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## The Excel Environment

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td><strong>Rows</strong></td>
<td>Horizontal; Numbered; 65,536 rows on one sheet</td>
</tr>
<tr>
<td><strong>Columns</strong></td>
<td>Vertical; Lettered; 256 columns on one sheet;</td>
</tr>
<tr>
<td><strong>Cells</strong></td>
<td>Intersection of a row and column; contains entered values, labels, formulas or functions; named according to the row and column it is located in</td>
</tr>
<tr>
<td><strong>Cell Selector</strong></td>
<td>Black rectangle that activates a cell for data entry, formatting, copying, etc; includes a fill handle on the bottom right corner.</td>
</tr>
<tr>
<td><strong>Cell Names/Addresses</strong></td>
<td>Each cell has a name, or address, composed of the letter and number of the corresponding column and row; cell addresses can be used in calculations</td>
</tr>
<tr>
<td><strong>Name Box</strong></td>
<td>Displays current cell address; can also be used to name a cell or range of cells</td>
</tr>
<tr>
<td><strong>Formula Box</strong></td>
<td>Displays formulas and functions that are in a cell</td>
</tr>
<tr>
<td><strong>Workbook</strong></td>
<td>The Excel file; contains worksheets</td>
</tr>
<tr>
<td><strong>Worksheet</strong></td>
<td>Grid of cells that contain data; a workbook can have multiple worksheets containing data</td>
</tr>
<tr>
<td><strong>Labels</strong></td>
<td>Text cell contents</td>
</tr>
<tr>
<td><strong>Values</strong></td>
<td>Numerical data cell contents</td>
</tr>
<tr>
<td><strong>Formulas</strong></td>
<td>Mathematical calculations</td>
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<tr>
<td><strong>Functions</strong></td>
<td>Built in mathematical operations</td>
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Examples:
- D5
- E4
- M22
- R25
- =f10*25%
- =sum(F10:F15)
Navigating and Adding Data
There are numerous ways to move around a spreadsheet. Using the mouse is a common method, but keyboard shortcuts are more reliable. The mouse is fine for basic data entry, but can cause confusion later when working with formulas and functions. Get in the habit of typing data and using the keyboard to enter it into the cell and move to the next cell. Spreadsheets can become quite large, so having a collection of navigation methods is helpful.

Enter  
Data is entered into cell and cell selector moves down to next cell

Arrows  
Data is entered into cell and cell selector moves in the direction of the arrow

Tab  
Data is entered into cell and cell selector moves to the next cell to the right

Backspace  
Only for editing within the cell; does not move selector from one cell to the next.

Delete  
Deletes contents of selected cell; deletes the character only if cursor is active inside of a cell

Mouse  
Data is entered and cell selector moves to the cell that is clicked; adds cell address to formulas and functions.

Page Up  
Moves view down sheet one screen length at a time; moves cell selector

Page Down  
Moves view up sheet one screen length at a time; moves cell selector

Scroll Bar  
Moves view up or down sheet; does not change location of cell selector

Ctrl + Home  
Moves cell selector to cell A1, the beginning of the spreadsheet

Home  
Moves cell selector to the beginning of a row

Sheet Tabs  
Click on a tab to view that sheet; Displays sheet names; Use scroll arrows next to sheet tabs if needed.

Basic Data Entry
1. Click a cell
2. Type Data
3. Press a key that enters data and navigates to the next cell: Enter, Tab, Arrow

Spreadsheet Creation Process
1. Type in data, including all labels and values
2. Create all mathematical calculations
3. Format data
4. Set up page for printing

Edit Cell Contents
- Click a cell and type new contents to replace
- Double click a cell to activate the cursor within it and edit existing contents
- Click a cell and press the Delete key to delete all contents in a cell

Resize Columns and Rows
- Click and drag the dividing row/column line in the gray row/column header
- Double click the dividing line of a column to automatically resize that column to fit its contents.
- **Format/Row/Height** - set height with the number of points (font size measurement) up to 409.
- **Format/Column/Width** – set number of characters up to 255
Insert and Delete Columns and Rows

- Right click a row or a column header and select “Insert”. Rows are added above selection, columns are added to the left of selection.
- Right click a row or a column header and select “Delete.”

**Insert/Rows**  
**Insert/Columns**

**Selection Methods**
Selecting multiple cells is a common necessity in Excel. You must select cells before you can do such things as copy, move, format, or name a range. There are different methods of selecting cells.

**Click and Drag** Use your mouse to click at the beginning point, hold the mouse button down, and drag to the end point.

**Shift Click** Click on the first cell in the group. Hold your Shift key down and click on the last cell. This selects the entire group of contiguous cells.

**CTRL Click** Click on the first cell in the group. Hold your Ctrl key down. While holding the Ctrl key, click on each cell you want to include in the group. This method selects cells even if they are noncontiguous.

