

# Excel 2016 - Lesson 15: Relative and absolute cell references

There are two types of cell references: relative and absolute. Let's refer to TipsMake.com's tutorial on relative and absolute cell references in Excel 2016!

1. Excel 2016 (Part 12): Formatting pages and printing spreadsheets
2. Excel 2016 (Part 13): Introduction to formulas
3. Excel 2016 (Part 14): Creating Complex Formulas

There are two types of cell references in Excel: **relative** and **absolute**. Relative and absolute references behave differently when copied and filled into cells. Relative references change when a formula is copied to another cell. Absolute references, however, remain the same no matter where they are copied.

Let's refer to TipsMake.com's tutorial article on **relative and absolute cell references in Excel 2016** !

Watch the video below to learn more about cell references:

## Relative references

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

### Create and copy a formula using relative references

In the example below, we want to create a formula that will multiply the price of each item by the quantity. Instead of creating a new formula for each item, we can create a single formula in **cell D2** and then copy it to the other rows. We will use relative references to calculate the total for each item correctly.

1. Select the cell containing the formula. In our example, we'll select **cell D4**.

	A	B	C	D	E
3	MENU ITEM	UNIT PRICE	QUANTITY	LINE TOTAL	
4	Empanadas: Beef Picadillo	\$2.99	15		
5	Empanadas: Chipotle Shrimp	\$3.99	10		
6	Tamales: Chicken Tinga	\$2.29	20		
7	Tamales: Vegetable	\$2.29	30		
8	Arepas: Carnitas	\$2.89	10		
9	Arepas: Queso Blanco	\$2.49	20		
10	Empanadas: Apple Cinnamon	\$3.19	40		
11	Beverages: Horchata	\$1.89	25		
12	Beverages: Lemonade	\$1.89	35		
13	Beverages: Tamarindo	\$1.89	10		
14	TOTAL			\$0.00	
15					

2. Enter the formula to calculate the desired value. In the example, we will type **=B4\*C4** .

	A	B	C	D	E
3	MENU ITEM	UNIT PRICE	QUANTITY	LINE TOTAL	
4	Empanadas: Beef Picadillo	\$2.99	15	=B4*C4	
5	Empanadas: Chipotle Shrimp	\$3.99	10		
6	Tamales: Chicken Tinga	\$2.29	20		
7	Tamales: Vegetable	\$2.29	30		
8	Arepas: Carnitas	\$2.89	10		
9	Arepas: Queso Blanco	\$2.49	20		
10	Empanadas: Apple Cinnamon	\$3.19	40		
11	Beverages: Horchata	\$1.89	25		
12	Beverages: Lemonade	\$1.89	35		
13	Beverages: Tamarindo	\$1.89	10		
14	TOTAL			\$0.00	
15					

3. Press **Enter** on your keyboard. The formula will be calculated and the result will be displayed in the cell.

4. Locate the **fill handle** in the lower-right corner of the desired cell. In our example, we will locate the **fill handle** for cell D4.

	A	B	C	D	E
3	MENU ITEM	UNIT PRICE	QUANTITY	LINE TOTAL	
4	Empanadas: Beef Picadillo	\$2.99	15	\$44.85	
5	Empanadas: Chipotle Shrimp	\$3.99	10		
6	Tamales: Chicken Tinga	\$2.29	20		
7	Tamales: Vegetable	\$2.29	30		
8	Arepas: Carnitas	\$2.89	10		
9	Arepas: Queso Blanco	\$2.49	20		
10	Empanadas: Apple Cinnamon	\$3.19	40		
11	Beverages: Horchata	\$1.89	25		
12	Beverages: Lemonade	\$1.89	35		
13	Beverages: Tamarindo	\$1.89	10		
14	TOTAL			\$44.85	
15					

