MS 365 Excel Basics #1

What is Excel?, Formulas, Functions, Formatting, Cell References & Page Setup

Goal of Video #1: Introduction to Excel, Excel Workbook files, Formulas, Functions, Formatting, Cell References and Page Setup for printing.

Table of Contents

What is Excel?

- Two-way grid
- Column = Letter
- Row = Number
- Cell = Intersection of column and row
- Worksheet = Sheet = All cells
    - Sheet Tab = Name of worksheet. You can select (or activate) a worksheet with your mouse cursor.
    - Keyboard to move (activate) the next sheet:
        - Ctrl + PgDn = move to right and activate next sheet
        - Ctrl + PgUp = move to left and activate next sheet
    - Open Activate dialog box: Right-click Scroll Arrows
- Workbook = File = All worksheets (and other behind the scenes things such as: (Queries, Data Model and VBA)
- Excel does two things:
    - Calculations, like Worksheet Formula
    - Data Analysis, like PivotTable
- Ribbon has tabs, tabs have groups and groups have buttons and dropdowns to enact commands
- QAT (Quick Access Toolbar) has buttons to enact commands
- Default Alignment indicates Data Type:
    - Text is aligned to left
    - Numbers are aligned to right
    - Logical Values (Boolean) are aligned center and Capitalized
    - Error Message is centered
- Number Formatting is a façade:
    - Number Formatting can be found in the Number group in the Home Ribbon tab
    - Number Formatting displays a number in a certain way on the surface of the cell, without changing the underlying number.
    - Formulas do not see Number Formatting. Formulas act on the underlying number.
    - You must use the ROUND function to change the underlying number and actually round the number.
    - Use the General Number Formatting to wipe away all Number Formatting and see what number is actually in the cell.
- Picture on next page:

What is Excel?

1. Two-way grid
2. Column = Letter
3. Row = Number
4. Cell = Intersection of Column and Row
5. Worksheet = All Cells
6. Sheet Tab = Name of Worksheet. You can select (or activate) a worksheet with your mouse cursor.
7. Workbook = File = All Worksheets (and other behind the scenes things such as: (Queries, Data Model and VBA)
8. Excel does two things: 1) Calculations, like Worksheet Formula, and 2) Data Analysis, like PivotTable

Keyboard to move (activate) the next sheet:
Ctrl + PgDn = move to right and activate next sheet
Ctrl + PgUp = move to left and activate next sheet
Open Activate dialog box: Right-click Scroll Arrows

1)

Sales
3
4
5
Total: 12

=SUM(J12:J14) Worksheet Formula that result in text answer

Worksheet Formula that results in number answer

2)

Product	Sales
Quad	23
Carlota	67
Carlota	46
Quad	9
Quad	43
Carlota	24

Product	Sum of Sales
Carlota	137
Quad	75
Grand Total	212

9. Ribbon has tabs, tabs have groups and groups have buttons and dropdowns to enact commands
10. QAT (Quick Access Toolbar) has buttons to enact commands
11. Default Alignment indicates Data Type:
    - Text is aligned to left
    - Numbers are aligned to right
    - Logical Values (Boolean) are aligned center and Capitalized
    - Error Message is centered

Text:	Word	Excel			Word				
Number:		43	8:00 AM	2/3/2025	43.12	8:00 AM	12/31/2024		
Logical:		TRUE		FALSE				**Total?**	0
Error		#DIV/0!							

Database Export
35
80
12
=SUM(V26:V28)

12. Number Formatting is a façade. Number Formatting displays a number in a certain way on the surface of the cell, without changing the underlying number. Formulas do not see Number Formatting. Formulas act on the underlying number.

Sales
3
4
5
Total: 12

<= Which one is right? =>

Sales
3
4
5
13

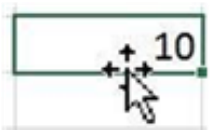
Tax Rate	Sales	Tax $
0.0375	100	3.75

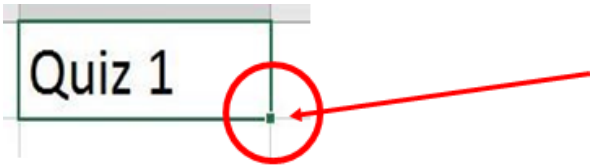
=P36*O36

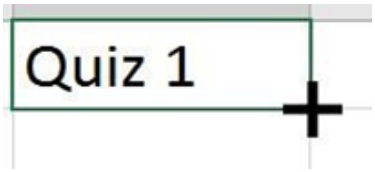
#1 most ask question in online Excel formulas for decades is about Number Formatting.

* Use the General Number Formatting to wipe away all Number Formatting and see what number is actually in the cell.

Cursors

- Selection Cursor: 
- Move Cursor: 

- Fill Handle: 

- Cross Hair = Angry Rabbit Cursor: 

    - Use Angry Rabbit to increment Text and Numbers, Dates, Numbers, Months and more
    - Use it to copy numbers and formulas

Put data or formula in cell with Keyboards

- Enter = Put thing in cell and move selected cell down
- Ctrl + Enter = Put thing in cell and keep cell selected
- Tab = Put thing in cell and move selected cell to right
- Shift + Enter = Put thing in cell and move selected cell up
    - Enter data into selected range: Enter moves down until last cell and then jumps to top of next column.

Formatting:

- Number Formatting is a façade:
    - Number Formatting displays a number in a certain way on the surface of the cell, without changing the underlying number
    - Formulas do not see Number Formatting. Formulas act on the underlying number.
    - You must use the ROUND function to change the underlying number and actually round the number.
- Style Formatting = Fill Color, Font Color, Borders and more (Not Number Formatting)

Excel's Golden Rule:

- Excel's Golden Rule:
  - When a formula input can change, put it in a cell, give it an informative label, and refer to it in the formula with a reference. However, if the formula input will never change (like 24 hours in a day, 12 months in a year), then you can type it into the formula.
- Full rule detail:
  - Hard coding formula inputs into formulas (typing them into formula) is the #1 cause of errors throughout spreadsheet history. In addition, a worksheet model is much more informative to the user when you type the formula inputs into cells, label them with labels that inform, and refer to them in the formula with cell references. When you hard code numbers that will not change into the formula, you do not have error risk, but the model may be less informative if the user could benefit from knowing the name of the formula input.
- Examples of formula inputs that can change:
  - SalesRep name like: Luong
  - Sales amount like: 100
  - Tax Rates like: 0.0375 or 3.75%
  - Sales Hurdles like: >500.
- Examples of formula inputs that will not change:
  - Months in a year: 12
  - Hours in a day: 24
  - Days in a week: 7
  - The Constant in finance formulas that represent the principal amount in finance: 1
  - Many scientific constants, such as: 9.8 m/s^2

Informative Labels for Excel Worksheet Solutions (Models):

- Label Excel solutions (models) carefully so users of the solution (including yourself) can understand what you have created. If a problem asks, "Count how many sales transactions were made for the product Quad where the city was Gunnison", here are examples of labels that do not provide the viewer with good information about the calculation being made:

Count how many sales transactions were made for the product Quad where the city was Gunnison.

Total	4	No informative at all about what is going on
Gunnison	Very little information provided	
Quad		
4		
Criteria:	**Result:**	Some information is provided
Gunnison	4	
Quad		

- Here is an example of labels that provide the viewer with good information about the calculation being made:

Count how many sales transactions were made for the product Quad where the city was Gunnison.

City	Product	Count Transactions or Count Records or Count Sales	Viewer is given good information about calculations that is being made
Gunnison	Quad	4	

Creating formulas

- All formulas start with an = sign as the first character in the cell
- Cell references are used in formulas to refer to cells with numbers and other content, like K2 or C7:J7
- Relative Cell References = when you copy formula, the cell reference moves relative the cell with the formula
- Absolute Cell Reference is created with F4 key. A $ sign is put in front of column reference and row reference, so cell reference will not move throughout copy action.
- Enter cell references into formula with Mouse or Arrow Keys
    - Arrows keys are fast when the cell is close
    - Use Mouse when cell is not close.
- Alt + = = SUM Function
- F2 = put cell in Edit Mode and place cursor at end of formula
- F4 = when cursor touching cell reference in Edit Mode, F4 adds dollar signs to lock the row and column references
- Tab = when function name is highlighted in blue, Tab, enters the function into the formula

Types of Formulas

- **Aggregate calculation** formulas
    - Aggregate = From many numbers (range or array) to calculate one answer
    - Examples: SUM to get a total or AVERAGE to calculate the average (mean: add up and divide by the count)
- **Single-Input Single-Output formulas** (Old School Formulas)
    - Because a single input is placed on either side of an operator, or in a function argument, the formula can only deliver a single answer.
    - It takes more effort to create single-input single-output formulas because:
        - You have to lock cell references
        - You have to manually copy formulas
        - Editing must be done in top cell and then you must re-copy formula through range.
- **Dynamic Spilled Array Formulas** (DSAF):
    - An array formula is a formula where there is two or more items (in a range or an array) on either side of the operator (like math * or /, or in a function argument) are then causes the formula to deliver more than one answer that spills to the cells below the cell with the formula.
    - A Dynamic Spilled Array Formula is "dynamic" because if the results expand or contact, the spilled range expands or contracts.
    - Benefits of DSAF:
        - Usually do not have to lock cell references
        - Do not have to manually copy formula
        - Editing is only done in top cell
    - Characteristics of DSAF:
        - Formula only lives in top cell
        - Cells below top cell show ghost formulas, but do not actually have a formula in the cell
        - When making a formula you can refer to any cell in the dynamic spilled range with a cell reference
        - If you type data in the path of the spilled array, you get a #SPILL! Error

Functions shown in video:

- **ROUND**(number,num_digits) = **Round a number**.
  - number = Number that you want to round.
  - num_digits = Position that you want to round to. 4 = 4th position to the right of the decimal. 2 = to the penny. 0 = to the dollar.
- **IFERROR**(value, value_if_error) = **replace error with value**.
  - value = the value that is checked for an error.
  - value_if_error = The value to return if the formula evaluates to an error. The following error types are evaluated: #N/A, #VALUE!, #REF!, #DIV/0!, #NUM!, #NAME?, or #NULL!.
- **SUM**(number1, [number2], ...) = **adds numbers to get a total**.
  - Number1 Required = The first number, cell reference, or range for which you want the average.
  - Number2, ... Optional = Additional numbers, cell references or ranges for which you want the average, up to a maximum of 255.
- **AVERAGE**(number1, [number2], ...) = **Returns the average (arithmetic mean) of the arguments (add numbers then divide by the count)**
  - Number1 Required = The first number, cell reference, or range for which you want the average.
  - Number2, ... Optional = Additional numbers, cell references or ranges for which you want the average, up to a maximum of 255.
- **XLOOKUP**(lookup_value,lookup_array,return_array,[if_not_found],[match_mode],[search_mode]) = **Lookup a value**.

XLOOKUP function, to lookup a value, a column or a row

When the XLOOKUP lookup function was introduced to the Excel world in September 2019, it changed the way worksheet formula lookup was done forever. It replaced many older lookup functions such as VLOOKUP, HLOOKUP, LOOKUP, INDEX, and MATCH. In my book *The Only App That Matters*, I devoted chapter 14 to showing the revolution that this function brought. At its essence it is a lookup function that lookups up a value, finds a match for the value, and then retrieves a value in the same position as the match. The returned value can be a single value, a column or a row. The arguments for this function are shown in Figure 4.7.

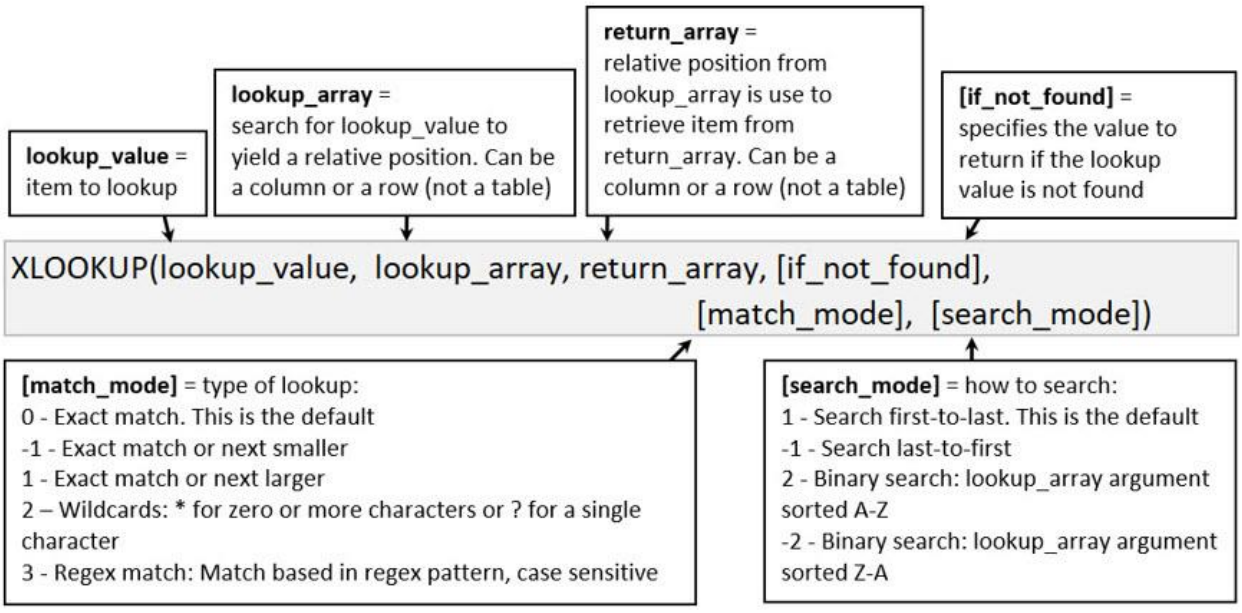


Figure 4.7 *Arguments for the XLOOKUP lookup function.*

Page Setup:

- Page Setup dialog box = Page Layout Ribbon tab, Page Setup group, Dialog Launch arrow in lower right corner (keyboard = Alt, P, S, P)
- Tabs in page setup dialog box:
    - Page
    - Margins
    - Header/Footer
    - Sheet

Useful keyboards:

- Ctrl + B = Bold and Ctrl + U = Underline
- Ctrl + ; = Todays Date
- Ctrl + * (Ctrl + Shift + 8) = select current range (everything until it bumps into all empty cells)
- Ctrl + Arrow will jump selected cell down to last cell with data
- Ctrl + Shift + Arrow will select range down to last cell with data
- Ctrl + 1 = open Format Cells dialog box
- Shift Selection Trick: Click cell, hold Shift, Click last cell to highlight everything in between
- Ctrl Selection Trick: Click cell, hold Ctrl, Click other cell to highlight cells that are not next to each other (noncontiguous cells)

Video Example

	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	MidTerm	Test 6	Test 7	Final	Total	Extra Credit
Max Points	50	50	50	50	50	50	100	75	75	200	750	5

Student Name	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	MidTerm	Test 6	Test 7	Final	Total	% Grade	Decimal Grade
Mohamed Aziz	50	49	48	49	50	33	82	50	73	175	664	0.885333333	3.4
Timmy Cartman	22	36	41	33	20	48	43	40	31	142	461	0.614666667	1.5
Gigi Gabar	26	30	10	37	29	14	99	62	0	184	496	0.661333333	1.9
Miki Ito	41	39	38	31	37	48	77	74	70	192	652	0.869333333	3.2
Shinnay Mims	46	45	41	45	49	50	85	75	75	182	698	0.930666667	3.7
Kenny Noline	46	48	46	50	48	44	99	70	68	191	715	0.953333333	3.8
Lin Pham	15	29	22	31	37	11	55	42	36	87	370	0.493333333	0.7
Dean Washington	48	49	48	45	43	45	98	71	69	195	716	0.954666667	3.8
Average	37	41	37	40	39	37	80	61	53	169	597	0.795333333	2.75

Formula in cell M3: =SUM(C3:L3)

Formula in cell M6: =SUM(C6:L6)+$N$3 **OR:** Formula in cell M6: =BYROW(C6:L13,SUM)+N3

Formula in cell N6: =M6/$M$3

Formula in cell O6: =XLOOKUP(N6:N13,Q6:Q40,R6:R40,,-1)

Formula in cell C14: =AVERAGE(C6:C13) **OR:** Formula in cell C14: =BYCOL(C6:L13,AVERAGE)

Bottom of lookup table:

0.840	3.1
0.855	3.2
0.870	3.3
0.885	3.4
0.900	3.5
0.915	3.6
0.930	3.7
0.945	3.8
0.960	3.9
0.975	4

% Grade	Decimal Grade
0	0
0.450	0.5
0.465	0.6
0.480	0.7
0.495	0.8
0.510	0.9
0.525	1
0.540	1.1
0.555	1.2
0.570	1.3
0.585	1.4
0.600	1.5
0.615	1.6
0.630	1.7
0.645	1.8
0.660	1.9
0.675	2
0.690	2.1
0.705	2.2
0.720	2.3
0.735	2.4
0.750	2.5
0.765	2.6
0.780	2.7
0.795	2.8
0.810	2.9
0.825	3