

I. Introduction

- Introductions
- Housekeeping
 - Location of restrooms
 - Length of class is 2 hours
 - You're encouraged to questions during class
 - Reminder– resources for further study listed at end of this document
 - Feel free to sit back and watch if the class is too advanced.

II. Class Learning Objectives

By the end of this class, you will be able to:

1. Recall basic Excel terminology
2. Create and revise simple formulas
3. Use mathematical operators in formulas using PEMDAS order
4. Define absolute and relative cell references
5. Use mathematical, logical, date, and text functions
6. Apply conditional formatting to data
7. Use Sort & Filter tools
8. Create and edit tables
9. Insert and edit charts

III. Review of Common Terminology

- **BRIEF review tabs** in the Ribbon
 - **Home Tab** – the default tab all of the Office software opens to. It has your most commonly accessed features.
 - **Formula Tab** – Houses the function library. You can browse to see what other functions exist in the Excel.

- **Navigating Excel**
 - **Row**
 - **Column**
 - **Cell**
 - **Cell Address or reference**
 - **Formula Bar**
 - **Workbook**
 - **Worksheet**

IV. Creating Formulas

- Remember that Excel only understands a formula written **with the equal sign first**.
- Excel's formulas look like a backwards version of an equation.
- Instead of referencing actual values - or numbers - in a formula, we are going to reference the cells those values are in. Such as =A1+B1 (the number located in cell A1, which means row 1, column A) plus the number in cell B1 (which means row 1, column B)
- Excel adds whatever values happens to be in those cells instead of the precise values. That way, if the values change, the total updates automatically.

Activity: Create a basic formula in Excel.

- Open the **Practice Workbook file** in the Class Materials folder on the desktop.
- Click on Practice worksheet tab.

- How would we add the values in cells A1 – F1 together?
 - Click in cell G1.
 - Type in =.
 - Click on A1, type a plus (+), then click on cell B1, and repeat for cells C1 through F1 until you have this formula:
 - =A1+B1+C1+D1+E1+F1
 - Note we don't have a value in the cell yet. This is because the formula hasn't been confirmed.
 - Press ENTER.
- Remember formulas will update our total automatically updated to reflect any changes to values located in the cells referenced in the formula.
 - This is because instead of referencing a specific value, we are asking Excel to add whatever value is in the cell to the rest of the cells. That way, when values change, our totals are automatically updated.
- Review the formula.
 - Click on cell G1. We still only see the total.
 - Note we can review the formula in the **formula bar located above** the spreadsheet. This is how we can troubleshoot problems we have with formulas that aren't behaving the way we expect!

V. Order of Operations

- Math is amazing, but we need to make sure Excel is performing our calculations in the order we need it to.
- Stay in Practice worksheet

Activity:

- Excel doesn't just perform operations in the order they are typed in. There is a hierarchy to how operations are performed. We need to tell Excel what order we want it to go in.
 - An easy way to remember the order of operations is "Please Excuse My Dear Aunt Sally".
 - P=Parenthesis ()
 - E=Exponents ^
 - M=Multiplication *
 - D=Division /
 - A=Addition +
 - S=Subtraction -
 - If you need Excel to perform addition before division, you need to put parenthesis around the values that are added first.
- You may get the wrong results if you forget the order of operations. Type the following into empty cells and explain:

Ex:

$$1+2+3*5= 18 \text{ or } 3 + 15$$

Vs.

$$(1+2+3)*5=30 \text{ or } 6*5$$

Activity: Play with PEMDAS

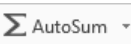
- Let's say we want to determine the result of dividing the total of A2 minus B2 from the total of C2 and D2.
 - In an empty cell, type **=A2-B2/C2+D2**
 - The symbols in the upper right corner of the 10 key pad are your mathematical functions. You may need to press NUM LOCK to activate the key pad.
 - With this formula, Excel will perform B2/C2 first.
- Now revise the formula in the formula bar by adding the appropriate parentheses.
=(A2-B2)/(C2+D2)
 - What happened to our value when we just added parenthesis?

