

Entering a Formula


Formulas are equations that perform calculations on values in your worksheet.

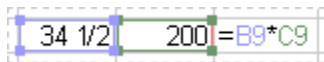
A formula starts with an equal sign (=).

1. Click the cell in which you want to enter the formula.
2. Type = (an equal sign).
3. Enter the formula.
4. Press ENTER.

- **Enter a formula that contains references: =A1+23**

Example formula	What it does
=C2	Uses the value in the cell C2
=Sheet2!B2	Uses the value in cell B2 on Sheet2



1. Click the cell in which you want to enter the formula.
2. In the **formula bar** , type = (equal sign).
3. To create a reference, select a cell, a range of cells, a location in another worksheet, or a location in another workbook. You can drag the border of the cell selection to move the selection, or drag the corner of the border to expand the selection.



4. Press ENTER.

- **Enter a formula that contains a function: =AVERAGE(A1:B4)**

Example formula	What it does
=SUM(A:A)	Adds all numbers in column A
=AVERAGE(A1:B4)	Averages all numbers in the range

1. Click the cell in which you want to enter the formula.
2. To start the formula with the function, type = (equal sign) and the function name or, click **Insert Function**  on the **formula bar** .
3. Create your argument with the cell references to be calculated.
4. When you complete the formula, press ENTER.

Commonly used Formulas


Statistical	<p>Calculate the average of a group of numbers</p> <table border="1"> <thead> <tr> <th></th> <th>A</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Data</td> </tr> <tr> <td>2</td> <td>10</td> </tr> <tr> <td>3</td> <td>7</td> </tr> <tr> <td>4</td> <td>9</td> </tr> <tr> <td>5</td> <td>27</td> </tr> <tr> <td>6</td> <td>0</td> </tr> <tr> <td>7</td> <td>4</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Formula</th> <th>Description (Result)</th> </tr> </thead> <tbody> <tr> <td>=AVERAGE(A2:A7)</td> <td>Averages all of numbers in list above (9.5)</td> </tr> <tr> <td>=AVERAGE(A2:A4,A7)</td> <td>Averages the top three and the last number in the list (7.5)</td> </tr> </tbody> </table>		A	1	Data	2	10	3	7	4	9	5	27	6	0	7	4	Formula	Description (Result)	=AVERAGE(A2:A7)	Averages all of numbers in list above (9.5)	=AVERAGE(A2:A4,A7)	Averages the top three and the last number in the list (7.5)
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	<p>Calculate a weighted average</p> <table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Price per unit</td> <td>Number of units</td> </tr> <tr> <td>2</td> <td>20</td> <td>500</td> </tr> <tr> <td>3</td> <td>25</td> <td>750</td> </tr> <tr> <td>4</td> <td>35</td> <td>200</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Formula</th> <th>Description (Result)</th> </tr> </thead> <tbody> <tr> <td>=SUMPRODUCT(A2:A4,B2:B4)/SUM(B2:B4)</td> <td>Divides the total cost of all three orders by the total number of units ordered (24.66)</td> </tr> </tbody> </table>		A	B	1	Price per unit	Number of units	2	20	500	3	25	750	4	35	200	Formula	Description (Result)	=SUMPRODUCT(A2:A4,B2:B4)/SUM(B2:B4)	Divides the total cost of all three orders by the total number of units ordered (24.66)			
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Math

Add numbers

=5+10

OR

1. Click a cell below the column of numbers or to the right of the row of numbers.
2. Click **AutoSum**  on the **Standard toolbar**, and then press ENTER.

OR

	A	B
1	Salesperson	Invoice
2	Buchanan	15,000
3	Buchanan	9,000
4	Suyama	8,000
5	Suyama	20,000
6	Dodsworth	22,500
	Formula	Description (Result)
	=B2+B3	Adds 15,000 to 9,000 (24,000)
	=SUM(B2:B3, B5)	Adds two invoices from Buchanan, and one from Suyama (44,000)
	=SUM(B2,B4,B6)	Adds individual invoices from Buchanan, Suyama, and Dodsworth (45,500)

Subtract numbers

=10-5

OR

	A	
1	Data	
2	15,000	
3	9,000	
4	-8,000	
	Formula	Description (Result)
	=A2-A3	Subtracts 9,000 from 15,000 (6,000)
	=SUM(A2:A4)	Adds all numbers in the list, including negative numbers (16,000)

Divide numbers

=10/5

OR

	A	
1	Data	
2	15,000	
3	12	
	Formula	Description (Result)
	=A2/A3	Divides 15,000 by 12 (1250)

Multiply numbers


=5*10

OR

	A
1	Data
2	5
3	15
4	30

Formula	Description (Result)
=A2*A3	Multiplies the numbers in the first two cells (75)
=PRODUCT(A2:A4)	Multiplies all the numbers in the range (2250)
=PRODUCT(A2:A4,2)	Multiplies all the numbers in the range, and 2 (4500)

Calculate the smallest or largest number in a range

1. Select a cell below or to the right of the numbers for which you want to find the smallest number.
2. Click the arrow next to **AutoSum** , and then click **Min** (calculates the smallest), or **Max** (calculates the largest), and then press ENTER.

