

The Most Exciting One Hour of Excel

SASBO Conference

Louisville, KY

April 3, 2023

Today's Topics

Timesavers

Workbook /
Worksheet
Design

Tables and
Named Ranges

Formulas and
Functions



Pivot Tables

Security

Timesavers

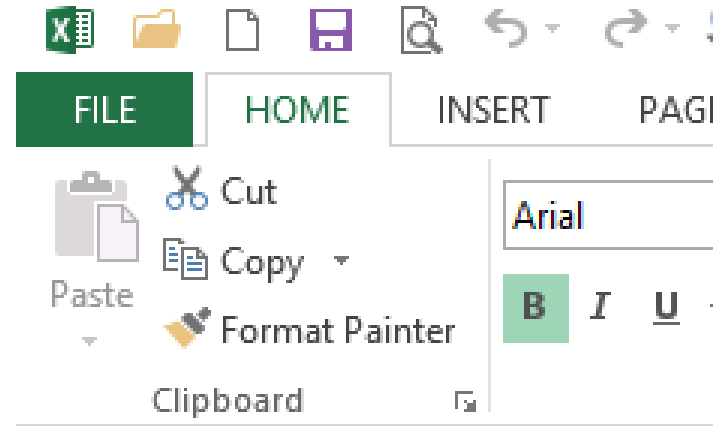
Keyboard Short-cuts



- ctrl + home goes to upper left corner of worksheet/freeze pane
- ctrl + arrow jumps to next empty cell
- shift + arrow highlights chosen cell(s)
- ctrl + pg up/down cycles through tabs within workbook
- alt + tab will cycle through open windows
-  + shift + s to screen clip
-  + ; to get emoji list

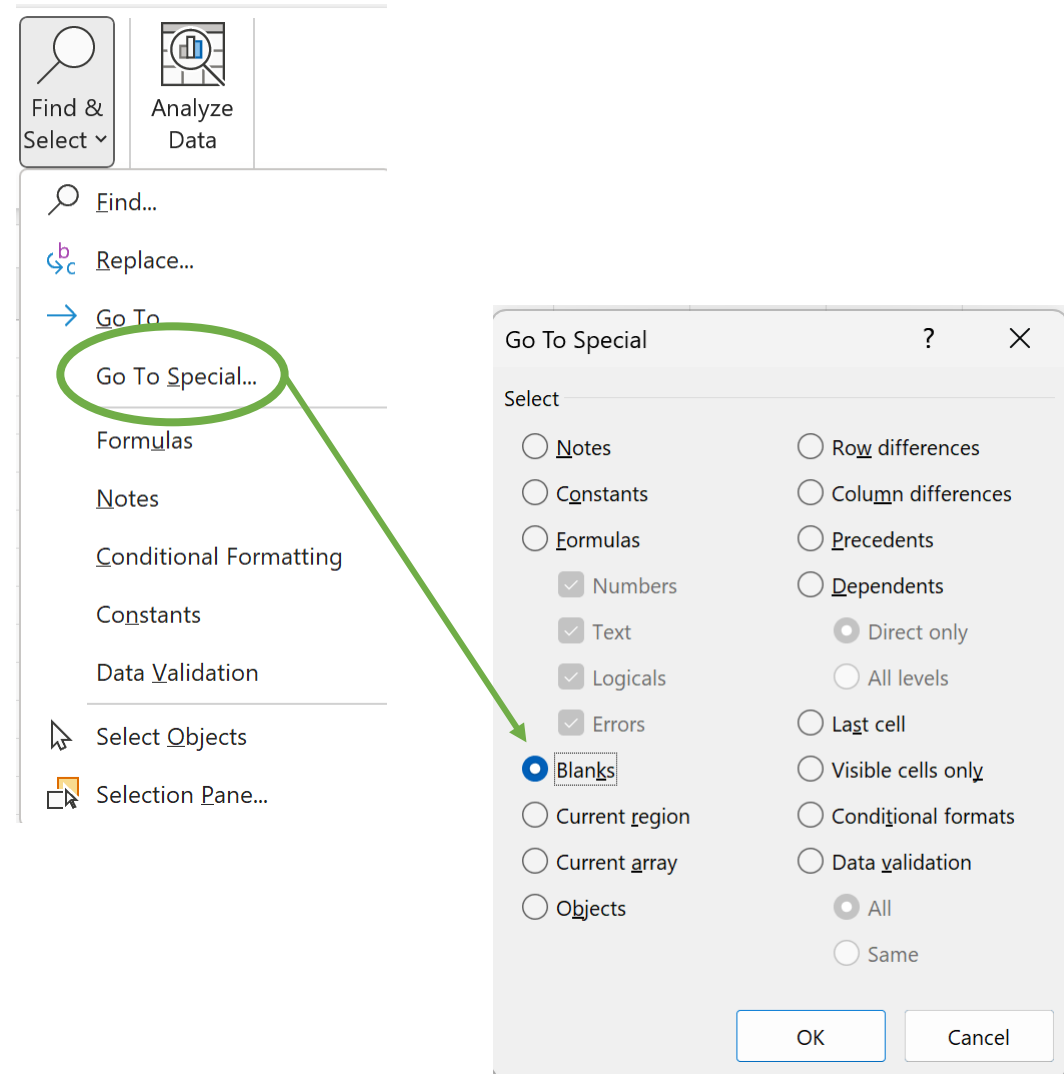
Format Painter

- Choose cell with desired format
- Click format painter
- Click in cell(s) to “paint”
- **Double click** to paint multiple and disconnected cells



Go To Special

- Select data area
- Click Go To Special
- Select Blanks
- Click OK
- **CAREFULLY** right click in a highlighted area
- Choose Delete
- Select appropriate delete option



Workbook / Worksheet Design

Functionality Considerations

- Is a spreadsheet the appropriate tool?
 - Word
 - ERP or HRIS system
- Does this spreadsheet save me time?
- Can this spreadsheet be used over time?
- Is this spreadsheet easy to use/update?
 - Hyperlinks
 - Data validation
 - Use of color and formatting
- Will this spreadsheet be used by others?
 - Documentation
 - Protection

Worksheet/book Organization

- Worksheet/Workbook Organization
 - “Pretty” vs “Usable
 - Calculations should not disrupt the data!
- Data input
 - Standardize
 - Data validation

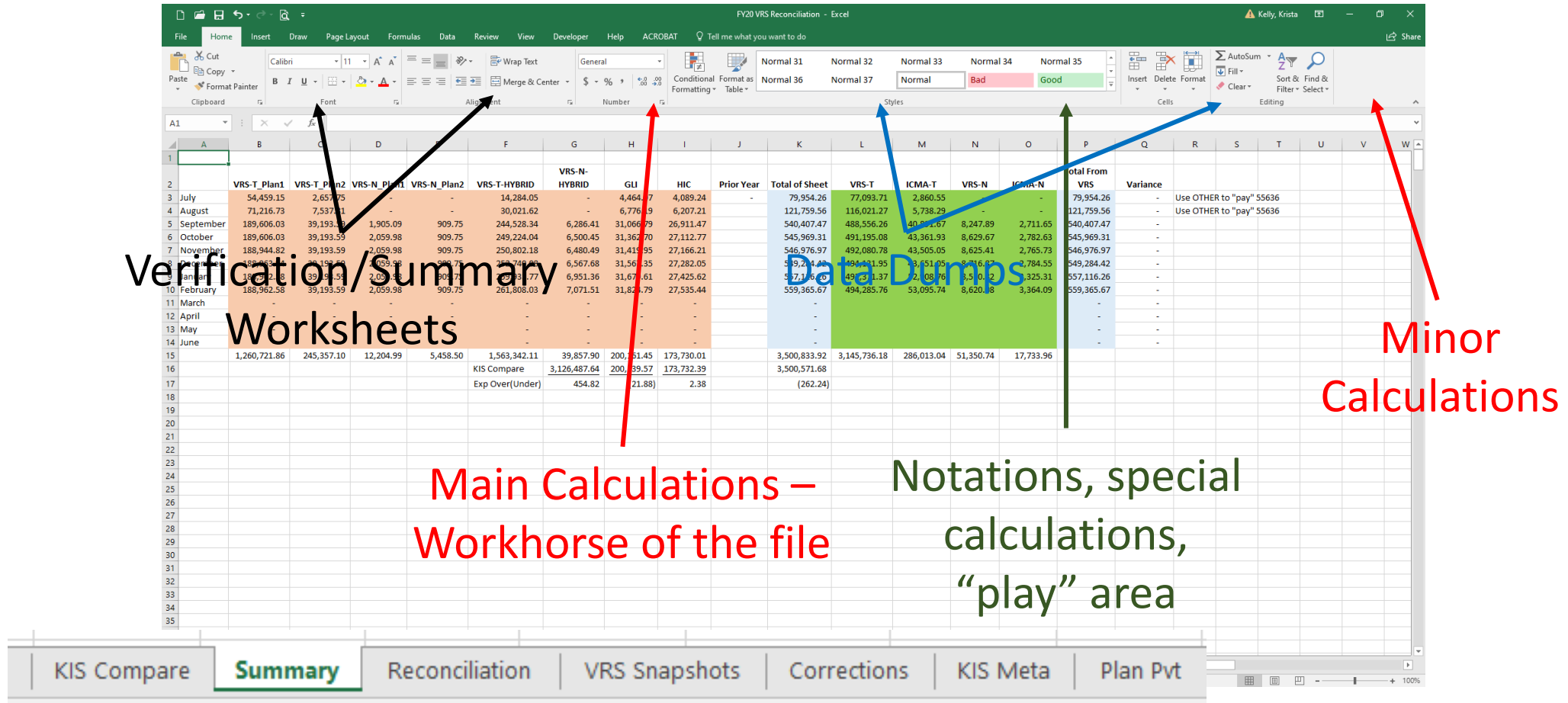
“Pretty” vs “Usable”

	B	C	D	E	G	J	K	L
13	Year & Type		FY20 (A)	FY20 (A)	FY20 (A)	FY20 (A)	FY20 (A)	FY20 (A)
14	Fund Description		Federal	General	Medical Trust	Consolidated	Food Service	Grand Total
15	Fund Number		202	205	705	All except 207	207	All
16	REVENUES							
24	Local		-	233,551	439	233,990	311,095	545,085
30	City		-	8,268,608	-	8,268,608	-	8,268,608
38	Commonwealth		-	17,861,127	-	17,861,127	33,783	17,894,910
42	Federal		180,085	-	-	180,085	785,868	965,953
43	Total Revenue		180,085	26,363,286	439	26,543,810	1,130,746	27,674,556
44								
45	EXPENDITURES							
96	Salaries		422,523	13,427,125	-	13,849,648	376,357	14,226,006
109	Benefits		163,586	5,180,040	20,840	5,364,467	176,630	5,541,097
110	Total Salaries and Benefits		586,110	18,607,165	20,840	19,214,115	552,988	19,767,103
111								
130	Purchased Services		49,122	1,617,826	-	1,666,947	5,376	1,672,323
132	Internal Services		-	-	-	-	-	-
149	Other Charges		33,182	669,309	-	702,492	1,985	704,477
168	Material and Supplies		81,947	1,332,660	-	1,414,607	494,047	1,908,654
170	Tuition to Joint Operations		-	-	-	-	-	-
171	Total Operational Expenditures		750,360	22,226,960	20,840	22,998,160	1,054,396	24,052,556
172								
180	Capital Outlay		-	27,458	-	27,458	13,187	40,644
186	Other Uses of Funds		-	1,844	-	1,844	-	1,844
187	Total Expenditures		750,360	22,256,261	20,840	23,027,462	1,067,582	24,095,044
188								
189	Revenues Over(Under) Expenditures		(570,275)	4,107,026	(20,402)	3,516,349	63,164	3,579,512
190								
191	OTHER FINANCING SOURCES (USES)							
205	Transfers In (Out)		-	(102)	-	(102)	102	-
206	Capital Lease Proceeds		-	-	-	-	-	-
207	Total other financing sources (uses)		-	(102)	-	(102)	102	-
208								
209	Increase (Decrease) in fund balance		(570,275)	4,106,923	(20,402)	3,516,246	63,266	3,579,512
216	Beginning Balance		-	0	242,147	242,147	580,992	823,139
217	Ending Balance		(570,275)	4,106,923	221,745	3,758,393	644,258	4,402,652
218								

Worksheet Organization Example

	A	B	C	D	E	F	G	H	I	J	K	L
1		No Jul or Aug VRS-N since these are all 10 mo employees										
2												
3	Missing	Snapshc	Empl ID	Type	Amount	Org Code	Contribution Month	Contribution Year	Record Type	Plan or Benef	Code	VRS Customer
4	67	July	612	V	1076.65	40236	7	2019	CMR	P	VRS-T_P	MPS000612
5	186	July	1645	V	722.6	40236	7	2019	CMR	P	VRS-T-H'	MPS001645
6	11	July	51	V	2247.82	40236	7	2019	CMR	P	VRS-T_P	MPS000051
7	273	July	2083	V	1664.27	40236	7	2019	CMR	P	VRS-T-H'	208
8	119	July	1160	V	991.15	40236	7	2019	CMR	P	VRS-T_P	MPS001160
9	73	July	720	V	1092.8	40236	7	2019	CMR	P	VRS-T_P	MPS000720
10	51	July	1523	V	1691.29	40236	7	2019	CMR	P	VRS-T_P	MPS001523
11	9	July	629	V	1774.38	40236	7	2019	CMR	P	VRS-T_P	MPS000629
12	18	July	170	V	1811.31	40236	7	2019	CMR	P	VRS-T_P	MPS000170
13	143	July	1377	V	857.84	40236	7	2019	CMR	P	VRS-T_P	MPS001377
14	303	July	2216	V	2372.33	40236	7	2019	CMR	P	VRS-T_P	221
15	263	July	2046	V	922.36	40236	7	2019	CMR	P	VRS-T-H'	204
16	309	July	2230	V	740.68	40236	7	2019	CMR	P	VRS-T-H'	223
17	125	July	1218	V	1618.58	40236	7	2019	CMR	P	VRS-T_P	MPS001218
18	225	July	1893	V	2567.71	40236	7	2019	CMR	P	VRS-T_P	189
19	75	July	740	V	2383.82	40236	7	2019	CMR	P	VRS-T_P	MPS000740
20	81	July	756	V	2252.29	40236	7	2019	CMR	P	VRS-T_P	MPS000756
21	28	July	240	V	1761.28	40236	7	2019	CMR	P	VRS-T_P	MPS000240
22	30	July	247	V	1709.03	40236	7	2019	CMR	P	VRS-T_P	MPS000247
23	20	July	173	V	2388.92	40236	7	2019	CMR	P	VRS-T_P	MPS000173
24	32	July	271	V	2155.24	40236	7	2019	CMR	P	VRS-T_P	MPS000271
25	215	July	1836	V	1764.02	40236	7	2019	CMR	P	VRS-T-H'	183
26	35	July	290	V	2004.88	40236	7	2019	CMR	P	VRS-T_P	MPS000290
27	38	July	293	V	3887.31	40236	7	2019	CMR	P	VRS-T_P	MPS000293
28	355	July	2365	V	878.58	40236	7	2019	CMR	P	VRS-T-H'	236
29	366	July	2403	V	830.22	40236	7	2019	CMR	P	VRS-T-H'	240

Workbook Organization Example



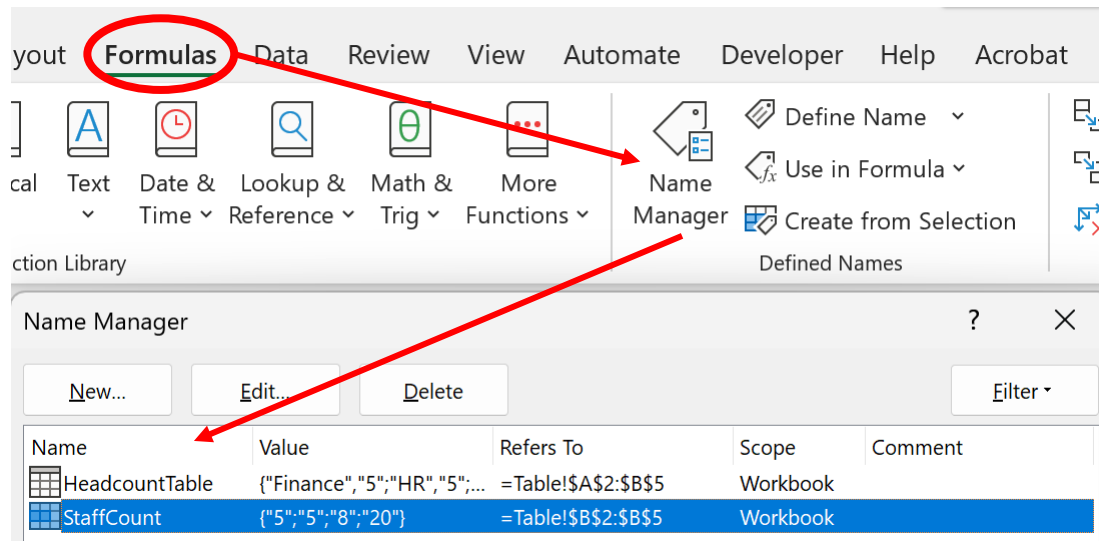
Tables and Named Ranges

Ways to refer to a range of cells

- Cell Reference
 - No special action needed
 - Determine if variable or absolute reference (using \$)
 - Can move and resize “box”
- Named Range
 - Formulas \Rightarrow Name Manager \Rightarrow New to create a range
 - Always absolute; adjusts to changes in sheet structure; must add rows in middle
 - Helpful in macros
- Table Properties
 - Insert \Rightarrow Table
 - Syntax is Table Name[Column Header] – Table Name cannot have spaces
 - Always absolute; adjusts to changes in sheet and table structure NOT column name changes

Benefit of Tables and Named Ranges

- Variable drop down menus
- “Understandable” references in formulas



	A	B	C	D	E	F
1	Location	Headcount				
2	Finance	5				
3	HR	5				
4	IT	8				
5	Maintenance	20				
6						
7		Total				
8		38	=SUM(B2:B5)			
9		38	=SUM(StaffCount)			
10		38	=SUM(HeadcountTable[Headcount])			
11						

Formulas and Functions

Considerations for Functions

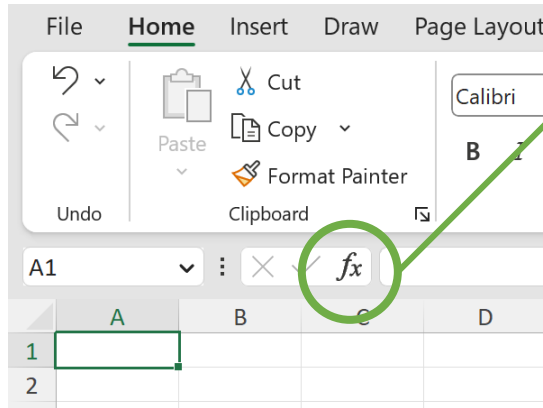
Efficiency

- Variable references
 - Limit hardcoding
- Minimize differences
 - Standardize references
- Minimize instances
- Pivot when possible

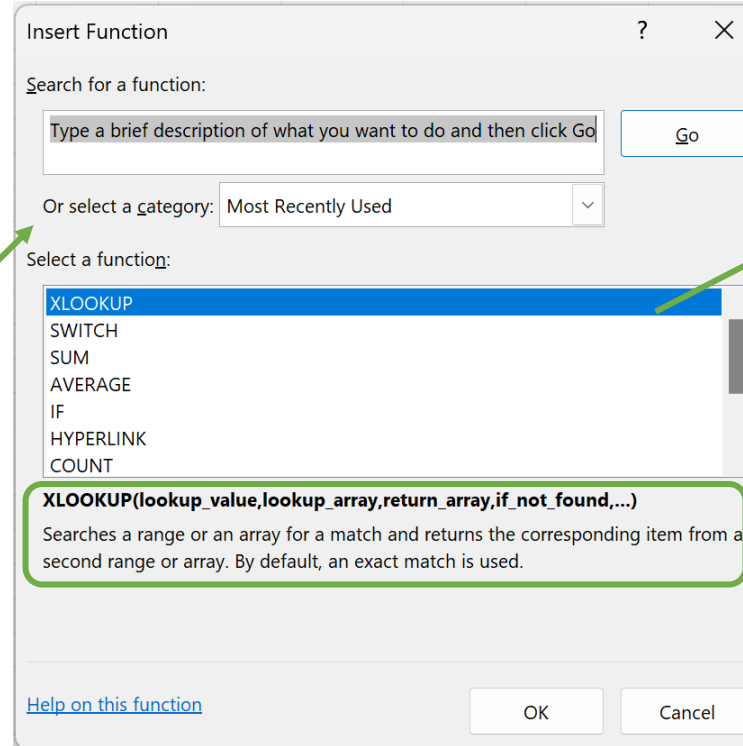
Complexity

- Lookups vs. SumIf
 - Calculation time
- Linked Workbooks
- Checks and controls

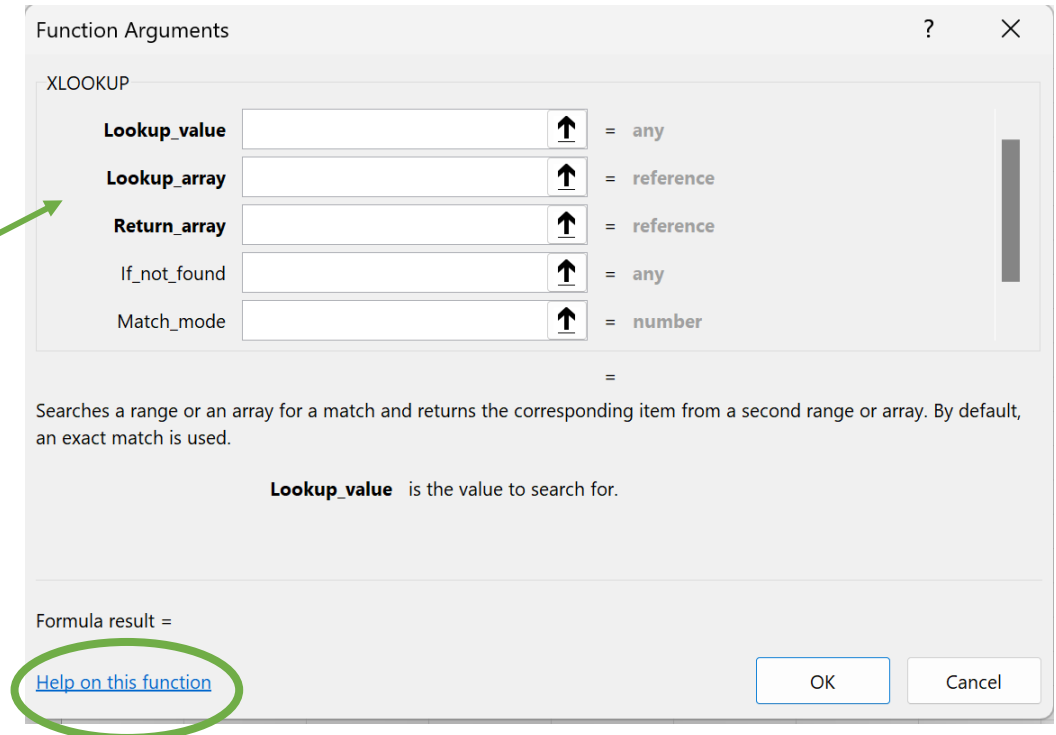
Function Wizard



Access the function wizard from any cell.



Search on key terms and use the description to evaluate the function of the formula. Scroll through by category to learn new things!



Descriptions of each component are provided as you click into them. Help options provided throughout link to web for more detailed descriptions and examples for assistance.

Function Categories

- Financial
- Date & Time
- Math & Trig
- Statistical
- Lookup & Reference
- Database
- Text
- Logical
- Information
- Engineering
- Cube
- Compatibility
- Web

Key Date & Time Functions

- **DAY, MONTH, & YEAR** – Returns a number for the selected component within a cell representing a date
- **DATE** – Returns a date in Excel date-time code
- **EDATE** – Date \pm specified number of months
- **EOMONTH** – Last day of the month \pm specified number of months
- **NOW** – “Volatile” = constantly recalculating
- **WEEKDAY** – Returns 1-7 based on day of week
- **YEARFRAC** – The number of years (integer) between two dates


Key Math & Trig Functions

- RAND – Random number generator
- ROUND – Rounds to the specified number of decimal places based on standard rounding rules learned in grade school
 - Can be set to show result in nearest millions, etc.
 - PLEASE use in financial calcs!
- ROUNDUP & **ROUNDDOWN** – Forces round up or down
- **SUMPRODUCT** – Sums the product of the values in two arrays
- SUM, **SUMIF**, **SUMIFS**
 - Do not use “IF” linked to data in separate workbook. Results in an error on recalc unless linked workbook is open.

Key Statistical Functions

- AVERAGE, **AVERAGEIF, AVERAGEIFS**
- COUNT, **COUNTIF, COUNTIFS**
 - COUNTA – Number of cells containing values
 - COUNTBLANK – Number of cells containing blanks
- MAX/MIN, MAXIFS/MINIFS
- MEDIAN, MODE
- RANK.AVG, RANK.EQ
 - Difference related to ties; Use “average” rank or “highest” rank for tied values

Key Lookup & Reference Functions

- **CHOOSE** – Provide different results based on numeric result
- HYPERLINK – Would only use as a return value for choice function
 - For basic link in a cell, right click and use  Link | >
 - Can link to place in workbook, a file stored on drive or cloud, website or email
- INDEX – Useful for searching for data when row and column are variable
- **MATCH** – Helpful when looking for missing values
- **XLOOKUP**
 - Replaces need for HLOOKUP & **VLOOKUP**
 - Fixes issues with column/row order and number of column/row for return value

Key Text Functions

- **CONCAT** or **TEXTJOIN**

- Use CONCAT for variable separators
- Use TEXTJOIN for consistent separators
 - Dashes between segments of account numbers or commas between address components

- **FIND** – Find text, symbol, or number within selected text.

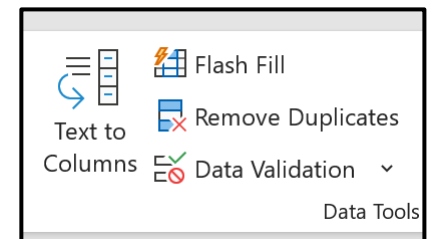
- IMPORTANT! This is case sensitive.

- **LEFT**, **RIGHT**, **MID** – Pulls the selected number of characters from the left, right, or middle of a string or number

- **LEN** – Determine the number of characters in a cell

❖ *Use functions above for repetitive manipulations of text*

❖ *Use Text to Columns or **Flash Fill** under Data menu for one-time change*



Key Text Functions (cont.)

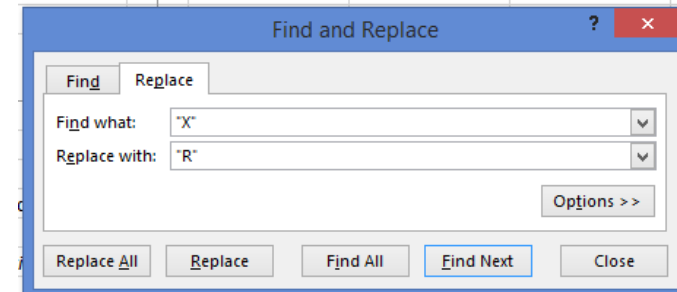
- **REPT** – Helpful when correcting leading zeros missing from CSV import
- **PROPER**, UPPER – Use to convert text to “title” case or all caps
- TRIM – Eliminates extra spaces
- VALUE – Helpful when correcting numbers stored as text

Key Logical and Information Functions

- IFNA vs **IFERROR**
 - Returns formula result if FALSE or a chosen value if TRUE
 - For #N/A vs any error (#DIV/0, #REF!, #VALUE!, etc.)
- ISERR vs ISERROR (Information Type)
 - Returns TRUE or FALSE if formula result is an error
 - For #N/A vs any error (#DIV/0, #REF!, #VALUE!, etc.)
- **IFS** (Just found this one and am SOOOO excited!)
 - Could eliminate nested IF
 - Acts like CHOOSE function with non-numeric

Formula Magic – Did you know?

- You can use the Replace tool to replace sections of a formula?



=SUMIFS('Acct Data'!\$S:\$S,'Acct Data'!\$I:\$I,T\$2,'Acct Data'!\$K:\$K,\$A5,'Acct Data'!\$G:\$G,"X")

- You can move the highlighted boxes of the formula by clicking and dragging?

YEARFRAC					=IFERROR(VLOOKUP(CONCATENATE(E\$3,\$B7),'AL Pvt'!\$A\$5:\$Z\$404,MATC				
	A	B	C	D	E				
1				FY15 (A)					
2									
3	Type	Obj		202	205				
4	A	1000	Cash	(0.00)	0.00				
5	A	1001	Cash - Petty Cash	-	-				
6	A	1002	Cash - Escrow Accounts	-	-				
7	A	1003	Due From City	(488,786.32)	=IFERROR(VLOOK				
8	A	1250	Cash - SNAP 00181-008	-	-				
9	A	1251	Cash - SNAP 00181-009	-	-				

Pivot Tables

Pivot Table - Basics

Why

- Dynamic way of viewing information
- Display by count, sum, average and more
- Filter to show pertinent records

How

- Select a cell within data table
- All columns must have headers
 - Non-unique headers will have count listed by second and subsequent instances
 - Ex: Name2

Pivot Table – Set-up

PivotTable Fields

Choose fields to add to report:

- ☐ DOB
- ☒ Grade Level
- ☒ Ethnicity
- ☐ Ethnicity Code
- ☐ Gender
- ☐ Test Date
- ☒ Reading Comprehension
- ☐ Argumentative Writing
- ☐ Expository Writing
- ☐ Algebra
- ☐ Functions
- ☐ Geometry
- ☐ Probability
- ☐ Physics
- ☐ Chemistry
- ☐ Biology/Life Sciences

MORE TABLES...

Drag fields between areas below:

FILTERS

COLUMNS

Grade Level

ROWS

Ethnicity

VALUES

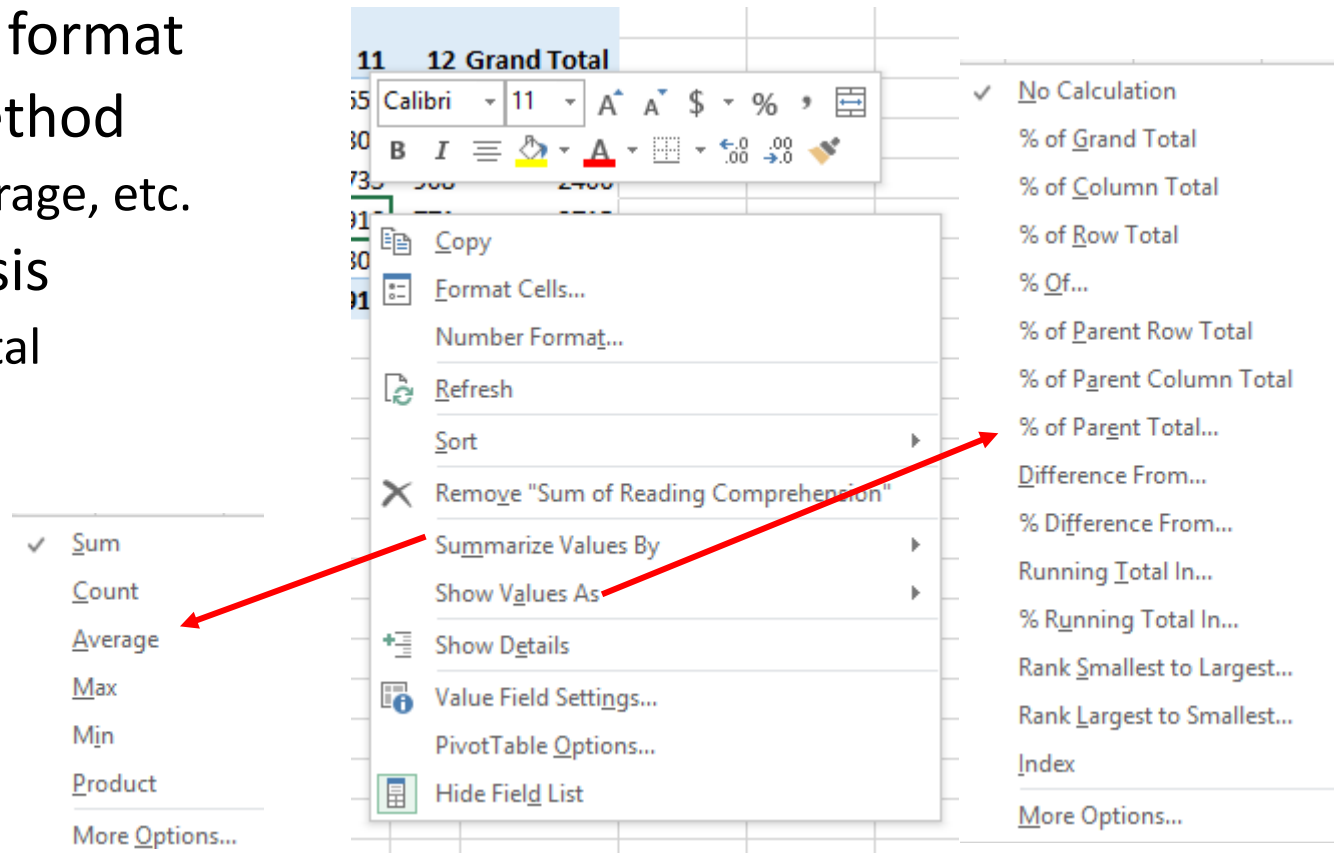
Sum of Reading...

- Drag and drop fields (column headers) to create the table
- Value typically defaults to count or sum

	A	B	C	D	E	F
1						
2						
3	Sum of Reading Comprehension	Column Labels				
4	Row Labels	9	10	11	12	Grand Total
5	African-American	481	178	651	639	1949
6	Caucasian	3407	787	2803	4895	11892
7	Hispanic	763		735	908	2406
8	Indian	861	165	918	771	2715
9	Pacific Islander	817	111	803	628	2359
10	Grand Total	6329	1241	5910	7841	21321
11						

Pivot Table - Formatting

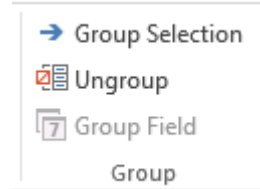
- Right click in table to...
 - Change cell & number format
 - Change calculation method
 - Basic Count, Sum, Average, etc.
 - Change calculation basis
 - % of Total, Running total



Pivot Table – Grouping Data

- PIVOT TABLE TOOLS

- Analyze tab



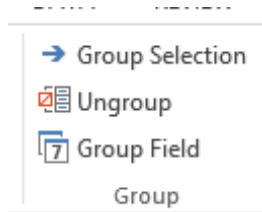
- Select row or column headers
 - Click on Group Icon
 - Click Group Selection
 - Collapse after all groups named
 - Rename groups

	A	B	C	D	
1					
2					
3	Count of StuID	Column Labels			
4	Row Labels	History	Math	Reading S	
5	Group1				
6	281				
7	300				
8	311				
9	315				
10	316				
11	321				
12	324				
13	326				
14	328				
15	333				
16	334				
17	338				
18	340				
19	342				

	A	B	C	D	E	F
1						
2						
3	Count of StuID	Column Labels				
4	Row Labels	History	Math	Reading	Science	Writing
5	<399	48	134	27	63	30
6	399-499	231	187	95	205	78
7	>499	68	20	7	11	22
8	Grand Total	347	341	129	279	13
9						

	1
	1
	1

Pivot Table – Grouping Data



- Group Field

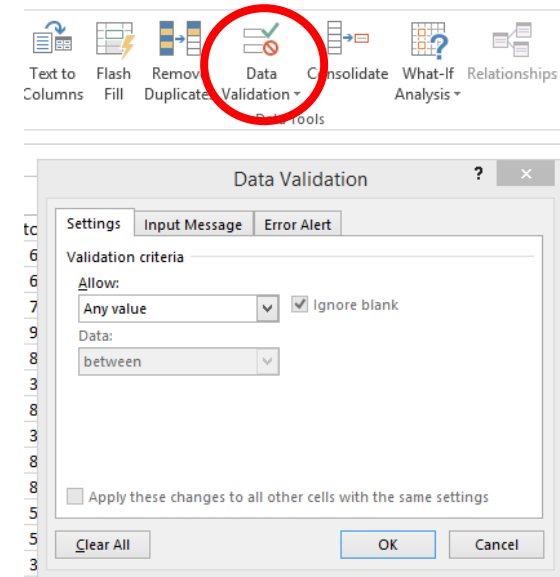
- Automatic Numeric Grouping
- Values do not have to exist in table
- Cannot have blank or non-numeric values

	A	B	C	D	E	F	G
1							
2							
3	Count of StuID	Column Labels					
4	Row Labels	History	Math				
5	200-299						
6	300-399	50	135				
7	400-499	229	186				
8	500-599	60	19				
9	600-699	8	1				
10	Grand Total	347	341				
11							

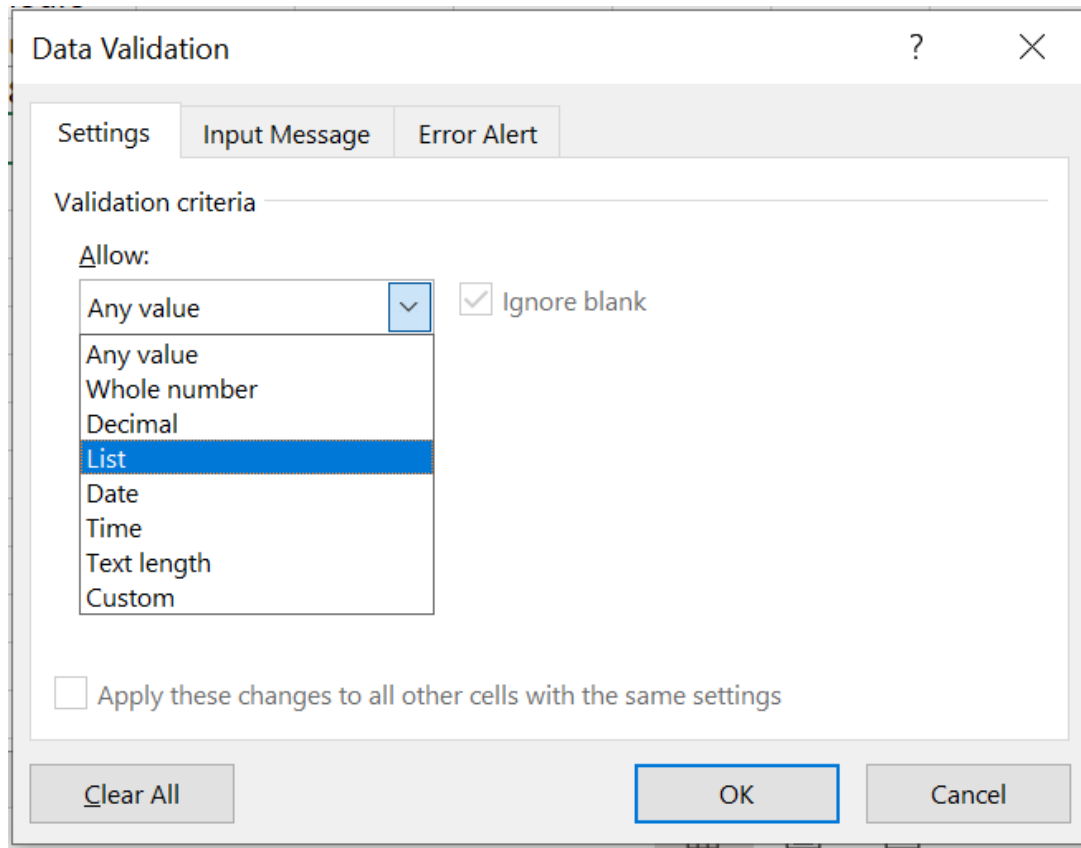
Security

Data Validation

- Found on the data tab
- Limits user entry to (typically):
 - Whole or Decimal number
 - List
- Set input message that shows when cell is selected
- Set error message if user attempts to use a value beyond the set limits

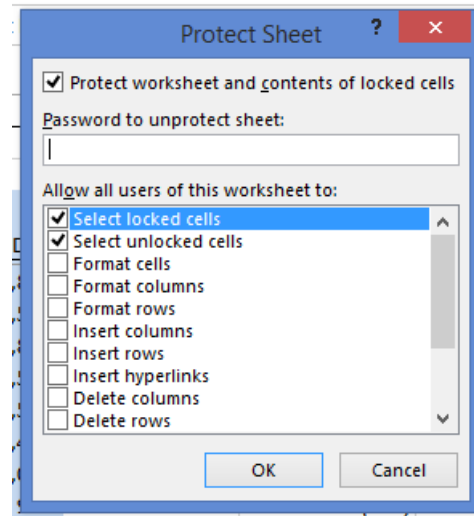
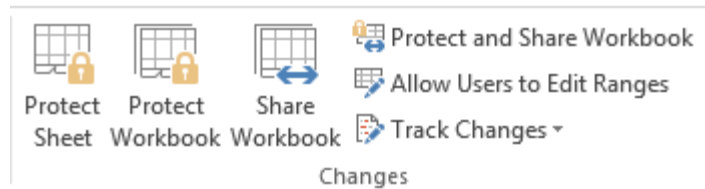
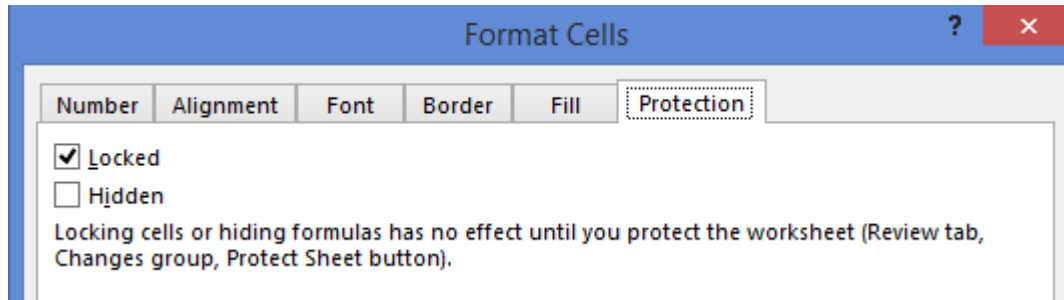


Data Validation



- Can use:
 - Cell range (=\$E\$2:\$E\$10)
 - Named Range (=Inputs)
 - Cannot use Table logic

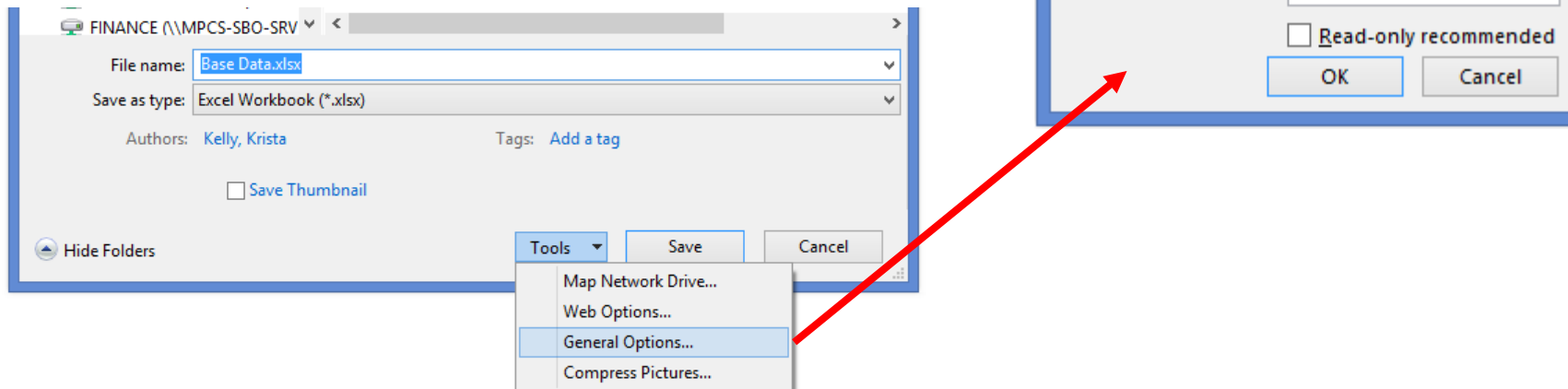
Cell or Workbook Protection



- Must first LOCK cells thru Format Cells – Protection
- Found on Review Tab
 - Limit users changes within worksheet
 - Can add password

File Protection

- Go thru Save As option
- Click on Tools button
- Select General Options
- Add password
 - Will require password entry to open file each time





Other Resources

Other ways to get Excel help

- Microsoft Excel – Help & Learning
 - <https://support.microsoft.com/en-us/excel>
- LinkedIn
 - Microsoft Excel Users group
 - Multiple LinkedIn Learning courses (Recommend Gini von Courter)
- ExcelJet
 - List of Functions (PDF): <https://exceljet.net/articles/101-excel-functions>
 - Also paid courses
- Miss Excel (Kat Norton)
 - Free on YouTube and TikTok
 - Paid on her website

