12.1 Central Tendency

How do you identify the middle of a data set (group of numbers)? There's more than one way to look at it.

> ### Central Tendency
> **Mean**:
>
> **Median**:
>
> **Mode**:
>
> **Range**:

1. Mathilda got the following test scores for her first five tests of 7th grade math.

   88, 90, 95, 88, 92

   a. Find the **mean**.

   b. Find the **median**.

   c. Find the **mode**.

   d. Find the **range**.

2. Mathilda stayed up late trying to take a perfect picture for her social media platform. She forgot she had a math test the next day, and failed it with a score of 42! This is called an   .
   It just doesn't belong with the rest of the data. It changes all our central tendency numbers.

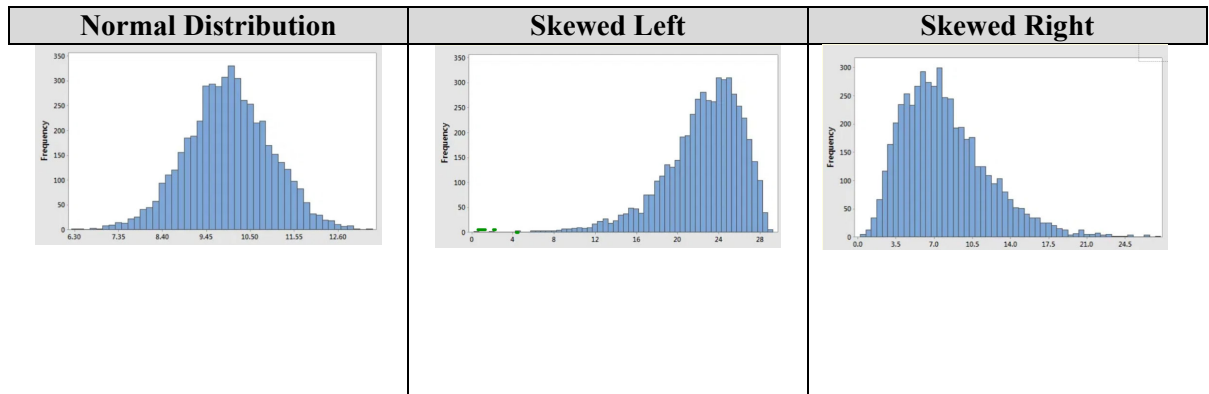| Old central tendency	New central tendency
Mean =	Mean =
Median =	Median =
Mode =	Mode =
Range =	Range =

When you have an outlier,   and   are affected while median and mode may not change at all.

When outliers are involved, median is a better measurement for the center of the data. For example…
- Salaries.
- Home prices.

There is a formal way of figuring out if a number is an outlier, but for now we are going to keep it simple and say an outlier is something that does not fit with the other numbers. It is really big, or really small compared to the rest of the data set.

Let's look at a few graphs.

Normal Distribution	Skewed Left	Skewed Right

If the data is skewed (meaning you have outliers), you should use median, not mean.

3. What would the data look like if we had the following?
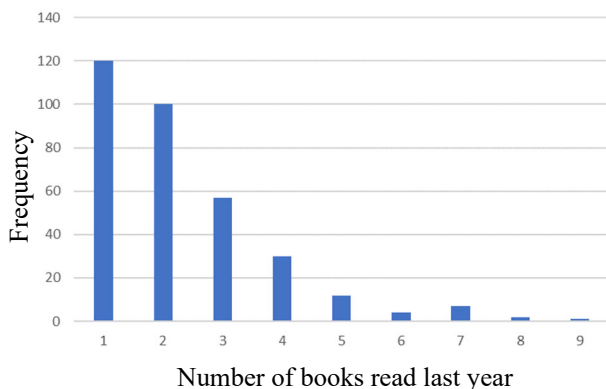
> Mean = 42.8
> Median = 62.5
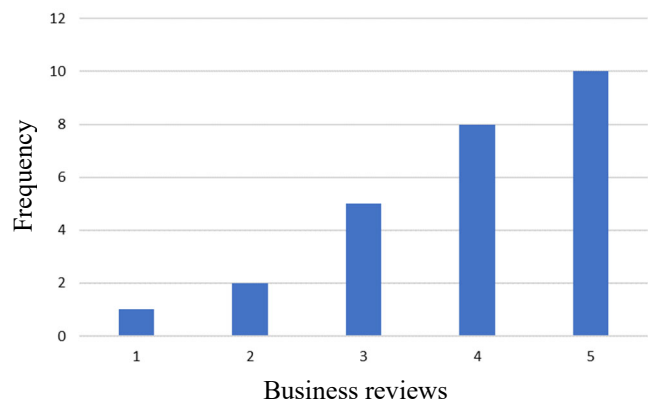> Mode = 65

12.1 Central Tendency
Calculus

12.1 Practice

For each data set below, state whether the median is larger than the mean, of if the mean is larger than the median.

