Design Document:

Microsoft Excel – Formulas & Functions

Class Description

Learn how to use formulas to automatically calculate and manipulate totals, percentages, averages and ranges in this class.

**Curriculum Track**

Microsoft Tools

**Audience**

Adults

**Course Length**

90 minutes

**Training Method**

Instructor-led hands-on

**Purpose**

To show users how to user formulas and functions to make calculations with their data.

Equipment Requirements

Projector and projection screen; computers with internet access for the instructor and each participant; laser pointer (recommended)

Software Requirements

Windows 7, Microsoft Excel 2013

Material Requirements

Pens or pencils, handouts, *Formulas & Functions* Practice File, participant surveys

**Learning Objectives**

At the end of the session, learners will be able to:

* Use the **SUM** function to calculate a total for a range of numbers
* Calculate a simple percentage using two values
* Use the **Average** function to calculate an average for a range of numbers
* Use the **MIN** function to calculate the minimum for a range of numbers
* Use the **MAX** function to calculate the maximum for a range of numbers

**Assessment Technique(s)**

Successful completion of class activities

Content Outline

**Agenda (2 mins.)**

* Outline the following topics that will be covered in class
  + Intro to Formulas, Functions, and Operators
  + Entering, Editing, and Copying Formulas
  + Calculating Sums
  + Calculating Percentages
  + Calculating Averages, Minimums, & Maximums
  + Tips & Tricks

**Topics, Talking Points, and Activities (85 mins.)**

* Intro to Formulas, Functions, and Operators
  + Explain that formulas allow Excel users to perform calculations using combinations of numbers, symbols, and operators
    - Share that a formula must be entered into the cell where a user wants the results displayed and must begin with an equal sign (=)
  + Explain that a function is a predefined formula that performs a specific calculation using values (called arguments) in a particular order
    - Share that common functions include **SUM** (summarizes values), **COUNT** (summarizes number of items), **AVERAGE** (finds the average of values), **MAX** (finds the largest value), and **MIN** (finds the smallest value)
  + Explain that Arithmetic operators are used in Excel’s formulas and functions. These include the following:
    - + = Addition (ex., 3+3)
    - - = Subtraction (ex., 3-1)
    - \* = Multiplication (ex., 3\*3)
    - / = Division (ex., 9/3)
    - Also highlight that Order of Operations rules from math apply to formulas, and review the following acronym to help users remember the order:
      * **P**lease **E**xcuse **M**y **D**ear **A**unt **S**ally
        + **P** aranetheses
        + **E** xponents
        + **M** ultiplication
        + **D** ivision
        + **A** ddition
        + **S** ubtraction
      * Write this example on the board and ask users to tell you the order: **(C3+C4)\*100**
* Entering, Editing, and Copying Formulas
  + Pull up *Practice File- Formulas & Functions* and use it to discuss the remaining concepts
  + Point out that there are two ways of entering formulas: by typing the entire formula into a cell, or by clicking on existing cells to create a formula. Share the following examples of each using the practice file:
    - In cell D3, type in the following: **=B11+B12**
    - Erase the contents, and then do the following: press the **=** key, use your mouse to click on cell **B11**, press the **+** key, click on cell **B12**, and then press the **Enter** key
  + Share that it’s not uncommon to make a mistake when entering a formula, particularly when using the typing method, but that it’s easy to correct a mistake
    - Explain that if the entire formula is wrong, a user just needs to click on the cell and reenter the correct formula; if only one part is wrong, a user should double-click on the cell and use the cursor to highlight the area that needs to be corrected, then enter the correct information
    - Demonstrate each technique by changing any component of the formula you entered in cell **D3**
  + Share that once a formula has been created, it’s easy to copy and paste it into another cell to save time and effort
    - Outline that to copy a formula, a user should follow these steps:
      1. Click on the cell containing the formula
      2. Click on the **Copy** button in the **Clipboard** group
      3. Click on the cell where you want to paste the formula
      4. Click on the **Paste** button in the **Clipboard** menu and then on the ***fx*** button
      5. Adjust any data, as required

