

Microsoft Office Virtual Learning

Relative and Absolute Cell References

May 13, 2020

Lesson: May 13, 2020

Objective/Learning Target:

Students will will understand the difference between
Relative and Absolute cell references in Excel and Google
Sheets

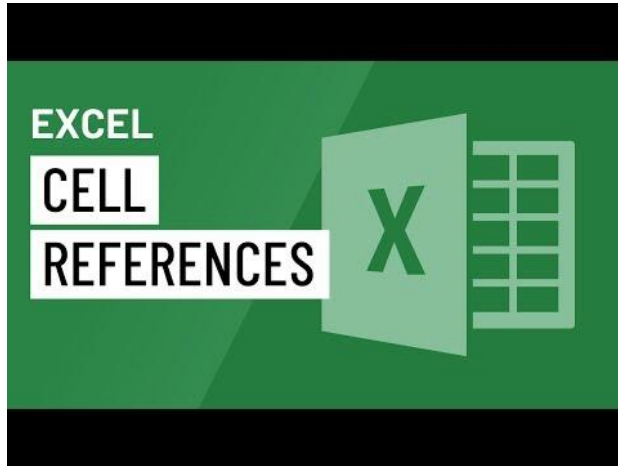


Introduction

There are two types of cell references: relative and absolute. Relative and absolute references behave differently when copied and filled to other cells. Relative references change when a formula is copied to another cell. Absolute references, on the other hand, remain constant no matter where they are copied.

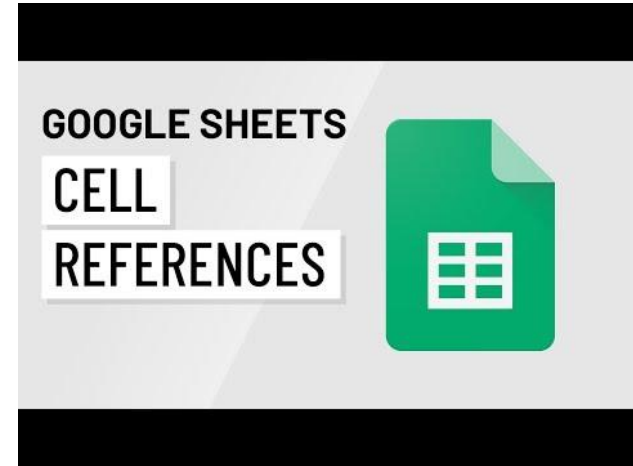
Video Tutorial

Excel



<https://youtu.be/iDg9s7BJ2m4>

Google Sheets



<https://youtu.be/ohJ74YDvM4A>



Relative References

By default, all cell references are relative references. When copied across multiple cells, they change based on the relative position of rows and columns. For example, if you copy the formula `=A1+B1` from row 1 to row 2, the formula will become `=A2+B2`. Relative references are especially convenient whenever you need to repeat the same calculation across multiple rows or columns.

To Create and Copy a Formula using Relative References

In the following example, we want to create a formula that will multiply each item's price by the quantity. Instead of creating a new formula for each row, we can create a single formula in cell D4 and then copy it to the other rows. We'll use relative references so the formula calculates the total for each item correctly (Excel - Left; Google Sheets - Right)

1. Select the cell that will contain the formula. In our example, we'll select cell D4.
2. Enter the formula to calculate the desired value. In our example, we'll type=B4*C4.

