

DATA ANALYSIS

12

Name: Key Date: _____ Period: _____

SECTION 12.1 MEASURES OF CENTRAL TENDENCY

VOCABULARY

DEFINITION	EXAMPLE
Data analysis: <i>making sense of a set of data</i>	
Data point: <i>an individual point of data (piece)</i>	
Measure of central tendency: <i>a simple measure of data that summarizes the data set</i>	<i>mean, median, mode, range</i>
Range: <i>difference between largest and smallest data points</i>	
Mean: <i>(arithmetic mean, average): sum of all data points divided by number of data points</i>	
Median: <i>the value of the middle point of data when lined up from greatest to least</i>	<i>(average of middle 2 if even number of data points)</i>
Mode: <i>The value which occurs most often. (there can be more than one)</i>	
Outlier: <i>a value that is very different from most of the data</i>	
Dot (line) Plot: <i>a way to order data and compare frequency</i> <i>2, 2, 5, 4, 1, 1, 3, 1, 1</i>	

Big Idea: How do we calculate measures of central tendency?

EXPLORATION 1

Measure each person in your class in inches and record their name, age in months, and height in inches in the table provided. Try to find ways to summarize the information in the table so that you can share your results with a friend without showing them the whole table. Would your strategy still work if there were 100 people in the survey? 1000 people?

Name	Height (in)	Age (months)

Answers will vary by class

PROBLEM 1

Use the age data in exploration 1 to:

- a. Construct a dot (line) plot. Determine the mode, range, and median for the data set.

EXAMPLE 1

Find the mean, median, mode, and range of the following data set.

{2, 8, 4, 8, 8, 6}

mean: $\frac{2+8+4+8+8+6}{6} = \frac{36}{6} = \boxed{6}$
 median: $2, 4, \underline{6}, 8, 8, 8$ $\frac{6+8}{2} = \boxed{7}$
 mode: $\boxed{8}$
 range: $8 - 2 = \boxed{6}$

PROBLEM 2

In the following data set, what is the mean? The median? The mode? The range?

$$\{4, 9, 12, 5, 9, 14, 11, 15, 5, 6, 7, 5\}$$

mean = average of all values = $\boxed{8.5}$

median: "middle" value: 4, 5, 5, 5, 6, 7, 9, 9, 11, 12, 14, 15
 $\frac{9+7}{2} = \boxed{8}$

mode: $\boxed{5}$ occurs 3 times

range: $15 - 4 = \boxed{11}$

PROBLEM 3

Find the mean and median of the following six weeks test grades:

$$\{95, 30, 98, 93, 100\}$$

mean: $\frac{30+93+95+98+100}{5} = \boxed{83.2}$

median: 30, 93, 95, 98, 100
 $\boxed{95}$

Compare the value of each as a measure of the data.

Mean is skewed because 30 is an outlier.

Median does not show the effect the outlier has.

PROBLEM 4

Two high school soccer teams have a scheduled game. The rosters from each school are reflected in the chart

School	Freshmen	Sophomores	Juniors	Seniors
A	1	3	6	8
B	5	7	4	2

- a. Construct dot plots for both of these teams.



- b. Compare these dot-plots to determine if one team is more experienced than the other team.

School A has older (more experienced) players.

EXPLORATION 2

Using the data from exploration 1, compute the mean and the median of the heights of the class. Then, imagine that a giant who is 400 inches tall joins the class. Compute the new mean and find the new median. How has each changed?

Numbers will vary by class

New mean will be much higher.

New median will not change much.

PRACTICE EXERCISES

1. Find the mean, median, mode and range of the following data sets:

a. {8, 8, 6, 10, 9, 10, 8, 2, 14, 8, 10, 9, 24, 16, 8}

2, 6, 8, 8, 8, 8, 8, 9, 10, 10, 10, 14, 16, 24

Mean average: 10

Median ~~8.5~~ 8.5

Mode 8

Range 22 occurs 5 times

24 - 2 = 22

b. {25, 29, 22, 30, 25, 21, 33, 25, 33}

21, 22, 25, 25, 25, 29, 30, 33, 33

Mean: 27 average

Median: 25 middle number ↗

Mode: 25 occurs 3 times

Range: 12 33 - 21 = 12

2. Tori has taken 5 tests and has a mean of 92. After her sixth test, her mean dropped to 90. What score did she make on her sixth test?

Data points: a, b, c, d, e, X

$$5. \frac{(a+b+c+d+e)}{5} = 92 \cdot 5$$

$$(a+b+c+d+e) = 460$$

$$6. \frac{a+b+c+d+e+X}{6} = 90 \cdot 6$$

$$(a+b+c+d+e)+X = 540$$

$$\begin{array}{r} 460 + X = 540 \\ -460 \quad -460 \end{array}$$

$$X = \boxed{80}$$

SUMMARY (What I learned today)
