

How to Calculate Standard Deviation Manually

1. Determine average of test results.
2. Calculate difference between average and individual test results
3. Calculate the square of individual results from Step 2, and determine the sum of those values.
4. Calculate the square root of: the sum from Step 3 divided by the number of tests minus 1.

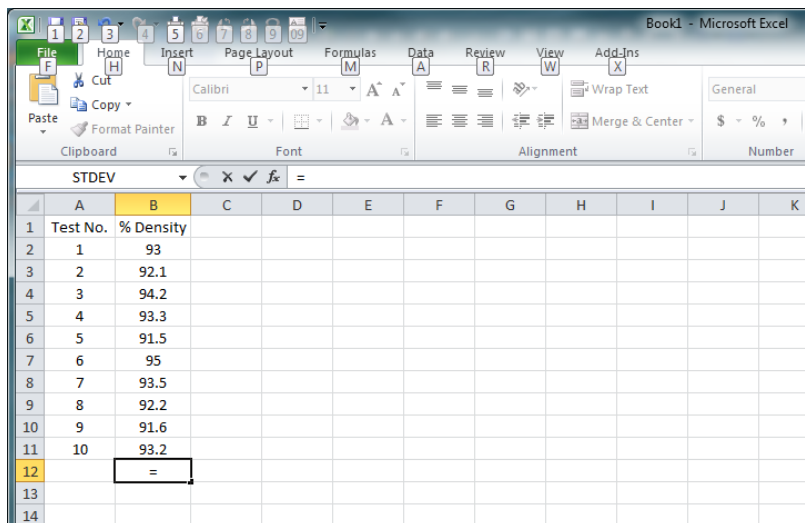
Example of 10 test results for % Density.

<u>Step 1</u>	<u>Step 2</u>	<u>Step 3</u>
93.0	0.0	0.00
92.1	-0.9	0.81
94.2	1.2	1.44
93.3	0.3	0.09
91.5	-1.5	2.25
95.0	2.0	4.00
93.5	0.5	0.25
92.2	-0.8	0.64
91.6	-1.4	1.96
<u>93.2</u>	<u>0.2</u>	<u>0.04</u>
Average = 93.0		Sum = 11.48

Step 4 $\sqrt{\frac{11.48}{9}} = 1.13$, The standard deviation for these 10 sample results is 1.13.

Determine Standard Deviation Using an Excel Spreadsheet

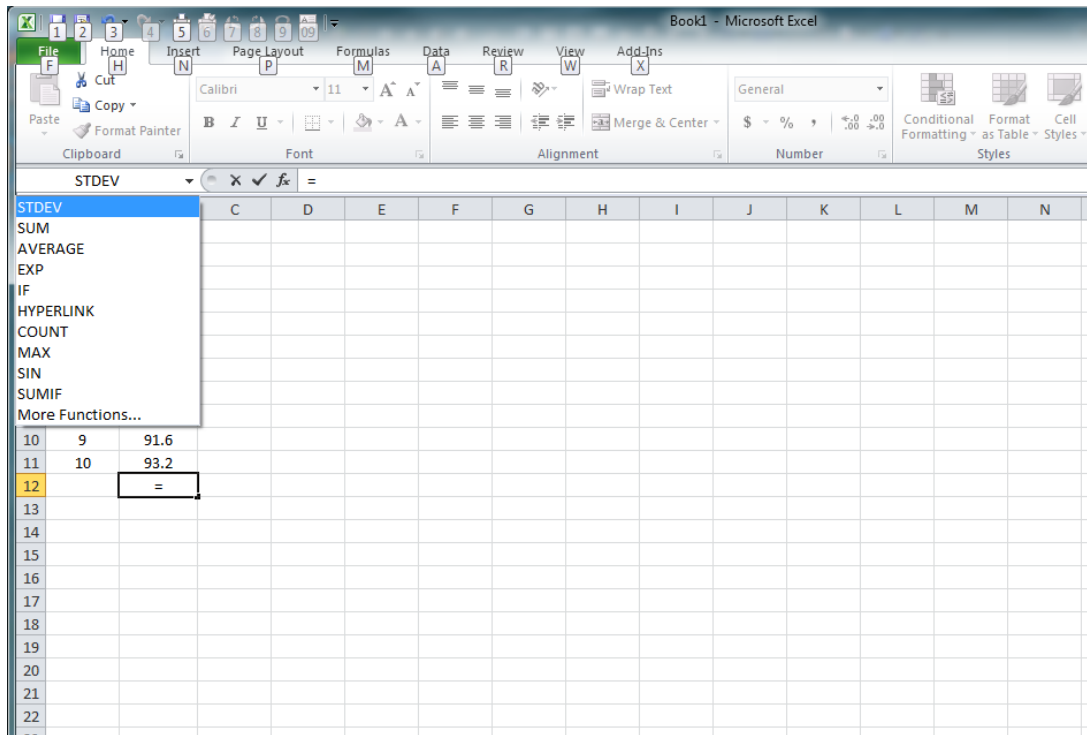
Step 1. Enter test Data. In the next cell below the test data, type the equals sign as shown below.