**Select All** Use **Edit/Select All**, Ctrl+A, or click the blank gray header at the upper left corner of your spreadsheet, where the column and row headers meet. Any of these will select all cells in the worksheet so that you may perform an action on all at once.

**Copy, Cut, Paste, and Move**
We often put data into cells and then need the same data elsewhere, or need to move it to different cells. Excel offers multiple ways to quickly copy or move data.

**Copy**
Select the desired cells then use **Edit/Copy**, the copy icon, Right click and Copy, or Ctrl+C. All content will be stored temporarily on the clipboard so that you may paste it elsewhere.

**Cut**
Select the desired cells then use **Edit/Cut**, the cut icon, right click and cut, or Ctrl+X. All content will be removed and stored temporarily on the clipboard so that you may paste it elsewhere.

See a dotted line around a copied or cut cell? The line is temporary and will go away on its own as you continue to work. It appears to remind you that you have that content ready to paste. If you want to remove it, just press your Escape key and it will go away.

**Paste**
Select the cell that you want to paste cell contents in. If you have copied or cut more than one cell, you only have to select the ONE cell where you want the information to begin. Excel will disperse cell contents into all the cells just as they were copied/cut. Use **Edit/Paste**, the paste icon, right click and paste, or Ctrl+V.

**Move**
Cutting data and pasting it elsewhere is a method of moving. You may also select the data and then drag it to a new location. After selecting the data, place your mouse over the edge of the cell selector. Your mouse pointer will show a four way arrow attached to it. When visible, you may click on the edge of the cell selector, hold the mouse button down, and drag the contents to a new location.
**Fill Handle**
The Fill handle appears as a small black square on the bottom right corner of the cell selector. It has multiple uses and is a quick way to copy and paste or fill in a series of data. The fill handle can copy the original cells and paste the in others, or it can fill in a data series for you.

---

Mouse pointer appearance when using the fill handle.

1. Select original cell(s)
2. Use mouse to click and drag fill handle in any direction.
3. Data will be filled in to each cell that you drag to.

Use the right mouse button to get a menu of options when using the fill handle – click and drag it with the RIGHT mouse button and choose action from the menu.

Set up the beginning of a series, select it, and use the fill handle to continue the series.

**Examples**
- Type January in one cell and February in the next cell. Select both cells and then drag the fill handle. Works with days of the week too!
- Type in a series of numbers in two or three cells. Select all of those cells and then drag the fill handle to have Excel continue the pattern of numbers.

Set up your own lists to get filled in with the fill handle:
1. Type a list of data, such as a list of names. Select all cells.
2. **Tools/Options/Custom Lists Tab**
3. Click the Import Button to bring in the values from the range of cells you have selected.
4. Now when you type one entry from the list and use the fill handle, you may choose to continue your own custom series or list. Select the first entry, right click and drag the fill handle, and select “Fill Series”
**Formatting**

In Excel you may format how text and numbers appear, as well as change the appearance of the cells. While there are many formatting choices, remember that the goal is to make data easy to read!

**Formatting Toolbar**

Like all Microsoft applications, the Formatting Toolbar contains common attribute choices. Other options will be accessed through the Format menu.

```
[Formatting Toolbar Image]
```

Notes on Formatting:
- Alignment changes where values are placed in a cell, not on the page as in Word.
- The percentage format moves the decimal point rather than just applying the percentage sign.
- Indentations move the values within the cell, not in relation to the entire sheet.
- Formatting options will only be applied to selected cells.
- Need to remove formats? **Edit/Clear/Formats**
- Need to format cells the same? Use **Format Painter**: Select formatted cells, click Format Painter, and then click the cell you want to apply the formats to. (or click and drag multiple ones)
- Even if you delete the contents of a cell, the formats still exist there.

**Number Formats**

Use the **Format/Cells/Number Tab** to get more options for number formats.

Notes on Number Formats
- Currency and Accounting differ in alignment
- You can use the fraction format to convert decimals to fractions

**Alignment**

The Alignment tab in the Format Cells dialog box helps to arrange data in a spreadsheet so that it fits and is easy to read.
- Horizontal and Vertical alignment changes the location of the value within the cell
- You may wrap text within a cell and make the cell larger so that text is contained within it rather than spilling over into other cells.
- Merging cells combines multiple cells into one large cell
- Use the Orientation slider to tilt values and labels.
- Click the box that says “Text” to change the direction of the text inside of a cell.
Fonts
The Font tab of the Format Cells dialog box contains basic formatting most of which is also found on the formatting toolbar.

Borders
Apply borders to selected cells by clicking on the type of border, and then clicking on the diagram where the border should be applied.

Conditional Formatting
Conditional formatting allows you to set up criteria and multiple formats for cells. When values meet certain criteria, the format will change. This is very helpful to highlight values that meet certain criteria, or alert the user of the spreadsheet that a cell contains a certain value.