5. Click and drag the fill handle to the cells you want to fill. In our example, we'll select cells **D5:D13** .

	A	B	C	D	E
3	MENU ITEM	UNIT PRICE	QUANTITY	LINE TOTAL	
4	Empanadas: Beef Picadillo	\$2.99	15	\$44.85	
5	Empanadas: Chipotle Shrimp	\$3.99	10		
6	Tamales: Chicken Tinga	\$2.29	20		
7	Tamales: Vegetable	\$2.29	30		
8	Arepas: Carnitas	\$2.89	10		
9	Arepas: Queso Blanco	\$2.49	20		
10	Empanadas: Apple Cinnamon	\$3.19	40		
11	Beverages: Horchata	\$1.89	25		
12	Beverages: Lemonade	\$1.89	35		
13	Beverages: Tamarindo	\$1.89	10		
14	TOTAL			\$44.85	
15					

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

	A	B	C	D	E
3	MENU ITEM	UNIT PRICE	QUANTITY	LINE TOTAL	
4	Empanadas: Beef Picadillo	\$2.99	15	\$44.85	
5	Empanadas: Chipotle Shrimp	\$3.99	10	\$39.90	
6	Tamales: Chicken Tinga	\$2.29	20	\$45.80	
7	Tamales: Vegetable	\$2.29	30	\$68.70	
8	Arepas: Carnitas	\$2.89	10	\$28.90	
9	Arepas: Queso Blanco	\$2.49	20	\$49.80	
10	Empanadas: Apple Cinnamon	\$3.19	40	\$127.60	
11	Beverages: Horchata	\$1.89	25	\$47.25	
12	Beverages: Lemonade	\$1.89	35	\$66.15	
13	Beverages: Tamarindo	\$1.89	10	\$18.90	
14			TOTAL	\$537.85	
15					

You can double-click on filled cells to check their correct formulas. The relative references for each cell should be different, depending on the row.

	A	B	C	D	E
3	MENU ITEM	UNIT PRICE	QUANTITY	LINE TOTAL	
4	Empanadas: Beef Picadillo	\$2.99	15	\$44.85	
5	Empanadas: Chipotle Shrimp	\$3.99	10	\$39.90	
6	Tamales: Chicken Tinga	\$2.29	20	\$45.80	
7	Tamales: Vegetable	\$2.29	30	\$68.70	
8	Arepas: Carnitas	\$2.89	10	=B8*C8	
9	Arepas: Queso Blanco	\$2.49	20	\$49.80	
10	Empanadas: Apple Cinnamon	\$3.19	40	\$127.60	
11	Beverages: Horchata	\$1.89	25	\$47.25	
12	Beverages: Lemonade	\$1.89	35	\$66.15	
13	Beverages: Tamarindo	\$1.89	10	\$18.90	
14			TOTAL	\$537.85	
15					

## Absolute references

Sometimes you may not want a cell reference to change when you copy it to other cells. Unlike relative references, absolute references do not change when copied or filled. You can use an absolute reference to keep rows and/or columns in a row.

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

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

You will typically use the **\$A\$2** format when creating formulas that contain absolute references. The other two formats are used less frequently.

When writing a formula, you can press the **F4** key on your keyboard to switch between relative cell references and absolute cell references, as shown in the video below. This is an easy way to quickly insert an absolute reference.

### Create and copy a formula using absolute references

In the example below, we'll use **cell E2** (which has a tax rate of 7.5%) to calculate the sales tax for each item in column D. To ensure the reference to the tax rate stays the same—even if the formula is copied and filled into other cells—we need to make **cell \$E\$2** an absolute reference.