1.

Number of books read last year

2.

Business reviews

3. A data set that has a skewed left distribution.

4. A data set that has a skewed right distribution.

Find the measures of central tendency for the following sets of data.

5. 3, 6, 8, 8, 8, 10, 11, 12, 12

Mean:

Median:

Mode:

Range:

Are there any outliers? If yes, what number(s)?

6. 45, 62, 56, 58, 128, 42, 62, 55
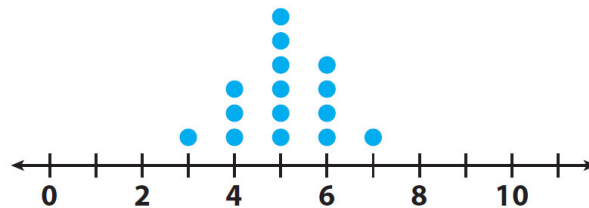
Mean:

Median:

Mode:

Range:

Are there any outliers? If yes, what number(s)?

7.

Mean:

Median:

Mode:

Range:

Are there any outliers? If yes, what number(s)?

8. Foot Locker records all shoe sizes sold in a day. Bob calculates the measure of central tendency for Foot Locker and gets the results in the box to the right.
    a. Do you think the data is Normal, Skewed Left, or Skewed Right?
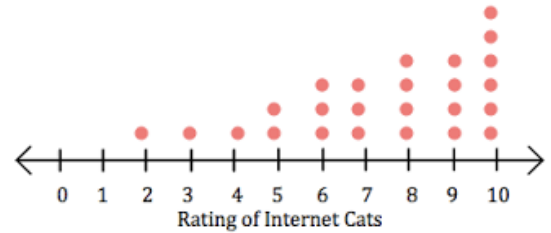
    MEAN = 9.2

    MEDIAN = 8

    MODE = 7

    b. Explain why you chose your answer form part a.

9. Bob loves cats on the internet. He asks some students in his class how much they like cats on the internet on a scale from 1-10 (1 being the lowest and 10 the highest). Below is a dot plot of his results.

   a. How many students did Bob ask?

   b. Describe the data.

Rating of Internet Cats

   c. Find the mean, median and mode.

   d. Which measure of central tendency best represents the data? Explain why.

12.1 Central Tendency

10. The list below shows the number of minutes Michael spent playing video games on each of six days.

$$91, \ 50, \ 88, \ 93, \ 50, \ 92$$

Which two measures of these data best describe the typical number of minutes Michael spent playing video games each day?

   (A) Mean and mode   (B) Mean and median

   (C) Mode and range   (D) Median and range

11. The list below shows Mr. Brust's golf scores for his last five rounds.

$$94, \ 110, \ 105, \ 85, \ 97$$

Which measure of data best describes how much these bowling scores varied?

   (A) Mean   (B) Median   (C) Mode   (D) Range

12. Match the data sets to their graphs.
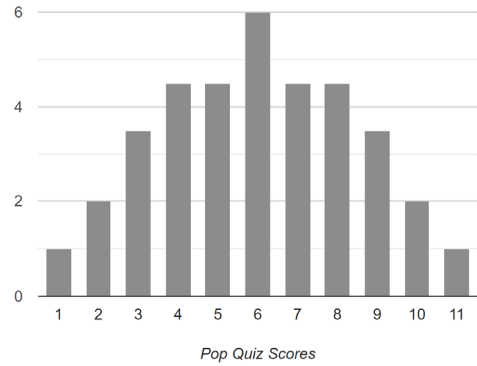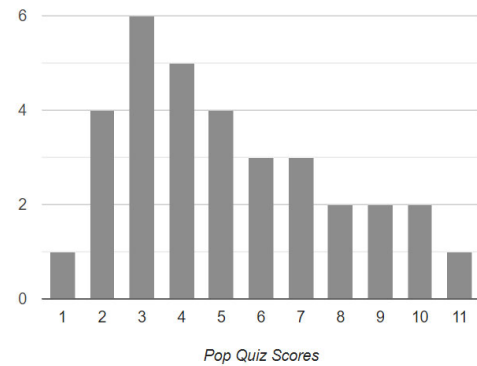
GRAPH #1

