

Basic Descriptive Statistics Calculations with Excel

(© 2014 T.G. Groleau)

Fortunately, most of Excel's statistical calculations are pretty straightforward. We need to know how to calculate the following:

- Mean and Standard Deviation
 - A measure of center and a measure of spread
- The Five Number Summary
 - Maximum, Minimum, Median (measure of center), and the Quartiles
- The Interquartile Range (IQR)
 - A measure of spread associated with the Five Number Summary.

This handout does not explain the meaning or purpose of any of these statistics. It covers only how they are computed in Excel®. Tour de France winners since World War II provide the practice data for this handout. It's available on the shared Google Drive as an Excel® file.

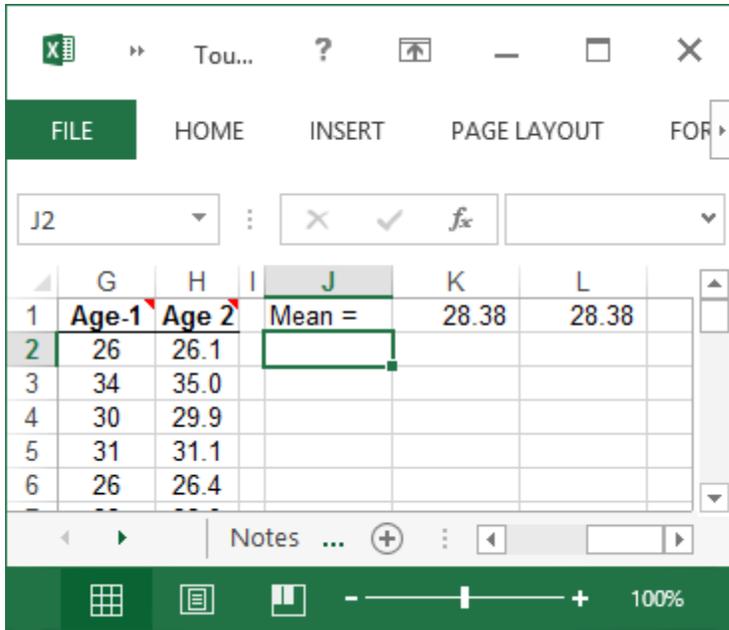
Mean

For some reason, Microsoft® decided that the word "average" was the best function name for the statistical mean. Therefore the function for mean is =AVERAGE(range of data).

In our Tdf Winner's example data, the ages run from cell H2 down to H69 so =AVERAGE(H2:H69) returns the correct mean of 28.38 years.

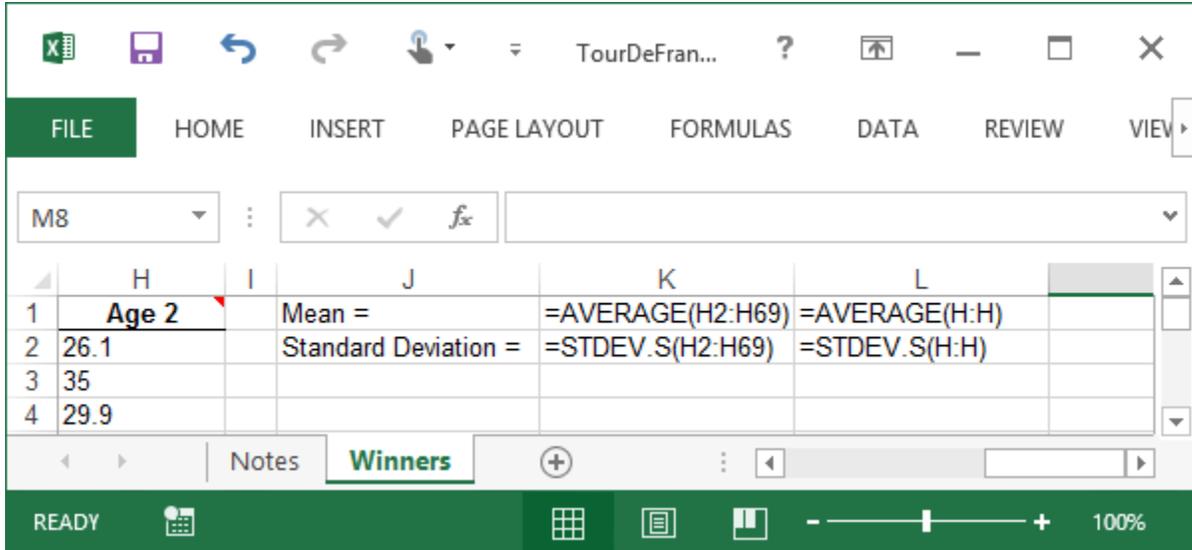
Most of the statistical functions ignore blank cells and non-numeric cells. Since the only numbers in column H are those from H2 through H63, you can tell the AVERAGE function to look at the entire column. In other words =AVERAGE(H:H) will also return the correct value.

