

## Measures of Central Tendency Practice Worksheet

### Definitions:

The three measures of central tendency are mean, median, and mode.

The mean of a set is also called its average. We find the mean by adding all the terms in the set and dividing by the number of terms.

The median of a set, just like the median of a road, is its middle. We find the median by putting the terms in order and locating the middle. If there is an even number of terms, thus the middle occurs between two terms, we take the average of those terms and that is our median.

The mode of a set is the most commonly repeated term. Sometimes there is more than one term repeated the same amount of times. In this case, all the terms with the highest level of repetition are the mode. If all of the terms occur the same number of times then there is no mode.

It is important to note that the only value of the three central tendencies that **MUST** be present in the original set is the mode. If you are told the mean of a set is 31, the median of the set is 28, and the mode is 12, the only thing you know for sure about the set is that it must contain the term 12.

### Missing Values:

Sometimes we are given a set with one or more values missing and we are asked to use the measures of central tendency to find the missing value(s).

Let's say we are given the set {2, 2, x, 6, 10, 12} and told that the mean is 6, and we are asked to find the median. We could find x by the following calculation:

$$\begin{aligned} \text{mean} &= \frac{\text{sum of all values}}{\text{number of values}} = \frac{2 + 2 + x + 6 + 10 + 12}{6} = \frac{32 + x}{6} = 6 \\ \text{if } \frac{32 + x}{6} &= 6, \quad \text{then } 32 + x = 36, \quad \text{so } x = 4 \end{aligned}$$

If  $x=4$ , this means that our set is {2, 2, 4, 6, 10, 12}. We see that there are 6 terms, therefore the median occurs between the third and fourth terms. The median is then

$$\text{median} = \frac{4 + 6}{2} = \frac{10}{2} = 5$$

### Practice:

For #1-3, find the mean, median, and mode of the data set.

1. {1, 5, 2, 8, 12, 3, 4}

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2.  $\{0, 5, 25, 5, 35\}$

3.  $\{2a, a, 5a, 6a, a, 8a, 12a, 5a\}, a \in \mathbb{N}$

For #4-6, find the value of all variables. If you cannot find the value of a variable, explain why.

4.  $\{2a, a, 5a, 6a, a, 8a, 12a, 5a\}, a \in \mathbb{N}$  if the mean of the set is 15

5.  $\{a, 2, 2, 4, x, 9, 11, 13, 17, 22\}$ , if the median is 7.5  
[Assume the set has already been ordered correctly!]

6.  $\{6, y, 2, 3, 3, 4, 5, 4, 7, 12\}$  if the modes are 3, 4, and 7.