

# Office 2016– Excel Basics 16

## Video/Class Project #28

### Excel Basics 16: Mixed Cell References in Formulas & Functions to Save Time

**Goal in video # 16:** Learn how to use Mixed Cell References in Excel Formulas.

#### Topics Covered in Video:

- 1) Example of Cell Reference: A1
  - i. Column reference = A
  - ii. Row reference = 1
- 2) Copying formulas with Cell References:
  - i. When we copy a formula that contains cell references, we need to consider whether we need: Relative, Absolute, Mixed with the Column Locked or Mixed with the Row Locked.
  - ii. If you will not copy the formula, there is no need to consider what type of cell reference it will be.
- 3) Four Basic Types of Cell References (Relative, Absolute, Mixed Column Locked, Mixed Row Locked):
  - i. Relative Cell References – Example: A1
    - No dollar signs
    - Moves relatively throughout the copy action.
    - Relatively means that if the formula is looking at a cell reference that is three cells to the left, when you copy the formula to any other cell, the cell reference will still be looking three cells to the left.
  - ii. Absolute Cell References – Example: \$A\$1
    - Dollar signs before both:
      - i. Column reference = A
      - ii. Row reference = 1
    - Absolute means that if the formula is looking at a particular cell reference, when you copy the formula to any other cell, the cell reference will still be looking at that particular cell reference. If the absolute cell reference is \$A\$1, the formula will always look at cell A1. It is as if the formula is locked on the cell A1 throughout copy action.
  - iii. Mixed Cell References with Row Locked – Example: A\$1
    - Dollar sign before row reference only.
    - Remains absolute or locked when copying across the rows, vertically (up and down).
    - Moves relatively when copying across the columns, horizontally (side to side).
  - iv. Mixed Cell References with Column Locked – Example: \$A1
    - Dollar sign before column reference only.
    - Remains absolute or locked when copying across the columns, horizontally (side to side).
    - Moves relatively when copying across the rows, vertically (up and down).
- 4) Keyboard to Toggle Cell References = F4 Key.
  - i. F4 key = If cursor is touching a cell reference in a formula while in edit mode, F4 toggles between the four basic types of cell references.
- 5) Why do we use Mixed Cell References:
  - i. BECAUSE THEY SPEED UP FORMULA CREATION TIME!!!
  - ii. For a 12 month budget, using Mixed Cell References will allow you to create your formula 12 times faster than someone who only used Relative and Absolute Cell References.

6) Two methods for learn how to use Mixed Cell References:

i. Sledge Hammer Method:

- Create formula
- Copy to next cell
- See what it was that changed (letter or number), which you did not want to change
- Go back to top cell and put a dollar sign in front of the thing that changed (letter or number), which you did not want to change. You put the dollar sign in front of the letter or number stops it from changing as a relative reference.

ii. Question method:

- When creating formulas with cell references that you will copy to other cells, ask two questions of every cell reference in your formula in order to figure out which of the four cell references you need:

Q1: What do you want the cell reference to do when you copy it across the columns (letters) or horizontally?

1. Should the cell reference move relatively?

OR

2. Should the cell reference be locked or absolute? If yes, \$ in front of letter.

Q2: What do you want the cell reference to do when you copy it across the rows or vertically?

3. Should the cell reference move relatively?

OR

4. Should the cell reference be locked or absolute? If yes, \$ in front of number.

7) Copying Formulas into Rectangular Ranges:

i. If you are copying a formula to a rectangular range with your Angry Rabbit (Cross Hair) and Fill Handle, you must do it in 2 steps:

- Copy it one direction
- Let go of Mouse
- Grab the Fill Handle with your Angry Rabbit a second time
- Copy the other direction

ii. If you have the rectangular range selected BEFORE you create your formula:

- Create Formula in Active Cell (light colored cell)
- To populate the contents of the Active Cell into all the selected cells, use keystroke: Ctrl + Enter

8) Assumption Tables (Formula Inputs) & Mixed Cell Reference Notes

- i. When you are copying a formula through rectangular range (like with an expenses formula that has expenses as a percentage of revenue as row headers and revenue as column headers, in order to use Mixed Cell References, the Assumption table has to be orientated in the same way as the table with formulas:
- ii. For Mixed Cell References and Assumption Tables:
  - Horizontal / Horizontal works.
  - Vertical / Vertical works.
  - Horizontal / Vertical will NOT work.

