The Fill Handle is in the bottom left corner of the selected cell. When you place your mouse over this handle, it changes from a thick white selection cross, to a think black cross. Once you see the darker cross you can click and drag the cell to fill its contents in a single direction (up, down, left or right). If you want to go in two directions, you must first complete one way, let go of the mouse and then drag again in the second direction.

When you use the Fill Handle to pull down a single number or plain text, it will work as a simple copy.

When you use the Fill Handle to pull down a text with numbers, a date, a month or a weekday it will fill in a Series of data.

When you select two or more numbers (including dates) and then use the fill handle, Excel will fill in the Series, following the original pattern. It can only follow simple addition and subtraction patterns.

The Fill Handle will pull down the format of the cell you start with. This includes number formats as well as capitalization,
**Mathematical Operations**

To let Excel know you expect it to “do math” you need start your cell with an equal sign (=).

- **Addition**, plus sign (+) = $5+2$ result 7
- **Subtraction**, hyphen (-) = $5-2$ result 3
- (also used for negative) = $-5$ result -5
- **Multiplication**, asterisk (*) = $5*2$ result 10
- **Division**, slash (/) = $5/2$ result 2.5
- **Power**, chevron (^) = $5^2$ result 25

There are several operands to use for logic comparisons.

- **Greater than**, greater than sign (>) = $5>2$ result TRUE
- **Less than**, less than sign (<) = $5<2$ result FALSE
- **Equal to**, equal sign (=) = $5=2$ result FALSE
- **Not equal to**, Greater & Less than signs (<> or !=) = $5<>2$ result TRUE

**Order of Operations**

Microsoft Excel respects the Order of Operations.

1st. Parenthesis
2nd. Powers
3rd. Multiplication and Division
4th. Addition and Subtraction

This means with an equation such as $=5+3*2$, excel will do the multiplication $3*2$ before it does the addition. The result would be 11. If you wanted the addition to happen first, you would have to use parentheses such that $=(5+3)*2$, giving you a result of 16.

Unlike traditional math, you should not use the square brackets, such as $[(5+3)*(4-2)]$ for separations, ONLY use parenthesis, such as $=((5+3)*(4-2))$, result 16.

**Cell Addresses**

Each cell belongs to a lettered column and a numbered row. We refer to its “address”. From the picture shown here we see that A1=“5”, A2=“6”, B1=“2” and B2=“3”. When we want to use these cells in our math equations we can refer to their address.

- $=A1+A2$ Result 7
- $=B1+A2$ Result 8

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

You can either type in the address you want or click on the cell after you’ve entered the operand (=, +, -, *, /, ^) and Excel will enter the address for you.

*Remember to let Excel know you want it to calculate something; you have to start with an equal sign (=).*
Functions
Microsoft Excel has several built in functions. To insert a function, click the **Paste Function** button on the Standard Toolbar, or by choosing the **Function…** option from the **Insert** menu.

The first category is a list of **Most Recently Used** functions. To see all the functions built into Excel, you can choose **All** from the Function categories: list. They will be listed on the right side, under **Function name:**, in alphabetical order.

Notice under these two lists there is a description. Each function you select will give you an example arrangement of the function and the arguments, as well as a description of what that function will do. Just choose the function you want to use and click **OK**.

An easier way to access the list of **Most Recently Used** functions is to press the equal sign on the keyboard, as if you were going to type a mathematical function. The name box, that displays which cell you are in, changes to the list of **Most Recently Used** functions.

If the function you desire is not on the most recently used list, chose the **More Functions…** option and you will get the above **Paste Function** dialog box.
No matter which method you use to select which function you desire, you will get a screen such as this.

The function name is listed in the top left corner and the description is across the bottom. There are blanks in the middle of the screen for the arguments of the statement. You can type in the data or use the Collapse or “go out and get it button”. This will collapse your formula screen such that you can select the data you wish to use as an argument in this function. Once you have chosen your desired data either press Enter or click on the Expand button.

