Standard Deviation

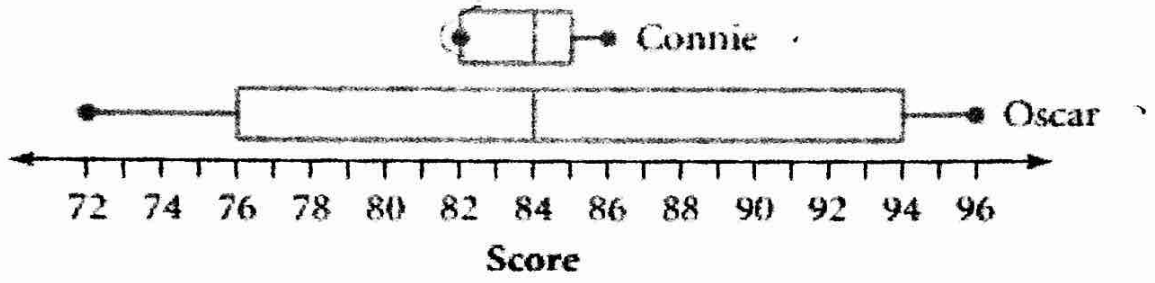
- gives a measure of how far the observed data pieces are from the mean.

Steps given data

1. find the mean(μ) $\mu = \frac{\text{sum}}{\#(n)}$
2. find deviation (data point $- \mu$)
3. square each deviation
4. sum the deviation^2
5. $\frac{\text{sum}}{n-1}$ (variance)
6. $\sqrt{\frac{\text{sum}}{n-1}}$ (standard deviation)

for examples, please see the next two pages

Semester Assignments



Connie Mean = 84 n = 7			Oscar Mean = 84 n = 7		
Score	**Deviation**	**(Deviation)^2**	**Score**	**Deviation**	**(Deviation)^2**
82	− 2	4	72	− 12	144
86	+2	4	94	+10	100
82	− 2	4	76	− 8	64
84	0	0	96	+12	144
85	+1	1	90	+6	36
84	0	0	76	− 8	64
85	+1	1	84	0	0
sum		14	***sum***		552
$\frac{sum}{n-1}$		2.333	$\frac{sum}{n-1}$		92
$\sqrt{\frac{sum}{n-1}}$		SD=1.528	$\sqrt{\frac{sum}{n-1}}$		SD=9.592

Label the mean and standard deviations on the box plots above.

What new information do you now know about Connie and Oscar's scores? Connie's scores are closer together than Oscar's.

Algebra 2 Name: _____

Given the chart below answer the following questions:

Trial	1	2	3	4	5	6	7
Distance Ball Travels (in cm)	26	49	23	30	49	3	41

2. Calculate the mean distance. Mean = 31.6

3. Complete the table using your mean distance from #2.

Trial	Distance Ball Travels	Deviation from Mean (actual - mean)	(Deviation)^2
1	26	-5.6	31.36
2	49	17.4	302.76
3	23	-8.6	73.96
4	30	-1.6	2.56
5	49	17.4	302.76
6	3	-28.6	817.96
7	41	9.4	88.36

Total Sum of (Deviation)^2 = 1619.72 last column

$\frac{\text{Total Sum of (Deviation)}^2}{\text{\# of Trials} - 1}$ = 269.95 (This is called the **VARIANCE**)

$\sqrt{\frac{\text{Total Sum of (Deviation)}^2}{\text{\# of Trials} - 1}}$ = 16.43 (This is called the **STANDARD DEVIATION**)

The **variance** is the sum of the squares of the deviations, divided by one less than the number of values/trials. The square root of the variance is the **standard deviation**. The standard deviation provides one way to judge the "average difference" between data values and the mean. It is a measure of how the data are spread around the mean.

Standard deviation, s, is a measure of the spread of a data set.

$$s = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$$

where x_i represents the individual data values, n is the number of values/trials, and $\bar{x}$ is the mean. The standard deviation has the same units as the data.

(deviation)^2