Microsoft Excel: Formulas and Functions

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The Practice files for this lesson are located in the subject guide under Practice Files:

Notes on Formulas

- **Formula** – An expression that calculates a value. Starts with an =, you enter the cell addresses, operators or functions to do the calculations
- **Function** – Used in a formula, the operations needed have already been defined for you. Each function needs arguments and produces a result.
- A formula is entered in the cell in which the result is to be displayed
- A formula can include numbers, cell references or ranges, and **operators** (+ - / *)
- If possible, avoid typing numbers into a formula. Refer to the cell/ranges with the numbers in it.

Order of Operations

- Formulas are calculated from left to right
- Any operation in parentheses is calculated first.
- Multiplication and division are always done before any addition or subtraction.
- **Please Excuse My Dear Aunt Sally** to remember Parentheses, Exponents (not covered in this class), Multiplication, Division, Addition, and Subtraction

Quick Access to Common Functions

Quickly calculate and enter common functions like **Sum**, **Average**, **Maximum** or **Minimum** by using the drop down on the ribbon.

<table>
<thead>
<tr>
<th>Function</th>
<th>Purpose</th>
<th>Example</th>
<th>Result – See spreadsheet example on back</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUM</td>
<td>Summarizes the sum of the values.</td>
<td>=SUM(B2:B13)</td>
<td>1530</td>
</tr>
</tbody>
</table>
### Calculating Percentages

To calculate % increase (or % difference) use this:

\[(\text{New Value} - \text{Old Value})/\text{Old Value}\]

Or, if you have a column with the difference already calculated, use Difference/Old Value.

In the example on the right, the formula in cell E2 is $=\frac{D2}{B2} = \frac{2}{100} = 0.02$ \(2.0\%\)

*Note: Cells E2:E13 are formatted in the Percent format*

### Trouble Shooting Tips

- When numbers suddenly change to ###### it means that the cell is too narrow to display them. Widen the column by placing the cursor on the column border and dragging it to the right until there is enough space.

- When a cell contains #VALUE!, the formula in the cell contains nonnumeric data or function names that cannot be used in the calculation.
- You will get a circular reference error if you have a formula that has a reference to the cell in which you want the calculation to appear.
- A green triangle in the upper left corner of a cell means possible error. Click on the cell, then click on the **Warning** indication to the left of it.
Microsoft Excel 2016: Formulas & Functions Activity Sheet

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Activity #1

1. Open Practice File- Formulas & Functions.
2. In the TOTAL INCOME box below the Jan column, enter the correct formula to calculate the income for January =B11+B12.
3. Copy and paste the formula from cell B13 into cells C13:M13 to find income totals for the months of February through December.
4. Edit the formulas in cells N16:N26 so they include the data in cells M16:M26.

Activity #2

1. In the Total Expenses box below the Jan column, use the SUM function to calculate the expenses for January =SUM(B16:B26).
2. Copy and paste the formula from cell B27 into cells C27:M27 to find income totals for the months of February through December.
3. Use the AutoSum function to calculate the total annual income in cell N13.

Activity #3

1. Calculate the % of Income the mortgage accounts for in cell O16 with the formula =N16/N13.
2. Click the % key in the Number group.
3. Edit your formula so N13 is an absolute reference. Your formula should look this: =N16/$N$13
4. Use the Auto-fill function to calculate the % of Income for each remaining expense category in cells O17:O26.

Activity #4

1. Use the SUM function to calculate the total income for the year in cell B3.
2. Use the SUM function to calculate the total annual expenses in cell B4.
3. Enter the correct formula to calculate the total yearly SURPLUS CASH in cell B5.
4. Use the Average function to calculate the Monthly Average in cell B6 with =AVERAGE(B27:M27).
5. Use the MIN function to calculate the minimum monthly expenses for the year =MIN(B27:M27).
6. Use the MAX function to calculate the maximum monthly expenses for the year =MAX(B27:M27).
The completed chart should look like the one below: