TOPIC: STANDARD DEVIATION

Calculating Sample Standard Deviation

◆ Recall: Mean & Median are **Measures of Center**, but often you'll need to more about the distribution of values.

► Standard Deviation (___) is a **Measure of Variation**, how _____ out #s are. $s \geq 0$ ($s \uparrow$, more "spread out")

13 **14** **15** **16** **17**	**5** **10** **15** **20** **25**
$\bar{x} = 15 \qquad s = 1.58$	$\bar{x} = 15 \qquad s = 7.91$
[LESS | MORE] spread out	**[LESS | MORE]** spread out

EXAMPLE Find the (A) mean & (B) standard deviation of the sample $\{5, 10, 12, 14, 3, 4\}$

Standard Deviation

Easier to use! Shorter, more calculations

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

$$\bar{x} = \frac{\sum x}{n}$$

x	x^2	$x - \bar{x}$	$(x-\bar{x})^2$
5			
10		$10 - 8 = 2$	$(2)^2 = 4$
12		$12 - 8 = 4$	$(4)^2 = 16$
14		$14 - 8 = 6$	$(6)^2 = 36$
3		$3 - 8 = -5$	$(-5)^2 = 25$
4		$4 - 8 = -4$	$(-4)^2 = 16$
48			

◆ For populations, you may see σ, μ, and N instead of s, $\bar{x}$, and n. Unless explicitly stated, use s equation.

TOPIC: STANDARD DEVIATION

PRACTICE Find the standard deviation of the sample below. Round your answer

Ages of students in a college class								
24	27	30	23	20	19	21	18	25

Recall

$$s = \sqrt{\frac{1}{n-1}\left(\sum x^2 - \frac{(\sum x)^2}{n}\right)}$$

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

EXAMPLE You take 3 samples of students taking a quiz. The histograms below show the # of correct answers. Without calculating s, rank the standard deviations of each sample from least to greatest.