

**STANDARD
DEVIATION**

Denoted by the letter s , the standard deviation is the square root of the *variance*.

$$s =$$

The standard deviation is a larger number when the values from a set of data are widely spread away from the mean and a smaller number (close to 0) when the data values are close together.

EXAMPLE: Find the standard deviation (*rounded to 2 decimal places*) of the following sample of data values:

3, 4, 5, 6, 4, 2, 0, 8, 4

STANDARD DEVIATION OF A FREQUENCY TABLE

Remember that standard deviation is *deviation from the mean*. So we will need to calculate the mean of the frequency table first.

Data Value, x	Frequency, f	$x \cdot f$
37	1	
38	2	
39	5	
40	5	
41	4	
42	2	
44	1	
	$\Sigma f =$	$\Sigma =$ $\bar{x} =$

After we have the mean, we follow the same pattern. Find how each data value deviates from the mean, then square these deviations to avoid the cancellation to zero.

STANDARD DEVIATION OF A FREQUENCY TABLE:

$$s = \sqrt{\frac{\sum (x - \bar{x})^2 \cdot f}{n - 1}}$$

Data Value, x	Frequency, f	Deviation from Mean $x - \bar{x}$	Deviation Squared $(x - \bar{x})^2$	Product $(x - \bar{x})^2 \cdot f$
37	1			
38	2			
39	5			
40	5			
41	4			
42	2			
44	1			
	$\Sigma f =$			$\Sigma =$

At this point we need to remember that we are using a frequency table. This means that each of these squared deviations occurs as many times as the data value itself - the frequency!

The final step is to sum ALL the squared deviations and use the standard deviation formula from above (*rounded to 2 decimal places*).

$s =$

EXAMPLE Given the following 8 family incomes (in thousands of dollars):

49, 51, 52, 51, 51, 50, 52, 52

- a. Find the range _____
- b. Find the mean _____
- c. Find the standard deviation (*round to 2 decimal places*). _____
- d. How many standard deviations is a family with an income of \$49,000 from the mean? (*round to 2 decimal places*). _____

EXAMPLE Given the following frequency table: a. Find the mean _____
b. Find the standard deviation _____

x	f
2	2
3	4
4	2
5	0
6	4