1. Select the cell containing the formula. In our example, we will select **cell D4**.

	A	B	C	D	E
2				TAX RATE:	7.5%
3	MENU ITEM	UNIT PRICE	QUANTITY	SALES TAX	LINE TOTAL
4	Empanadas: Beef Picadillo	\$2.99	15		\$44.85
5	Empanadas: Chipotle Shrimp	\$3.99	10		\$39.90
6	Tamales: Chicken Tinga	\$2.29	20		\$45.80
7	Tamales: Vegetable	\$2.29	30		\$68.70
8	Arepas: Carnitas	\$2.89	10		\$28.90
9	Arepas: Queso Blanco	\$2.49	20		\$49.80
10	Empanadas: Apple Cinnamon	\$3.19	40		\$127.60
11	Beverages: Horchata	\$1.89	25		\$47.25
12	Beverages: Lemonade	\$1.89	35		\$66.15
13	Beverages: Tamarindo	\$1.89	10		\$18.90
14				TOTAL	\$537.85
15					

2. Enter the formula to calculate the desired value. In the example, we would enter **=(B4\*C4)\*\$E\$2**, making **\$E\$2** an absolute reference.

	A	B	C	D	E
2				TAX RATE:	7.5%
3	MENU ITEM	UNIT PRICE	QUANTITY	SALES TAX	LINE TOTAL
4	Empanadas: Beef Picadillo	\$2.99	=(B4*C4)*\$E\$2		\$44.85
5	Empanadas: Chipotle Shrimp	\$3.99	10		\$39.90
6	Tamales: Chicken Tinga	\$2.29	20		\$45.80
7	Tamales: Vegetable	\$2.29	30		\$68.70
8	Arepas: Carnitas	\$2.89	10		\$28.90
9	Arepas: Queso Blanco	\$2.49	20		\$49.80
10	Empanadas: Apple Cinnamon	\$3.19	40		\$127.60
11	Beverages: Horchata	\$1.89	25		\$47.25
12	Beverages: Lemonade	\$1.89	35		\$66.15
13	Beverages: Tamarindo	\$1.89	10		\$18.90
14				TOTAL	\$537.85
15					

3. Press **Enter** on your keyboard. The formula will calculate and the result will be displayed in the cell.

4. Locate the **fill handle** in the lower-right corner of the desired cell. In our example, we will locate the **fill handle** for cell D4.

	A	B	C	D	E
2				TAX RATE:	7.5%
3	MENU ITEM	UNIT PRICE	QUANTITY	SALES TAX	LINE TOTAL
4	Empanadas: Beef Picadillo	\$2.99	15	\$3.36	\$48.21
5	Empanadas: Chipotle Shrimp	\$3.99	10		\$39.90
6	Tamales: Chicken Tinga	\$2.29	20		\$45.80
7	Tamales: Vegetable	\$2.29	30		\$68.70
8	Arepas: Carnitas	\$2.89	10		\$28.90
9	Arepas: Queso Blanco	\$2.49	20		\$49.80
10	Empanadas: Apple Cinnamon	\$3.19	40		\$127.60
11	Beverages: Horchata	\$1.89	25		\$47.25
12	Beverages: Lemonade	\$1.89	35		\$66.15
13	Beverages: Tamarindo	\$1.89	10		\$18.90
14				TOTAL	\$541.21
15					

5. Click and drag **the fill handle** to the cells you want to fill (cells D5:D13 in the example).

D4 $= (B4 * C4) * \$E\$2$				
A	B	C	D	E
			TAX RATE:	7.5%
MENU ITEM	UNIT PRICE	QUANTITY	SALES TAX	LINE TOTAL
Empanadas: Beef Picadillo	\$2.99	15	\$3.36	\$48.21
Empanadas: Chipotle Shrimp	\$3.99	10		\$39.90
Tamales: Chicken Tinga	\$2.29	20		\$45.80
Tamales: Vegetable	\$2.29	30		\$68.70
Arepas: Carnitas	\$2.89	10		\$28.90
Arepas: Queso Blanco	\$2.49	20		\$49.80
Empanadas: Apple Cinnamon	\$3.19	40		\$127.60
Beverages: Horchata	\$1.89	25		\$47.25
Beverages: Lemonade	\$1.89	35		\$66.15
Beverages: Tamarindo	\$1.89	10		\$18.90
			TOTAL	\$541.21

