Chapter 12 – Working with Data

Name _____ Class _____

The most frequently occurring number in a set of data is the Mode.

The "**middle**" number after a set of data has been put in order from largest to smallest, or smallest to largest is the Median.

What is the **median** and **mode** of the following sets of data?

3, 6, 6, 8, 9 mode = 6 median = 6

19, 16, 12, 5 mode = NONE median = 14

5, 5, 5, 8, 8, 8, 14 mode = 5, 8 median = 8

Price	Number of T-Shirts sold
$12	6
$15	4
$18	2
$25	3

What is the mode of the T-shirt prices? $12

Write the prices in order from smallest to largest.

12, 12, 12, 12, 12, 12, 15, 15, 15, 15, 18, 18, 25, 25, 25

What is the median of the T-shirt prices? 15

12.1 Median and Mode

To calculate a mean you need to do the following two steps.

1 - Add up all the numbers in the data set.
2 - Divide the total from step 1 by how many # there are.

A store sold 8,7,9 and 12 TV's over 4 days.

Total Sum : 8 + 7 + 9 + 12 = 36

36 (Total TV's sold) ÷ 4 (number of days) = 9 (mean)

The mean number of sales is 9.

What is the mean of the following data set?
35, 72, 16, 44, 82, 55 mean = 304 ÷ 6 = 50.6

Elmer scored the following points in his first 6 basketball games:
15, 13, 14, 14, 17, 16
What is the mean number of points scored? 89 ÷ 6 = 14.83

How many points would he need to score in his next game to increase his mean by 1 point for the seven games?

New mean = 15.83 x 7 = 110.81 total points
−89 already scored

21.81 or 22 points in the last game.

12.2 Mean

The word to describe the **difference** between the largest and smallest values in a data set is called the Range.

A value in the data that is much larger or smaller than the other data values is called the Outliers.

A data set may have one or more outliers, or it might not have any at all.

The starting players on a grade 7 basketball team have the following heights: 164cm, 170cm, 158cm, 162cm, 172cm.

a) What is the height of the tallest person? 172
b) What is the height of the shortest person? 158
c) What is the range of the data? 172 - 158 = 14cm

What value(s) appear to be outliers in each set of data?
a) 18, 19, 79, 17, 20, 12 the outlier(s) is/are 79
Why are they an outlier? Explain
almost 4 times larger than other numbers.

What value(s) appear to be outliers in this set of data?
a) 98, 202, 99, 91, 2, 95, 89, 88, 94 the outlier(s) is/are
2 202
Why are they an outlier? Explain
way too small Double size of other #'s

12.3 Range and Outliers

How can outliers affect measures of central tendency – what do they do to the **mode**?
No change

How can outliers affect measures of central tendency – what do they do to the **median**?
very small change

How can outliers affect measures of central tendency – what do they do to the **mean**?
large change

How can outliers affect measures of central tendency – what do they do to the **range**?
largest change

In a science experiment, students were asked to measure the length of their right thumb from the first knuckle to the end of their thumb. The table shows the lengths that were measured by 8 different students.

Student	A	B	C	D	E	F	G	H
Length (cm)	3.2	2.7	3.1	2.8	27	3.1	3.3	3.0

	leave 27 in	Take out 27
a) What is the range?	24.3	0.6
b) What is the median?	3.1	3.1
c) What is the mean?	6.025	3.03
d) What is the mode?	3.1	3.1

e) Identify any possible outlier(s). Should the outlier be removed from the data set? (YES) / NO
27

f) Explain why or why not the outlier should be removed or included.
No thumb is that long.

g) IF you remove ONE data point as an outlier (you need to choose which to remove) and only have 7 pieces of data left. Using those 7 pieces calculate the
mean = 3.03, mode = 3.1, median = 3.1, range = 0.6

h) Which measure of central tendency changed the most? Mean

* Range is NOT a measure of central tendancy.

12.4 The Effects of Outliers

1) The three measures of central tendency are

Mean
Median
Mode

2) If you are looking for the most popular song on the radio – which measure of central tendency would you use? Mode Why? – EXPLAIN in complete sentences.

3) If your data has one outlier that really changes your information such as the example here 6, 8, 11, 12, 15,17, 52 – The number 52 is an outlier. Which measure of central tendency is most affected by removing the outlier?

Mean

4) Because the answer to question 3 changes so much – which measure of central tendency would be better to use to describe those numbers? Median Why? EXPLAIN in complete sentences.

5) A set of four whole numbers has a mode of 7. The smallest number is 2. What is the mean if the largest number is 8?

2, 7, 7, 8 Mean = $\frac{24}{4} = 6$

6) A set of five whole numbers has a mean of 6 and a median of 6. There is NO mode. What is the largest possible number in the set (if you can only use positive numbers)?

1, 2, 6, 7, (14) The Three unknown values must be as small as possible, so the last one can be as large as possible.

12.5 Choose the BEST measure of Central Tendency

What I need to work on + VOCABULARY