**Note:** Stress step 5 so users know that they may have to change values or cell references within the new data set

**ACTIVITY**: Have participants complete **Activity #1** on the *Activity Sheet*

* Calculating Sums
  + Explain that there are two ways to calculate sums in Excel: by typing them in and by using the **AutoSum** function
* To calculate a sum by typing, tell users to complete the following steps:
  1. Click in the cell where they want the sum to appear
  2. Type in **=SUM(**
  3. Type in the range of cells (ex. **B16:B26**)
  4. Close the parentheses
  5. Press the **Enter** key
* To use the **AutoSum** function, tell users to do the following:
  1. Click in the cell where they want the sum to appear
  2. Click the **AutoSum** button on the **Formulas** tab
  3. Check the formula to verify that the range of cells is the correct one; if not, adjust it
  4. Press the **Enter** key

**ACTIVITY**: Have participants complete **Activity #2** on the *Activity Sheet*

* Calculating Percentages & Using AutoFill
  + Explain that percentages are calculated by dividing a figure by a total or an original amount (i.e., require a Division operation)
  + To calculate a percentage, tell users to complete the following steps:
    1. Enter the number followed by a forward slash (/) followed by the total, original amount, or goal, (ex., =B16/B13)
    2. Hit the **Enter** key
    3. Click the % key in the **Number** group
  + Share with participants that AutoFill can help them quickly copy data within rows or columns. To use AutoFill, ask them to complete the following steps:
    1. Select the cell with the text, data, or formula they wish to copy
    2. Move the cursor to the lower right corner of the cell until it turns into a cross
    3. Click and drag down or across until it covers all the cells you want to copy the data into, then release the mouse button

**ACTIVITY**: Have participants complete **Activity #3** on the *Activity Sheet*

* Calculating Averages, Minimums, & Maximums
  + Discuss that other common calculations include averages, minimums, and maximums, and that there is a function to use for each one
    - Demonstrate how to calculate an average in cell **I6** using cells **B17** through **M17** [**=AVERAGE(B17:M17)**]
    - Demonstrate how to calculate an minimum in cell **I7** using cells **B17** through **M17** [**=MIN(B17:M17)**]
    - Demonstrate how to calculate a maximum in cell **I8** using cells **B17** through **M17** [**=MAX(B17:M17)**]
* Tips & Tricks
  + Review the following basic troubleshooting tips with participants before asking them complete the final activity
    - If numbers suddenly change to **#####** it means the cell is too narrow to display them. To correct it, place the cursor on the column border and double-click to auto-adjust the width to the appropriate size
    - If a cell contains **#VALUE?** or **#NAME?** instead of a number it means there is something wrong with the formula [ex. Trying to calculate an average but using **=AVG(B17:M17)** instead of **=AVERAGE(B17:M17)**]. To correct it, fix the formula
    - If a cell contains a green triangle in the upper left corner, it means there is a possible error in the formula. To correct it, click on the arrow so the **Warning** box appears with a message (ex. The formula contains unrecognized text). If the information is correct, click **Ignore** **Error**; if not, take one of the appropriate actions to resolve it. If you need help understanding the error, click the **Help on this error** option
    - If you see a circular reference error it means that the cell is referencing itself in the calculation (ex. **=SUM(A13:A17)** and the cell in which you’ve set up the formula is cell **A17**). This is usually the result of a typo, so to fix it, replace the improper cell with the proper one

**ACTIVITY**: Have participants complete **Activity** **#4** on the *Activity Sheet*

**Wrap Up/Closing (3 mins.)**

* Highlight the upcoming technology classes and share the types of topics that will be covered
* Ask if there are questions and answer any that were “parked” during the session
* Thank participants for coming and ask them to complete the class survey before leaving