1. Select the cells for which you want to set conditional formatting.
2. **Format/Conditional Formatting**
3. Set the rule, criteria, and parameters
4. Click the format to set the appearance when the criteria is met
5. Click OK – or you may click Add to add two more criteria on that cell.

AutoFormat
Use **Format/AutoFormat** to quickly apply built in collections of formatting options. Excel interprets the arrangement of your data and applies formatting options itself. Simply click on one of the samples in the AutoFormat box and click OK. You may change formatting on the cells yourself even after applying AutoFormat.
Printing

Printing an Excel spreadsheet can be a challenge at times, but following a few simple suggestions can lead to easily achieving attractive results.

Page Break Preview

Use Page Break Preview to see and change where one page ends and another begins. In this view, you can click and drag to move page breaks, and insert breaks where you want them. You may work on the spreadsheet as normal when in Page Break Preview.

View/Page Break Preview

Click and drag the blue lines to change where the pages breaks are located.

To return to Normal View: View/Normal

Page Set up

The page Setup dialog box is the most important component in getting your spreadsheet to fit correctly on a page.

File/Page Setup/Page Tab

- Often changing the orientation makes the data fit on the page better.
- You can have Excel force the data onto a specified number of pages. This will effectively shrink the content in appearance so that it fits onto the page.
- Scaling will shrink or enlarge the content to affect how it fits the page.
- Specify paper size to get an accurate view of how the data will fit.
- You may preview and print from the Page tab, too.

Margins

File/Page Setup/Margins Tab

- Changing margins will adjust how your data fits on the page.
- Smaller sets of data may be more attractive when centered on the paper. Select both boxes, Horizontally and Vertically, to center everything on the page.

Headers and Footers

File/Page Setup/Header/Footer Tab

- Use the Header/Footer tab to set up content that you want printed at the top and bottom of every page.
- Access recently used headers and footers in the drop down menus.
- Create new headers and footers by clicking the Custom button(s).
Header and Footers have three possible sections, the left, center, and right. You do not have to use each section. Place the content in the appropriate box according to where you want it to appear on the page. You may have multiple lines of text in each section.

<table>
<thead>
<tr>
<th>Left section:</th>
<th>Center section:</th>
<th>Right section:</th>
</tr>
</thead>
<tbody>
<tr>
<td>&amp;{Page}</td>
<td>&amp;{Date}</td>
<td>University of Nevada Las Vegas Office of Information Technology</td>
</tr>
</tbody>
</table>

Use the buttons to insert common content. As you click the button to insert content, Excel enters code into that section.

**Sheet Options**
The sheet tab contains a mixture of options that allow you to control how your spreadsheet prints.

**File/Page Setup/Sheet Tab**

- **Print area**: Print portions of your spreadsheet. Select the cells you want to print using any selection method. **File/Print Area/Set Print area** to save the selection.
- **Print Titles**: Specify the row or column that your titles reside in and Excel will print them at the top and/or left of each page.
- **Gridlines**: Check if you want the cell lines to print over the entire sheet of paper.
- **Row and Column Headings**: Prints out the row numbers and the column letters with your data.
- **Page Order**: Changes how your pages are numbered and which way they print out. Excel will go across your data to subsequent pages or go down your data to subsequent pages.

**Print Options**

When you are ready to print, there are also print options in the final window before sending it to the printer. Whether you choose the Print button from page setup, print preview, or **File/Print**, you can access more options.

You usually want to stay away from the printer icon in your toolbar when using Excel. This icon sends the spreadsheet directly to the printer without giving you any options. You usually want to make some setup decisions and preview it before sending to the printer.
The main differences in the Print options dialog box for Excel are the “Print What” choices.

Selection
Select specific cells to print rather than all of your data

Active sheet
Prints only the worksheet you are currently viewing

Entire Workbook
Print all worksheets in the file. Make sure you have set each up and previewed it before using this option.

Multiple Worksheet Basics
Click on a sheet tab at the bottom of the Excel window to view other sheets. Use the scroll arrows to scroll through a large collection of sheets.

Insert Additional Worksheets
Insert/Worksheet
Insert as many sheets as your computer can support in its memory.

Rename Worksheets
Double Click the existing name to highlight it. Type a new name onto the sheet tab. Press the Enter Key.

Move Worksheets
Click and drag a worksheet tab to move it and change the order.
OR
- Right click a sheet tab and select “Move or Copy” from the shortcut menu.
- Select the sheet before which you want to place the sheet you are moving and click OK.
- You may also choose to move the worksheet to a new file.
- Click “Create a copy” to copy the worksheet to a new location or a new file.