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

D4 $= (B4 * C4) * \$E\$2$				
A	B	C	D	E
			TAX RATE:	7.5%
MENU ITEM	UNIT PRICE	QUANTITY	SALES TAX	LINE TOTAL
Empanadas: Beef Picadillo	\$2.99	15	\$3.36	\$48.21
Empanadas: Chipotle Shrimp	\$3.99	10	\$2.99	\$42.89
Tamales: Chicken Tinga	\$2.29	20	\$3.44	\$49.24
Tamales: Vegetable	\$2.29	30	\$5.15	\$73.85
Arepas: Carnitas	\$2.89	10	\$2.17	\$31.07
Arepas: Queso Blanco	\$2.49	20	\$3.74	\$53.54
Empanadas: Apple Cinnamon	\$3.19	40	\$9.57	\$137.17
Beverages: Horchata	\$1.89	25	\$3.54	\$50.79
Beverages: Lemonade	\$1.89	35	\$4.96	\$71.11
Beverages: Tamarindo	\$1.89	10	\$1.42	\$20.32
			TOTAL	\$578.19

You can double-click on filled cells to check their formulas for accuracy. Absolute references should be the same in each cell, while other references are relative to the cell's row.

	A	B	C	D	E
2				TAX RATE:	7.5%
3	MENU ITEM	UNIT PRICE	QUANTITY	SALES TAX	LINE TOTAL
4	Empanadas: Beef Picadillo	\$2.99	15	\$3.36	\$48.21
5	Empanadas: Chipotle Shrimp	\$3.99	10	\$2.99	\$42.89
6	Tamales: Chicken Tinga	\$2.29	20	\$3.44	\$49.24
7	Tamales: Vegetable	\$2.29	30	\$5.15	\$73.85
8	Arepas: Carnitas	\$2.89	=(B8*C8)*\$E\$2		\$31.07
9	Arepas: Queso Blanco	\$2.49	20	\$3.74	\$53.54
10	Empanadas: Apple Cinnamon	\$3.19	40	\$9.57	\$137.17
11	Beverages: Horchata	\$1.89	25	\$3.54	\$50.79
12	Beverages: Lemonade	\$1.89	35	\$4.96	\$71.11
13	Beverages: Tamarindo	\$1.89	10	\$1.42	\$20.32
14				TOTAL	\$578.19
15					

Be sure to include **the dollar sign (\$)** whenever you make an absolute reference across multiple cells. The dollar signs have been omitted in the example below. This causes Excel to interpret it as a relative reference, which produces incorrect results when copied to other cells.

	A	B	C	D	E
2				TAX RATE:	7.5%
3	MENU ITEM	UNIT PRICE	QUANTITY	SALES TAX	LINE TOTAL
4	Empanadas: Beef Picadillo	\$2.99	15	\$3.36	\$48.21
5	Empanadas: Chipotle Shrimp	\$3.99	10	#VALUE!	#VALUE!
6	Tamales: Chicken Tinga	\$2.29	20	\$2,208.19	\$2,253.99
7	Tamales: Vegetable	\$2.29	30	#VALUE!	#VALUE!
8	Arepas: Carnitas	\$2.89	=(B8*C8)*E6		\$65,169.20
9	Arepas: Queso Blanco	\$2.49	20	#VALUE!	#VALUE!
10	Empanadas: Apple Cinnamon	\$3.19	40	#####	#####
11	Beverages: Horchata	\$1.89	25	#VALUE!	#VALUE!
12	Beverages: Lemonade	\$1.89	35	#####	#####
13	Beverages: Tamarindo	\$1.89	10	#VALUE!	#VALUE!
14				TOTAL	#VALUE!
15					

## Using cell references with multiple worksheets

Excel allows you to reference any cell on a worksheet, which can be especially useful if you want to reference a specific value from another worksheet. To do this, simply begin the cell reference with the name of the worksheet followed by **an exclamation point (!)**. For example, if you wanted to reference **cell A1 on Sheet1**, its cell reference would be **Sheet1!A1**.

