Intermediate Excel Workshop II

November 21, 2019

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Keyboard Shortcuts

Shortcut	Windows/PC	Mac
Jump to end of data table	Ctrl + (Up/Down/Left/ Right)	Cmd + (Up/Down/Left/ Right)
Jump to end of data table + highlight entire region	Ctrl + Shift + (Up/Down/Left/ Right)	Cmd + Shift + (Up/Down/Left/ Right)
Cycle through cell references	F4	Cmd + T
Display formula + highlight inputs	F2	Ctrl + U

INDEX Function

Summary: Returns value at a given position in a range or array.

Purpose: Get a value in a list or table based on location

Return Value: Value at a given location

Syntax: =INDEX(array, row_num, [column_num])

Arguments:

- array – range of cells, or an array constant
- row_num – row position in the reference or array
- column_num – column position in the reference or array

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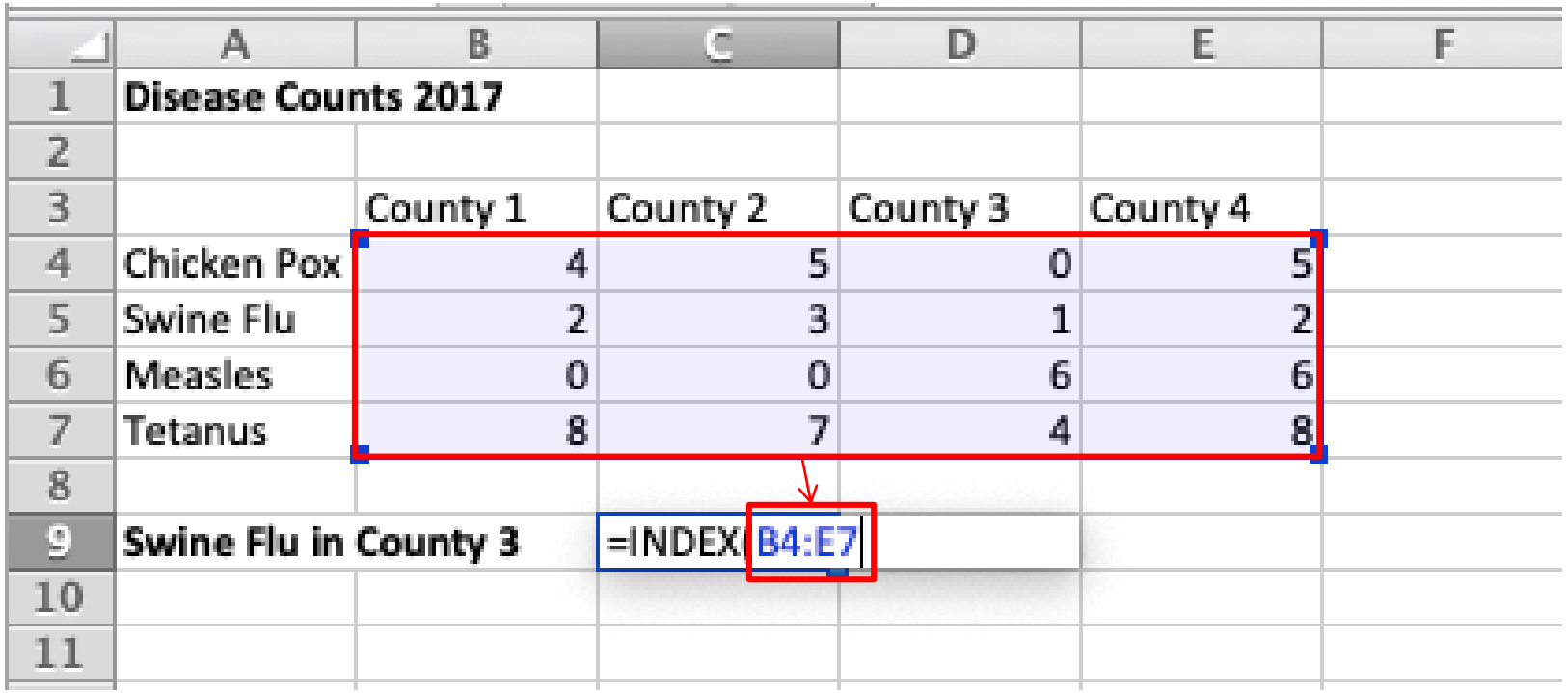
Step 1. Identify an array

