Good morning! Remote EOC → May 5

F2F → May 6 May 7

1. "Here"

2. Discuss Data Distributions from yesterday

3. Compare Data Sets

4. EOC Reviews

Comparing Data Sets

Scenario: Coach Webb is trying to decide which two of his point guards he wants to start for the first round of play-offs. The data below shows the numbers of points scored by Jace and Tyler from the past six games.

Jace: 11, 11, 6, 26, 6, 12 .   Tyler: 15, 12, 13, 10, 9, 13

1. Without doing any calculations, who do you think Coach Webb should select as a starting player and why? *Tyler, less outliers, more consistent, Jace's scores are lower except for 26.*

2. Identify the mean score for each player.
            Jace: __12__   Tyler: __12__

3. Calculate the deviations for the points scored for each player. Then describe the deviation (ie: are they above the average, below the average, equal to the average)

Jace			Tyler	
Points Scored	Describe Deviation		Points Scored	Describe Deviation
11	$-12 = -1$ *Below*		15	$-12 = +3$ *Above avg.*
11	$-12 = -1$		12	$-12 = 0$ *Average*
6	$-12 = -6$		13	$-12 = 1$ *Above*
26	$-12 = 14$ *above avg*		10	$-12 = -2$ *Below*
6	$-12 = -6$ *Below avg*		9	$-12 = -3$ *Below*
12	$-12 = 0$ *average*		13	$-12 = 1$ *Above*

(Jace margin: 1, 1, 6, 14, 6, +0 → 28)
(Tyler margin: 3, 0, 1, 2, 3, +1 → 10)

What do you notice about the deviations for each player?
Tyler is above average more often

4. For each player, find the sum of the ~~positive~~ deviations and then divide by the number of data values. Round your final answer to the nearest hundredth.

    Jace Sum of Deviations: __28__ Divided by # of values = __$28/6$__ $= 4.\overline{6}$

    Tyler Sum of Deviations: __10__ Divided by # of values = __$10/6$__ $= 1.\overline{6}$

5. The numbers that you just calculated are the mean absolute deviations (MAD). What does the mean absolute deviation tell you about each player?
On averge, Tyler scores closer to 12 points than Jace.

6. If you were Coach Webb, which player would you choose to start in the play-off game and why? *Tyler, his score average is more reliable.*

22

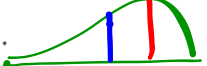## Comparing Measures of Center and Spread

Measures of Center

- Mean: _Symmetric distributions_
- Median: _Skewed or outlier, robust against large numbers_
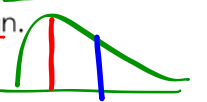- Mode: _"most" frequent categorical data_

If the data is symmetric, the mean is _equal to_ the median.
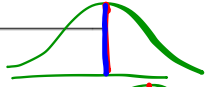
If the data is skewed left, the mean is _less than_ the median.

If the data is skewed right, the mean is _greater than_ the median.
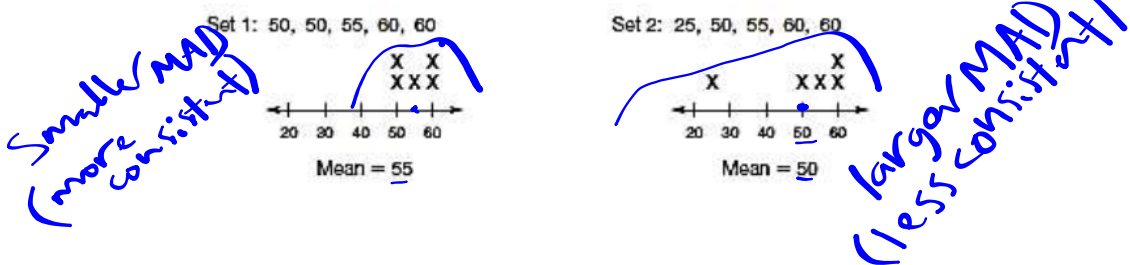
Measures of Spread

- Interquartile Range: _middle 50% range; median_
- Mean Absolute Deviation: _mean_

If the data is more spread, than the data values are _more_ spread out, which means they are _less_ consistent. This results in the MAD being _large_.