DATA SET A

Mean = 6.2

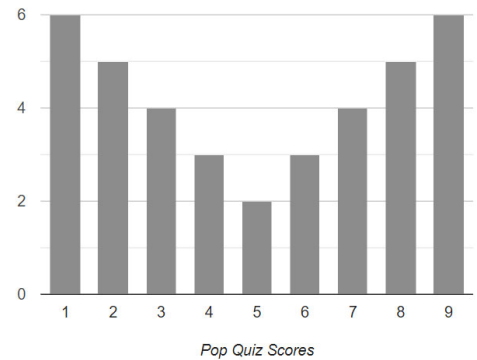Median = 6

Data Set A matches

Mode = 3
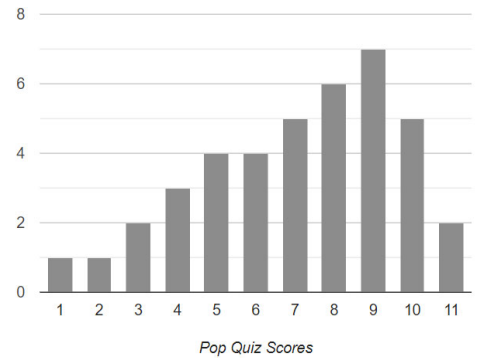
graph _____

GRAPH #2

DATA SET B

Mean = 5

Median = 5

Data Set B matches

Mode = 10 and 2

graph _____

GRAPH #3

DATA SET C

Mean = 6

Median = 6

Data Set C matches

Mode = 6

graph _____

GRAPH #4

DATA SET D

Mean = 7.4

Data Set D matches

Median = 8.1

graph _____

Mode = 9

12.2 Variability

The **variability** of a data set describes how _____ the data is. There are several ways to measure variability, but at this grade level, we want to keep it fairly basic.

Variability

Range:

Mean Absolute Deviation (MAD):

1. Terry plays on the middle school basketball team. The number of points he has scored in each game is below.

$$17, 18, 18, 19, 19, 20, 21, 24$$

Find the following:

	Median	Mean
Central Tendency		
	Range	Mean Absolute Deviation
Variability		

2. Chris is a player on a different team. The number of points he has scored in each game is below.

4, 9, 14, 18, 20, 24, 32, 35

Find the following:

	Median	Mean
Central Tendency		
	Range	Mean Absolute Deviation
Variability		

Which player would you want on your team?

3. The grams of sugar per serving in Mr. Brust's five favorite cereals.

12, 13, 6, 8, 11.

Find the following:

	Median	Mean
Central Tendency		
	Range	Mean Absolute Deviation
Variability		

Find the following values for each data set.

7, 8, 10, 10, 13

1. Median

2. Range

3. Mean

4. Mean Absolute Deviation

110, 114, 104, 108, 106

5. Median

6. Range

7. Mean

8. Mean Absolute Deviation

42, 36, 51, 47

9. Median

10. Range

11. Mean
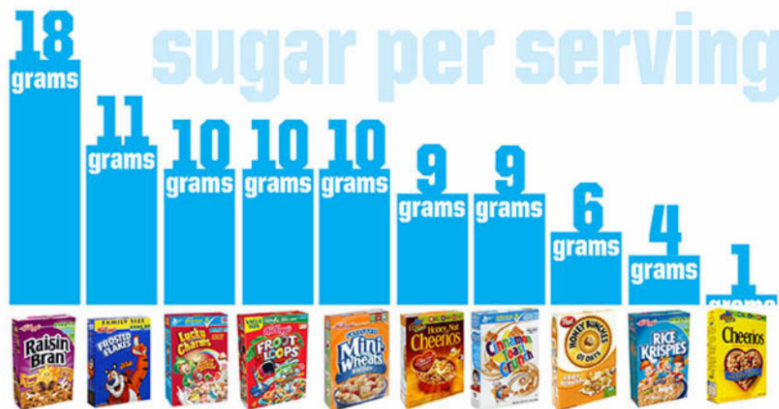
12. Mean Absolute Deviation

20, 32, 17, 34, 41, 84

13. Median

14. Range

15. Mean

16. Mean Absolute Deviation

12.2 Variability

.

Use the graph below to answer 17-19.

17. Find measures of central tendency.

    a. Mean =

    b. Median =

    c. Mode =

    d. Are there any outliers?

18. Find the variability.

    a. Range =

    b. Mean Absolute Deviation (MAD) =

19. Describe the sugar in the cereals shown above.

12.3 Comparing Data Sets

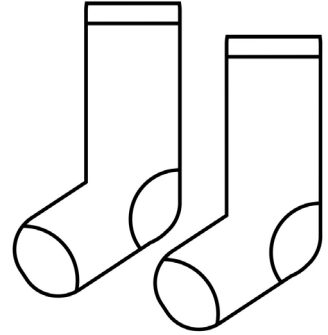## SOCS

Shape –

Outliers –

Center –

Spread –

	BRUST	SULLIVAN	KELLY
Shape			
Outliers			
Center	Mean: Median: Mode:	Mean: Median: Mode:	Mean: Median: Mode:
Spread	Range: MAD:	Range: MAD:	Range: MAD:

What conclusions can be made by comparing these data sets?
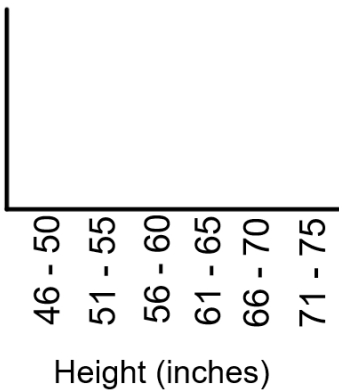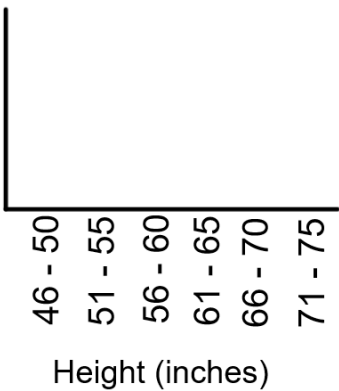
12.3 Comparing Data Sets

Math 7

Compare the data sets.

1. The heights of boys and girls are collected in a 7th grade class.

Boys: 56, 58, 59, 60, 62, 63, 64   Girls: 61, 68, 49, 52, 54, 52

	BOYS	GIRLS
Shape	Finish the bar graph and describe the shape 46 - 50, 51 - 55, 56 - 60, 61 - 65, 66 - 70, 71 - 75 Height (inches)	Finish the bar graph and describe the shape 46 - 50, 51 - 55, 56 - 60, 61 - 65, 66 - 70, 71 - 75 Height (inches)
Outlier		
Center	Mean: Median: Mode:	Mean: Median: Mode:

	Range:	Range:
Spread	MAD:	MAD:

Based on the data sets, are boys taller than girls in this 7th grade class? Explain!!!

2. The test scores of two 7th grade classes are shown below.
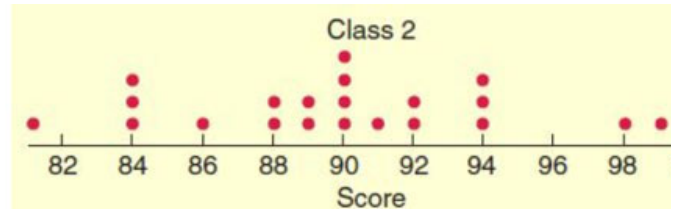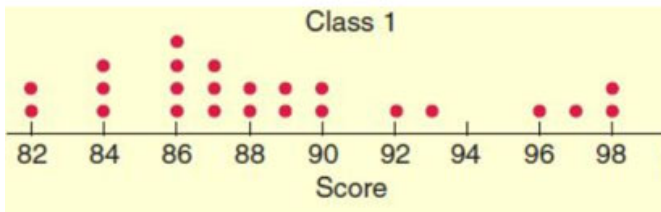
	CLASS 1	**CLASS 2**
Shape		
Outlier		

Center	Mean: Median: Mode:	Mean: Median: Mode:
Spread	Range: MAD:	Range: MAD:

Based on the data sets, which 7th grade class did better on the test? Explain!!!

Unit 12 Review – Descriptive Statistics

Reviews do NOT cover all material from the lessons but will hopefully remind you of key points. To be prepared, you must study all packets from Unit 12.

Several donations for the "Mr. Bean needs two new front teeth" fund were collected by his 5th period class. Those donations (in dollars) are listed below.

5, 15, 9, 6, 18, 100

Calculate the following values. A calculator may be used but show the work that leads to your answer.

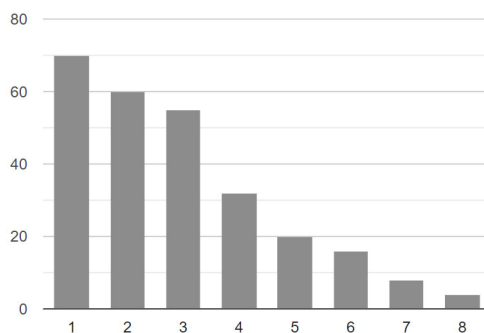|	
1. Mean	2. Median
3. Mode	4. Range
5. Are there outliers? If yes, what number(s)?	6. Mean Absolute Deviation

7. List the mean and median in order from least to greatest for the following data set. You do not need to list the actual values.

8. The following data represents the number of correct answers out of 150 problems for students in 1st period and 2nd period:

1st Period: 68, 68, 69, 70, 71, 74, 76, 78, 82, 86, 88, 90, 96, 104, 110

2nd Period: 86, 87, 88, 90, 92, 94, 95, 99, 99, 99, 104, 104, 118, 124, 146

Compare the data sets of the test scores using sentences. Talk about SOCS!

Shape
Outliers
Center
Spread