- Identify the array or search area to pull data from
- Exclude label column and rows



	A	B	C	D	E	F
1	**Disease Counts 2017**					
2						
3		County 1	County 2	County 3	County 4	
4	Chicken Pox	4	5	0	5	
5	Swine Flu	2	3	1	2	
6	Measles	0	0	6	6	
7	Tetanus	8	7	4	8	
8						
9	**Swine Flu in County 3**		=INDEX(B4:E7			
10						
11						

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Step 2. Identify the row_num

- Identify the row you are looking for
- The number is relative -- you are specifying the second row from the top of the array, not row 2 on the spreadsheet

	A	B	C	D	E	F
1	**Disease Counts 2017**					
2						
3		County 1	County 2	County 3	County 4	
4	Chicken Pox	4	5	0	5	
5	Swine Flu	2	3	1	2	
6	Measles	0	0	6	6	
7	Tetanus	8	7	4	8	
8						
9	**Swine Flu in County 3**		=INDEX(B4:E7, 2			
10						
11						

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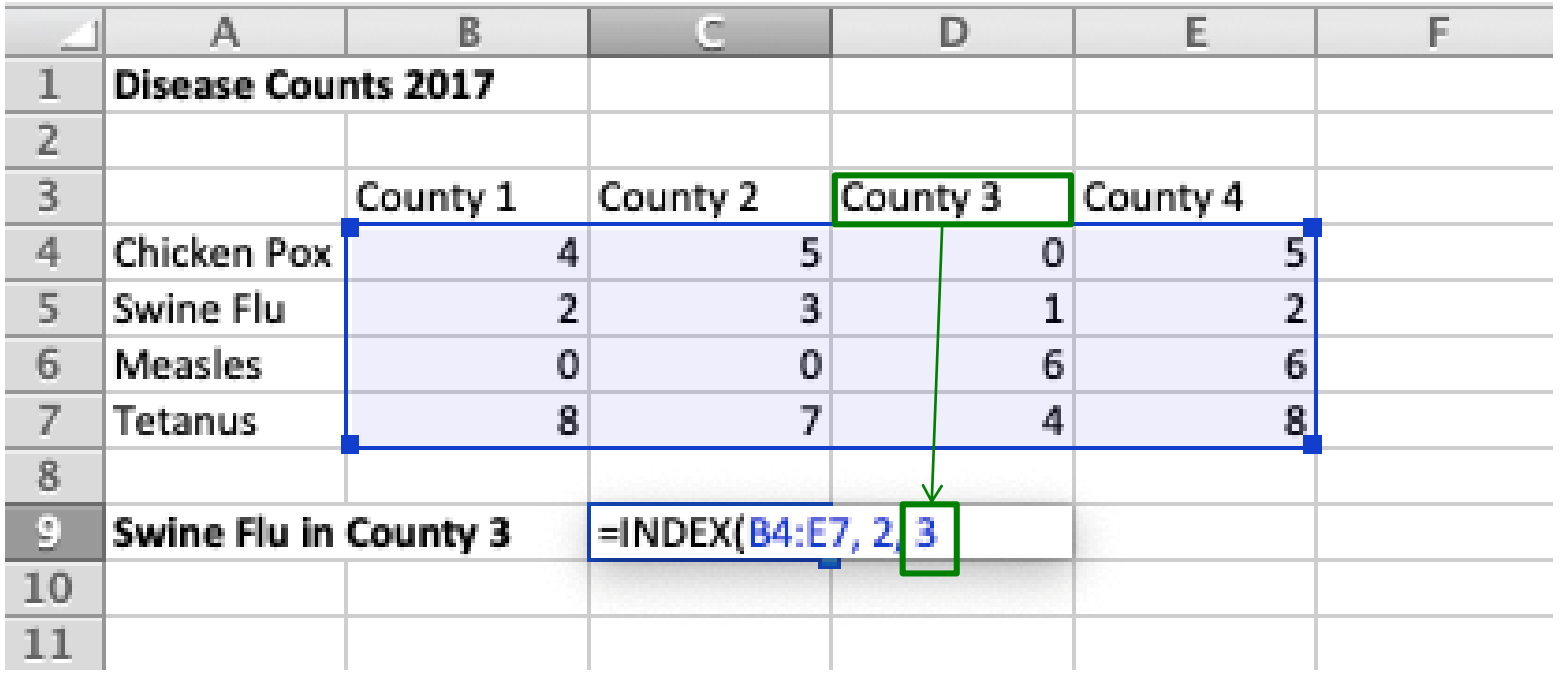
Step 3. Identify the column_num