VI. Using Functions

a. Mathematical functions – AutoSum and Average

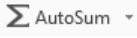
- Click on the Auto Inventory worksheet.
- We are going to create a summary of some information of what's going on with our car lot.
- We've looked at adding short lists of numbers together, but not all the values we want to add will be short lists.
- Excel has shortcuts to help us with math so we don't have to do as much work!

Activity: Review of AutoSum function

- Click in cell E33 (just below the list of prices).
- Click on the **AutoSum button**  on the Home Tab
- Press ENTER.
- Note that Excel automatically figured out which values we were talking about based on the active cell – the one we just clicked on, or E33.
- Excel will automatically pick the set of contiguous values that are adjacent to where the AutoSum is inserted.
- What happens if you didn't put AutoSum adjacent to the values you want to add?

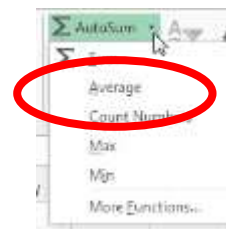
Activity: Review of using AutoSum manually

- Click in cell B35
- Type in **Total Inventory**
- Tab over to cell E35

- Click on the **AutoSum button** 
 - Note that Excel didn't know which values to add, because the cell isn't adjacent to any numerical values.
- Click in cell E2 and drag down to select all cells through E32
 - Note that you can always type in the values, but this can lend itself to more mistakes.
- Press ENTER

Activity: Explore Average function

- Click in cell B36.
- Type **Average Price** and tab over to cell E36
- Hover on the AutoSum button.
 - Note that it is actually 2 buttons. Clicking on the Greek letter will automatically put in AutoSum, but if you click on the options arrow you see other commonly used functions.
- Click on the **AutoSum options button**.
- Select **Average**.
 - Note that because this is **next** to the Autosum data, it automatically tried to average AutoSum. We want the average of our inventory.
- Click and drag to select E2:E33
- Press ENTER.



b. Date Function

- Stay in the Auto Inventory worksheet
- Not all functions in Excel are math functions.
- We want to determine how long each of the cars on our lot have been sitting there.
- Before we can do that, we need to know today's date.
- Rather than type in the date every day (and potentially sometimes forget), we are going to **use a function that will update with today's date automatically every time we open the file.**
- I want today's date to appear at the top of the worksheet, so I'm going to start by creating some space for it.

Activity: Insert today's date

- Click on the row heading for row 1
- Click on Insert (Cells Grouping, Home tab) **3 times** to insert in 3 rows
- Click in cell A1
- Type **Today's Date:** and tab over to cell C1
- In C1, Type **=TODAY()**
 - Note that the function has the same elements as Autosum.
 - = sign
 - Function type (today)
 - Parentheses (which are necessary for every function, regardless of whether there is anything inside them)
- Press ENTER

Activity: Let's determine the age of the vehicles in our inventory by subtracting the date the car entered the lot with today's date.

- Click in cell G5
- Type an equals =
- Click on cell C1
- Type a minus -
- Click on cell F5
- Press ENTER.
 - **Question:** Was there anything covered in Excel for Beginners that would help us to duplicate this formula down this entire column?
- Grab the AutoFill handle and drag down several lines.
 - You will get an error message and wrong values.
 - This is because we need to understand **ABSOLUTE AND RELATIVE VALUES!**

c. Absolute vs. Relative Values

- Cell references are similar to street addresses.
- An **absolute reference is the exact address**: Central Library is located at 4100 Virginia Beach Blvd [or your branch library address].
- A **relative reference is giving someone directions relative to a known location**: go east for five blocks east of Town Center and the building is on the northwest corner.

Relative Reference

- A relative reference is a cell reference that **adjusts automatically** when the formula is copied to adjacent rows and columns. Relative references are the **default** setting in Excel.
 - When you use Autofill or copy a formula down a column the row part of the formula will automatically adjust.
 - If you're autofilling across a row, the column part of the formula will automatically adjust.