	A	B	C	D	E	F	G	H
1	<b>Example 2: Mixed Cell References &amp; Assumption Tables.</b>							
2	<b>Goal: Calculate Expenses for Budgeting Process.</b>							
3								
4	<b>Month</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>		
5	Revenue	\$65,487	\$75,894	\$65,007	\$95,449	\$99,220		
6	COGS	=ROUND(B\$5*\$B16,2)		\$30,200	\$44,342	\$46,094		
7	Operating	\$12,756	\$14,783	\$12,663	\$18,592	\$19,327		
8	Administrative	\$10,110	\$11,717	\$10,036	\$14,736	\$15,318		
9	Other	\$2,644	\$3,064	\$2,624	\$3,853	\$4,006		
10	Total Expenses	\$55,933	\$64,822	\$55,523	\$81,524	\$84,745		
11	Net Income	\$9,554	\$11,072	\$9,484	\$13,925	\$14,475		
12								
13	This Assumption Table can be used with Mixed Cell References because							
14	expenses in Assumption Table are oriented in the same direction as the formula table.							
15	<b>Assumption Table (Formula Inputs):</b>							
16	COGS	46.46%		<=< Expenses are <b>Vertical</b> in Assumption Table & <b>Vertical</b> in Formula Table				
17	Operating	19.48%		Horizontal / Horizontal works.				
18	Administrative	15.44%		Vertical / Vertical works.				
19	Other	4.04%		Horizontal / Vertical will NOT work.				
20								
21	This Assumption Table can <b>NOT</b> be used with Mixed Cell References							
22	because expenses in Assumption Table are <b>NOT</b> oriented in the same direction as the formula table.							
23	<b>Assumption Table (Formula Inputs):</b>							
24	COGS	Operating	Administrative	Other				
25	46.46%	19.48%	15.44%	4.04%				

1. **Example:**

	A	B	C	D	E	F
1	<b>Example 1: Mixed Cell References in Multiplication Table</b>					
2						
3	Multiplication Ta					
4		1	2	3	4	5
5	1	=B\$4*\$A5	2	3	4	5
6	2	2	4	6	8	10
7	3	3	6	9	12	15

2. **Example:**

	A	B	C	D	E	F
1	<b>Example 2: Mixed Cell References &amp; Assumption Tables.</b>					
2	<b>Goal: Calculate Expenses for Budgeting Process.</b>					
3						
4	<b>Month</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>
5	Revenue	\$65,487	\$75,894	\$65,007	\$95,449	\$99,220
6	COGS	=ROUND(B\$5*\$B16,2)		\$30,200	\$44,342	\$46,094
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8	Administrative	\$10,110	\$11,717	\$10,036	\$14,736	\$15,318
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11	Net Income	\$9,554	\$11,072	\$9,484	\$13,925	\$14,475
12						
13	This Assumption Table can be used with Mixed Cell References because					
14	expenses in Assumption Table are oriented in the same direction as the formula table.					
15	<b>Assumption Table (Formula Inputs):</b>					
16	COGS	46.46%		<<= Expenses are <b>Vertical</b> in Assumption		
17	Operating	19.48%		Horizontal / Horizontal works.		

### 3. Example:

	A	B	C	D	E	F
1	<b>Example 3: Mixed Cell References for Budget with Income Statement Accounts</b>					
2						
3	<b>Assumptions (Formula Inputs)</b>					
4	Start Revenue for Jan	5000		<b>2018 NI Projections</b>	<b>Jan</b>	<b>Feb</b>
5	Revenue % Increase	0.015		<b>Revenue</b>	\$5,000.00	\$5,075.00
6	Expense as % of Revenue:			<b>Expenses</b>		
7	COGS	0.375		<b>COGS</b>	=ROUND(E\$5*\$B7,2)	
8	Salaries and Wages	0.135		<b>Salaries and Wages</b>	\$675.00	\$685.13
9	Rent	0.075		<b>Rent</b>	\$375.00	\$380.63

### 4. Example:

	A	B	C
1	<b>Example 4: Mixed Cell References for Retirement Savings Table</b>		
2			
3	Yearly PMT	-\$3,000.00	
4			
5	<b>What will your Pens</b>		
6	<b>Years/Rate</b>	3%	4%
7	10	=FV(B\$6,\$A7,\$B\$3)	\$36,018.32
8	15	\$55,796.74	\$60,070.76

### 5. Example:

	A	B	C	D	E	F	G
1	<b>Example 5: Mixed Cell References &amp; Correct Assumption Table for Dynamic Payroll Table</b>						
2							
3	<b>Employee Take Home Pay Table</b>						
4	<b>Names</b>	<b>January Sales</b>	<b>Commission on Sales</b>	<b>Base Salary</b>	<b>Gross Pay</b>	<b>FICA Deduction</b>	<b>Medicare Deduction</b>
5	Steve	\$125,000.00	\$2,500.00	\$2,000.00	\$4,500.00	=ROUND(\$E5*\$F\$14,2)	
6	Abdi	\$97,855.00	\$1,957.10	\$2,000.00	\$3,957.10	\$245.34	\$57.38
7	Tyrone	\$181,250.00	\$3,625.00	\$2,000.00	\$5,625.00	\$348.75	\$81.56
8	Aya	\$95,500.00	\$1,910.00	\$2,000.00	\$3,910.00	\$242.42	\$56.70
9	Bobbi	\$78,550.00	\$1,571.00	\$2,000.00	\$3,571.00	\$221.40	\$51.78
10	<b>Totals</b>	<b>\$578,155.00</b>	<b>\$11,563.10</b>	<b>\$10,000.00</b>	<b>\$21,563.10</b>	<b>\$1,336.91</b>	<b>\$312.67</b>
11							
12						<b>Assumpti</b>	
13			<b>Commission Rate</b>			<b>FICA Deduction</b>	<b>Medicare Deduction</b>
14			2.00%			6.20%	1.45%
15							

## New Keyboards:

- i. F4 key toggles between the four cell references.
- ii. To populate the contents of the Active Cell into all the selected cells: Ctrl + Enter
- iii. Ctrl + "Period" = Ctrl + . = Move between the four corners of a highlighted range