- Column of the array you would like to reference
- The number is also relative to the array, not for the whole spreadsheet



	A	B	C	D	E	F
1	**Disease Counts 2017**					
2						
3		County 1	County 2	County 3	County 4	
4	Chicken Pox	4	5	0	5	
5	Swine Flu	2	3	1	2	
6	Measles	0	0	6	6	
7	Tetanus	8	7	4	8	
8						
9	**Swine Flu in County 3**		=INDEX(B4:E7, 2, 3			
10						
11						

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Example Output

Finding the amount of swine flu cases in County 3

	A	B	C	D	E	F
1	**Disease Counts 2017**					
2						
3		County 1	County 2	County 3	County 4	
4	Chicken Pox	4	5	0	5	
5	Swine Flu	2	3	1	2	
6	Measles	0	0	6	6	
7	Tetanus	8	7	4	8	
8						
9	**Swine Flu in County 3**		1			
10						
11						

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MATCH Function

Summary: Used to locate the position of a lookup value in a row, column, or table

Purpose: Get position of an item in an array

Return Value: Number representing a position in the array

Syntax: =MATCH(lookup_value, lookup_array, [match_type])

Arguments:

- lookup_value – Value to match in lookup_array
- lookup_array – Range of cells or an array reference
- [match_type] – [optional] how to match, specified as -1, 0, or 1 (default is 1)

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Step 1. Input the lookup_value

- Identify the label or value the function is looking for

	A	B	C	D	E	F
1	**Disease Counts 2017**					
2						
3		County 1	County 2	County 3	County 4	
4	Chicken Pox	4	5	0	5	
5	Swine Flu	2	3	1	2	
6	Measles	0	0	6	6	
7	Tetanus	8	7	4	8	
8						
9	**Position of Chicken Pox Column A**			=MATCH("Chicken Pox"		
10						
11						

