

11-6 Reteaching

Analyzing Data

- The *mean* is the average of the values.
- The *median* is the middle value(s) when the values are listed in order.
- The *mode* is the most common value(s).

Problem

What are the mean, median, and mode for the data set below?

2 2 5 5 1 3 6 6 3 5 3 4 3 2 4 4 5 2 4 1 3 5 5 3 5 3 4 3 5 3 3 1 5 6

Step 1 Find the mean. The mean is the average of the values. Add all the values, and then divide the sum by the number of values.

$$\frac{124}{34} \approx 3.65$$

Step 2 Find the median. Write the values in numerical order. For an odd number of values, the median is the middle value. For an even number of values, the median is the mean of the middle two values.

1 1 1 2 2 2 2 3 3 3 3 3 3 3 3 3 3 4 4 4 4 4 5 5 5 5 5 5 5 5 5 6 6 6

16 values
2 values
16 values

The mean of the middle two values is $\frac{3+4}{2} = \frac{7}{2} = 3.5$.

Step 3 Find the mode(s). If no value occurs more than once, then the data set has no mode. How many times does each value occur in the data set?

1: three times 2: four times 3: ten times
4: five times 5: nine times 6: three times

The most common value is 3.

The mean is about 3.65, the median is 3.5, and the mode is 3.

Exercises

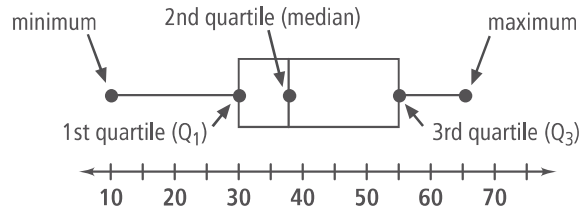
Find the mean, median, and mode of each set of values.

- 872 888 895 870 882 878 891 890 888 **about 883.8; 888; 888**
- 2020 2040 2068 2120 2015 2301 2254 **about 2116.9; 2068; no mode**
- 25 27 26 33 28 26 24 30 26 28 24 27 **27; 26.5; 26**
- 4.4 5.6 1.5 2.1 3.8 1.9 4.7 2.5 4.7 2.8 **3.4; 3.3; 4.7**
- 194 502 413 768 986 616 259 351 825 **546; 502; no mode**
- 36 37 38 38 38 37 26 36 39 40 40 40 35 **about 36.9; 38; 38 and 40**

11-6 **Reteaching** (continued)

Analyzing Data

A *box-and-whisker plot* is a visual representation of a data set. The plot shows the minimum and maximum data values, and organizes the data values into four groups separated by three *quartiles*. The second quartile is the median of the values.



Problem

What is a box-and-whisker plot for the data set? 5 6 8 12 11 9 4 3 7 10

Step 1 Write the values in numerical order. Find the minimum and maximum.

3 4 5 6 7 8 9 10 11 12

minimum: 3 maximum: 12

Step 2 Find the second quartile. Q_2 is the median of all the data values.

3 4 5 6 7 8 9 10 11 12

$$\frac{7 + 8}{2} = 7.5$$

Step 3 Find the first quartile. Q_1 is the median of the lower half of the values.

3 4 5 6 7 8 9 10 11 12

Step 4 Find the third quartile. Q_3 is the median of the upper half of the values.

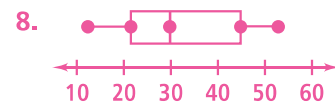
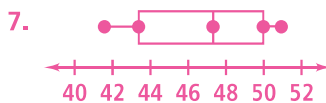
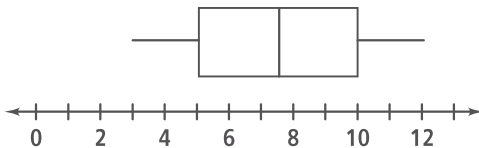
3 4 5 6 7 8 9 10 11 12

Step 5 Draw a number line for the base of the plot.

Above the number line, plot the three quartiles, the minimum value, and the maximum value.



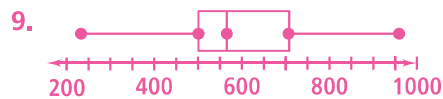
Step 6 Draw a box through Q_1 and Q_3 , a vertical line through the median, and line segments from the box outward to the minimum and maximum values.



Exercises

Make a box-and-whisker plot for each data set.

7. 43.4 46.5 47.9 51.0 50.2 49.5 42.5 41.6 46.8 50.0



8. 19 20 21 22 23 25 27 12 19 31 53 52 48 41 29 33 48 46 44 42

9. 721 242 567 541 589 234 965 845 566 487 486 515 577 875 698 564 654