

**Statistical Reasoning**  
**Collecting and Analyzing Data**

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Class: \_\_\_\_\_

Measures of Center and Spread

A teacher has a problem and needs your input. They have to give one math award this year to a deserving student but can't decide between two students. Here are the test grades for her two best students:

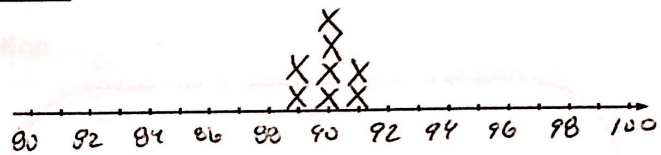
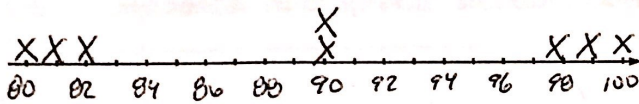
Bryce: 90, 90, 80, 100, 99, 81, 98, 82

Briana: 90, 90, 91, 89, 91, 89, 90, 90

Make a dotplot of both their test scores

Bryce

Briana



Who do you think should get it and why?

**Comparing sets of data**

Measures of Center

Mean - average

Median - middle, numbers must be in order

Mode - the number that occurs the most

Measures of Spread

Standard Deviation - on average, how far away each number is from the mean

Interquartile Range -  $Q_3 - Q_1$

Range - highest number minus the lowest number

Calculate the mean, median, and mode of Bryce's distribution

90 90 90

Calculate the mean, median, and mode of Briana's distribution.

90 90 90

80 81 | 82 90 | 90 98 | 99 100  
 $Q_1$        $Med$        $Q_3$

Now who do you think should get the award?

**The Five Number Summary**

Calculate Bryce's five number summary

Min = 80       $Q_3 = 98.5$   
 $Q_1 = 81.5$        $Max = 100$   
 $Med = 90$

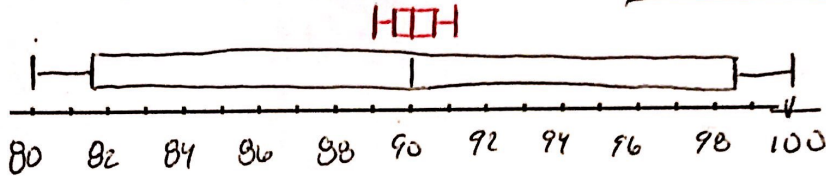
89 89 | 90 90 | 90 90 | 91 91  
 $Q_1$        $Med$        $Q_3$

Calculate Briana's five number summary

Min = 89       $Q_3 = 90.5$   
 $Q_1 = 89.5$        $Max = 91$   
 $Med = 90$

**Using the Five Number Summary for Box and Whisker Plots**

Make a box and whisker plot of Bryce and Briana's test scores on top of each other.



**Calculating Measures of Spread: Standard Deviation**

Use the table below to calculate the standard deviation of Bryce's distribution.

| Test scores for Bryce | $x - \bar{x}$ | $(x - \bar{x})^2$ |
|-----------------------|---------------|-------------------|
| 90                    |               |                   |
| 90                    |               |                   |
| 80                    |               |                   |
| 100                   |               |                   |
| 99                    |               |                   |
| 81                    |               |                   |
| 98                    |               |                   |
| 82                    |               |                   |
| Variance:             |               |                   |
| Standard Deviation:   |               |                   |

Use the table below to calculate the standard deviation of Briana's distribution.

| Test Scores for Briana | $x - \bar{x}$ | $(x - \bar{x})^2$ |
|------------------------|---------------|-------------------|
| 90                     |               |                   |
| 90                     |               |                   |
| 91                     |               |                   |
| 89                     |               |                   |
| 91                     |               |                   |
| 89                     |               |                   |
| 90                     |               |                   |
| 90                     |               |                   |
| Variance:              |               |                   |
| Standard Deviation:    |               |                   |

What does the standard deviation measure?

**Calculating Measures of Spread: The Interquartile Range**

Calculate Bryce's IQR  $Q_3 - Q_1$   
 $98.5 - 81.5 = 17$

Calculate Briana's IQR  $Q_3 - Q_1$   
 $90.5 - 89.5 = 1$

So who should get the award?