

Statistical Reasoning
Collecting and Analyzing Data

Key

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:

81 8.5 91 98.5 23
 80 81 82 90 90 98 99 100

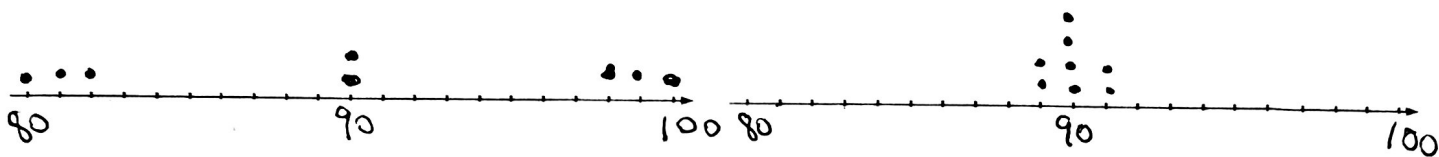
Bryce: 90, 90, 80, 100, 99, 81, 98, 82

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, \bar{x}
 add, divide by n

Median - middle # when
 in order

88 90 95 $\frac{90+91}{2} = 90.5$
 88 90 | 91 95

Mode -
 # repeated most
 2 3 3 4 5 - 1 mode
 2 3 3 4 4 5 - 2 mode
 2 3 4 5 - No mode

Measures of Spread

Standard Deviation - the typical
 distance from mean
 S_x

Interquartile Range -
 $Q3 - Q1 = IQR$

How wide box is

Range - max - min

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

mean = 90 median = 90
 mode = 90

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

mean = 90
 mode = 90 median = 90

Now who do you think should get the award?

The Five Number Summary

Calculate Bryce's five number summary

min Q1 med Q3 max
80 81.5 90 98.5 100

Calculate Briana's five number summary

min Q1 med Q3 max
89 89.5 90 90.5 91

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.

mean = 90

Test scores for Bryce	$x - \bar{x}$	$(x - \bar{x})^2$
90	$90 - 90 = 0$	0
90	$90 - 90 = 0$	0
80	$80 - 90 = -10$	100
100	$100 - 90 = 10$	100
99	$99 - 90 = 9$	81
81	$81 - 90 = -9$	81
98	$98 - 90 = 8$	64
82	$82 - 90 = -8$	64

Variance: $490 / 7 = 70$

Standard Deviation: $\sqrt{70} = 8.37$

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

x	$(x - \bar{x})^2$

Calculator

Variance:

Standard Deviation: 0.76

What does the standard deviation measure?

Calculating Measures of Spread: The Interquartile Range

Calculate Bryce's IQR

$Q3 - Q1 = 98.5 - 81.5 = 17$

Calculate Briana's IQR

$90.5 - 89.5 = 1$

So who should get the award?