Note that if a worksheet name contains **spaces**, you will need to include **single quotes ('')** around the name. For example, if you wanted to refer to cell A1 on a worksheet named **July Budget**, its cell reference would be **'July Budget'!A1**.

## Referencing cells on worksheets

In the example below, we will reference a cell with a calculated value between two tables. This will allow us to use the exact same value on two different spreadsheets without having to rewrite the formula or copy data.

1. Locate the cell you want to reference and note the worksheet it is in. In our example, we want to reference **cell E14** on the **Menu Order** worksheet.

	A	B	C	D	E
2				TAX RATE:	7.5%
3	MENU ITEM	UNIT PRICE	QUANTITY	SALES TAX	LINE TOTAL
4	Empanadas: Beef Picadillo	\$2.99	15	\$3.36	\$48.21
5	Empanadas: Chipotle Shrimp	\$3.99	10	\$2.99	\$42.89
6	Tamales: Chicken Tinga	\$2.29	20	\$3.44	\$49.24
7	Tamales: Vegetable	\$2.29	30	\$5.15	\$73.85
8	Arepas: Carnitas	\$2.89	10	\$2.17	\$31.07
9	Arepas: Queso Blanco	\$2.49	20	\$3.74	\$53.54
10	Empanadas: Apple Cinnamon	\$3.19	40	\$9.57	\$137.17
11	Beverages: Horchata	\$1.89	25	\$3.54	\$50.79
12	Beverages: Lemonade	\$1.89	35	\$4.96	\$71.11
13	Beverages: Tamarindo	\$1.89	10	\$1.42	\$20.32
14				TOTAL	\$578.19

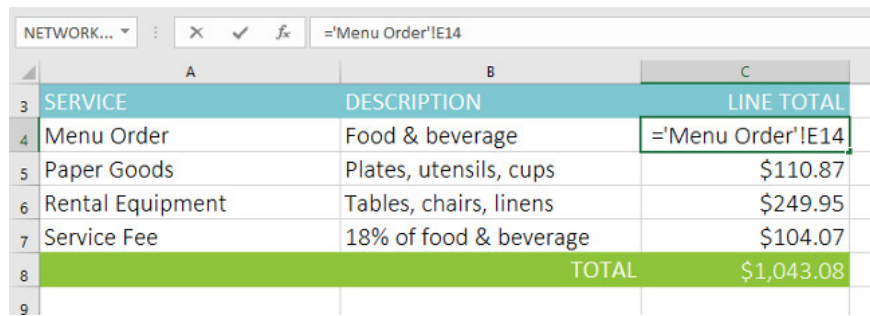
2. Navigate to the desired spreadsheet. In our example, we will select the **Catering Invoice** spreadsheet .

	A	B	C
3	SERVICE	DESCRIPTION	LINE TOTAL
4	Menu Order	Food & beverage	
5	Paper Goods	Plates, utensils, cups	\$110.87
6	Rental Equipment	Tables, chairs, linens	\$249.95
7	Service Fee	18% of food & beverage	\$0.00
8		TOTAL	\$360.82

3. Locate and select the cell where you want the value to appear. In our example, we'll select **cell C4** .

	A	B	C
3	SERVICE	DESCRIPTION	LINE TOTAL
4	Menu Order	Food & beverage	
5	Paper Goods	Plates, utensils, cups	\$110.87
6	Rental Equipment	Tables, chairs, linens	\$249.95
7	Service Fee	18% of food & beverage	\$0.00
8		TOTAL	\$360.82