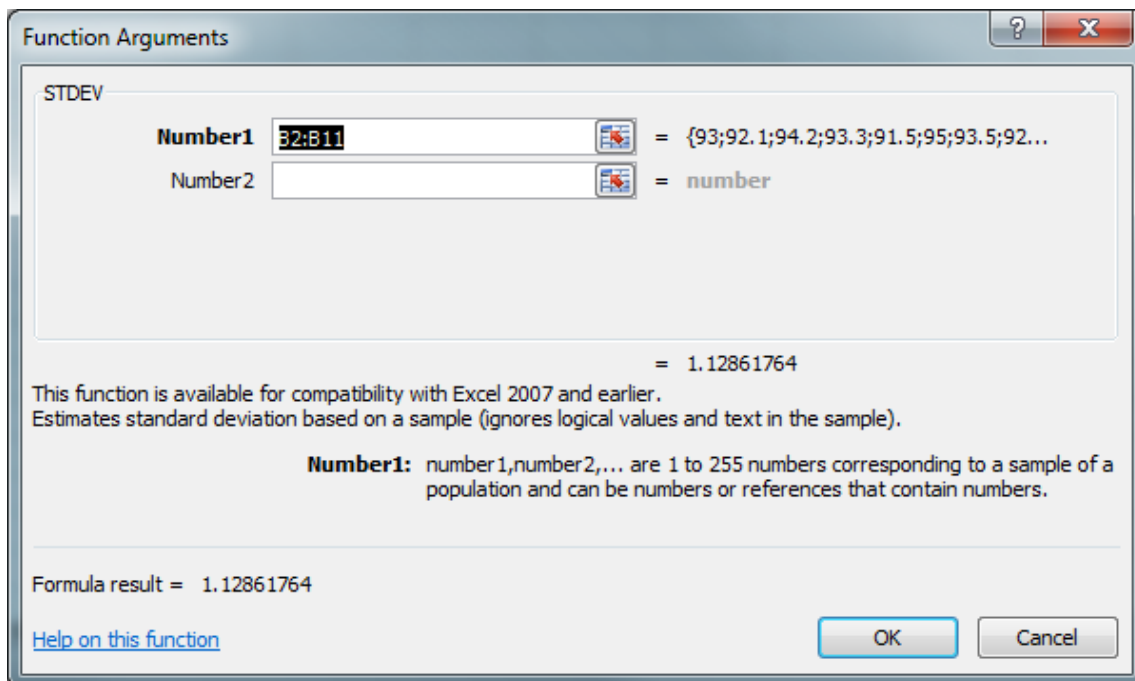
The screenshot shows the Microsoft Excel interface. The formula bar at the top displays "STDEV" and "=". The spreadsheet has columns A through K and rows 1 through 14. Column A is labeled "Test No." and column B is labeled "% Density". The data is as follows:

Test No.	% Density
1	93
2	92.1
3	94.2
4	93.3
5	91.5
6	95
7	93.5
8	92.2
9	91.6
10	93.2
	=

Step 2. Click on the drop down function box right above columns A & B, and select STDEV.