Absolute Reference

- An absolute reference is a cell reference that **won't automatically adjust** when the formula is copied to adjacent rows or columns.
- An **absolute reference never changes**, no matter where you are in the city. The building address is still at 4100 Virginia Beach Blvd.
- A **relative reference changes depending on where you are**. 3 blocks east, for example, only works if you are at Town Center. It doesn't get you to the library if you are coming from Lynnhaven Mall.
- The dollar symbol "\$" tells Excel that a cell should be seen as a specific cell – or address - instead of as a relative reference.

Switching Between Relative and Absolute Cell Formats

There are four combinations to select from when you reference a cell. To cycle through the four formats, press function key F4.

A1 Relative Reference - this is the default format in Excel.

\$A\$1 Absolute Reference - both the column and row are absolute, or static.

A\$1 Mixed Reference - this format uses a relative column and an absolute (static) row.

\$A1 Mixed Reference - this format uses an absolute (static) column and a relative row

Activity: Correct our formula so there is an absolute reference

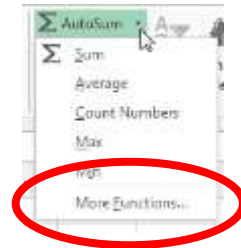
- Click in cell G5.
- Click in the formula bar just before the C.
- Type in a \$ in front of both the C and the 1 (cell C1 has today's date).
 - QUESTION: do we need to make F5 an absolute reference too?
 - No. We want to reference different values as we move down column F (the date each car entered the lot). That way we know the age of each car, not just the one car in row 5.
- AutoFill down column G until the end of your inventory.

d. Logical Functions – COUNT

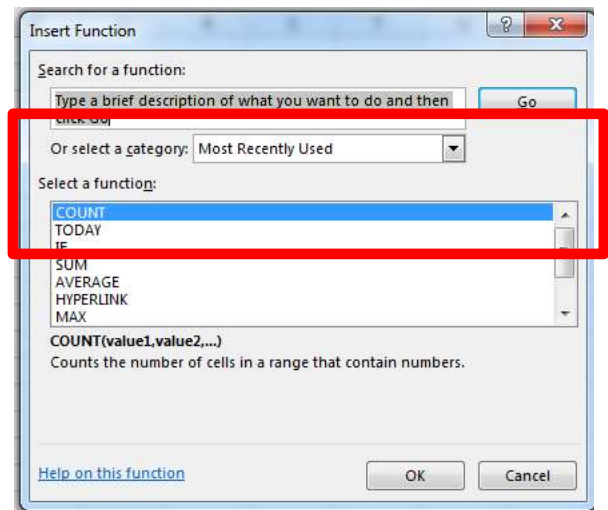
- We've looked at some math functions and date functions as well as some just basic math. Well done! Now let's look at some more complicated functions out there.
- There are more details about our inventory that I'd like to include in the little summary at the bottom of our worksheet.
- First, I'd like a running count of how many vehicles are currently on our car lot.

Activity: Create a Count statement

- Click in cell B40.
- Type in '**Number of Vehicles**' and tab over to cell D40.
- Click on the **options arrow** next to AutoSum in the Ribbon.
- Click on **More Functions**.



- Click on **Count** in the Most Recently Used category and then click OK
- Click and drag to select E5:E35.
- Click OK.
 - Point out that if you add a new vehicle to the bottom of this list, it won't be included in any of our formulas.
 - Sometimes it is worthwhile to include more cells in a formula than are currently needed in the spreadsheet. This allows for growth over time!



e. Text Functions – CONCATENATE

- Let's go to the Donors spreadsheet
- There may be times when you may wish text from two or more columns or rows were combined into one. CONCATENATE will do this for you!

Activity: Combine First Name and Last Name into a new column

- Select column D – email addresses – by clicking in column header D.
- Click Insert button in the Home Tab once to add a column to the left.
- Click in cell D2.

- Click Formulas Tab in the Ribbon.

