



Formulas and Functions

4.1 Simple Formulas:

Just like a calculator, Excel can add, subtract, multiply, and divide. In this lesson, we'll show you how to use cell references to create simple formulas.

Mathematical operators

Excel uses standard operators for formulas, such as a plus sign for addition (+), a minus sign for subtraction (-), an asterisk for multiplication (*), a forward slash for division (/), and a caret (^) for exponents.

Addition	+
Subtraction	-
Multiplication	*
Division	/
Exponents	^

All formulas in Excel must begin with an equal's sign (=). This is because the cell contains, or is equal to, the formula and the value it calculates.

Understanding cell references

While you can create simple formulas in Excel manually (for example, =2+2 or =5*5), most of the time you will use cell addresses to create a formula. This is known as making a cell reference. Using cell references will ensure that your formulas are always accurate because you can change the value of referenced cells without having to rewrite the formula.



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Class: Fourth
Subject: Computer Applications / Code: MU0244007
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2st term–Lecture No. 4/ Formulas and Functions.



The image shows two screenshots of an Excel spreadsheet. The top screenshot shows a spreadsheet with columns A and B, and rows 1, 2, and 3. Cell A1 contains the number 10, and cell A2 contains the number 5. Cell A3 contains the formula `=A1+A2`. A yellow callout box points to cell A3 with the text: "The formula in cell A3 refers to the value in cell A1 plus the value in cell A2". The bottom screenshot shows the same spreadsheet, but cell A3 now displays the number 15. A yellow callout box points to cell A3 with the text: "The formula calculates and displays the answer to the equation A1 plus A2".

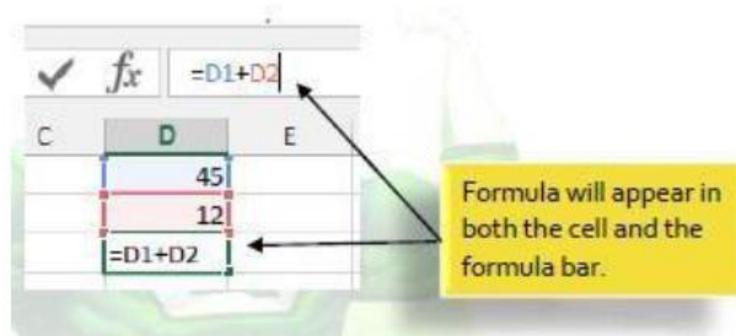
By combining a mathematical operator with cell references, you can create a variety of simple formulas in Excel. Formulas can also include a combination of cell references and numbers, as in the examples below:



=A1+A2	Adds cells A1 and A2
=C4-3	Subtracts 3 from cell C4
=E7/J4	Divides cell E7 by J4
=N10*1.05	Multiplies cell N10 by 1.05
=R5^2	Finds the square of cell R5

To create a formula

- 1- Select the cell that will contain the formula.
- 2- Type the equals sign (=). Notice how it appears in both the cell and the formula bar.



- 3- Type the cell address of the cell you wish to reference first in the formula: cell D1 in our example. A blue border will appear around the referenced cell.
- 4- Type the mathematical operator you wish to use. In our example, we'll type the addition sign (+).



5- Type the cell address of the cell you wish to reference second in the formula: cell D2 in our example. A red border will appear around the referenced cell.

6- Press Enter on your keyboard. The formula will be calculated, and the value will be displayed in the cell.

❖ TIP: If the result of a formula is too large to be displayed in a cell, it may appear as pound signs (#####) instead of a value. This means that the column is not wide enough to display the cell content. Simply increase the column width to show the cell content.

Modifying values with cell references

The true advantage of cell references is that they allow you to update data in your worksheet without having to rewrite formulas.

❖ TIP: Excel will not always tell you if your formula contains an error, so it's up to you to check all of your formulas.