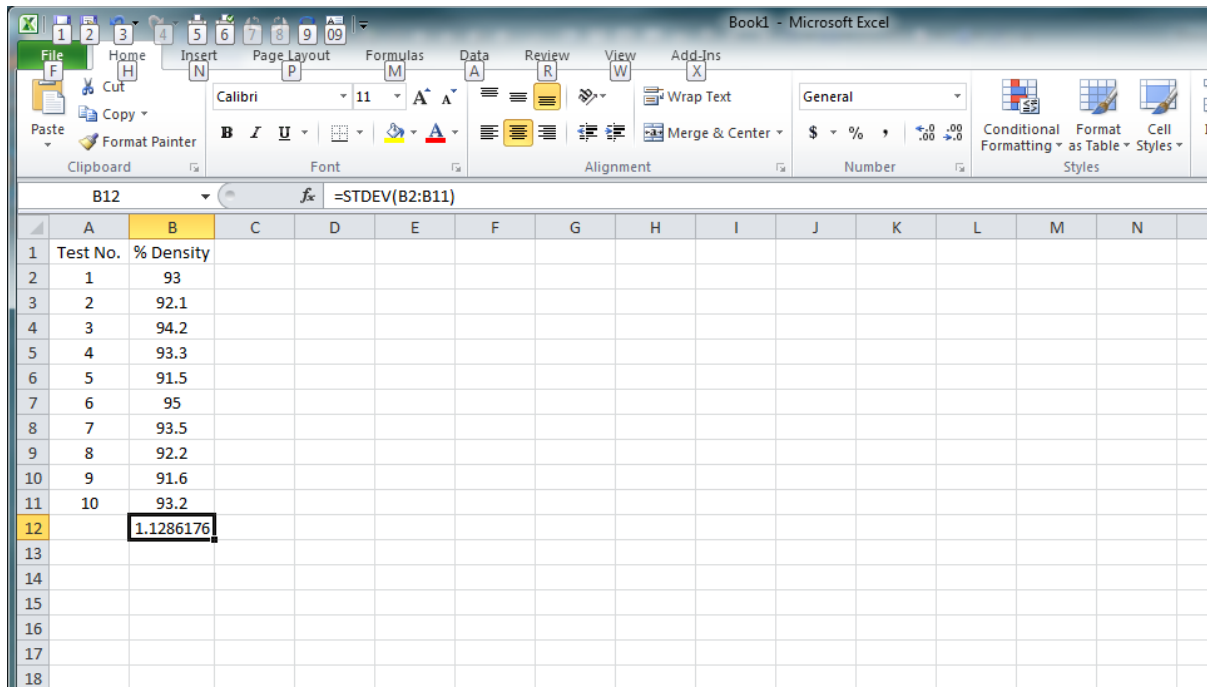


Step 3. Excel will give you the range of cells it “thinks” you want to use to calculate the standard deviation. Be sure the correct range of cells is shown; if not, correct the cell locations.



In this case, cells B2 through B11 are the correct values, so click on OK.

Step 4. Excel calculates the standard deviation for you; the answer is 1.13.



The screenshot shows the Microsoft Excel interface with the following data and formula:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Test No.	% Density												
2	1	93												
3	2	92.1												
4	3	94.2												
5	4	93.3												
6	5	91.5												
7	6	95												
8	7	93.5												
9	8	92.2												
10	9	91.6												
11	10	93.2												
12		1.1286176												
13														
14														
15														
16														
17														
18														

The formula bar at the top shows the formula: `=STDEV(B2:B11)`.