Delete Worksheets
View the sheet you want to delete Edit/Delete Sheet

Color Code Sheet tabs
Right Click a sheet tab
1. Select “Tab Color”
2. Click on a Color
The color choice shows up as an underline when the sheet is selected, and as a full tab color when the sheet is not selected.
Arrange windows
Compare workbooks side by side
   Window/Arrange
Select how you want the workbooks arranged next to each other and click OK

Freeze panes
To scroll through large amounts of data but keep titles visible, you may freeze rows or columns in place. The “frozen” row(s) or column(s) will stay in place as you scroll down or across the spreadsheet.

You must place your cell selector correctly before selecting the menu option to freeze the titles.
Any row above the cell selector will be frozen into place.
Any column to the left of the cell selector will be frozen into place.

1. Place cell selector
2. Window/Freeze Panes

To unfreeze:
Window/Unfreeze Panes
(Location of the cell selector is unimportant)

Go To
Use the Go To box to quickly navigate to a desired location
   Edit/GoTo
Keyboard Shortcut:  Ctrl+G

Type in the Cell address and click OK
Type in a sheet name and a cell address if you want to jump to another sheet. The sheet name has to include an exclamation mark. Example: Sheet!A1
The GoTo box keeps a history of the cells you have specified in the GoTo box. This makes it easy to go back to the GoTo box and navigate back easily by selecting one in the list and clicking OK.

Find
Use the Find box to locate certain values, labels, or symbols in a worksheet or workbook.
   Edit/Find
Keyboard Shortcut:  Ctrl+F

Specify what you are looking for in the Find What box.
Click Find Next or Find All
Use the Options button to specify more search criteria.
Use the Format button to specify a particular format for the search criteria
Replace
Use the Replace box to find a value, label, or symbol, and replace it with a different one.

**Edit/Replace**
Specify what you want to find, and then specify what you want to replace that with.

Examples:
- Find all instances of “Manager” and replace with “Director”
- Find all instances of the percentage format and replace with the number format to display the decimals instead of the percentage symbols.
- Find all bolded instances of “Total” and replace with red colored “Grand Total”

The Replace Tab is in the same box with the Find tab.
Keyboard Shortcut: **Ctrl+R**
Formulas

Formulas are mathematical sentences that are entered into a cell to perform calculations. Formulas follow a specific syntax and include operators and arguments. Operators are the math symbols, and arguments are the cell addresses and/or constant values. All are put together to instruct Excel what math calculations to perform on which values and to return the answer in the cell.

Mathematical Operators

Operators are math symbols, and tell Excel what calculations to perform. Excel uses the following mathematical operators (operands) to perform calculations:

+ Plus sign Addition
- Minus sign Subtraction
* Asterisk Multiplication
/ Forward slash Division Note the forward slash, not a backslash.
() Parentheses Denote order of operations if necessary
= Equal All formulas start with the equal sign (at the beginning rather than end)

When creating formulas, the keypad on the right of your keyboard may be more convenient rather than the numbers above the letters, and needing the shift key to access some mathematical operators.

Values

Arguments are the values that you want to use in the calculation. These instruct Excel what values to calculate. Arguments are of two types:

• Cell addresses - the calculation is performed on whatever value is entered into that cell
• Constant values - the calculation is performed with that specific number

Examples of cell addresses: A1 C22 F29
Examples of constant values: 32 3.5 20%

When you use a cell address in a formula, the formula uses whatever value is placed in that cell. Change the contents of it and the formula recalculates.

Formula Syntax

To create a formula, you will combine arguments and operators to create a mathematical sentence. The formula instructs Excel in what math to perform on which values. The formula must follow certain syntax so that Excel understands the instructions.
Syntax Rules
• A formula must start with an equal (=) sign to indicate to Excel that it is supposed to calculate the contents of the cell rather than just display it.
• There can be no spaces included in a formula.
• Combine arguments and operators following the equal sign.

The formula is typed into the cell where you want the answer to be displayed. Once calculated, the formula is stored in the background of the cell and the spreadsheet displays and prints the result of the calculation.

Steps to create a formula:
1. Select the cell where you want the results of the formula to appear; type the formula into the cell where you want the answer to display.
2. Type and equal sign (=) to begin the formula.
3. Type the combination of arguments and operators.
4. Press the Enter key.

Example: =C4*0.25
The asterisk (*) is the multiplication operator
C4 is a cell address argument
0.25 is a constant value argument

Example: =B4+B5+B6-C17
This formula uses all cell addresses as arguments, and a mix of mathematical operators.

Excel will capitalize for you – don’t worry about capitalizing the cell addresses.

Using the Mouse
Do NOT use the mouse to move to another cell when you are finished creating a formula. The mouse will pick up the cell address you click on and use that in the formula! Use the Enter key to enter the formula and get the calculation results.

