\$14,400
Germany	\$1,800	\$1,100	\$3,600			\$6,500
Japan			\$1,800	\$1,800		\$3,600
United Kingdom	\$5,400		\$1,100	\$6,300	\$2,700	\$15,500
United States	\$9,750	\$2,700	\$1,800	\$11,200	\$3,800	\$29,250
<b>Grand Total</b>	<b>\$25,550</b>	<b>\$7,400</b>	<b>\$9,400</b>	<b>\$26,700</b>	<b>\$10,900</b>	<b>\$79,950</b>

Figure 5.75 ToursPT

20. Make one more copy of the Current Tours sheet and rename it **Tours by State**. Place the Tours by State sheet to the right of the European Guests sheet. Go to the Table Tools and turn off the Banded Rows.

21. Subtotal the data by State, summing the Total Cost column. (**Note:** Remember to follow the four rules of subtotaling!)

22. After you subtotal, turn on filters and filter out 3-day tours in the table.

	A	B	C	D	E	F	G	H	I	J
	<b>Tours By Canyon</b>									
1										
2										
3	<b>First Name</b>	<b>Last Name</b>	<b>Guests</b>	<b>Average Age</b>	<b>Home Country</b>	<b>Tour Canyon</b>	<b>Tour State</b>	<b>Days</b>	<b>Per Person Cost</b>	<b>Total Cost</b>
4	Santos	Albert	2	58	Brazil	Grand Canyon National Park	Arizona	5	550	\$ 1,100
5	Vanessa	Burleigh	4	30	United Kingdom	Grand Canyon National Park	Arizona	7	900	\$ 3,600
6	Jim	Carrey	1	54	Canada	Canyon de Chelly National Monument	Arizona	5	550	\$ 550
7	Jennifer	Connelly	2	45	United States	Canyon de Chelly National Monument	Arizona	5	550	\$ 1,100
8	James	Gardipee	1	46	United States	Grand Canyon National Park	Arizona	5	550	\$ 550
11	Leonora	Maag	2	45	Brazil	Grand Canyon National Park	Arizona	7	900	\$ 1,800
12	Raymond	Mah	2	55	Canada	Grand Canyon National Park	Arizona	5	550	\$ 1,100
14	Pat	Rhinehart	2	73	Germany	Grand Canyon National Park	Arizona	7	900	\$ 1,800
15	Vince	Shad	3	69	United States	Grand Canyon National Park	Arizona	7	900	\$ 2,700
16	Indira	Singh	2	55	United Kingdom	Glen Canyon National Recreation Area	Arizona	7	900	\$ 1,800
17	Rod	Vanderzee	2	58	United States	Grand Canyon National Park	Arizona	7	900	\$ 1,800
18	Alex	Wigham	2	70	United States	Grand Canyon National Park	Arizona	7	900	\$ 1,800
19	Alfred	Yankovic	2	56	United States	Canyon de Chelly National Monument	Arizona	7	900	\$ 1,800
20						<b>Arizona Total</b>				\$ 21,500
21	Laurie	Black	2	66	Canada	Fall Canyon Death Valley National Park	California	7	900	\$ 1,800
22	Scarlett	Johansson	3	31	United States	Fall Canyon Death Valley National Park	California	7	900	\$ 2,700
23	Deborah	Klein	2	65	Germany	Fall Canyon Death Valley National Park	California	5	550	\$ 1,100
24	Jolene	Terry	2	67	Canada	Fall Canyon Death Valley National Park	California	7	900	\$ 1,800
25						<b>California Total</b>				\$ 7,400
26	Yoko	Hanamoto	2	29	Japan	Black Canyon of the Gunnison National Park	Colorado	7	900	\$ 1,800
27	Nick	Kopec	2	65	United Kingdom	Black Canyon of the Gunnison National Park	Colorado	5	550	\$ 1,100
28	Grace	Kruger	2	56	Germany	Black Canyon of the Gunnison National Park	Colorado	7	900	\$ 1,800
29	Erik	Laarson	2	63	Canada	Black Canyon of the Gunnison National Park	Colorado	5	550	\$ 1,100
30	Ingrid	Schultz	2	57	Germany	Black Canyon of the Gunnison National Park	Colorado	7	900	\$ 1,800
31	Analise	Wendle	2	58	United States	Black Canyon of the Gunnison National Park	Colorado	7	900	\$ 1,800
32						<b>Colorado Total</b>				\$ 9,400

Figure 5.76 Subtotal

23. On each worksheet, make the following print setup changes:
  - a) Add a footer with the **current date**, **worksheet name**, and your name.
  - b) Change to Landscape Orientation
  - c) Set the scaling to Fit All Columns on One Page
  - d) For any worksheets that print on more than one page, add **Print Titles** to repeat the first three rows at the top of each page.
24. Check the spelling on all of the worksheets and make any necessary changes. Save the **PR5 Canyon Trails** workbook. Submit the **PR5 Canyon Trails** workbook as directed by your instructor.

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## 13. 5.5 Scored Assessment

### Tables for a Retail Company

Download Data File: [SC5 Data](#)

Retail companies with today's online, as well as, in-store sales have a lot of data to keep track of! Keeping track of sales, costs, and profits on a daily basis is essential to making the most of a business. This exercise illustrates how to use the skills presented in this chapter to generate the data needed on a daily basis by a retail company.

1. Open the data file **SC5 Data** and save the file to your computer as **SC5 Dynamite Customer Sales**.
2. Click the **Sales** Sheet. Format the data set as a table. Choose a style from the styles gallery.
3. Create the following calculated columns.
  - a) In I4, and J4, use a VLOOKUP function that will look up the **Product Price** and **Product Cost** based on the **Product Sold** column which lists an ID number. [Hint: The Product Table sheet lists the Price and Cost] If any error messages appear, check the Range Lookup.
  - b) In K4, use a formula to calculate Profit. **Hint:** Profit =(Product Price-Product Cost)\*Units Sold
4. Format columns I, J, and K as currency with two decimal places.
5. Make a copy of the **Sales** sheet and rename it **Online Sales by Date**. Place this sheet to the right of the Sales sheet. Answer the following question by filtering the data accordingly. **What was the total Profit for Online Sales?** Sort the results by Date Sold (A/Z).
6. Make a copy of the **Sales** sheet and rename it **June Sales by Country**. Place this new sheet to the right of the Online Sales by Date sheet. Answer the following question by filtering the data accordingly. **In June, for all products sold, what was the total profit earned?** Sort the results by Country, then Name both in (A/Z).
7. Make another copy of the **Sales** sheet and rename it **Sales by Product**. Place this new sheet to the right of the June Sales by Country sheet. Using a slicer, filter the data accordingly to display the **average** Product Price, Product Cost, and Profit for DETA100 and DETA200 items. Sort the filtered sheet by Product Sold. [Hint: In the total row make sure to type the word **Average** in column A.]
8. Make one final copy of the **Sales** sheet and rename it **Subtotals by Sales Type**. Place this new sheet to the right of the Sales by Product sheet. Subtotal the sheet by Sales Type, summing the Profit column.
9. Add a 2nd subtotal to the **Subtotals by Type** sheet that subtotals by Sales Type and averages the Profit column.
10. From the **Sales** sheet, create the below PivotTable totaling per product type the Product Cost for Online and Retail sales. Insert the PivotTable as a new sheet. Name the sheet **ProductPT**.

Sum of Product Cost	Column Labels ▼		
Row Labels ▼	Online	Retail	Grand Total
DETA100	\$ 159.00		\$ 159.00
DETA200	\$ 127.00	\$ 63.50	\$ 190.50
DETA800	\$ 608.00		\$ 608.00
PURA100	\$ 86.00	\$ 21.50	\$ 107.50
PURA200	\$ 168.00		\$ 168.00
PURA250	\$ 64.60	\$ 32.30	\$ 96.90
PURA500	\$ 67.00		\$ 67.00
SUPA101	\$ 61.20		\$ 61.20
SUPA102	\$ 25.00		\$ 25.00
SUPA103	\$ 54.00		\$ 54.00
SUPA104	\$ 60.00	\$ 15.00	\$ 75.00
SUPA105	\$ 90.00	\$ 18.00	\$ 108.00
<b>Grand Total</b>	<b>\$ 1,569.80</b>	<b>\$150.30</b>	<b>\$ 1,720.10</b>

Figure 5.77 ProductPT

11. For each worksheet, add a footer with the **worksheet name** in the center and **your name** in the right panel.
12. Preview each worksheet in Print Preview and make any necessary changes for professional printing. (*Hint: Orientation, page scaling, and print titles might need to be used.*)
13. Check the spelling on all of the worksheets and make any necessary changes. Save the **SC5 Dynamite Customer Sales** workbook, and submit the file as directed by your instructor.