- Click TEXT button.

- Select CONCATENATE.



- Text1 field in the CONCATENATE Function Arguments pop up box will have a blinking cursor – click in B2 to select First Name data.

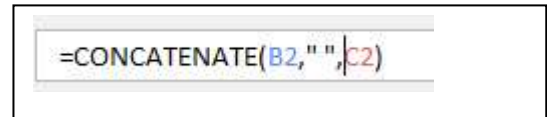
- Click in Text2 field in the Function Arguments box.

- Click C2 to select it.



- Click OK – but is it OK?
 - =CONCATENATE(B2,B3)
 - NO – there's no space between first name and last name.

- To correct this, we'll revise the formula in the Formula bar!
 - Click in Formula bar and click after the first comma.
 - Type quotation mark “
 - Press spacebar once
 - Type another quotation mark “
 - Type a comma.
 - Press ENTER and review the results



- Now we can use AUTOFILL to drag/copy the formula down to the last row in the spreadsheet.

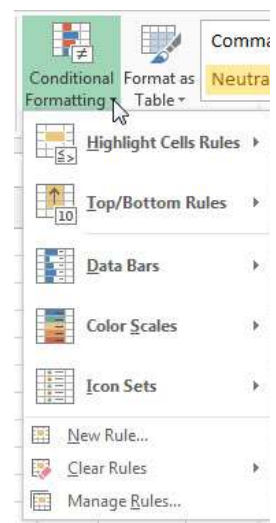
VII. Viewing Data

a. Conditional Formatting

- Let's go back to the Auto Inventory worksheet.
- Sometimes you want to use cell formatting to draw your attention to specific data. That data may change over time, so having Excel change the formatting automatically for us could be pretty cool.
- When do you think it would be useful to see a cell automatically highlighted?

Activity: Apply conditional formatting to inventory older than 45 days

- Let's say we want to see which cars have been on the lot for more than 45 days. We can do this by highlighting data based on that criterion.
- Select cells G5 through G35
- Click the **drop-down menu on the Conditional Formatting button** from Home Tab -> Styles group
- Select **Highlight Cells Rule**
 - Note the other options available – greater/lesser, equals to, contains text, etc. Plus the Top/Bottom options and other visual styles (data bars, etc.)
- Select **Greater Than**



- Type **45** and keep the default color (light red fill, dark red font)
- Press OK

b. Sorting Data

Basic Sort

- Let's go back to the Donors worksheet.
- A sort keeps **all of the data on your worksheet visible**, but organizes it either alphabetically or numerically.
- There is a Sort & Filter group on the Data tab. However, we are going to **use the Sort & Filter option on the Home tab** today.
- Click on the Home tab.

Activity: Sort by Last Name

- Click anywhere in the **Last Name column**.
 - Note that you **click IN the column**, you don't select the column.
- Click on the **Sort & Filter button** in the Editing grouping on the Home tab.
- Click on **Sort A to Z**.
 - Note that it didn't just sort that column; it moved all the rows to keep the information together, but organized your data alphabetically by last name.
- Now click the **Undo button** to remove the sort.
- QUESTION: How would you sort by Previous Contributions data from Smallest to Largest? Try it!



Custom Sort

- Sorting allows you to sort all data based on what's located in a single column or row.
- What happens if you want to sort by multiple fields? E.G., what if I want to sort by Zip Code, but I want my contacts organized by Last Name within those Zip Codes?

Activity: Perform a custom sort by Zip Code then by Last Name

- Click anywhere in your data.
- Click on the **Sort & Filter** button in the Editing grouping on the Home tab.
- Click on **Custom Sort**.
- Set your first sort to be done by **Zip Code** and organized **smallest to largest**.
- Click on **Add Level**.
- Set your second sort to be by **Last Name** and **A to Z**.
- Click OK.
- Click **Undo** button to remove the sort.
- QUESTION: How would you do a custom sort by City then by Previous contributions? Try it!
- Click **Undo** button when finished.