However, the mouse can be used to click on a cell address and put it into the formula rather than typing it. This is sometimes preferred over typing the entire mathematical sentence.
1. Click a cell to type the formula in.
2. Type an equal sign (=) to begin the formula.
3. Type any constant values that you are using, but use the mouse to click on the cells you are using. As you click on a cell, Excel will place that address in the formula for you.
4. You must still press the Enter key when you are finished (or click the green check mark in the formula bar).

Formula Bar
The Formula Bar provides a space for you to view and edit formulas. It is located at the top of your spreadsheet, below the menus and other toolbars. The result of formulas display in the worksheet cells, but the formula itself can be seen in the formula bar when the cell is selected. Click on the formula in the formula bar to edit.

Edit formulas and functions here

= C4/F14
X – Click the red X to cancel entry of the current formula in creation (same as pressing the escape key; cancels new text)
✓ Click on the green check mark to enter typed text into the cell; same as pressing the Enter key except that the cell selector remains on the same cell.
fx – Insert Function; used to begin the Function process; introduced in Module 2.

Order of Operations
Excel uses standard Order of Operations. To specify a different order of calculation you must use parentheses.

Standard Order of Operations:
- Parentheses
- Exponents
- Multiplication and Division (both, from left to right)
- Addition and Subtraction (both, from left to right)

To change the order, you must put calculations within parentheses so that Excel evaluates them first before moving outside to other calculations.

Example:
=4+5*3

Type this formula in a cell and see how Excel performs the calculation. It will NOT add 4+5 and then multiply by 3, getting 27. According to order of operations, the multiplication must be performed first. So Excel will evaluate 5*3 first, getting 15, then adding the 4, resulting in 19.

To change the order:
=(4+5)*3

Now Excel will evaluate what is in the parentheses first (4+5) and then move outside to multiply the 9*3.

Troubleshooting tips
Excel will attempt to correct formula syntax for you. If you press the Enter key after creating a formula and get an error message, read it! Excel may be identifying an error and offering to fix it for you. Your selection is important in how Excel handles the error and what you have to do to fix it.

Excel attempts to identify errors and make suggestions for correction. Excel may correct it for you, or take you back to allow you to edit the formula yourself.
Excel may also display specific error types directly within the cell. These errors are indicated in the cell instead of the results of the formula and indicate what kind of problem is detected.

Some common errors:
- #Value – wrong argument or operator; check the syntax of your formula
- #Name – text used within formula is incorrect (usually occurs with functions); check spelling
- #Div/0 – the formula is referring to a cell with a zero value and it cannot divide by zero; put a value in the cell it’s using or change the cell address to one that contains a value.

- Always make sure there are no spaces in your formulas.
- Make sure parentheses occur in pairs.
- Do not put math operators at the end of a formula
- When using functions, ensure you spell the function name correctly.
**Functions**

Functions are mathematical calculations built into Excel. The mathematical operations are built into the instructions, and you need only to give Excel the values (arguments) to perform the calculations on.

For example, a formula for averaging a list of numbers might appear as such:

\[= (A1+A2+A3+A4)/4\]

The function used to average those same numbers:

\[=\text{AVERAGE}(A1:A4)\]

The math operators to add the numbers and then divide by the quantity is built into the function called “Average.” Excel knows to add all selected numbers together, count them, and divide by that number.

Like formulas, functions must follow certain syntax. Excel will attempt to help you troubleshoot errors in your functions so read error messages. You may also view and edit functions in the formula bar. Functions can be selected from a list or typed in.

**Function Syntax**

When composing calculations using functions, you may type the entire sentence, type portions and use the mouse to enter cell addresses (arguments), or use the Insert Function dialog boxes to complete all components of the function.

A function has the following basic components, syntax and rules:

\[=(\text{Name})\text{Arguments}\]

- Function names may be typed or selected from a list
- Arguments may be typed or selected with the mouse.
- A Function begins with an equal sign (=) just as a formula does.
- The name of the function comes directly after the equal sign.
- The arguments are constructed within parentheses. Additional pairs of parentheses may be used inside them to specify order of operations.
- Various functions have different requirements for the arguments. (See examples below)
- No spaces in functions.
- You can combine a function with formula-type components (See example E below)

**Examples:**

<table>
<thead>
<tr>
<th>A</th>
<th>=SUM(A1:A5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>=AVERAGE(B1:B7)</td>
</tr>
<tr>
<td>C</td>
<td>=SIN(F45)</td>
</tr>
<tr>
<td>D</td>
<td>=CONCATENATE(A1,B1,C1)</td>
</tr>
</tbody>
</table>
| E         | =SUM(A1:A5)*20%  
  (Finding 20% of the sum; example of a function combined with formula elements) |
**Insert Function Method**

Use the Insert Function button to select the function name rather than typing it, and to construct arguments within the Function Arguments box.