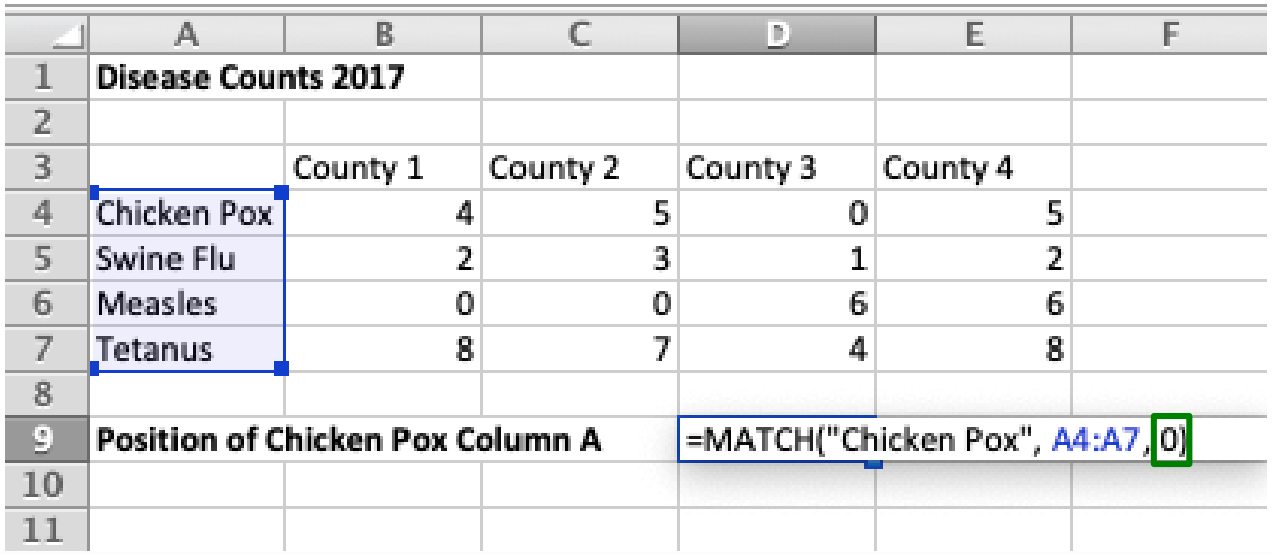
Step 2. Specify the lookup_array

- Choose an array that you want to search in

	A	B	C	D	E	F
1	**Disease Counts 2017**					
2						
3		County 1	County 2	County 3	County 4	
4	Chicken Pox	4	5	0	5	
5	Swine Flu	2	3	1	2	
6	Measles	0	0	6	6	
7	Tetanus	8	7	4	8	
8						
9	**Position of Chicken Pox Column A**			=MATCH("Chicken Pox", A4:A7		
10						
11						

Step 3. [optional] Specify the match_type

- Specifies the method for the first argument
  - 1 = assumes array is assorted by ascending order and returns largest value ≤ lookup_value
  - 0 = finds exact value as lookup_value
  - -1 = finds smallest value ≥ lookup_value



	A	B	C	D	E	F
1	**Disease Counts 2017**					
2						
3		County 1	County 2	County 3	County 4	
4	Chicken Pox	4	5	0	5	
5	Swine Flu	2	3	1	2	
6	Measles	0	0	6	6	
7	Tetanus	8	7	4	8	
8						
9	**Position of Chicken Pox Column A**			=MATCH("Chicken Pox", A4:A7, 0)		
10						
11						

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Example Output

Position of Chicken Pox Column A

	A	B	C	D	E	F
1	**Disease Counts 2017**					
2						
3		County 1	County 2	County 3	County 4	
4	Chicken Pox	4	5	0	5	
5	Swine Flu	2	3	1	2	
6	Measles	0	0	6	6	
7	Tetanus	8	7	4	8	
8						
9	**Position of Chicken Pox Column A**			1		
10						
11						

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INDEX and **MATCH** can be combined to create a more powerful, error-resistant **VLOOKUP**

- VLOOKUP requires us to count how many columns over the return value is found
- VLOOKUP can only search for *lookup_value* in the **first** column of *table_array*
- If we insert a column, VLOOKUP will either return the wrong column's value or break completely
- INDEX MATCH allows us to look up across both rows and columns, whereas VLOOKUP and HLOOKUP only allow one dimension

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Example: VLOOKUP vs INDEX MATCH

- VLOOKUP is essentially a special case of INDEX MATCH
  - =VLOOKUP(lookup_value, table_array, col_index_num, FALSE)
    is the same as
  - =INDEX(table_array, MATCH(lookup_value, **lookup_array**, 0), col_index_num)
- If we wanted INDEX MATCH to do the same thing as VLOOKUP, ***lookup_array*** would simply be the first column of table_array
- We can see INDEX MATCH gives us more freedom:
  - We can select any **lookup_array** that we want
  - We can even replace col_index_num with another MATCH statement!