OR

	A
1	Data
2	10
3	7
4	9
5	27
6	0
7	4


Formula	Description (Result)
=MIN(A2:A7)	Smallest number in the range (0)
=MAX(A2:A7)	Largest number in the range (27)
=SMALL(A2:A7, 2)	Second smallest number in the range (4)
=LARGE(A2:A7,3)	Third largest number in the range (9)



Raise a number to a power

=5^2

Calculate percentages

“amount” / “total” = “percentage”


To quickly display the result as a percentage, instead of as a decimal, click **Percent Style**  on the **Formatting** toolbar.

	<p>Round a number</p> <ol style="list-style-type: none"> On the Format menu, click Cells, and then click the Number tab. In the Category list, click Currency, Accounting, Percentage, or Scientific. In the Decimal places box, enter the number of decimal places that you want to display. <p>OR</p> <p>To display more or fewer digits after the decimal point: Click Increase Decimal  or Decrease Decimal  on the Formatting toolbar.</p>																																		
<p>Counting</p>	<p>Count all of the cells in a range</p> <table border="1" data-bbox="350 520 1451 718"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Data</td> <td>Data</td> <td>Data</td> <td>Data</td> </tr> <tr> <td>2</td> <td>15,000</td> <td>28,500</td> <td>55,000</td> <td>87,000</td> </tr> <tr> <td>3</td> <td>9,000</td> <td>13.700</td> <td>63,800</td> <td>23,000</td> </tr> <tr> <td>4</td> <td>8,000</td> <td>1000</td> <td>19,000</td> <td>99,900</td> </tr> </tbody> </table> <table border="1" data-bbox="402 730 1253 865"> <thead> <tr> <th>Formula</th> <th>Description (Result)</th> </tr> </thead> <tbody> <tr> <td>=ROWS(A1:D4) * COLUMNS(A1:D4)</td> <td>The total number of cells in the range (16)</td> </tr> </tbody> </table>		A	B	C	D	1	Data	Data	Data	Data	2	15,000	28,500	55,000	87,000	3	9,000	13.700	63,800	23,000	4	8,000	1000	19,000	99,900	Formula	Description (Result)	=ROWS(A1:D4) * COLUMNS(A1:D4)	The total number of cells in the range (16)					
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Financial	Calculate a running balance			
		A	B	C
	1	Deposits	Withdrawals	Balance
	2	\$1,000	\$625	=SUM(A2,-B2)
3	1000	740	=SUM(C2,A3,-B3)	

Text	Display only the last four digits of identification numbers		
	A	B	
	1	Type	Data
	2	Social Security Number	555-55-5555
	3	Credit Card Number	5555-5555-5555-5555
		Formula	Description (Result)
		=CONCATENATE("***_*-*", RIGHT(B2,4))	Combines the last four digits of the SSN with the "***_*-*" text string (***_*-*5555)
	=CONCATENATE(REPT("****-*",3), RIGHT(B3,4))	Repeats the "****-*" text string three times and combines the result with the the last four digits of the credit card number w(****_*-*5555)	
	Security In the example, you should put the formula in column C and hide column B so that the original data cannot be viewed when printed.		

Display formulas on your worksheet.

On the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode** . Click **Formula Auditing Mode** again to display your formula results again.

Tip: To print the worksheet with the formulas showing, just print as normal when in the **Formula Auditing Mode**.

Replace error values when printing

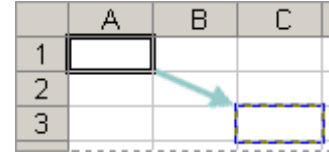
1. Select the worksheet with the error you don't want to print.
2. On the **File** menu, click **Page Setup**, and then click the **Sheet** tab.
3. Under **Print** in the **Cell errors as** box, click **<blank>**, **--**, or **#N/A**.

Move or copy a formula

When you move (cut + paste) a formula, the cell references within the formula do not change. When you copy a formula, the cell references may change based on the type of reference used.

1. Select the cell that contains the formula.
2. Check that the cell references used in the formula will produce the result you want.
 - Absolute cell reference:** In a formula, the exact address of a cell, regardless of the position of the cell that contains the formula. An absolute cell reference takes the form \$A\$1.
 - Relative cell reference:** In a formula, the address of a cell based on the relative position of the cell that contains the formula and the cell referred to. If you copy the formula, the reference automatically adjusts. A relative reference takes the form A1.


The "Changes To" column reflects how a reference type (absolute or relative) updates if a formula containing the reference is copied two cells down and two cells to the right.



Formula being copied

Reference (Description)	Changes to
\$A\$1 (absolute column and absolute row)	\$A\$1
A\$1 (relative column and absolute row)	C\$1
\$A1 (absolute column and relative row)	\$A3
A1 (relative column and relative row)	C3

3. On the **Edit** menu, click **Copy**.
4. Select the cell you want to copy it to.
5. To copy the formula and any formatting, on the **Edit** menu, click **Paste**.
6. To copy the formula only, on the **Edit** menu, click **Paste Special**, and then click **Formulas**.

Tip: You can also copy formulas into adjacent cells by using the fill handle (**fill handle:** The small black square in the lower-right corner of the selection. When you point to the fill handle, the pointer changes to a black cross.) . Select the cell that contains the formula, and then drag the fill handle over the range you want to fill.