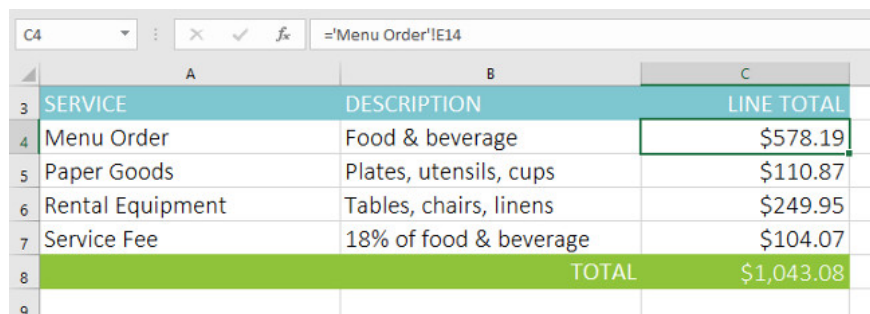
4. Type **the equals sign (=)** , the table name followed by **an exclamation mark (!)** and the cell address. In the example, we would type **=MenuOrder!E14** .



The screenshot shows an Excel spreadsheet with a table. The table has three columns: SERVICE, DESCRIPTION, and LINE TOTAL. The data is as follows:

SERVICE	DESCRIPTION	LINE TOTAL
Menu Order	Food & beverage	=Menu Order!E14
Paper Goods	Plates, utensils, cups	\$110.87
Rental Equipment	Tables, chairs, linens	\$249.95
Service Fee	18% of food & beverage	\$104.07
TOTAL		\$1,043.08

5. Press **Enter** on your keyboard. The value of the referenced cell will appear. Now, if the value of cell E14 changes on the Menu Order spreadsheet, it will be automatically updated on the Catering Invoice spreadsheet.

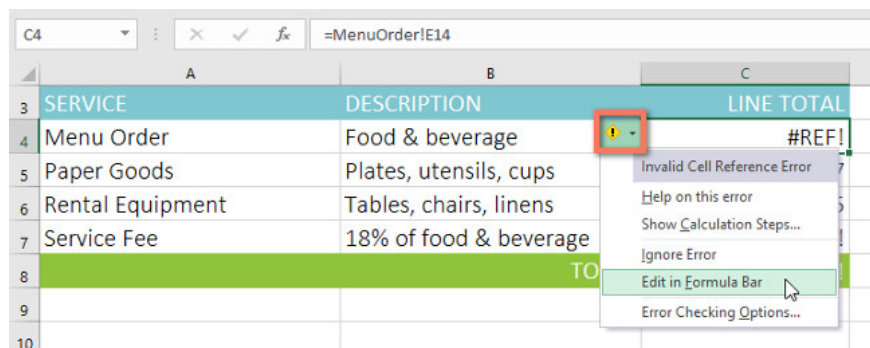


The screenshot shows the same Excel spreadsheet as above, but now the value of the formula in cell C4 is displayed as \$578.19.

SERVICE	DESCRIPTION	LINE TOTAL
Menu Order	Food & beverage	\$578.19
Paper Goods	Plates, utensils, cups	\$110.87
Rental Equipment	Tables, chairs, linens	\$249.95
Service Fee	18% of food & beverage	\$104.07
TOTAL		\$1,043.08

If you rename your worksheet at a later point, the cell reference will be automatically updated to reflect the new worksheet name.

If you enter an incorrect sheet name, a **#REF!** error appears in the cell. In our example, we mistyped the sheet name. To edit, ignore, or investigate the error, click the **Error** button next to the cell and select an option from the menu.



The screenshot shows the same Excel spreadsheet as above, but now the value in cell C4 is #REF!. A yellow warning icon is visible next to the cell, and a context menu is open over it. The menu options are:

- Invalid Cell Reference Error
- Help on this error
- Show Calculation Steps...
- Ignore Error
- Edit in Formula Bar
- Error Checking Options...

See more articles:

1. Excel 2016 (Part 3): How to create new and open existing spreadsheets
2. Excel 2016 (Part 4): How to store and share spreadsheets
3. Excel 2016 (Part 5): Basic concepts of cells and ranges

Have fun!

You finished reading the article "**Excel 2016 - Lesson 15: Relative and absolute cell references**" edited by the [TipsMake](#) team. We hope this article has provided you with many useful tech tips and tricks. You can search for similar articles on tips and guides. Thank you for reading and for following us regularly.

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