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## PART VI

# CHAPTER 6 – MULTIPLE SHEET FILES

Excel workbooks often contain a large amount of data, and worksheets can quickly become overwhelming. When one worksheet becomes cumbersome, data can be broken out into smaller subsets and placed in separate worksheets within the same Excel file. Separating out spreadsheet data into smaller pieces can lead to better data organization within a file and increase its ease of use. When a retail company needs to track overall sales, as well as, individual store sales, it makes sense to place each store's sales data in a separate sheet within a file. Adding a summary sheet that sums across all the sheets will allow for total company sales data in the same file. This chapter will show how to set up a workbook to make multi-sheet formulas quick and easy.

Other examples of when multiple sheets make the most sense are when you are comparing regional data for a salesforce and wish to evaluate individual salesperson performance along with overall sales, and data over a period of time where sheets can be broken out by year or by month. When comparing data across several sheets, it is essential that all the sheets are laid out in the same way. To facilitate this, a template can be used. A template is the basic pattern for each new sheet that can be used repeatedly to make sure each new sheet has the same setup, formatting, formulas, etc. as the existing sheets in a file. In this chapter, we will use both pre-made, Microsoft Excel templates, as well as, ones we will create from scratch to meet the specific needs of our work.

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# 14. 6.1 Multiple Sheet Basics

## Learning Objectives

- 1. Navigating through a multiple sheet file.
- 2. Adding, deleting, copying, and moving sheets.
- 3. Grouping and ungrouping sheets.

Throughout our textbook, we have worked with Excel files that have included multiple sheets. Depending on the version of Excel you are using, a new Excel file may start with one or several sheets. In this chapter, we will be working with a personal budget file that contains income and expenses for an entire year. Our file contains a sheet for each month of the year, as well as, a Summary sheet that will add all twelve monthly sheets of data together. To begin with, we'll get comfortable with moving through the sheets, organizing them, and making sure that all twelve monthly sheets are consistent.

**Figure 6.1** shows the January sheet in the Personal Budget file along with all the sheet tabs along the bottom of the window.

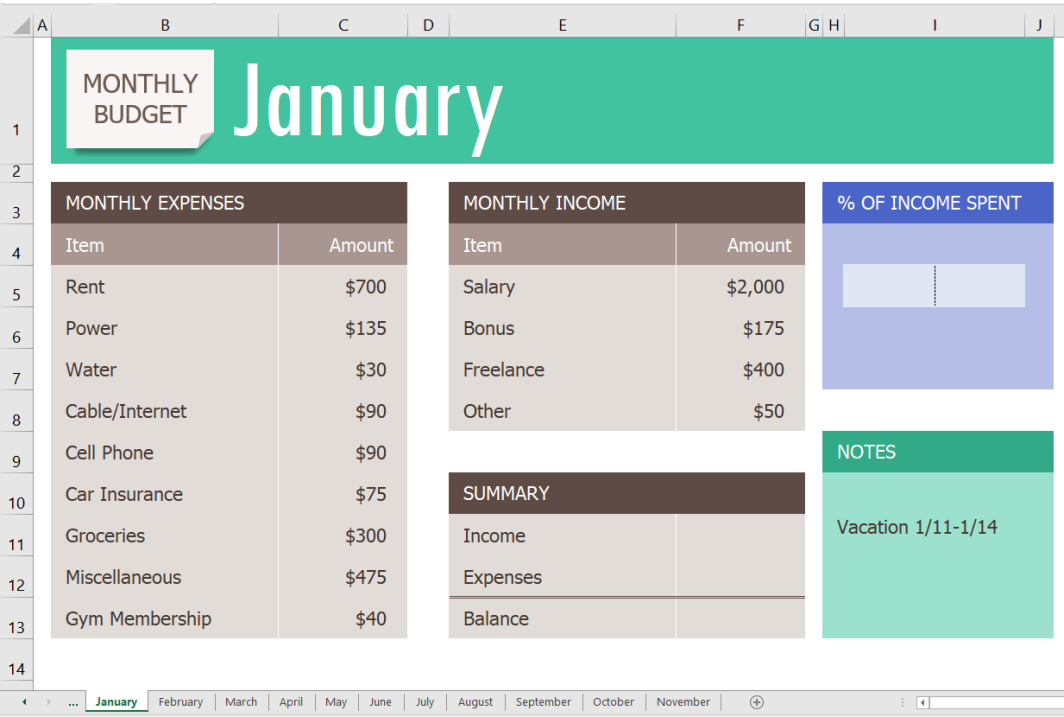


Figure 6.1 Personal Budget File


## Navigating Through a Multiple Sheet File

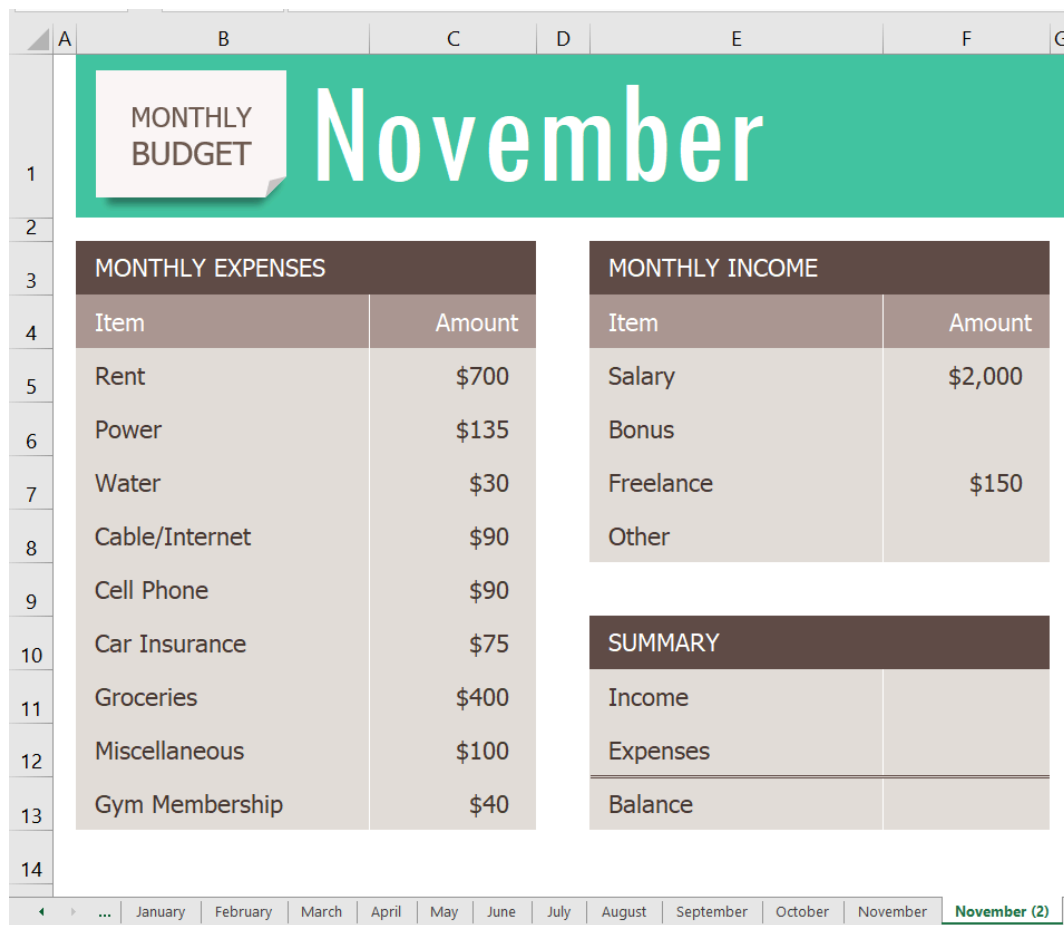
Download Data file: [CH6 Data](#)

