

Personal Computer Skills
Excel Formulas
"How To" Instructions

What are Formulas?

Excel can use numbers entered into one cell to calculate values in other cells. The equations used to calculate values in a cell are known as formulas.

How Does Excel Recognize a Formula?

Excel recognizes the contents of a cell as a formula when an equal sign (=) is the first character in the cell. For example, if the formula =8+6 were entered in cell B3, the value of 14 would be displayed in B3 of the worksheet. The formula bar displays the formula =8+6.

Structure of a Formula

A worksheet formula consists of two components, operands and operators:

- Operands - number or cell reference used in formulas
- Operators- tells Excel what to do with the operands
 - For example, =B3+5, B3 and 5 are operands, the plus (+) sign is the operator that tells Excel to add the value contained in cell b3 to the number 5.
- The following are operators used in Excel:

Operator	Operation	Example	Meaning
+	Addition	=B5+C5	Adds the values in B5 and C5
-	Subtraction	=C8-232	Subtracts 232 FROM the value in C8
*	Multiplication	=D4*D5	Multiplies the value in D4 by the value in D5
/	Division	=E6/4	Divides the value in E6 by 4
^	Exponentiation	=B3^3	Raises the value in B3 to the third power

Order of Evaluation (Operation)

Formulas containing more than one operator are called complex formulas. For example, the formula =C3*C4+5 will perform both multiplication and addition to calculate the value in the cell. The sequence used to calculate the value of a formula is called the Order of Evaluation.

Formulas are evaluated in the following order:

1. Contents within parentheses are evaluated first. You may use as many pairs of parentheses as you want. Excel will evaluate the innermost set of parentheses first.
2. Mathematical operators are evaluated in order of priority, as shown in the table below.
3. Equations are evaluated from left to right if two or more operators have the same order of evaluation. For example, in the formula =20-15-2, the number 15 would be subtracted from 20, then 2 would be subtracted from the difference (5).

Order of Evaluation	Operator	Symbol
First	Exponentiation	^
Second	Positive or Negative	+ or -
Third	Multiplication or Division	* or /
Fourth	Addition or Subtraction	+ or -

Relative, Absolute, and Mixed Cell References

Three types of cell references are used to create formulas: Relative, Absolute, and Mixed.

1. **Relative Reference** - Adjusts to its new location when copied or moved. For example, the formula =A3+A4 is copied to B5, the formula will change to =B3+B4. In other words, this formula is instructing Excel to add the two cells directly above. When the formula is copied or moved, the cell references change, but the operators stay the same.
2. **Absolute Reference**- Do not change when moved or copied to a new cell. To create an absolute reference, you insert a dollar sign (\$) before the column letter and/or row number of the cell reference you want to stay

the same. For example $=\$A\$3+\$A\4 is copied to B7 and the formula remains the same in the new location.

3. **Mixed Cell Reference** - Cell references containing both relative and absolute references. When formulas with mixed cell references are copied or moved, the row or column references preceded with by a dollar sign will not change; the row or column references not preceded by a dollar sign will adjust relative to the cell to which they are moved. For example, when the formula $=A\$3+A\4 is copied to B7, the formula changes to $=B\$3+B\4 .

Creating Formulas Quickly

Point-and-Click Method: You can include cell references in a formula more quickly by clicking on the cell rather than keying the reference. To use, simply substitute keying a cell reference with clicking on the cell. For example, to center the formula $=A3+B3$ in a cell, you would first highlight the cell that will contain the formula. Then, press =, click A3, press +, click B3 and press enter.

AutoSum

The AutoSum button makes summing a long column or row of numbers simple. The AutoSum button is identified by the Greek letter sigma (Σ).

To use AutoSum,

- Place the highlight in the cell where you want the total to appear.
- Click the AutoSum button
- Excel scans the worksheet to determine the most logical column or row of adjacent cells containing numbers to sum.
- Excel will then display an outline around the range it has selected.
- This range is identified in the highlighted cell.
- If you prefer a range other than the one Excel selects, drag to select those cells.