Try Question 1 in the “Questions” sheet.

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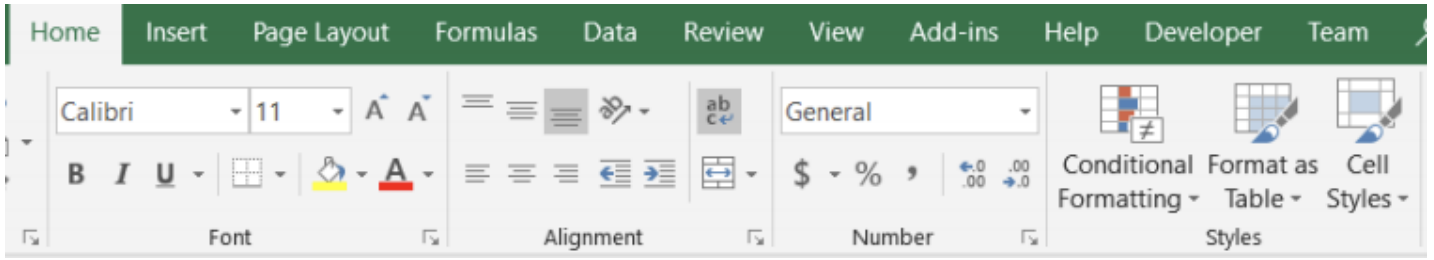
Conditional Formatting



	A	B	C	D
1	7	9	4	7
2	6	8	10	7
3	9	9	5	4
4	9	2	4	6
5	1	7	1	4
6				
7	7	9	4	7
8	6	8	10	7
9	9	9	5	4
10	9	2	4	6
11	1	7	1	4

- Another quick way to format cells and visualize the data within

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Try Question 2 in the “Questions” sheet.

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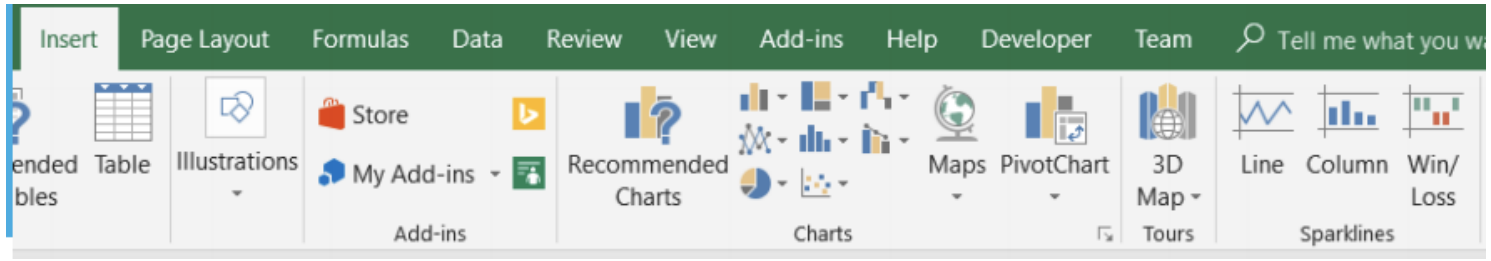
Sparklines



- Useful tool for quickly visualizing a lot of data without having to go through the trouble of making a chart
- For example, summarizing data in each row and each column:

	A	B	C	D	E
1	7	9	4	7	
2	6	8	10	7	
3	9	9	5	4	
4	9	2	4	6	
5	1	7	1	4	
6					

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Try Question 3 in the “Sparklines” sheet.