1. Open the data file **CH6 Data** and save the file to your computer as **CH6 Personal Budget**. Notice that the file has an **Expenses Summary** sheet at the far left followed by monthly sheets.
2. Click on the different sheets at the bottom of the screen to move through the sheets. Notice that the **Expenses Summary** sheet is formatted differently from the monthly sheets. Notice also that all the monthly sheets are identical in layout and format.
3. Take a second look at the months at the end of the year. Not all the data has been entered for September through November... and there is no sheet for December. We will enter the remaining data and add an additional sheet for December.
4. Add the following data in the **September, October, and November** sheets:

	September	October	November
Power	\$135	\$135	\$135
Water	\$30	\$30	\$30
Groceries	\$300	\$325	\$400
Miscellaneous	\$100	\$50	\$100
Bonus			
Freelance	\$500		\$150
Other		\$100	

## Copying a Sheet

1. To make a **December** sheet, we are going to copy the **November** sheet.
2. Point your mouse at the **November** sheet tab at the bottom of the screen.
3. Hold down your left mouse button and then press and hold down the CTRL key.
  -  **Mac Users:** hold down your left button while pointing at the **November** sheet tab and then press and hold down the **Option (alt)** key
4. At this point, you will see a black down-pointing arrow to the left of the **November** sheet tab and your mouse cursor will become a small piece of paper with a plus sign on it.
5. Drag your mouse to the right (still holding down the left-mouse button and the CTRL key) until the black down-pointing arrow is to the right of the **November** sheet tab.
6. Let go of the mouse button and then the CTRL key. You should now have a **November (2)** sheet to the right of the **November** sheet as shown in **Figure 6.2**.



Next, we'll update the **November (2)** sheet to turn it into our **December** sheet.

1. Right-click on the November (2) sheet name at the bottom of the screen and choose Rename.



2. Type “December” and press Enter.

**Note for all users:** you can also double-click a sheet tab name to rename it.

3. Click on the December sheet.


4. Click on B1 and change “November” to “December”. Be careful not to click on the “Monthly Budget” image.

5. Make the following data changes:

- Miscellaneous: **\$300**
- Bonus: **\$250** (it's the holidays!)
- Freelance: delete amount

6. Save your work.

7. Point your mouse at the **December** sheet tab at the bottom of the screen.


8. Hold down your left mouse button and then press and hold down the CTRL key (  **Mac Users** hold down **Option** key)

9. Drag your mouse to the right (still holding down the left-mouse button and the CTRL key) until the black down-pointing arrow is to the right of the **December** sheet.

10. Let go of the mouse button and then the CTRL key. You should now have a **December (2)** sheet to the right of the **December** sheet.
11. Rename the **December(2)** sheet **Practice**.

## *Skill Refresher*

### **Copying a Sheet**


1. Point your mouse at the **sheet you want to copy** at the bottom of the screen.
2. Hold down your left mouse button and then press and hold down the CTRL key (  **Mac Users** hold down the **Option** key)
3. Drag your mouse to the right (still holding down the left-mouse button and the CTRL key) until the black down-pointing arrow is to the right of **your existing sheet**.
4. Let go of the mouse button and then the CTRL key. You should now have a **Sheetname (2)** to the right of the **original sheet**.
5. Rename the **Sheetname (2)** sheet as desired.

## Moving and Deleting Sheets

Sometimes your sheets do not end up in the right order, and you need to move them in order to fix this. Let's try moving our "Practice" sheet to see how this is done.

1. Point to the **Practice** sheet and hold down your left mouse button.
2. Notice this time that there is still a black arrow to the left of the **Practice** sheet, but the piece of paper is blank. It does not have a plus sign (+) because we are moving, instead of copying, the sheet.
3. Left-drag the mouse to the left until the black arrow marker is between the **October and November** sheets.
4. Release the mouse button.
5. Try moving the **Practice** sheet back to the right of the **December** sheet.

Since our **Practice** sheet is not a sheet we will need in our Budget file, we'll go ahead and delete it now.

1. Right-click on the **Practice** sheet tab at the bottom of the screen.  
 **Mac Users** hold down the **Ctrl** key and click the **Practice** sheet tab
2. Click Delete. **Figure 6.3** shows the warning message box that will appear on your screen. Your message box might look slightly different depending on the version of Excel you are using. It is important to note that you cannot Undo once you delete a sheet!

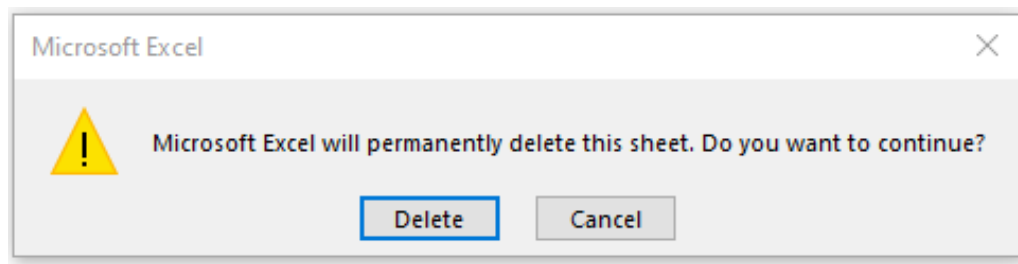


Figure 6.3 Warning Message Box

3. Click Delete.

## Grouping and Ungrouping Sheets

Take a look at the monthly sheets again. Notice that there is a place in each of these sheets in the range F11:F13 to calculate three pieces of Summary data: Income, Expenses, and Balance; but there aren't any formulas in these cells. There is also a place for the % of Income Spent (in cell I5), but we will need to add a formula in I6:I7 to calculate this. If we entered these formulas individually in each of the 12 month sheets, it would take a long time! Because this task would be very repetitive, it would also be fairly likely that we would make some mistakes along the way entering the same formulas over and over again. By grouping all the month sheets together, we can enter each of the formulas once and have them appear in all the sheets.

1. Click on the **January** sheet to make it active.
2. Hold the SHIFT key down and click on the **December** sheet.

Now all 12 sheets should be selected. You can tell this in two ways: the sheet tabs that have been selected are now bold at the bottom of your screen. Also, notice in the Title bar at the top of the screen the word [Group] or – Group (depending on your version of Excel) added to the end of the title. You can see both of these in **Figure 6.4**.

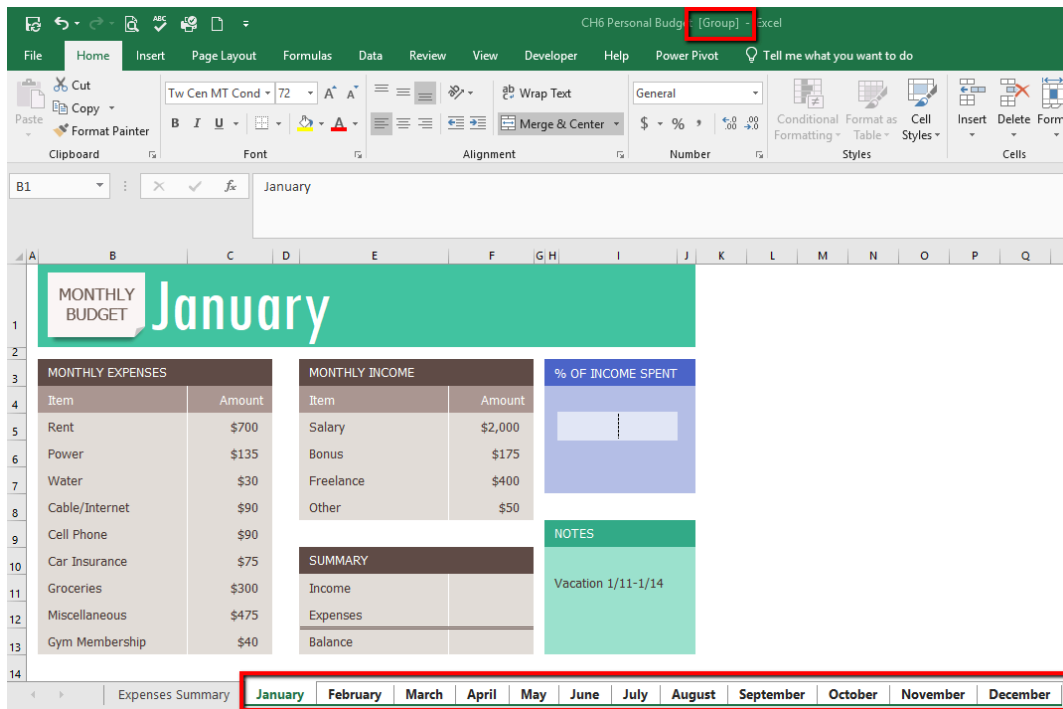


Figure 6.4 Grouped Sheets

IT IS IMPORTANT TO REMEMBER THAT ANY CHANGES WE MAKE TO THE JANUARY SHEET WILL BE MADE TO ALL THE SHEETS!! This is a very good thing when we want to make changes to all the sheets at once, but we need to be sure to ungroup them when we're done making these changes. Let's go ahead and add the formulas to all twelve of the sheets at once:

1. Click in F11 in the **January** grouped sheet.
2. Enter the formula **=SUM(F5:F8)**.
3. In F12, enter the formula **=SUM(C5:C13)**.
4. In F13, subtract Expenses from Income. In the **January** sheet, your balance should be \$690. HINT: if your answer is negative, you subtracted Income from Expenses.
5. Click on I6. (I6 and I7 are formatted and merged together – this is fine.)
6. Enter a formula that divides Expenses (F12) by Income (F11). Your answer will show as a percentage since this cell has already been formatted to do this. HINT: If you percentage is greater than 100%, you have your numbers reversed.

Notice that a data bar was set up in I5 to visually show the income spent. Do you remember how to do this from earlier in our textbook? Your January sheet should now look like **Figure 6.5**.



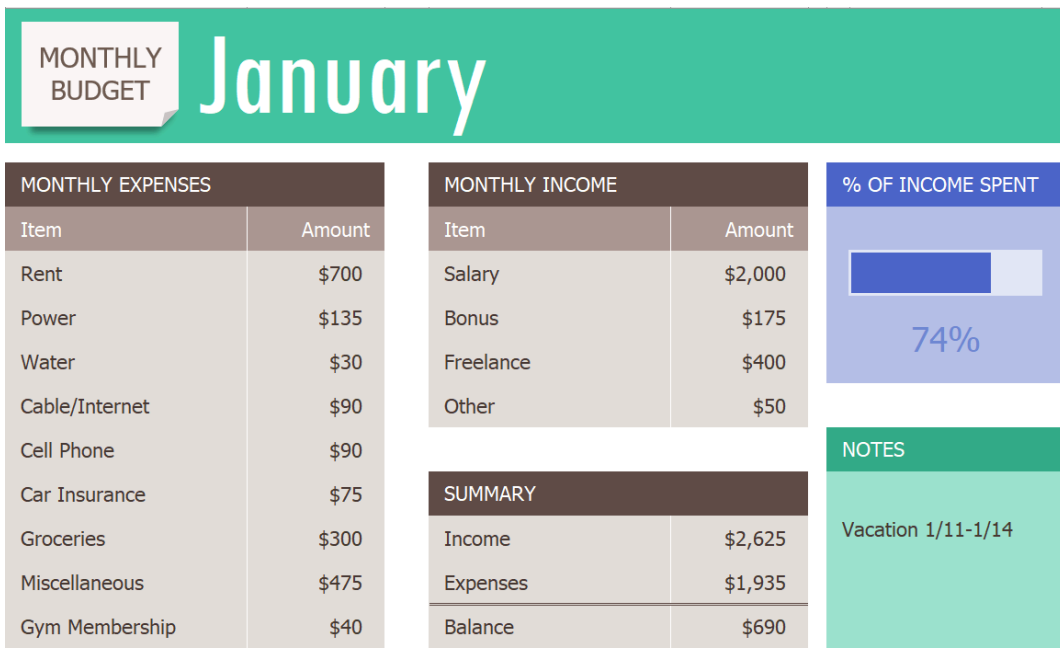



Figure 6.5 January Sheet with Formulas

7. Now that we are done making changes to all the monthly sheets at once, we need to ungroup them. Right-click on one of the grouped sheets and choose **Ungroup Sheets**.

 **Mac Users** hold down **Ctrl** key click on one of the grouped sheets and choose **Ungroup Sheets**.

Notice the sheets tabs are no longer bold and the word [Group] is no longer in the title bar.

8. Click on several of the month sheets to see that all the formulas have been added.

9. Click on the **December** sheet. Your sheet should now look like Figure 6.6.

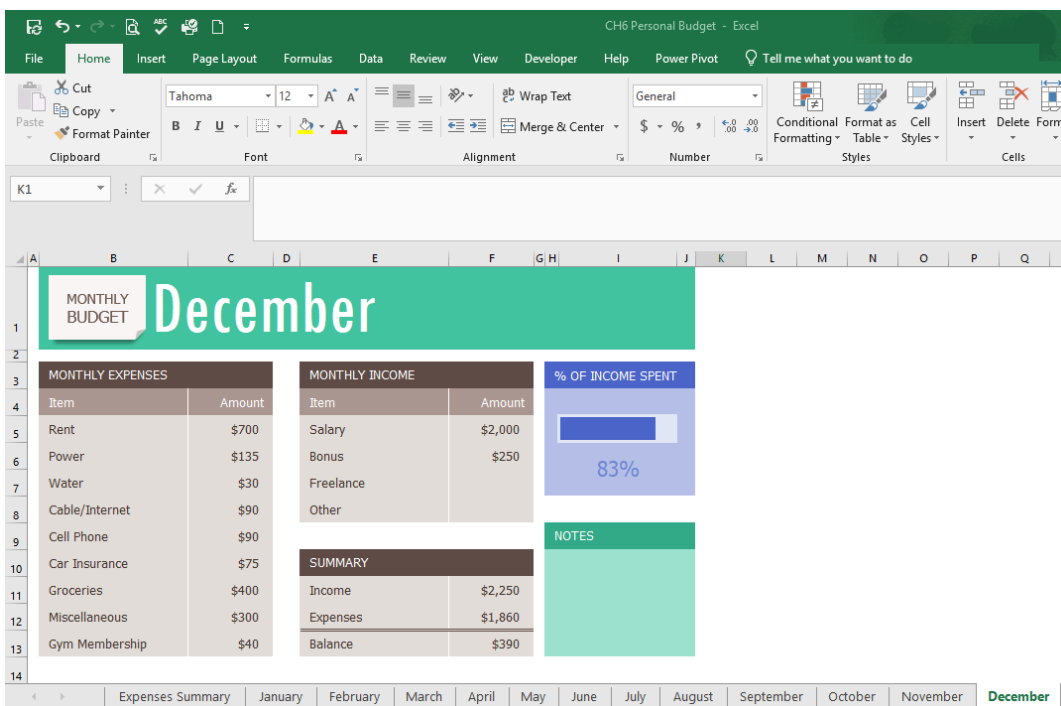



Figure 6.6 December Sheet with Formulas

1. Take a look at the Notes in the September sheet. It says that the rent was raised in September, so we need to cancel our Gym Membership and show \$0 for the Gym amount in October, November, and December.
2. Group the **October, November, and December** sheets. If you do this successfully, these three sheet names should be bold and the word [Group] or – Group will appear in the Title bar.
3. Click on C13 and change the amount to **\$0**. Press Enter.
4. Ungroup the sheets. The balances should be: October \$605, November \$530, and December \$430.


## *Skill Refresher*

### **To Group Sheets:**

Click on the leftmost sheet you want to group; then hold the SHIFT key down and click on the rightmost sheet you want to group.  Same for Excel for Mac.

### **To Ungroup Sheets:**

Right-click on one of the grouped sheets and choose Ungroup Sheets.

 **Mac Users** hold down **Ctrl** key click on one of the grouped sheets and choose **Ungroup Sheets**.

## *Key Takeaways*

- You can easily move, copy, delete, and rename sheets in your Excel file.
- Grouping sheets allows you to change a group of identically formatted sheets at the same time.

