Name: 1st Hour

Algebra II: Chapter 11 – Data Analysis and Statistics – Part I

Measures of Center

Mean: Also known as the average of a data set, denoted $\bar{x}$. The mean of n numbers is the sum of the numbers divided by n.

Median: The middle value of a set of data listed in increasing or decreasing order. When the data set has an even number of elements, the median is the mean of the two middle values.

Mode: The most common item in a data set.

Use the definitions of mean, median, and mode to complete the following:

1. The quiz grades in Tina Chare's two sections of geometry are shown below. To help compare the two data sets, the leaves for each stem are written in order from the stem out.

1st: 40, 53, 55, 58, 60, 62, 65, 66, 69, 70, 72, 75, 75, 81, 82, 85, 100, 100, 100 (n=19, 1360)

1st period		3rd period
	3	2 9
0	4	
8 5 3	5	
9 6 5 2 0	6	8
5 5 2 0	7	0 5 8 8 8 9
5 2 1	8	0 2 4 5 5 5 6
	9	0 3 5 8
0 0 0	10	

3rd: 32, 39, 68, 70, 75, 78, 78, 78, 79, 80, 82, 84, 85, 85, 85, 86, 90, 93, 95, 98 (n=20, 1560)

a. For each class, determine the mean, median, and mode.

1st period: mean 72 median 70 mode 100

3rd period: mean 78 median 81 mode 78, 85

b. A student in Ms. Chare's 3rd period missed the quiz because of a field trip. When that score was averaged in, the mean for this class fell to 76. What was that score?

$$21 \cdot \frac{1560 + x}{21} = 76 \cdot 21$$

$$1560 + x = 1596$$

$$x = 36$$

2. The Wacky Widget Company has 15 employees. The jobs and annual salary for each job are given below.

Job	Annual Salary
President	$250,000
Vice President	$100,000
Warehouse Supervisor	$60,000
Sales Supervisor	$60,000
Sales Representative NE	$40,000
Sales Representative NW	$40,000
Sales Representative SE	$40,000
Sales Representative SW	$40,000
Secretary to President	$25,000
Secretary to Vice President	$20,000
Warehouse Worker	$20,000
Warehouse Worker	$20,000
Custodian	$18,000
Custodian	$16,000
Custodian	$16,000

$\bar{x} = \frac{765,000}{15}$

a. Find the mean, median, and mode of the salaries.

mean $51,000 median $40,000 mode $40,000

b. Why do you suppose most employees were upset by a newspaper article reporting "Average Wacky Widget worker earns $51,000."

- only 4 workers make > $51,000
- most employees make less
- top 2 make almost half the $

c. Now consider the salaries of all employees except the president. Find the mean, median, and mode of the salaries.

$\bar{x} = \frac{515,000}{14}$

mean $36,785.71 median $32,500 mode $40,000

In general, which is more affected by extreme values, the mean or the median?

mean is more affected by an extreme value

3. Below are listed the 10 deadliest hurricanes to hit the U.S. since 1900.

Year	Estimated Deaths	Area Hit
1900	6000	Texas Gulf Coast
1909	350	Louisiana and Mississippi
1915	275	Texas and Louisiana
1919	775	Texas and Louisiana
1928	1836	Southern Florida
1935	408	Southern Florida
1938	600	Long Island and Southern New England
1944	390	North Carolina to New England
1957	390	Texas, Louisiana, and Alabama
2005	1833	Louisiana, Mississippi, Florida, Georgia, Alabama

a. Find the mean and median number of deaths caused by these hurricanes.

mean 1286 median 504 ← $\frac{408+600}{2}$

b. Which measure more accurately describes the death toll? Why?

The mean balances out the extremely deadly hurricanes at the high end

4. A teacher has 15 algebra students in 2nd hour and 25 algebra students in 3rd and 6th hour. The following are quiz results after all students have taken the quiz.

2nd Hour	3rd Hour	6th hour
$\bar{x} = 72$	$\bar{x} = 80$	$\bar{x} = 83$

What is the mean score for all classes?

$$\bar{x} = \frac{72(15) + 8(25) + 83(25)}{15 + 25 + 25} = 79.31$$

5. Make up a set of data consisting of five temperatures for which the mean is positive and median is negative.

$-5°, -5°, -5°, -5°, 21°$

median $= -5°$ $\bar{x} = \frac{1°}{5} = .2°$

6. True or false. If true, explain why. If false, give a counter example. *The mean of a data set is always greater than its median.*

-5, 10, 10 ← give a diff. ex.

median: 10 $\bar{x} = 5$

7. True or false. If true, explain why. If false, give a counter example. *The median of a data set is sometimes not a member of the set.*

-5, 10, 12, 20

ex: median: $\frac{10+12}{2} = 11$

8. When data are non-numerical but can be ordered, such as letter grades, the mean cannot be calculated directly; but both the median and mode can be found. Last year in Mr. Flag's history course, the final grades were 8 A's, 6 B's, 3 C's, 3 D's, and 1 E.

   a. What was the modal grade?

   A

   b. What was the median grade?

   B

   c. Can you find a mean grade for the grades? If yes, devise a system that finds a mean grade. If not, explain why not.

A = 4

B = 3

C = 2

D = 1

E = 0

$\frac{8(4)+6(3)+3(2)+3(1)+1(0)}{21}$

$= 2.81$

C+