1. Select a cell to create the function in. The answer will be displayed in this cell.
2. Click the Insert Function button. This enters the equal sign in the cell for you, too.
3. Select a function from the list and click OK.
4. Enter the arguments in the Function Arguments Box and click OK.

---

**Select a function from the list**

The most recently used functions are displayed.

**Choose a Category of functions to see more**

**Click the function to read the information about it**

---

**Use the Function Arguments box to construct the cell addresses and/or constant values to use.**

Move the box and use the mouse in your spreadsheet if needed to select the cell addresses.

Each Function has its own requirements in Function Argument Box. Fields in bold are required, the others are optional.
Autosum

The Autosum button provides a shortcut to common functions.

1. Click the Autosum button in the standard toolbar.
2. Confirm that it is assuming the correct cells; click and drag with your mouse to select the correct cells if needed.
3. Press Enter

Use the Autosum drop down button to access the other common functions: Min, Max, Average, Count.
Relative and Absolute Referencing

It is common to have a collection of data and need to do the same calculation in multiple places. Rather than creating the formula in every cell that you need, Excel allows you to create it once, and then copy and paste to multiple locations. However, you must think about how you want the cell address to be affected. By default when you copy and paste formulas, the cell address are changed by Excel to reflect the new location. This is called Relative Referencing. The formula references cells in a relative location from where it's created, so it will reference cells in the same relative location from where it’s copied to. If you want to copy and paste a formula and keep any or all cell addresses the same, you must apply Absolute Referencing, which causes the formula to absolutely use a specific cell (or set of cells) regardless of where you copy the formula to.

Copy and Paste

You may use any copy and paste method to copy a formula or function and paste it to a new location. This saves time when you want to perform the same calculation in multiple rows or multiple columns.

1. Select a cell that contains a formula or function and copy it.
2. Select the cell(s) where to you want to copy it to and paste.

Also, remember that you can use the Fill Handle on the Cell Selector to copy and paste. The fill handle works with formulas and functions as well. Click and drag the fill handle to copy a cell and paste it into others. The formula or function will be copied and pasted and recalculated in the new cells.

Relative Referencing

Relative Referencing - The formula references cells in a relative location from where it’s created, so it will reference cells in the same relative location from where it’s copied to.

By default, when you copy and paste a formula or function, Excel uses Relative Referencing. This means that if, for example, you copy to a cell one row down, and Excel will adjust each row address in the formula to match the new location. You can copy a formula, move across rows or columns to paste and Excel will update the addresses to match the relative location of the data from the new cell.

Example

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>256</td>
<td>256</td>
<td>258</td>
</tr>
<tr>
<td>2</td>
<td>123</td>
<td>123</td>
<td>123</td>
</tr>
<tr>
<td>3</td>
<td>258</td>
<td>694</td>
<td>537</td>
</tr>
<tr>
<td>4</td>
<td>=A1+A2-A3</td>
<td>=B1+B2-B3</td>
<td>=C1+C2-C3</td>
</tr>
</tbody>
</table>

The original formula is in cell A4. When copied and pasted to other columns, Excel changes the addresses to use the correct column of numbers. The formula refers to the same relative location of values used in the calculation.

Note: clicking and dragging to move a formula or function will not change the cell address. You may relocate the formula or function without affecting the arguments. (Applies to cut and paste, too.)
Absolute Referencing

If you do not want Excel to apply relative referencing, you must “anchor” any cell address that you want to stay the same when copied and pasted. Applying absolute referencing entails editing the formula or function and inserting dollar signs ($) within the cell address(es) that you want to stay the same.

So instead of the formula appearing as

=A1+A2

Copying and pasting to column B would change the formula to =B1+B2

With absolute referencing, it would appear as

=$A$1+$A$2

Copying and pasting to column B would not cause the addresses to change.

Example

<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>20%</td>
<td>29.00</td>
<td>35.99</td>
<td>89.50</td>
<td></td>
<td>20%</td>
<td>29.00</td>
<td>35.99</td>
<td>89.50</td>
</tr>
<tr>
<td>2</td>
<td>=B1*A1</td>
<td>=C1*B1</td>
<td>=D1*C1</td>
<td></td>
<td>=G1*$F$1</td>
<td>=H1*$F$1</td>
<td>=I1*$F$1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Shortcut: Click in the formula or function in the formula bar, place your cursor within the cell address, and press the F4 key to toggle through absolute, relative, or mixed referencing options.

To calculate percentages of each value in columns B, C, and D, the formula could multiply the number by the percentage value in cell A1.

If the original formula is created in cell B2 and then copied to the other columns, Excel will apply Relative Referencing and update all addresses to the new relative location of values. The new pasted formulas are incorrect since A1 changes to B1 and C1.