## Attribution

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## 15. 6.2 Formulas with 3-D References

### *Learning Objectives*

- Entering formulas that reference another sheet.
- Using the SUM function to add up multiple sheets.

The Summary sheet in many multiple sheet workbooks is utilized to present totaled information from the other sheets in the file. This is done to give a quick synopsis of all the other sheets in one convenient location. For this reason, the Summary sheet is usually the first sheet in multiple sheet files. Summary sheets “pull” data from the other sheets using three-dimensional (3-D) cell references. In order to distinguish between A3 in the Summary sheet, A3 in the January sheet, A3 in the February sheet, etc.; a 3-D cell reference includes the sheet name along with the cell reference. The syntax to reference a cell in a different sheet is =SheetName!CellRange. So, the cell reference for A15 in the March sheet would be =March!A15.

Let’s start working on our summary sheet by trying out some 3-D formulas:

1. Click on the **Expenses Summary** sheet **tab** at the bottom of the screen.
2. Click on C5 and enter the formula =**January!C5**. Press Enter.  
This will return the amount \$700 from cell C5 in the **January** sheet.
3. Delete the formula in C5 in the **Expenses Summary** sheet.
4. This time, click on C5 and type =. Then click on the **January** sheet, and then click on C5.
5. Press Enter. This will put the same formula, =January!C5, in cell C5 in the **Expenses Summary** sheet and will return the value \$700. This is the **point and click method**. This method reduces the potential for making errors, such as misspellings or typing the wrong amount.
6. In cell C6 in the **Expenses Summary** sheet, try entering a formula for the Power amount in the **April** sheet. You should get \$135 as the Power amount, and the formula should be =April!C6.
7. Delete the formulas in cells C5 and C6 in the **Expenses Summary** sheet.

For the Annual Amounts in C5:C13 in the **Expenses Summary** sheet, we don’t need the amount from a single month’s sheets; instead, we need the sum of all the entries in all the monthly sheets. So, we need to sum three-dimensionally through all twelve month sheets.

Let’s try adding up all the monthly amounts in our Expenses Summary sheet:

1. Click in C5 in the **Expenses Summary** sheet.
2. Type =**SUM**(. (Make sure to type the open parentheses!)
3. Click on the **January** sheet.
4. Hold the SHIFT key down and click on the **December** sheet.
5. Click on C5 again and press ENTER. Cell C5 should display the sum amount of \$8,400.
6. Click on C5 in the **Expenses Summary** sheet. In the formula bar, you should see the following formula:  
=SUM(January:December!C5). This formula tells Excel to SUM cell C5 in the sheets January through December.
7. Let’s try another 3-D SUM together. Click on C6.
8. Type =**SUM**(. (Make sure to type the open parentheses!)

9. Click on the **January** sheet.
10. Hold the SHIFT key down and click on the **December** sheet.
11. Click on C6 again and press ENTER. Cell C6 should now display the sum amount of \$1,610.
12. Click on C6 in the **Expenses Summary** sheet. In the formula bar, you should see the following formula:  
=SUM(January:December!C6).

If you feel comfortable with these 3-D formulas, you can copy C6 down through C13 to fill in the rest of the formulas. If you're not quite comfortable yet, keep practicing the above steps to add 3-D formulas to cells C7:C13. When you're done, your Expenses Summary sheet should match **Figure 6.7**.

ANNUAL EXPENSES (TO DATE)	
Item	Amount
Rent	\$8,400
Power	\$1,610
Water	\$360
Cable / Internet	\$1,080
Cell Phone	\$1,080
Car Insurance	\$900
Groceries	\$4,175
Miscellaneous	\$2,535
Gym Membership	\$360

*Figure 6.7 Complete Expenses Summary Formulas*

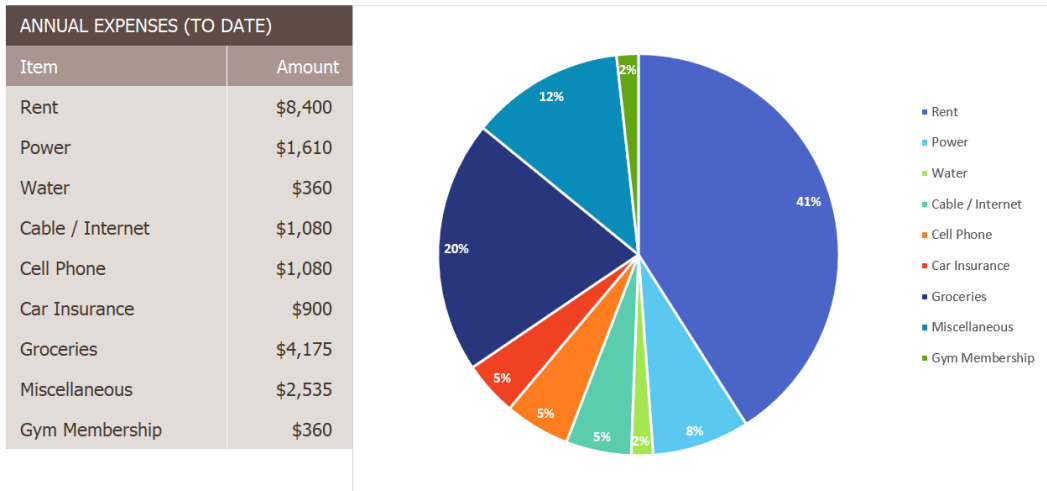
While our 3-D formulas are complete in the Expenses Summary sheet, our summary feels like it is lacking something. Let's add a visual representation of our summary numbers to the sheet.

1. Highlight cells B5:C13 in the **Expenses Summary sheet**.
2. Click on Pie Chart in the Insert tab in the ribbon and select the 2-D pie.
3. Move and resize the pie chart so that it fills cells D3:J15.
4. Delete the chart title.
5. Move the legend to the right side of the chart. Resize the legend as needed.
6. Add percentage data labels to the pie slices. Format the data labels to be bold with white font color. Your complete Expenses Summary sheet should look like **Figure 6.8** below.
7. Check the spelling on all of the worksheets and make any necessary changes.
8. Save your file. If you're printing your assignment at this point, print **ONLY** the Summary sheet in regular and formula view. Close your file.

MONTHLY  
BUDGET

# Expense Summary

Figure 6.8 Completed  
Expenses Summary  
Sheet



## Skill Refresher

### To SUM across sheets:

1. Click on the cell where you want the 3-D SUM to appear.
2. Type **=SUM(**
3. Click on the leftmost sheet in the group of sheets you want to sum.
4. Hold the SHIFT key down and click on the rightmost sheet in the group of sheets you want to sum.
5. Click on the cell in the sheet you're in that you want to sum.
6. Press ENTER.

## Skill Refresher

### 3-D References in Formulas

To reference a cell in another sheet, use the formula syntax **=SheetName!CellAddress**.

### To enter a 3-D reference:

1. Click on the cell where you want the formula to appear and type **=**.
2. Click on the sheet with the cell you want.
3. Click on the cell in the sheet you want and press ENTER.

## *Key Takeaways*

- 3-D references in formulas allow you to use data from one or more sheets on another sheet.

## Attribution

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## 16. 6.3 Templates

### Learning Objectives

1. Use existing Microsoft Excel templates to create new spreadsheets.

A template is a predefined pattern for a spreadsheet that has already been created for you. Hundreds of templates, already created by Microsoft, are available for you to use in Excel. These templates are very helpful if you have limited time to get a new task done in Excel, and you don't know where to start. Templates do a lot of the work for you! Templates include all the formulas, formatting, etc. needed in a professional Excel spreadsheet. All that's left to do is enter the data. Predefined Microsoft templates include everything from billing statements to blood pressure trackers to business cards. Depending on your version of Excel or Office 365, template categories may include: Business, Personal, Planners and Trackers, Lists, Budgets, Charts, and Calendars. In this chapter we will explore using existing Microsoft templates.

To access the templates in Excel, do the following:

1. Click the **File tab** in the ribbon.
2. Click **New** in Backstage View.  **Mac Users:** Click the **File** menu option and choose **New from Template**
3. The top of your screen should look similar to **Figure 6.9**. If you have opened templates previously, these may show in this screen as well.