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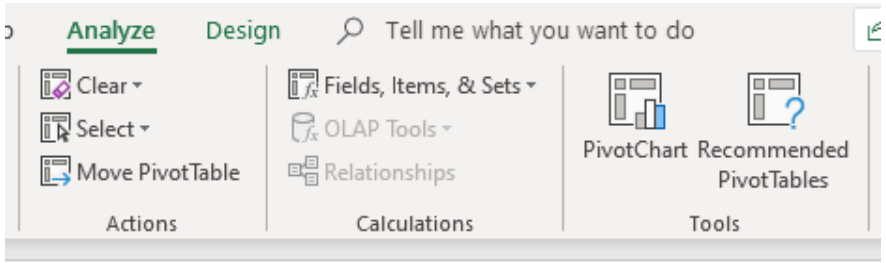
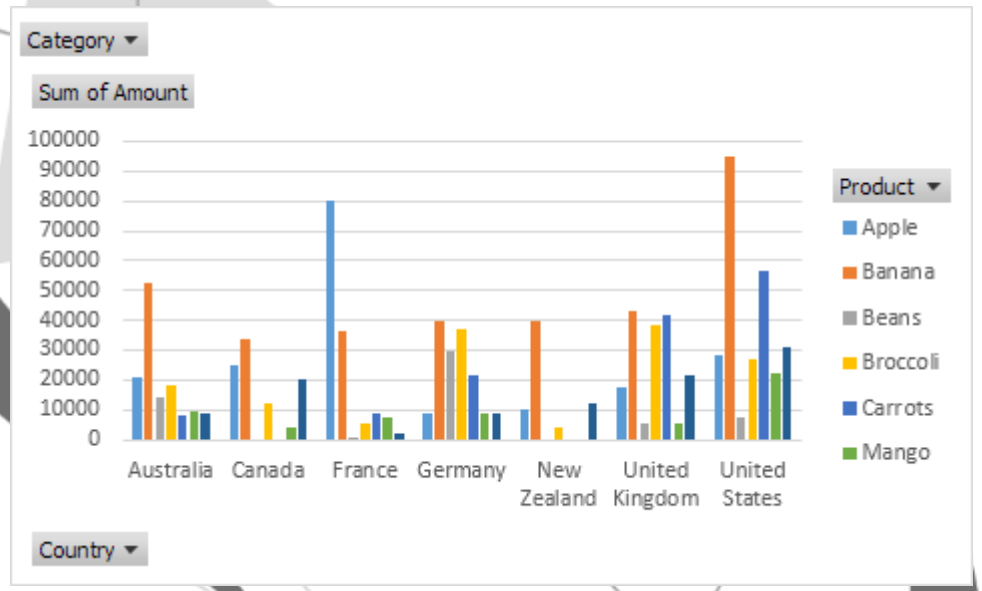
PivotChart





- Useful tool for quickly visualizing data created from PivotTable
- Can specify types of graphs and filter data

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Try Question 4 in the “PivotChart” sheet.

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LINEST Function

Summary: Find statistical parameters for data with linear trends

Purpose: Find slope, intercept, coefficient of determination, etc. for data

Return Value: Returns slope for the line of best fit for data (more if you use array formula, but we will not cover it today)

Syntax: =LINEST(known_y's, [known_x's], [const], [stats])

Arguments:

- known_y's– y values for data
- [known_x's],– [optional] x values of data. Default is [1,2,..] that is the same size as y's
- [const] – [optional] 0 for forcing y-intercept to be 0, 1 otherwise (1 is default)
- [stats] – [optional] 1 for returning all values, 0 for returning only slope & intercepts