To apply Absolute Referencing, insert dollar signs to “anchor” the cell address where the percentage is stored. When the formula is pasted to other locations, any cell address with dollar signs will stay the same. In this example, absolute referencing is applied to cell F1 so that when the formula is pasted into other the columns, the number evaluated changes according to that column, but the location of the percentage stays absolute.
**Cross sheet calculations**
To calculate numbers that appear on multiple sheets, you must include the sheet name with the cell address in the arguments. Sheet names are followed by and exclamation mark (!) to instruct Excel to use the cell on that sheet.

Select the cell in which you want to create the formula or function. Construct the formula with the sheet name! along with cell addresses.

**Example**
=SUM(2001!B5+2002!B5+2003!B5+2004!B5)
This formula is adding the values in cell B5 from each sheet. The sheets are named “2001”, “2002”, “2003”, and “2004”

You may also use the mouse to click on the cells that you want in your calculation. Click on the sheet tab, then click on the cell or cells that you want to include in the arguments. Excel will enter the sheet name, the exclamation mark, and the cell address for you.

You may copy and paste calculations using sheet names. Relative referencing will still apply to the cell addresses, but the sheet name will remain the same.

**Named Ranges**
Names ranges provide an option that makes it easier to use values in multiple sheets. With names ranges, you select a cell or group of cell and name that area. Then, the Name can be used as arguments in a formula or function rather than the cell addresses.

Example:
=SUM(A1:A3)
If the cells A1 through A3 are selected and named as “January”, the function could appear as:
=SUM(January)

Once you name a range, the name can be used in any calculation on any worksheet within the same workbook.

Example:
=SUM(2001!A1:A3)
=SUM(January)

**Name a range**
1. Select the cell or cells
2. Type a name for the range in the **Name Box** and press the Enter key
3. Repeat for any sets of named ranges you want to use.

**Use name as argument**
Rather than including the sheet name and cells, simply include the named range as that argument

=2003!A2*0.0725
=January*0.0725
If the sheets are renamed or removed, formulas using them will no longer be able to calculate correctly.
When copied and pasted, absolute referencing is used and the cell addresses used in the named range stay the same.

Cross Workbook calculations
To use values that exist in another workbook, add the file name to the arguments for your formula or function.

- File names are included within brackets. [  ]
- You must also specify the sheet to use within the file, which is still followed by an exclamation mark (!).
- The files must be open when creating a calculation using them so that Excel can establish the link.

   [File.xls]Sheet!Cell

Example:

= [Sales.xls]Smith!B4*3%

In this example, let us assume that we need to find the commission amount for a salesperson. Mr. Smith’s sales records are all kept in the Sales.xls workbook along with everyone else’s, each sheet containing the information for one person. Another workbook contains calculations that complete Payroll information. The Payroll workbook must use values from the Sales workbook.

As we work in the payroll file, we need to get total sales for Mr. Smith, apply the 3% commission, and get the answer.

The formula above instructs Excel to retrieve the value from cell B4 on the Smith worksheet in the Sales workbook. It then calculates the commission. The payroll workbook is linked to the Sales workbook.

When copying and pasting a formula or function using multiple files, absolute referencing is applied to all arguments by default, including the cell addresses.

If the linked file is renamed or removed, the formula will no longer be able to calculate correctly. The sheets in that file must also remain the same.
**Auditing Toolbar**

As another editing tool, the Auditing toolbar allows you to see lines that clearly diagram how formulas and functions are using data.

**View/Toolbars/Formula Auditing**

Use the Auditing toolbar to audit your data, whether you have invalid data and errors that you need to explore further, or if you simply want to see the precedents and dependents used in formulas and by values.

Tracing Precedents shows what values are used in a formula or function. Select the cell with the formula or function and click the Trace Precedents button. Click the Remove Precedent Arrows button to clear the arrows off.

Tracing dependents draws a line from a value to each formula or function that uses it in a calculation. Select a cell and then click the Trace Dependents button. Click the Remove Dependent Arrows button to clear the arrows off.

You may turn on the trace for multiple values, formulas, and functions. Click the Remove All Arrows button to clear off the sheet when finished.
**The Chart Wizard**

Graphs are visually appealing and make it easy for viewers to interpret and compare data. Providing a visual representation of data is often preferred over culling through lists of numbers.

Excel includes a Chart Wizard that leads users through the graph creation process in four steps. Steps within the Wizard have multiple tabs with various options to help you create a professional looking graph.

**Data**

By following a few tips on setting up and selecting your data, graph creation will be quick and simple.

- Enter and format all data before creating a graph.
- Data may be labels, values, and the results of formulas and functions.
- Format your titles differently than your data so that Excel recognizes them.
- Select the data to include in the graph.
- Include titles in your selection so that Excel may place them in the graph.
- Select only the parts of the data that need to appear in the graph.
- Remember to use SHIFT clicking and CTRL clicking to select the contiguous or noncontiguous data as needed.