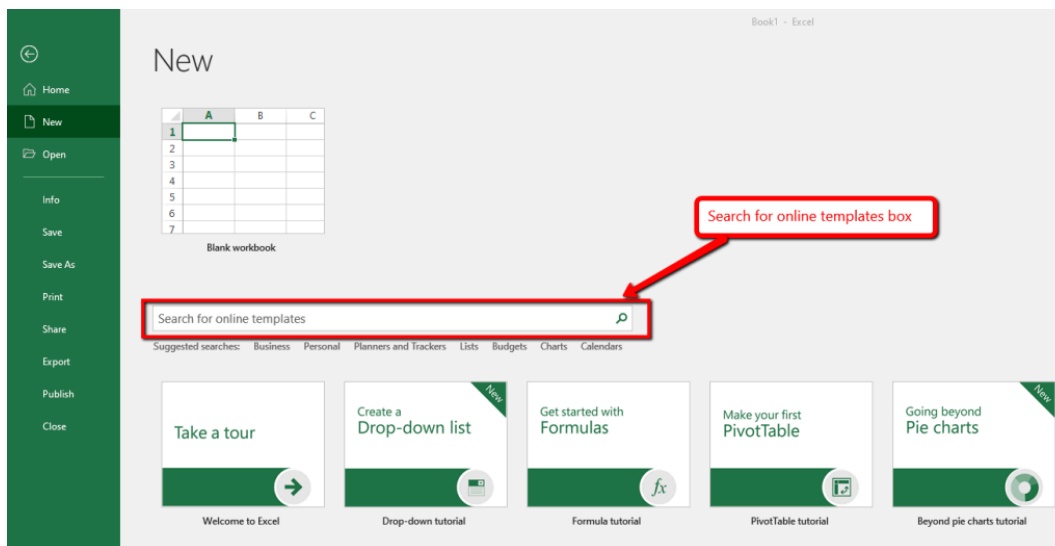


Figure 6.9 New Template Screen in Backstage View

In the **Search for online templates** box shown above, you can type a description for the template you want to use. Let's start by searching for a Travel Expense Report.

1. Click in the Search for online templates box.

2. Type **Travel Expense** and press ENTER.
3. Click on the **Travel Expense Report** that looks like Figure 6.10 below and click Create. NOTE: If this template is not available, select a similar one.

Your screen should look similar to **Figure 6.10** below. Notice the design, layout, and formulas have already been set up for you.


Date	Description of Expense	Airfare	Lodging	Ground Transportation (Gas, Rental Car, Taxi)	Meals & Tips	Conferences and Seminars	Miles	Mileage Reimbursement	Miscellaneous	Currency Exchange Rate	Expense Currency	Total
12/11/2019	Travel to client office	350.00	150.00	45.00	12.00	50.00	35.00	11.20		1.31	CAD	\$471.91
12/11/2019	Lunch with client				24.30		12.00	3.84		1.31	CAD	\$21.48
12/11/2019	Afternoon seminar					100.00	6.00	1.92		1.00	USD	\$101.92
12/16/2019	Travel to airport						70.00	22.40		1.00	USD	\$22.40
<b>Total</b>		<b>350.00</b>	<b>150.00</b>	<b>45.00</b>	<b>36.30</b>	<b>150.00</b>	<b>123.00</b>	<b>39.36</b>	<b>0.00</b>			<b>\$617.71</b>

Figure 6.10 Travel Expenses Report Template

Try using this template by doing the following:

1. Change the Name to **your name**.
2. Change the Department to **Technology**.
3. Hold down CTRL and click ~ to see where the formulas are in the sheet. Working in formula view helps you see where the formulas are, so you won't delete them.
4. In formula view, carefully delete just the data, including the Description of Expense and the dollar amounts. Don't delete any formulas!
5. Hold down CTRL and click ~ again to return to Normal view.
6. Enter Dates, Descriptions and expenses for a trip of your imagining in the first three rows under the column headings.
7. Save the completed file as **CH6 Travel Expenses**. Close the file.

We will practice using one more Excel template to create a class schedule. If you already know your schedule for next term, you can use it to complete this template. Otherwise, use your current class schedule.

1. Click the **File tab** in the ribbon.
2. Click **New** in Backstage View.  **Mac Users:** Click the **File** menu option and choose **New from Template**
3. Click in the Search for online templates box.
4. Type **Class Schedule** and press Enter.
5. Click on the **Student schedule** that looks like Figure 6.11 below and click Create. NOTE: If this template is not available, select a similar one.




	A	B	C	D	E	F	G	H	I
1		<b>CLASS SCHEDULE</b>					SCHEDULE START	TIME INTERVAL	Class List >
2							8:00 AM	15 MIN	
3		TIME	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
4		8:00 AM							
5		8:15 AM		MTH-113		MTH-113		MTH-113	
6		8:30 AM							
7		8:45 AM							
8		9:00 AM							
9		9:15 AM							
10		9:30 AM							
11		9:45 AM							
12		10:00 AM							
13		10:15 AM							

Figure 6.11 Class Schedule Template

- Click on the **Class List** sheet. Replace the information in the Class, ID, Day, Location, Start Time and End Time columns with your own class schedule. In the Day column, use the dropdown arrow in the lower right corner of the cell to select the day of the week.
- Click back on the **Class Schedule** sheet to view your completed schedule. Click in cell H2, then click the dropdown arrow in the lower right corner and select **60 MIN** for the Time Interval.
- Save the completed file as **CH6 Class Schedule**. Close the file.

## Skills Refresher

### To use a Microsoft predefined template:

- Click on the File tab in the ribbon.
- Click on New
  -  **Mac Users:** Click the **File** option and choose **New from Template**
- Type the desired template description in the Search box, and press ENTER.

## Key Takeaway

- There are many pre-designed templates in Excel developed in Excel that you can use. This will save you the time and effort of designing and creating these files from scratch.

## Attribution

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## 17. 6.4 Preparing to Print

### *Learning Objectives*

1. Printing all of the worksheets in a workbook at one time.
2. Preparing multiple worksheets for printing using grouping.

Just like consistency in formatting is important when working with workbooks containing multiple worksheets with the same type of data, so is consistency in page setup. Now that the CH6 Personal Budget workbook is complete, you are going to prepare it for printing by changing the page orientation and adding a header. You will also print all 13 worksheets at one time.

### Applying Page Setup Options to Grouped Worksheets

*Data file: **Continue with CH6 Personal Budget.***

As always, you need to review your workbook in Print Preview before considering it complete. When you do that with this workbook, you notice that the worksheets are each printing on two pages. You decide to switch all the worksheets to Landscape orientation to see if that helps. You will also add a footer with the worksheet name to each of the worksheets.

1. Go to Print Preview. To view all of the worksheets at one time, select Print Entire Workbook in the first box in the Settings section. You should now have 26 pages to scroll through in Print Preview. If you were to click the Print button, all of the worksheets would print, not just the active sheet.
2. Exit Backstage View. You want to change the page orientation of all the sheets, but you cannot change all of them at one time in Print Preview.
3. Group all of the worksheets together, including the **Expenses Summary sheet through the December sheet.**
4. Click on the Page Layout tab on the ribbon, then select Landscape using the Orientation button in the Page Setup group.
5. Click the Page Setup dialog box launcher arrow in the Page Setup group then click the Header/Footer tab.