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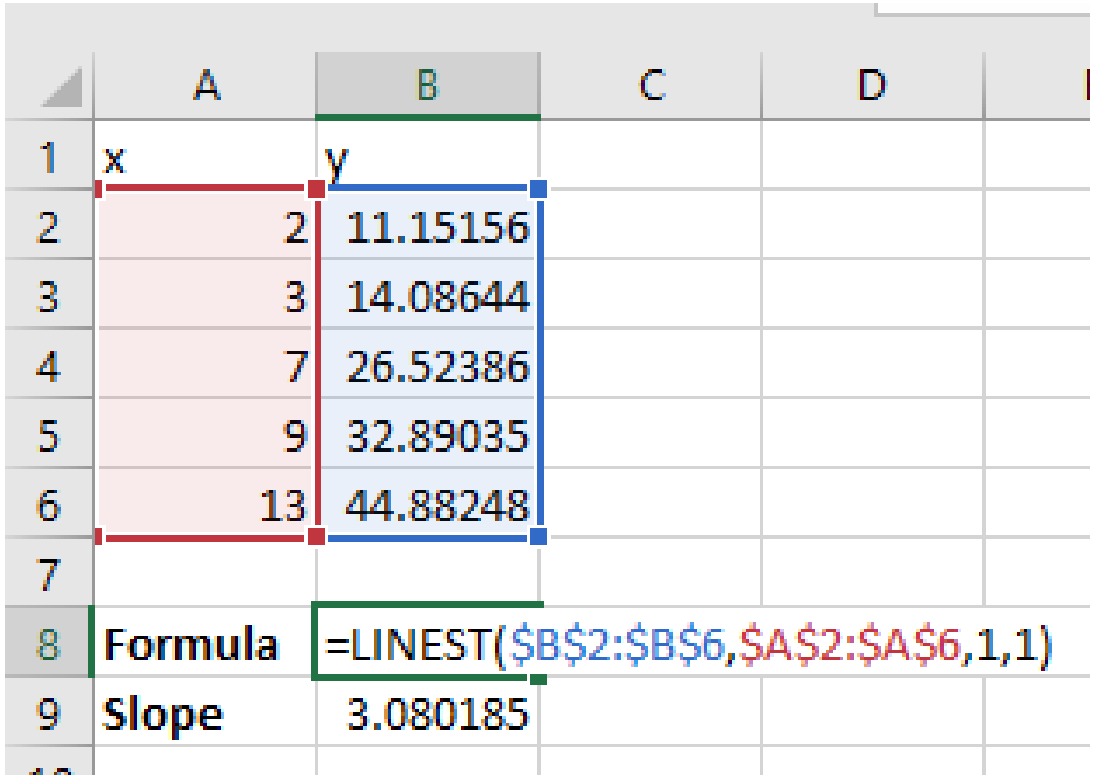
Example Output

Finding the slope for x and y



	A	B	C	D
1	x	y		
2	2	11.15156		
3	3	14.08644		
4	7	26.52386		
5	9	32.89035		
6	13	44.88248		
7				
8	**Formula**	=LINEST($B$2:$B$6,$A$2:$A$6,1,1)		
9	**Slope**	3.080185		

LOGEST Function

Summary: Find statistical parameters for data with exponential trends (y = b*(m^x))

Purpose: Find growth factor, coefficient of determination, etc. for data

Return Value: Return growth factor (m) for the line of best fit for data (more if you use array formula, but we will not cover it today)

Syntax: =LOGEST(known_y's, [known_x's], [const], [stats])

Arguments:

- known_y's– y values for data
- [known_x's],– [optional] x values of data. Default is [1,2,..] that is the same size as y's
- [const] – [optional] 0 for forcing b to be 1, and 1 otherwise (1 is default)
- [stats] – [optional] 1 for returning all values, 0 for returning only b & m

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Example Output

Finding the growth factor for x and y

	A	B	C	D	E
1	x	y			
2	2	23			
3	3	55			
4	7	4378			
5	9	39370			
6	13	3188647			
7					
8	Formula	=LOGEST($B$2:$B$6,$A$2:$A$6,1,1)			
9	Growth factor	2.954096			

Try Questions 5 and 6 in the “LINEST and LOGEST” sheet.