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>University</td>
<td>25333</td>
<td>25346</td>
<td>25382</td>
<td>27226</td>
<td>27336</td>
</tr>
<tr>
<td>6</td>
<td>College of Arts</td>
<td>15163</td>
<td>15213</td>
<td>15226</td>
<td>15380</td>
<td>15364</td>
</tr>
<tr>
<td>7</td>
<td>College of Sciences</td>
<td>9230</td>
<td>9226</td>
<td>9246</td>
<td>9346</td>
<td>9360</td>
</tr>
<tr>
<td>8</td>
<td>Continuing Education</td>
<td>970</td>
<td>910</td>
<td>1422</td>
<td>2553</td>
<td>2622</td>
</tr>
</tbody>
</table>

Only the data in columns A and the 2005 data is selected, so that is what will appear in the graph.
The Wizard

After selecting the data to be graphed, start the Chart Wizard by clicking the icon in the toolbar. Each step of the Wizard has multiple tabs, so explore each before clicking the Next button.

After making selections on each tab in a step, click the NEXT button.

You can click the BACK button to return to a previous step in the wizard.

**Step 1: Chart Type**
Choose the type of graph to create.

Type categories are on the left. Click a chart type in the list.

For each main type, there are various sub-types available. Click on the picture of the one that you want to use under “Chart sub-type”.

Use the “Press and Hold to View Sample” button to get a small preview of your data in the selected chart type. This will help to ensure that your data works within the selected type of graph, and that the data was selected correctly.

When you have selected the chart type, click NEXT.

**Step 2: Chart Source Data**
If you set up and select your data before starting the Wizard, you may not have to make any adjustments or change any options in Step 2.

Ensure the chart is graphing the series in the direction you expected by selecting “Rows” or “Columns”.

You may adjust the cell address range if needed.

The series tab gives you additional options for changing what data is included.

The wizard provides a thumbnail preview of your current graph.
Step 3: Chart Options

Step 3 of the Wizard includes six tabs with various options for the appearance of the graph. Click on each of the tabs to set options as needed before clicking the NEXT button.

Titles Tab
Type in titles to appear on the top or along the axes of your graph.

Axes Tab
Depending on the arrangement and nature of your data, you may change how the axes are graphed, or exclude an axis if needed.

Gridlines Tab
Add additional gridlines to the graph if visually appealing.

Legend Tab
Place the legend in relationship to the graph, or remove it.

Data Labels Tab
Add data labels onto your graph areas to have the value displayed on the bar, plot line, pie piece, etc.

Data Table
Attach the table of values to be displayed as part of the graph.

The wizard provides a thumbnail preview of your current graph.

You will be able to return to any option tab later if you want to make changes. Click Next in the Wizard when you are finished with all tabs.
Step 4: Chart Location
The final step of the wizard allows you to place the graph in the desired location within the workbook.

As a new sheet: Inserts a new worksheet into the workbook and places the graph on it. Type a name for the new sheet before clicking Finish and Excel will place that name on the sheet tab. A graph that is placed on a new sheet by itself is sized to print perfectly on an 8.5x11 sheet of paper.

As object in: This option inserts the graph on an existing sheet. Choose the sheet from the drop down menu. The graph will float on the sheet as a graphic object, allowing you to move and resize as needed.

Step 4 is the last step, so after making your location and sheet name selection, click the Finish button.
**Formatting and Editing Graphs**

Excel provides options for customizing graphs. There are two main methods of accessing formatting and editing options for an existing graph: the **chart menu** and **double clicking** an element of the graph. When you have a graph selected, a chart menu appears in Excel. Use this menu to return to any step of the wizard, and to manipulate 3-D graphs. Double click an element to change colors, line thickness, font formatting, and more.

**Formatting Options**

Double click titles and labels to format the fonts, choose colors, and make alignment changes.

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Double click any graph bar to change the color or pattern that fills it, add data labels, or access other options pertaining to the type of graph chosen.

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![Chart Menu](image1.png)

![Data Series](image2.png)
Three-Dimensional Graph Options

If a 3-D graph sub type was chosen, the Chart menu includes a “3-D View” selection. Use this box to tilt the graph or rotate it.

**Chart/3-D View**

**Editing**
If values in the source data change, the graph will automatically update to reflect that change. Graphs are linked to the data.

Use the Chart menu to return to any option and make changes. The Chart Menu is only visible when you have an existing graph selected.

**Chart/Chart Type** – select a different type of graph to create.

**Chart/Source Data** – change cell ranges being used in the graph

**Chart/Chart Options** – change selections for appearance options

**Chart/Location** – change the location of a graph from one status to another (as its own sheet or floating on another existing sheet).

If the graph is a floating graphic object on an existing sheet, simply move and resize using the mouse as needed.