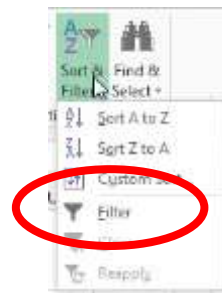
c. Filtering Data

Checklist Filter

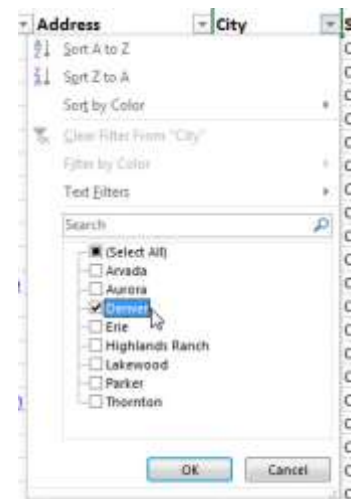
- Stay on Donors worksheet.
- A Sort arranges data but keeps it visible. What if you only want to see specific data?
- **Filters will hide some of your data from your view without actually deleting anything.**
- This is really useful for looking up information or only printing specific information in large worksheets.


Activity: Create a filter to only show Denver residents

- Click on the **Sort & Filter** button in the Editing grouping on the Home tab.
- Click on **Filter**.
 - Note that all that changed were options arrows appeared next to each of our column headings. We only need to click on the filter button once to perform as many filters as we want. All the filter button on the ribbon does is turn on and off these options buttons.




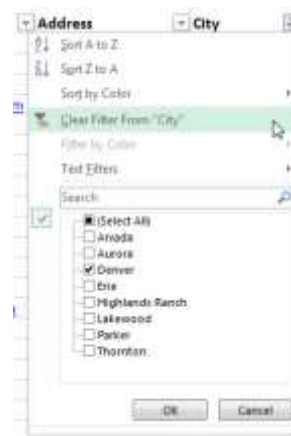
- Click on the **options button** next to City.
- Click in the **box next to Select All** in the checklist portion of the dropdown to **deselect all choices**.
- Click in **the box next to Denver** so it's the only city selected.
- Click on OK.



- Note our data is only showing people in our contacts list who live in Denver.
 - How do we know that the spreadsheet has been filtered: a funnel icon  appears next to the filter option on City; row numbers turned blue, row numbers missing from the list.
 - If someone filters a workbook and clicks save, the filter is saved as well. If you ever open a workbook that is missing data, first check to see if filters are turned on.

Activity: Remove the filter

- Click on the filter icon  next to the City header.
- Click on “Clear Filter from City” to Remove filter from City.



VIII. Formatting Data as a Table

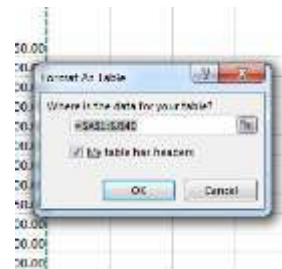
- When you are looking at this much data in a spreadsheet, it can be hard to read.
- Formatting your data as a table gives a visual element to the table that makes it prettier and easier to read.

Activity

- Stay in the Donors sheet.
- Click anywhere in your data.
- Click the Format as a Table button in the Styles group on the Home tab.
- Select any of the formatting options
 - Note the different grouping:
 - Banded
 - Gridlines or no gridlines
 - Headers or no headers
 - Light, medium, dark



- Note the cell range in the pop up box and the “marching ants” border around the parameter of the data indicating where the formatting will be applied.
- Click on OK.
- Note the following:
 - Alternating row colors (for most table styles).
 - Table extends just as far as the text fields do.
 - Note that when you build worksheets, it’s best not to leave blank rows or columns between their data. If you do, Excel could miss information you want to include.
- Note keyboard shortcut for formatting spreadsheet as a table is to click anywhere in data and **then press CTRL + T and click OK.**