If the data is less spread, than the data values are _less_ spread out, which means they are _more_ consistent. This results in the MAD being _small_.

Example 1: Which data set will have the greater mean absolute deviation? Explain how you know.

Set 1: 50, 50, 55, 60, 60
```
        X  X
        X X X
+--+--+--+--+--+
20 30 40 50 60
   Mean = 55
```
Smaller MAD (more consistent)

Set 2: 25, 50, 55, 60, 60
```
              X
        X    X X X
+--+--+--+--●--+
20 30 40 50 60
   Mean = 50
```
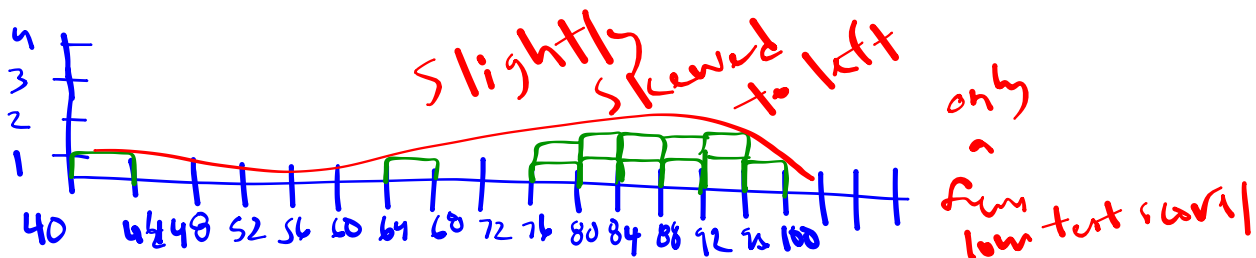_larger MAD (less consistent)_

Example 2: The following data represents test scores from Unit 11 test.

Unit 11 Test Scores: 81, 41, 89, 92, 80, 86, 77, 66, 84, 92, 97, 88, 77

a. Compare the mean and median.

Mean = 80.77 and median = 84 / mean < median slightly skewed left

b. What type of distribution does the data create? What does this mean?

Slightly skewed to left

only few low test scores

```
4
3
2
1
   40    44 48 52 56 60 64 68 72 76 80 84 88 92 96 100
      46
```

Continued from previous page – data is copied below.

Unit 11 Test Scores: 81, 41, 89, 92, 80, 86, 77, 66, 84, 92, 97, 88, 77

c. Do you think there are any outliers?

d. Which measure of center best describes the grades and why?

e. Which measure of spread best describes the grades and why?

f. Test scores from the Unit 12 Test are below.

Unit 12 Test Scores: 55, 89, 92, 75, 64, 87, 92, 91, 77, 63, 50, 81

Would the test scores of the Unit 11 Test or the Unit 12 Test have a lower mean absolute deviation (MAD)? Explain how you know without doing calculations.

g. Which test had a larger range of scores – the Unit 11 Test or the Unit 12 Test?

h. Which test had the lowest minimum score – the Unit 11 Test or the Unit 12 Test?

i. Which test had the highest maximum score – the Unit 11 Test or the Unit 12 Test?

24

Example 3: The histograms below show the scores of Mrs. Smith's first and second block class at Red Rock High School.


Test Scores of Mrs. Smith's First Block Class

Test Scores of Mrs. Smith's Second Block Class
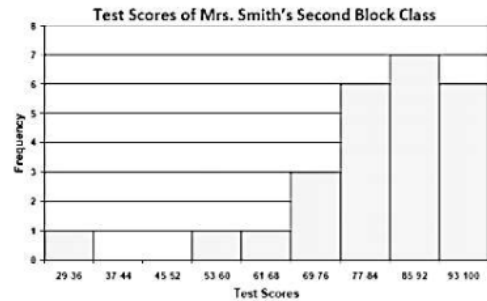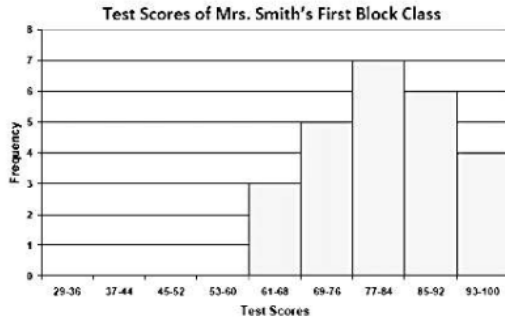
Compare the histograms using the following information:
- **69 and above is passing**
- **68 or below is failing**

1. How many students are in her 1st and 2nd block class?

2. How many students failed the test in each class?

3. Which measure of center best describes the data and why?

4. Which class seemed to do better overall?

Example 4: Each girl in Mrs. Rainey's class and Ms. Walsh's class measured their own height. The heights were plotted on the dot plots below. Use the dot plots to compare the heights of the girls in the two classes.


Mrs. Rainey

Height (inches)

Ms. Walsh

Height (inches)
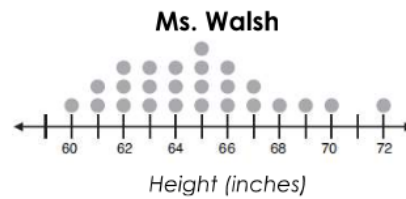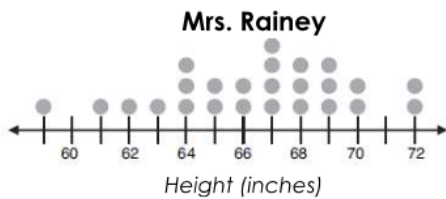
a. Describe the distribution for each class.

b. Which teacher has taller female students? How do you know by looking at the dot plots?

25

Example 5: The following box plots show the average monthly high temperatures for two years in Milwaukee and Honolulu. Use the box plots to answer the following questions.

Honolulu

Milkwaukee

80 81 84.5 87 88
average monthly high temperature (°F)

26   35   57   73   80
average monthly high temperature (°F)
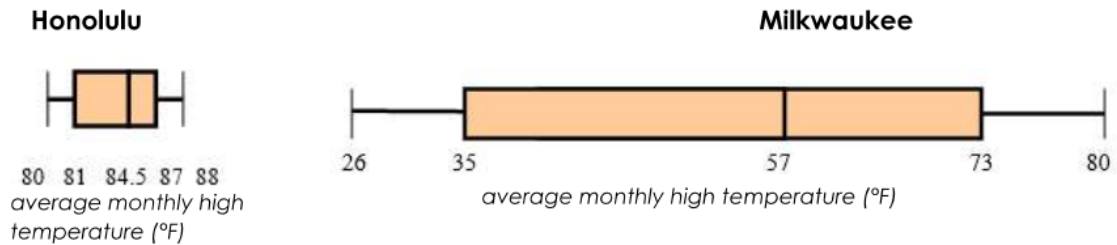
a. What was the median temperature for both cities?

b. What was the range for both cities?

c. Which city has more spread in its data and why?

d. Which city has a larger maximum?

e. Which city has a smaller minimum?

Examples 6: The histograms below represent the amount of time students spend on their homework.
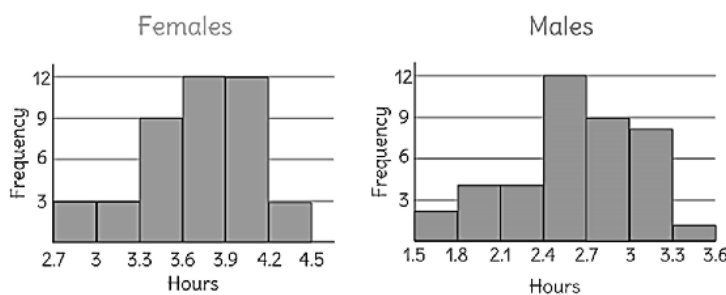
Females

Males

a. Typically, who spends more time on homework – females or males?

b. How many females spend less than 3.3 hours on homework?

c. How many males spend less than 3.3 hours on homework?