Item	Price	Quantity	Total
Empanadas: Beef Picadillo	\$2.99	15	=B4*C4
Empanadas: Chicken Shrimp	\$2.99	20	
Tamale: Chicken Tinga	\$2.25	20	
Tamale: Vegetarian	\$2.25	30	
Arroz: Carnitas	\$2.89	10	
Arroz: Queso Blanco	\$2.49	20	
Empanadas: Apple Cinnamon	\$3.19	40	
Beverages: Horchata	\$1.89	25	
Beverages: Lemonade	\$1.89	15	
Beverages: Tamarindo	\$1.89	10	

Item	Price	Quantity	Total
Empanadas: Beef Picadillo	\$2.99	15	=B4*C4
Empanadas: Chicken Shrimp	\$2.99	20	
Tamale: Chicken Tinga	\$2.25	20	
Tamale: Vegetarian	\$2.25	30	
Arroz: Carnitas	\$2.89	10	
Arroz: Queso Blanco	\$2.49	20	
Empanadas: Apple Cinnamon	\$3.19	40	
Beverages: Horchata	\$1.89	25	
Beverages: Lemonade	\$1.89	15	
Beverages: Tamarindo	\$1.89	10	

3. Press Enter on your keyboard. The formula will be calculated, and the result will be displayed in the cell.
4. Select the cell you want to copy. In our example, we'll select cell D4. The fill handle will appear in the bottom-right corner of the cell.
5. Click and drag the fill handle over the cells you want to fill. In our example, we'll select cells D5:D13.

Item	Price	Quantity	Total
Empanadas: Beef Picadillo	\$2.99	15	\$44.85
Empanadas: Chicken Shrimp	\$2.99	20	
Tamale: Chicken Tinga	\$2.25	20	
Tamale: Vegetarian	\$2.25	30	
Arroz: Carnitas	\$2.89	10	
Arroz: Queso Blanco	\$2.49	20	
Empanadas: Apple Cinnamon	\$3.19	40	
Beverages: Horchata	\$1.89	25	
Beverages: Lemonade	\$1.89	15	
Beverages: Tamarindo	\$1.89	10	

Item	Price	Quantity	Total
Empanadas: Beef Picadillo	\$2.99	15	\$44.85
Empanadas: Chicken Shrimp	\$2.99	20	
Tamale: Chicken Tinga	\$2.25	20	
Tamale: Vegetarian	\$2.25	30	
Arroz: Carnitas	\$2.89	10	
Arroz: Queso Blanco	\$2.49	20	
Empanadas: Apple Cinnamon	\$3.19	40	
Beverages: Horchata	\$1.89	25	
Beverages: Lemonade	\$1.89	15	
Beverages: Tamarindo	\$1.89	10	

6. Release the mouse. The formula will be copied to the selected cells with relative references, displaying the result in each cell.



Absolute Cell References

There may be times when you do not want a cell reference to change when copying or filling cells. You can use an absolute reference to keep a row and/or column constant in the formula.

An absolute reference is designated in the formula by the addition of a dollar sign (\$). It can precede the column reference, the row reference, or both.

\$A\$2	The column and the row do not change when copied
A\$2	The row does not change when copied
\$A2	The column does not change when copied

You will most likely use the \$A\$2 format when creating formulas that contain absolute references. The other two formats are used much less often.

To Create and Copy a Formula using Absolute References

In the example below, we're going to use cell E2 (which contains the tax rate at 7.5%) to calculate the sales tax for each item in column D. To make sure the reference to the tax rate stays constant—even when the formula is copied and filled to other cells—we'll need to make cell \$E\$2 an absolute reference. (Excel - Left; Google Sheets - Right)

1. Select the cell that will contain the formula. In our example, we'll select cell D4.
2. Enter the formula to calculate the desired value. In our example, we'll type $= (B4 * C4) * \$E\2 , making \$E\$2 an absolute reference.

	A	B	C	D	E
1					Tax Rate: 7.5%
2					
3					
4	Empire State Beef Pudding	\$2.99	10		
5	Empire State Chicken Strips	\$2.99	20		
6	Tamale: Chicken Tingi	\$2.29	20		
7	Tamale: Vegetarian	\$2.29	20		
8	Amigos: Cornitos	\$2.49	20		
9	Amigos: Queso Blanco	\$2.49	20		
10	Empire State Apple Cinnamon	\$1.19	40		
11	Beverages: Horchata	\$1.89	25		
12	Beverages: Lemonade	\$1.89	25		
13	Beverages: Tamarindo	\$1.89	25		
14				TOTAL	\$138.00