• *To create a formula using the point-and-click method*

Rather than typing cell addresses manually, you can point and click on the cells you wish to include in your formula. This method can save a lot of time and effort when creating formulas. In our example below, we'll create a formula to calculate the cost of ordering several boxes of plastic silverware.

1- Select the cell that will contain the formula. In our example, we'll select cell D3.

2- Type the equals sign (=).

3- Select the cell you wish to reference first in the formula: cell B3 in our example. The cell address will appear in the formula, and a dashed blue line will appear around the referenced cell.

4- Type the mathematical operator you wish to use. In our example, we'll type the multiplication sign (*).

5- Select the cell you wish to reference second in the formula: cell C3 in our example. The cell address will appear in the formula, and a dashed red line will appear around the referenced cell.



6- Press Enter on your keyboard. The formula will be calculated, and the value will be displayed in the cell.

D3

	A	B	C	D
1	Paper Supply Inventory Orders			
2	Item	Quantity	Price Per Unit	Total Cost
3	Plastic Silverware (box of 100)	9	\$8.75	+
4	Napkins (box of 250)	12	\$2.59	
5	Plates (box of 50)	6	\$14.25	
6	Cups (box of 75)	10	\$11.99	
7	Total			

C3

=B3*C3

	A	B	C	D
1	Paper Supply Inventory Orders			
2	Item	Quantity	Price Per Unit	Total Cost
3	Plastic Silverware (box of 100)	9	+	\$8.75 =B3*C3
4	Napkins (box of 250)	12	\$2.59	
5	Plates (box of 50)	6	\$14.25	
6	Cups (box of 75)	10	\$11.99	
7	Total			



D3 : =B3*C3

	A	B	C	D	E
1	Paper Supply Inventory Orders				
2	Item	Quantity	Price Per Unit	Total Cost	
3	Plastic Silverware (box of 100)	9	\$8.75	\$78.75	
4	Napkins (box of 250)	12	\$2.59		
5	Plates (box of 50)	6	\$14.25		
6	Cups (box of 75)	10	\$11.99		
7	Total				

Formulas can also be copied to adjacent cells with the fill handle, which can save a lot of time and effort if you need to perform the same calculation multiple times in a worksheet.

edit a formula

Sometimes you may want to modify an existing formula. In the example below, we've entered an incorrect cell address in our formula, so we'll need to correct it.

- 1- Select the cell containing the formula you wish to edit.
 - 2- Click the formula bar to edit the formula. You can also double-click the cell to view and edit the formula directly within the cell.
 - 3- A border will appear around any referenced cells.
 - 4- When finished, press Enter on your keyboard or select the Enter command in the formula bar.
 - 5- The formula will be updated, and the new value will be displayed in the cell.
- ✚ TIP: If you change your mind, you can press the Esc key on your keyboard or click the Cancel command in the formula bar to avoid accidentally making changes to your formula.



4.2 Complex Formulas

A simple formula is a mathematical expression with one operator, such as $7+9$. A complex formula has more than one mathematical operator, such as $5+2*8$. When there is more than one operation in a formula, the order of operations tells Excel which operation to calculate first. In order to use Excel to calculate complex formulas, you will need to understand the order of operations.

Order of operations

Excel calculates formulas based on the following order of operations:

1. Operations enclosed in parentheses.
2. Exponential calculations (3^2 , for example).
3. Multiplication and division, whichever comes first.
4. Addition and subtraction, whichever comes first.

Creating complex formulas

In the example below, we will demonstrate how Excel solves a complex formula using the order of operations. Here, we want to calculate the cost of sales tax for an invoice. To do this, we'll write our formula as $= (D2+D3)*0.075$ in cell D4. This formula will add the prices of our items together and then multiply that value by the 7.5% tax rate (which is written as 0.075) to calculate the cost of sales tax.

	A	B	C	D
1	Menu Item	Price	Quantity	Total
2	Item 1	\$2.29	20	\$45.80
3	Item 2	\$2.29	30	\$68.70
4	Tax			$=(D2+D3)*0.075$
5	Total			