Using Mean, Median, and Mode

Whether you use mean, median or mode depends both
- on the type of data and
- on the shape of distribution.

Example. This distribution of science quiz scores is heavily skewed to the right, and its “peak” is at 6. Which of the three measures of center would best describe this distribution?

Let us calculate the mean, median, and mode.

Mode: We can see from the graph that mode is 6.

Median: There are 24 students. The students’ actual scores are 1, 2, 3, 3, 3, 4, 4, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 6, 6, 6, 6, 6, 6, 6, 6, 6.

Median is the average of the 12th and 13th score, which is 5.

Mean is $\frac{1 + 2 + 3 + 3 + 3 + 4 + 4 + 7 \times 5 + 10 \times 6}{24} = 4.79167 \approx 4.79$.

Notice, the mean is less than 5, whereas the two highest bars on the graph are at 5 and 6. In this case, the mean does not describe the peak of the distribution very well, because it actually falls outside the peak! Both median and mode do describe it well.

1. a. Find the mean, median, and mode of this data set: 3, 4, 4, 5, 5, 5, 6, 8, 25.

   mean _______ median _______ mode _______

b. Which of the three, mean, median, or mode, best describes the center of this data?

   Clearly, either _________ or ___________, but not the ____________!

   The _____________ is off from the central peak of the distribution.

   The reason for this is that the data item 25 throws it off. This 25 is very different from the other data items in the set, and could even be a typing error! Such an item is called an outlier.

2. The graph shows the response to a certain question in a survey.

   It is measured as a yes/no question. Which of the below are possible to determine? (Mark with an “x”).

   _____ mean _____ median _____ mode

   Hint: Imagine what the original data that was used to create the graph looks like.
3. Judith asked 55 teenagers about how much money they spent to purchase Mother's Day gifts.

a. Which of the numbers $11 and $9 is the mean? Which is the median?

b. Would mean or median better describe this data? Why?

c. About how many percent of these teenagers spent $10 or less on a Mother's Day gift?

4. Name what is being studied (usually the title of the graph tells you this).

   - Describe how the data was measured and in what units. For example, perhaps the respondents gave numerical answers, in dollars. Perhaps they chose from yes/no as their answer.
   - Fill in the parts about mean, median, and mode. You do not have to find the mean, even when it is possible.

   **Hint:** Think what kind of data was used to create the graph (the original data).

a. What is being measured or studied? _______________________

   How is it measured?

   Which are possible? (Mark with an “x”).
   _____ mean _____ median _____ mode

   Mode is: ___________ Median is: ___________

b. What is being measured or studied? _______________________

   How is it measured?

   Which are possible? (Mark with an “x”).
   _____ mean _____ median _____ mode

   Mode is: ___________ Median is: ___________