**Mac Users:** Click the **Page Setup** button (there are no “dialog box launcher arrows”) in Excel for Mac

6. Click the Custom Footer button. In the center section, insert the sheet name using the Insert Sheet Name button. The Footer dialog box should look like **Figure 6.12.**

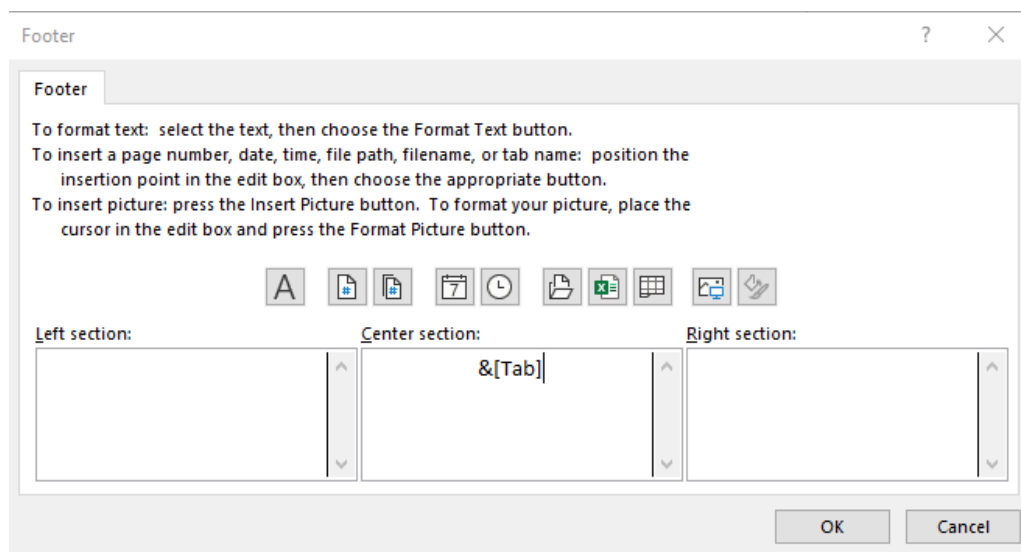




Figure 6.12 Insert Worksheet Name

7. Click OK to close the Footer dialog box. Click OK again to close the Page Setup dialog box.
8. Return to Print Preview to confirm that each worksheet is printing on one page, in landscape orientation, with the correct worksheet name appearing in the footer.

 **Mac Users:** the monthly sheets may still show as printing on multiple pages. If that is the case, close Print Preview, make sure all of the sheets are still grouped, click the **Page Layout** tab, click the **Page Setup** button, and click the **Fit** to scaling option. It should show “1 pgs wide by 1 tall”. Then click **OK**.

In Print Preview you notice that the **Expenses Summary** sheet is not set to print correctly. Part of the chart is appearing on a second page. You can easily fix this by changing the Scaling, but you only want to change the scaling of the **Expenses Summary** sheet, not the entire workbook. If you make the change in Print Preview while the worksheets are grouped it will change all of the worksheets.

 **Mac Users** can skip steps 1-7 below. You should see in Print Preview that all sheets are now displaying on one page including the Expenses Summary sheet. Continue with **Step 8** below.

1. Exit Backstage View.
2. Ungroup the worksheets by right-clicking on any of the worksheet tabs and selecting Ungroup Sheets.
3. If needed, click on the **Expenses Summary** worksheet tab to make it the active worksheet.
4. Click on the Page Layout tab on the ribbon and locate the Scale to Fit group of commands. (See **Figure 6.13**.)

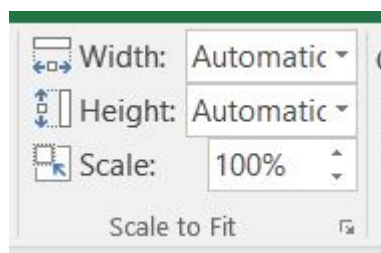


Figure 6.13 Scale to Fit

5. Click the drop-down arrow for Width: and select 1 page. This has the same result as selecting Fit All Columns on

One Page in the Scaling setting in Print Preview.

6. Return to Print Preview to confirm that the **Expenses Summary** worksheet is now printing on one page only.
7. Exit Backstage View.
8. Save the **CH6 Personal Budget** workbook.
9. Submit the following files as directed by your instructor.

- **CH6 Personal Budget**
- **CH6 Travel Expenses**
- **CH6 Class Schedule**

### *Key Takeaways*

- To print all of the worksheets in a workbook at one time select Print Entire Workbook in the Print Settings.
- You can apply page setup options, such as scaling, orientation, and headers/footers, to multiple worksheets at one time by grouping the worksheets.

## Attribution

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## 18. 6.5 Chapter Practice

### CREATING A Multiple Sheet Workbook for a Sports Team

Data file: [PR6 Data](#)

You have just been hired by Pacific Northwest Soccer Club, and you quickly realize that there isn't a consistent way for all the coaches to keep track of their team statistics. To help with this, you decide to create a multiple sheet workbook for Season Stats for each team. Since you are also the coach of the High Flyers Team this season, you will need to use the workbook to enter your team's statistics.

1. Open the data file **PR6 Data** and save the file to your computer as **PR6 Pacific NW Sports Team**.
2. Copy the range B11:G22 in the **Season Stats** sheet to the same range in the **Player Stats** sheet.
3. You will add formulas to this worksheet before entering the data later in the assignment. Group the sheets and add the following formulas to both sheets:
  4. In C22 and D22, you will need to count the Xs (that you will enter later) in rows 12 through 21. To do this, use the COUNTA function. If necessary, review the COUNTA function in Chapter 2. Your formulas will return zeros for now, until you enter the data.
  5. In E22 and F22, sum rows 12 through 21.
  6. In G12, calculate the Goal Percentage by dividing the number of Goals by the number of Shots. This formula will display an error message because there is no data in column E (Excel shows the #DIV/0! error when a number is divided by zero). We don't want to display error messages, so an IF statement that tests the value of column E will solve this problem.
  7. Change the formula in G12 to an IF Function with the following three arguments:
    - Test – is E12 greater than zero
    - If the Test is True – divide the number of Goals by the number of Shots
    - If the Test is False – enter a zero
8. Copy G12 down the column through G22. Format these cells as percentages.
9. Ungroup the sheets.
10. Save the file.
11. In the **Season Stats sheet**, enter the following data:
  - D3 – High Flyers
  - D4 – Fall and the current year (i.e. – Fall 2020)
  - D5 – Pacific Northwest Soccer
12. Enter your name, phone number, and email address in row 8.
13. Make two copies of the **Player Stats** worksheet. Rename the Player Stats worksheets **Player 1, Player 2 and Player 3**.
14. Group the **Player** sheets only. Enter the following formulas:
  15. A formula in D4 that points (links) to cell D3 in the **Season Stats** sheet. Your formula should be ='Season Stats'!D3.
  16. A formula in D5 that points to cell D4 in the **Season Stats** sheet.
  17. A formula in D6 that points to cell D5 in the **Season Stats** sheet.
18. Ungroup the sheets.

19. Click on the **Player 1** sheet. Enter the Player Name: **Juan Ramirez**. Enter the following data from **Table 1** below:  
Table 1: Player 1 Sheet

	Played	Started	Shots	Goals
Game 1	x	x	2	1
Game 2	x	x	3	1
Game 3				
Game 4	x			
Game 5	x	x	2	0
Game 6	x			
Game 7				
Game 8	x	x	1	1
Game 9	x	x	4	2
Game 10	x	x	3	3

20. Click on the **Player 2** sheet. Enter the Player Name: **Zach Johnson**. Enter the following data from **Table 2** below:  
Table 2: Player 2 Sheet

	Played	Started	Shots	Goals
Game 1	x	x	1	1
Game 2	x	x	2	1
Game 3	x	x	1	1
Game 4	x	x	1	1
Game 5	x	x	2	0
Game 6	x	x	5	2
Game 7	x	x	4	2
Game 8	x	x	1	1
Game 9	x	x	4	1
Game 10	x	x	3	2

21. Click on the **Player 3** sheet. Enter the Player Name: **Vito Lawrenz**. Enter the following data from **Table 3** below:  
Table 3: Player 3 Sheet

	Played	Started	Shots	Goals
Game 1	x	x	0	0
Game 2	x	x	1	1
Game 3	x	x	2	0
Game 4	x		1	1
Game 5	x	x	2	0
Game 6	x	x	3	1
Game 7	x	x	2	1
Game 8	x	x	1	1
Game 9	x	x	1	1
Game 10	x	x	1	1

22. Go to the **Season Stats** sheet and click on cell C12. Enter a 3-D formula to COUNTA (count the x's) in C12 for the **Player 1 through Player 3** sheets. Copy the formula in C12 through D21.
23. Change the formulas in C22 and D22 from COUNTA to SUM.
24. Click on E12. Enter a 3-D formula to SUM cell E12 in the **Player 1 through Player 3** sheets. Copy the formulas through F21.
25. Preview the worksheets in Print Preview. Notice that only part of the data is printing for each worksheet. This is because a Print Area was incorrectly set when the file was first created. You need to clear this Print Area for **each worksheet** individually (modifying print areas cannot be done on grouped sheets). Exit Backstage View and for each worksheet, click the **Print Area** button on the Page Layout tab and select **Clear Print Area**.
26. Group the sheets and add a Custom Footer that shows the Sheet Name in the center of the footer.
27. Double check Print Preview to make sure each sheet is printing on one page, and that the Sheet Name shows in the center of the footer.
28. Your completed Seasons Stats sheet should look like Figure 6.14.