	G	H	I	J	K	L
1	Age-1	Age 2		Mean =	=AVERAGE(H2:H69)	=AVERAGE(H:H)
2	26	26.1				
3	34	35				
4	30	29.9				
5	31	31.1				
6	26	26.4				
7	33	32.9				
8	28	28.4				
9	29	29.4				
10	30	30.4				
11	29	29.4				
12	23	23				

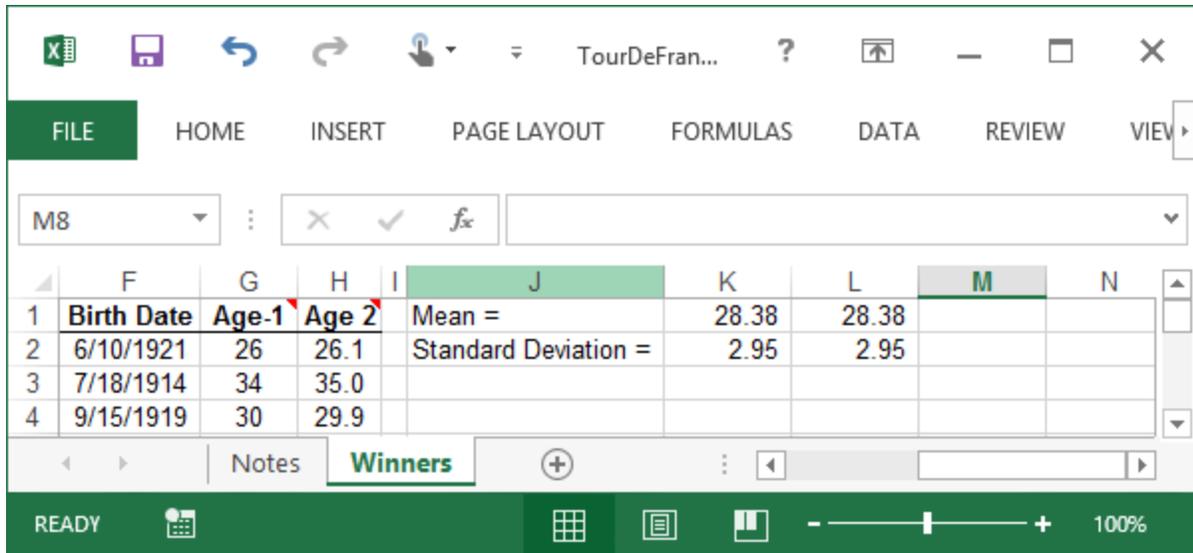


Sample Standard Deviation

The standard deviation is function has a similar structure and is written =STDEV.S(data range). As with AVERAGE, you can specify and exact range or specify an entire column.



Note: In the real world you would NOT use both the Column K and Column L versions of these functions. Both are shown here (and throughout this handout) to demonstrate that they give the same output. You can use whichever format you prefer.