	A	B	C	D	E
1					Tax Rate: 7.5%
2					
3					
4	Empire State Beef Pudding	\$2.99	10		
5	Empire State Chicken Strips	\$2.99	20		
6	Tamale: Chicken Tingi	\$2.29	20		
7	Tamale: Vegetarian	\$2.29	20		
8	Amigos: Cornitos	\$2.49	20		
9	Amigos: Queso Blanco	\$2.49	20		
10	Empire State Apple Cinnamon	\$1.19	40		
11	Beverages: Horchata	\$1.89	25		
12	Beverages: Lemonade	\$1.89	25		
13	Beverages: Tamarindo	\$1.89	25		
14				TOTAL	\$138.00

3. Press Enter on your keyboard. The formula will calculate, and the result will display in the cell.
4. Select the cell you want to copy. In our example, we'll select cell D4. The fill handle will appear in the bottom-right corner of the cell.
5. Click and drag the fill handle over the cells you want to fill (cells D5:D13 in our example).

	A	B	C	D	E
1					Tax Rate: 7.5%
2					
3					
4	Empire State Beef Pudding	\$2.99	10	\$3.36	
5	Empire State Chicken Strips	\$2.99	20	\$6.80	
6	Tamale: Chicken Tingi	\$2.29	20	\$4.80	
7	Tamale: Vegetarian	\$2.29	20	\$4.80	
8	Amigos: Cornitos	\$2.49	20	\$5.80	
9	Amigos: Queso Blanco	\$2.49	20	\$5.80	
10	Empire State Apple Cinnamon	\$1.19	40	\$3.60	
11	Beverages: Horchata	\$1.89	25	\$4.20	
12	Beverages: Lemonade	\$1.89	25	\$4.20	
13	Beverages: Tamarindo	\$1.89	25	\$4.20	
14				TOTAL	\$138.00

	A	B	C	D	E
1					Tax Rate: 7.5%
2					
3					
4	Empire State Beef Pudding	\$2.99	10	\$3.36	
5	Empire State Chicken Strips	\$2.99	20	\$6.80	
6	Tamale: Chicken Tingi	\$2.29	20	\$4.80	
7	Tamale: Vegetarian	\$2.29	20	\$4.80	
8	Amigos: Cornitos	\$2.49	20	\$5.80	
9	Amigos: Queso Blanco	\$2.49	20	\$5.80	
10	Empire State Apple Cinnamon	\$1.19	40	\$3.60	
11	Beverages: Horchata	\$1.89	25	\$4.20	
12	Beverages: Lemonade	\$1.89	25	\$4.20	
13	Beverages: Tamarindo	\$1.89	25	\$4.20	
14				TOTAL	\$138.00

6. Release the mouse. The formula will be copied to the selected cells with an absolute reference, and the values will be calculated in each cell.

Challenge

Excel

1. Open Excel 2016.
2. Enter the following into the designated Cells

A1	10
A2	2
A3	5

3. Use the fill handle to copy the same numbers into cells B1 through B3 and C1 through C3
4. In cell A4, enter a formula that multiplies B3, C3, and A3.
5. Use the fill handle to copy the formula you just created to cells D5:D12.
6. In Cell A5, enter a formula that adds A1, B2 and C3

Sheets

1. Open Google Sheets and create a new blank spreadsheet.
2. Enter the following into the designated Cells

A1	10
A2	2
A3	5

3. Use the fill handle to copy the same numbers into cells B1 through B3 and C1 through C3
4. In cell A4, enter a formula that multiplies B3, C3, and A3.
5. Use the fill handle to copy the formula you just created to cells D5:D12.
6. In Cell A5, enter a formula that adds A1, B2 and C3

For More Resources:

Microsoft Excel:

<https://edu.gcfglobal.org/en/excel2016/relative-and-absolute-cell-references/1/>

Google Sheets:

<https://edu.gcfglobal.org/en/googlespreadsheets/types-of-cell-references/1/>