	A	B	C	D	E	F	G
2		<b>SEASON STATISTICS</b>					
3		<b>TEAM NAME</b>	High Flyers				
4		<b>YEAR/SEASON</b>	Fall (Current Year)				
5		<b>ORGANIZATION</b>	Pacific Northwest Soccer				
7		<b>COACH'S NAME</b>		<b>PHONE NUMBER</b>	<b>EMAIL ADDRESS</b>		
8		Student's Name		(503) 555-1212	<a href="mailto:student@pcc.edu">student@pcc.edu</a>		
11			<b>Played</b>	<b>Started</b>	<b>Shots</b>	<b>Goals</b>	<b>Goal Percentage</b>
12		Game 1	3	3	3	2	67%
13		Game 2	3	3	6	3	50%
14		Game 3	2	2	3	1	33%
15		Game 4	3	1	2	2	100%
16		Game 5	3	3	6	0	0%
17		Game 6	3	2	8	3	38%
18		Game 7	2	2	6	3	50%
19		Game 8	3	3	3	3	100%
20		Game 9	3	3	9	4	44%
21		Game 10	3	3	7	6	86%
22		TOTAL SEASON	28	25	53	27	51%

Figure 6.14 Completed Seasons Stats Sheet

29. The formulas in row 12 of the Seasons Stats sheet should match Figure 6.15.



	A	B	C	D	E	F	G
2		SEASON STATISTICS					
3		TEAM NAME	High Flyers				
4		YEAR/SEASON	Fall (Current Year)				
5		ORGANIZATION	Pacific Northwest Soccer				
7		COACH'S NAME		PHONE NUMBER		EMAIL ADDRESS	
8		Student's Name		(808) 555-1212		student@pcc.edu	
11		Played	Started	Shots	Goals	Goal Percentage	
12		Game 1	=COUNTA("Player 1:Player 3"!C12)	=COUNTA("Player 1:Player 3"!D12)	=SUM("Player 1:Player 3"!E12)	=SUM("Player 1:Player 3"!F12)	=IF(E12>0,F12/E12,0)

Figure 6.15 Season Stats Sheet Formulas in Row 12

30. Check the spelling on all of the worksheets and make any necessary changes.
31. Save the **PR6 Pacific NW Sports Team** workbook and submit as directed by your instructor.

## Attribution

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# Appendix

Coming soon. Please see Glossaries at the end of each chapter.

# Glossary

## **Alignment Guide**

A green vertical or horizontal line that displays when you are moving or sizing an object to assist with proper placement

## **Artistic Effects**

Formats applied to images that make pictures resemble sketches or paintings

## **Blank Document**

A starting point for creating a new document in Microsoft Word

## **Blogs**

A regularly updated website or web page, typically one run by an individual or small group, that is written in an informal or conversational style

## **Booting**

Booting is the process of turning on the computer and powering up the system.

## **Bulleted List**

A list of items in no particular order that are preceded by a bullet for emphasis and organization

## **Bullets**

Text symbols such as small circles that precede each item in a bulleted list

## **Cell**

The intersection of a row and column in a table

## **Check Box**

A small box which can be clicked to indicate a check is turned on or off to indicate an on or off response

## **Color Saturation**

Intensity of the color; higher saturation makes a picture look more vivid, lower saturation makes the colors look more grey

## **Cover Letter**

A letter of introduction that highlights key points in the resume that follows

## **Ellipses**

Informally as dot-dot-dot, is a series of dots that indicates an intentional omission of a word, sentence, or whole section from a text without altering its original meaning. When selected, additional options appear

**Em Dash**

A punctuation symbol that indicates and explanation or emphasis

**Field**

Placeholders that store and display data, and can perform simple tasks like returning the page number or current date and time

**Footer**

The bottom margin of each page

**Format Painter**

Allows you to copy formatting from one item and apply it to another

**Formatting Marks**

Characters that display on the screen but do not print, indicating where the Enter key, the Spacebar, and Tab key were pressed, also called non printing characters

**Indentation**

Specifies the distance between where the lines in a paragraph start in relation to the left or right margins

**Inside Address**

The name and address of the person of business received the letter, positioned below the date line

**Keyboard Shortcut**

One or more keys used to perform a menu function or other common functions

**Layout Options**

Picture formatting options that control the manner in which text wraps around a picture or other object

**Leader**

The space between tab stops can show a line, dots or dashes to line up information and guide the reader

**Letterhead**

The heading at the top of a sheet of letter paper that typically includes name and address or company logo.

**Lock Anchor**

A feature in word that allows you to move your image to any position on the same page as the anchor paragraph which forces the object to stay in that position

**Mini-Toolbar**

Appears whenever you right-click text in Word, Excel or PowerPoint and provides a quick-access version of the Font group on the Home tab, plus a few extra buttons from other groups

**Newsletter**

A printed or electronic report containing news regarding updates for an organization or business and is sent to interested parties

**One-Click Row/Column Insertion**

A feature in Word tables that allows users to insert a new row or column by pointing to the desired location and then clicking once

**Page Border**

A decorative border that appears outside the margins on each page and can be solid, dashed, or an artistic style

**Pictures**

Images or graphics that are stored locally on a computer or flash drive and can be uploaded to a document to add visual interest

**Present Online**

A Word feature that allows you to share your documents online using a web browser

**Quick Access Toolbar**

Located above the Ribbon (top-left) and provides access to commonly used features and commands, such as Save and Undo/Redo, and is customizable

**Quick Styles**

An efficient way to add effects to a picture such as shape, border, and other effects

**Resume**

A formal document that provides an overview of professional qualifications for an employment opportunity

**Resume Assistant**

A feature in Word where you can see suggestions from LinkedIn to enhance your resume

**Save As Dialog Box**

Allows the user specify the drive, directory, and name of a file to save their file

**Screen Clipping**

Allows you to capture an image from your screen

**Shape Effects**

A grouping of coordinating effects that can be applied to a shape including shadows, glows, reflections, soft edges, bevels, and three-dimensional (3-D) rotations

**Shape Outline**

Allows you to change the outline color, weight (thickness), and style of a the outline surrounding a shape

**Shape Styles**

Allows you to apply preset colors and effects to quickly change the appearance of your shape

**Shapes**

Lines, arrows, stars, banners, ovals, rectangles, and other basic shapes with which you can illustrate an idea, a process or a workflow

**Sharpen/Soften**

A way to enhance picture details or make pictures more appealing by removing unwanted blemishes on a picture

**Small Caps**

Allows you to capture an image from your screen

**SmartArt**

Horizontal position which is set for placing and aligning text on a page

**Special Character**

Normal characters that don't appear on standard keyboards; but once inserted into a Word doc, they look the same as keyboard characters

**Spelling and Grammar Check**

Identifies spelling and grammatical errors and provides suggestions for correction

**Square Text Wrapping**

The manner in which text displays around an object

**Tab Indicator**

A button to the left of the ruler that provides tab marker options

**Tab Stop**

Horizontal position which is set for placing and aligning text on a page

**Table**

An arrangement of information organized into rows and columns

**Tags**

Any word, phrase, or number string related to the file that may help you locate the file later

**Text Box**

A moveable, resizable container for text or graphics

**Text Effects and Topography**

Decorative formats, such as shadowed or colors that make text stand out

**Toggle Button**

A button that can be turned on and off by clicking it once to turn on, and clicking again to turn it off

**Word Art**

Gallery of text styles that you can add to your publications to create decorative effects, such as shadowed or mirrored (reflected) text

**Word Processing**

The act of using a computer program to create, edit and print documents

**Word Processor**

Software or a device that allows users to create, edit, and print documents

**YouTube**

A free video sharing website