The Five Number Summary

Excel® has similar functions for every statistic in the five number summary. Here's the list.

Statistic	Excel Function
Maximum	=MAX(data range)
Third Quartile, Q ₃	=QUARTILE(data range, 3)
Median	=MEDIAN(data range)
First Quartile, Q ₁	=QUARTILE(data range, 1)
Minimum	=MIN(data range)

You may notice that the QUARTILE() function has two inputs. The first is the data range (just like the other statistics functions) and the second specifies which quartile you want, the first or the third.

Here's how it looks in Excel®:

Microsoft Excel window: TourDeF... | FILE | HOME | INSERT | PAGE LAYOUT | FORMULAS | DATA | REVIEW

Formula bar: H9 | 29.4

	H	I	J	K	L
1	Age 2		Mean =	=AVERAGE(H2:H69)	=AVERAGE(H:H)
2	26.1		Standard Deviation =	=STDEV.S(H2:H69)	=STDEV.S(H:H)
3	35				
4	29.9		Maximum =	=MAX(H2:H69)	=MAX(H:H)
5	31.1		Third Quartile =	=QUARTILE(H2:H69,3)	=QUARTILE(H:H,3)
6	26.4		Median =	=MEDIAN(H2:H69)	=MEDIAN(H:H)
7	32.9		First Quartile =	=QUARTILE(H2:H69,1)	=QUARTILE(H:H,1)
8	28.4		Minimum =	=MIN(H2:H69)	=MIN(H:H)
9	29.4				
10	30.4				
11	29.4				

Worksheet: Winners | READY | 100%

Microsoft Excel window: TourDeF... | FILE | HOME | INSERT | PAGE LAYOUT | FORMULAS | DATA | REVIEW

Formula bar: J9

	H	I	J	K	L	M	N	O
1	Age 2		Mean =	28.38	28.38			
2	26.1		Standard Deviation =	2.95	2.95			
3	35.0							
4	29.9		Maximum =	35.00	35.00			
5	31.1		Third Quartile =	30.00	30.00			
6	26.4		Median =	28.25	28.25			
7	32.9		First Quartile =	26.33	26.33			
8	28.4		Minimum =	22.80	22.80			
9	29.4							
10	30.4							
11	29.4							

Worksheet: Winners | READY | 100%

Interquartile Range

There is no Excel function for Interquartile Range (IQR). Instead you have to create a formula that finds the difference between the third and first quartiles.

The screenshot shows an Excel spreadsheet with the following data and formulas:

	H	I	J	K	L
1	Age 2		Mean =	=AVERAGE(H2:H69)	=AVERAGE(H:H)
2	26.1		Standard Deviation =	=STDEV.S(H2:H69)	=STDEV.S(H:H)
3	35				
4	29.9		Maximum =	=MAX(H2:H69)	=MAX(H:H)
5	31.1		Third Quartile =	=QUARTILE(H2:H69,3)	=QUARTILE(H:H,3)
6	26.4		Median =	=MEDIAN(H2:H69)	=MEDIAN(H:H)
7	32.9		First Quartile =	=QUARTILE(H2:H69,1)	=QUARTILE(H:H,1)
8	28.4		Minimum =	=MIN(H2:H69)	=MIN(H:H)
9	29.4				
10	30.4		Interquartile Range =	=K5-K7	=L5-L7
11	29.4				

The screenshot shows the same Excel spreadsheet, but with the formulas calculated and numerical results displayed:

	H	I	J	K	L	M	N	O
1	Age 2		Mean =	28.38	28.38			
2	26.1		Standard Deviation =	2.95	2.95			
3	35.0							
4	29.9		Maximum =	35.00	35.00			
5	31.1		Third Quartile =	30.00	30.00			
6	26.4		Median =	28.25	28.25			
7	32.9		First Quartile =	26.33	26.33			
8	28.4		Minimum =	22.80	22.80			
9	29.4							
10	30.4		Interquartile Range =	3.68	3.68			
11	29.4							