Activity: Play with the table formatting

- Try expanding the table downward to incorporate more rows by dragging the border corner down.
- Play with changing the table formatting using the Table Tools Design tab.
- If you have time, play with the features in that tab.
 - Table Tools contextual tab:
 - Check box to add Total Row!
 - Change style in Table Styles group
 - Deselect Filter to remove option buttons from headers (filter buttons are active automatically with all table styles.)
 - Remove Duplicates

970-585-9206	\$800.00
303-218-5743	\$4,000.00
303-625-0452	\$11,000.00
310-573-1157	\$1,250.00
970-654-1238	\$10,000.00
605-992-0303	\$15,000.00

IX. Inserting a Chart

- When is using a chart appropriate? When you want to visually represent data, you can use a chart.
- Charts work best to report on 2 axes of information such as expenses per month or hours of leave taken per employee.

Activity: Insert a chart showing the earnings for all stores last year.

- Click the Sales worksheet tab.
- Click anywhere in your data.
 - Note that if you select a cell without data in it, you will get a blank chart. Make sure you always start by clicking on the data you want to display.
- Go to the Insert tab and select Chart (Excel 2010)



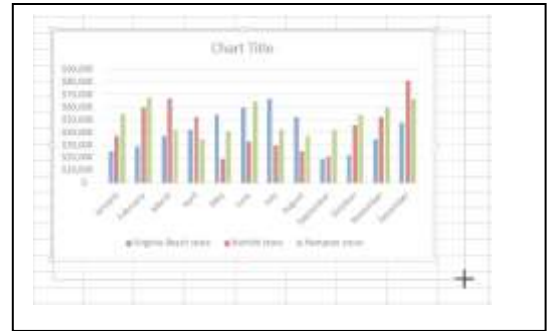
- In Excel 2013, select a chart type from the Charts group in the Ribbon.



- Take a minute to look at the various chart types available.
- QUESTION: which of the chart types would work best for this question?
 - When in doubt, select a chart type and then hover over the different options to get a preview (Excel 2013) or the name (Excel 2010). Use that to see if it meets your needs.
- Click on the chart types of your choice.
 - Note that we have contextual tabs that appear while we have the chart selected. If we click off the chart, the tabs go away. When we click on the chart, they reappear. The only time we have chart editing tools is when we have a chart selected.
- Click on Change Chart Type in the Type group (Excel 2013) to change the way the chart looks.
 - In Excel 2010, select the Design Tab and then Change Chart Type.
 - Select the 2D column chart if chart isn't in that format already and click OK.

Activity: Make the chart pretty by editing it

- **Remember** to select (click on) a chart before editing it.
- **Make the chart bigger** using the handles on the corners.
- **Click on Chart Title and change** to 2014 Store Earnings.
- Hover over different layouts in the **Chart Styles group** to preview other options.
- **Click Change Color button** in the Chart Styles group to preview other color options.
- Click the plus in the upper right corner of the chart to demonstrate how to turn on and off features like Axis Title, Chart Title, Data Labels, etc.
- Delete the chart by clicking in the blank space of the chart and pressing delete on the keyboard.



X. Wrap Up

- Review what you learned today
- Questions?
- Resources for additional learning:
 - www.vbgov.com/tech-ed
 - Tech Help
 - Upcoming classes
- Demonstrate Lynda.com:
 - Go to VBPL website: www.VBgov.com/libraries > Find Materials > Research & Articles > A to Z Resources
 - Scroll down and click on Lynda.com
 - Enter library card number and pin number into appropriate boxes
 - You will need to set up an account with your name and email
 - Locate Search bar across top of page and enter subject
 - Notice list of suggested courses in middle of page with course descriptions and related courses tab
 - Use filter options on the left side of page to narrow results by skill level and subject
 - Use + button to add courses to your playlist
- **Homework** – if you would like to practice your new skills, play around with one of the templates in the File tab of the ribbon. You could download and work on budget, calculator, or inventory list worksheets.
- Google – search for tips, for example: Microsoft Excel 2013 Pivot Tables
- Please complete the evaluation form!

Thank you for coming!

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