



## Standard Deviation

$$\sqrt{\frac{\sum(\text{data item} - \text{mean})^2}{n - 1}}$$

- **6 Steps to Compute Standard Deviation**  
(How far from the normal )

3, 3, 7, 7, 7, 11, 11

- **1** - Find the mean for the data set (numbers)
  - Add the numbers:  $(3 + 3 + 7 + 7 + 7 + 11 + 11 = 49)$  and
  - Divide by how many numbers in the data set:  $(49 / 7 = 7)$

(data item – mean)

- **2** - Find the deviation of each data item from the mean
  - $(3 - 7 = -4)$  [do it twice];
  - $(7 - 7 = 0)$  [do it three times];
  - $(11 - 7 = 4)$  [do it twice]

(data item – mean)<sup>2</sup>

- **3** - Square each deviation
  - $(-4)(-4) = 16$  [do it twice];
  - $(0)(0) = 0$  [do it three times];
  - $(4)(4) = 16$  [do it twice]

$\sum(\text{data item} - \text{mean})^2$

- **4** - Sum the (total) square deviations:
  - $16 + 16 + 0 + 0 + 0 + 16 + 16 = \underline{64}$

$\frac{\sum(\text{data item} - \text{mean})^2}{n - 1}$

- **5** - Divide the sum in step 4 by  $(n - 1)$ , where  $n$  represents the number of data items:
  - $64 / (7-1) = 10.6666667$

$$\sqrt{\frac{\sum(\text{data item} - \text{mean})^2}{n - 1}}$$

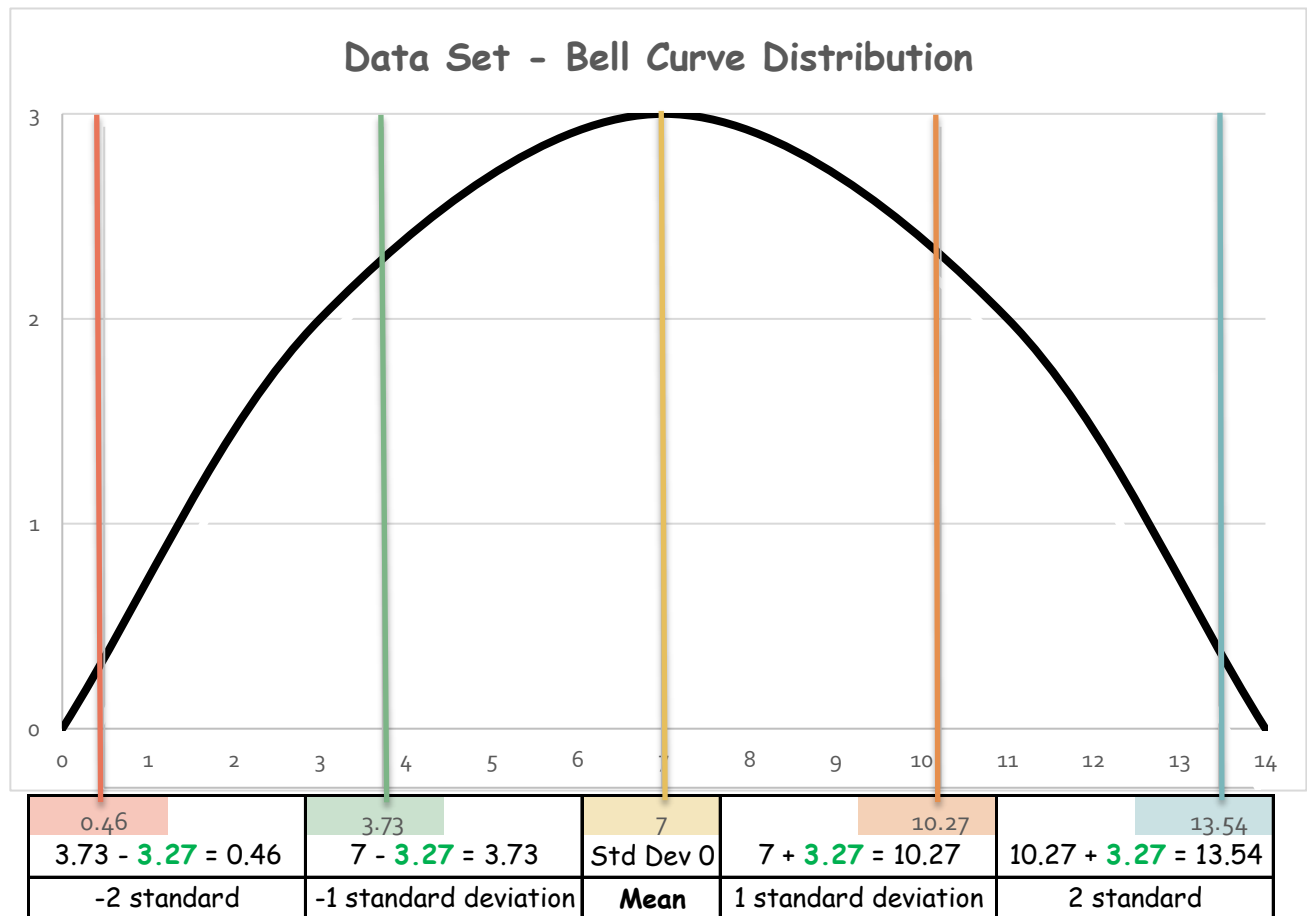
- **6** - Take the square root of the quotient in step 5
  - this value will be the standard deviation for the data set

## 6 Steps to Compute Standard Deviation

Step 1:	Step 2:	Step 3:	Step 4:	Step 5:	Step 6:
Data Set	$data\ item - mean$	$(data\ item - mean)^2$	$\sum (data\ item - mean)^2$	$\frac{\sum (data\ item - mean)^2}{n - 1}$	$\sqrt{\frac{\sum (data\ item - mean)^2}{n - 1}}$
3	$3 - 7 = -4$	$(-4) * (-4) = 16$	16		
3	$3 - 7 = -4$	$(-4) * (-4) = 16$	16		
7	$7 - 7 = 0$	$(0) * (0) = 0$	0		
7	$7 - 7 = 0$	$(0) * (0) = 0$	0		
7	$7 - 7 = 0$	$(0) * (0) = 0$	0		
11	$11 - 7 = 4$	$(4) * (4) = 16$	16		
11	$11 - 7 = 4$	$(4) * (4) = 16$	16	$64 / (7 - 1)$	$\sqrt{10.66666667}$
			64	10.66666667	3.265986324

<div> <div>sum of</div> <div>49</div> <div>data set</div> </div> <div> <div>divide by</div> <div>7</div> <div># in</div> <div>data set</div> </div> <div> <div>7</div> <div>= mean</div> </div>	<div>standard deviation</div> <div>(one unit)</div> <div>3.27</div>
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