You do not need the equal sign unless you are doing a logic comparison (A4=26).

In the sample above, you can see we can Sum more than one number/set of numbers. As soon as you click into Number 2 a Number 3 will appear. The description tells us this will allow up to 30 arguments to sum.

Notice across the bottom of this window we see a Formula Result =. This will show us the answer we will see when we are done. Notice there is also an =number at the end of each argument line. This will give you a piece-by-piece result for each argument. This is especially helpful when using the logic functions, such as If.

When you click the OK button, the cell you were in should contain your desired result. Pressing the F2 key on the keyboard will put this formula into edit mode. Excel color-codes which data it is using in this formula. To bring back the gray edit box, click on the equal sign on the formula bar.

NOTE: If you know the format and function, you can simply type in the information, such as “=Sum(A2:A4)”. Don’t forget the equal sign.
**Absolute/Relative**

When you create an equation in Excel using the cell addresses of other cells, Excel sets up the equation to have a relative reference. This is important when you are using the Fill Handle or the Copy and Paste features because the answer is relative to the location of the data. For example:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td>=A1+B1</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>4</td>
<td>2</td>
<td>=A2+B2</td>
</tr>
</tbody>
</table>

If this equation is copied into cell C2, or the Fill Handle is used to drag the equation down to C2, Excel will give you this result:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td>=A1+B1</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>4</td>
<td>2</td>
<td>=A2+B2</td>
</tr>
</tbody>
</table>

Since the equation was moved down, between rows, only the row number changes. If instead we moved the equation across, the row numbers will remain the same, but the column numbers will change:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td>=A1+B1</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>4</td>
<td>2</td>
<td>=A2+B2</td>
</tr>
</tbody>
</table>

The addresses in the equation are "relative" to where the answer is positioned. The equation in cell C1 tells Excel to take the number that is two to the left and add it to the number one to the left from this cell. When we move the cell over or down, the basic equation stays the same, it still says, take the number that is two to the left and add it to the number one to the left from this cell.

If you do not want a number to move relatively you can make it *absolute* by using dollar signs ($) in the equation. The F4 button on the keyboard will place the characters in for you while you are in Enter or Edit mode.

- =$A$1 - Locks the reference into Cell A1
- =$A1$ - Locks the reference into Column A, but will allow the row number to change
- =A$1 - Locks the reference into Row 1, but will allow the row number to change

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>6</td>
<td>=$A$1+B1</td>
<td>SubTotals:</td>
<td>123</td>
<td>456</td>
<td>789</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>4</td>
<td>=$A$1+B2</td>
<td>Taxrate:</td>
<td>6.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>=$A$1+B3</td>
<td>Taxes:</td>
<td>=F1*$F$2</td>
<td>=G1*$F$2</td>
<td>=H1*$F$2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Naming
Another way to ensure an absolute reference to a cell is to Name the cell, and use that name in your equation. The simplest way to define a cell name is to select the cell, erase the cell address within the name box, type the Name of the cell in the name box and press Enter.

Once a name is defined, you can use it in your equations:

=B12*TaxRate

When you use the fill handle or the Copy/Paste feature, the B12 will change to be relative to the new location, but TaxRate will remain throughout, always pointing to cell B1.

This same method can be used for a range of cells. Select the desired range, click within the name box, erase the current cell address, type the name of the range, press Enter.

*NOTE* There are some limitations in naming. You cannot use many special characters such as the hyphen (-), and the name must be all one word, no spaces. In the example above we used capitalization to show multiple words, you can also use the underscore(_).

Good Names:
taxrate TaxRate Tax_Rate

Bad Names:
tax rate Tax-Rate

The Name option is under the Insert menu:

Insert->Name->Define

To Delete: Select the name in the list and press the Delete button

To Redefine: Select the name in the list and then click within your worksheet to point to the new cell(s). Click the Add Button to re-add the name to the list.