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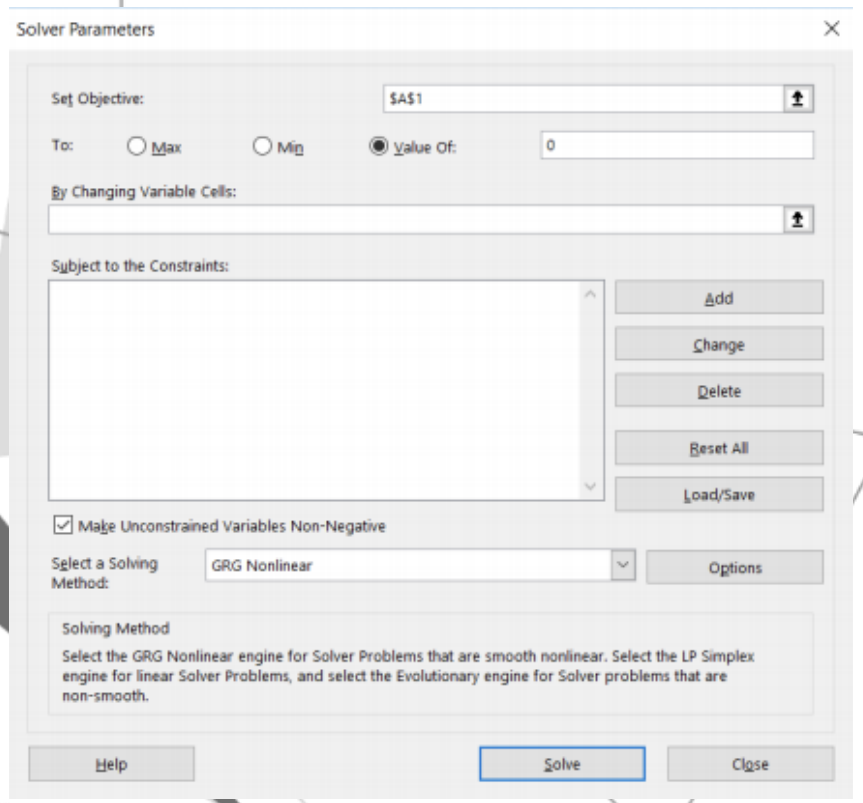
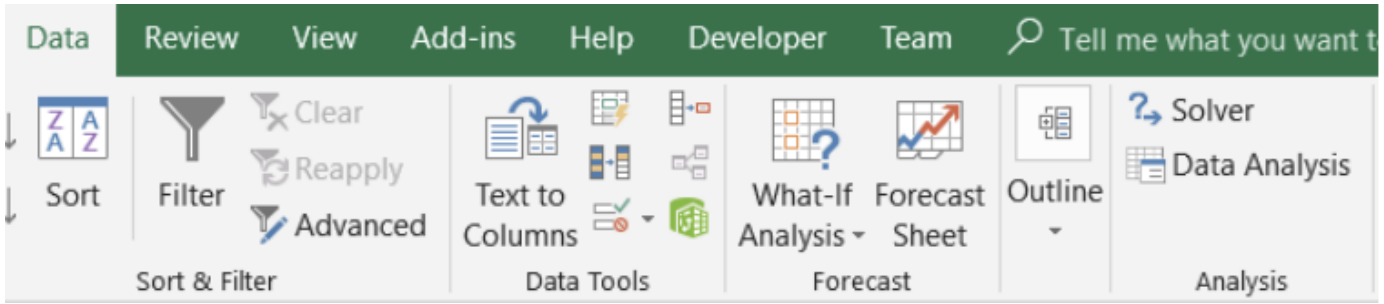
Solver





- https://support.office.com/en-us/article/load-the-solver-add-in-in-excel-612926fc-d53b-46b4-872c-e24772f078ca
- A more powerful version of GoalSeek that can optimize (min/max) with constraints

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Try Question 7 in the “Solver” sheet.

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Questions?

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