

Lesson 30: Plotting Data Sets

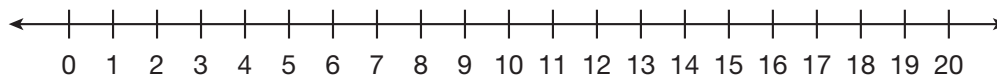
Data can be plotted in a variety of different ways. Depending on the way that the data are plotted, a graph can show the way that the points are distributed.

Plots on a Number Line

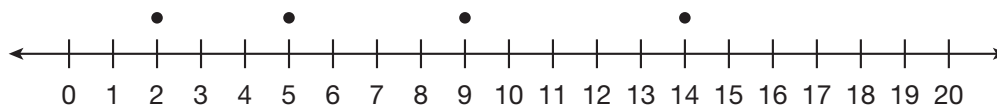
You can use a number line to plot the points in a data set.

Example

Dana has three sisters. Her sisters are 2, 5, and 14 years old. She also has a brother who is 9 years old. Plot the ages of Dana's brother and sisters on the following number line.



The data set includes the ages of Dana's sisters and brother. The siblings are 2, 5, 9, and 14 years old. To plot the points from that set on a number line, draw a point by each of those numbers.



The number line represents the ages of Dana's brother and sisters.

Dot Plots

A **dot plot** shows the number of times each value in a data set occurs. A number line and dots are used to organize the data. A dot plot is useful when there are several identical points in the same data set.

▶ Example

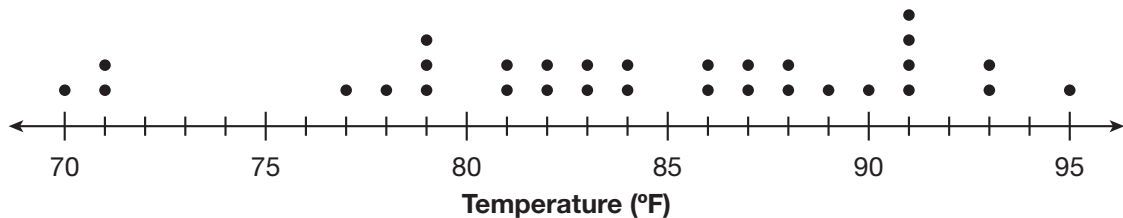
The list shows the high temperatures (in °F) in New York City in August 2010. Plot the temperatures in a dot plot.

79, 83, 87, 93, 91, 86, 84, 86, 91, 90, 91, 77, 81, 79, 79, 87,

88, 84, 88, 89, 82, 81, 71, 71, 70, 82, 78, 83, 93, 91, 95

To add the points in a dot plot, draw a dot by each number. If there is more than one point with the same value, draw one dot above the other.

August 2010 High Temperatures in New York City



The dot plot shows the distribution of points from the lowest number, 70, to the highest number, 95. Because the most dots are above 91, you can see that there was a high temperature of 91 degrees the greatest number of days.

Box Plots

A **box plot** shows the range of values in a data set, including the minimum and maximum value. It also represents how the values are distributed by showing the median, first quartile, and third quartile of the data set.

▶ Example

A city bus company counts the number of passengers who ride on 15 different buses one morning.

32, 25, 40, 45, 27, 42, 35, 48, 27, 36, 27, 40, 39, 35, 41

First, put the numbers in order from least to greatest.

25, 27, 27, 27, 32, 35, 35, 36, 39, 40, 40, 41, 42, 45, 48

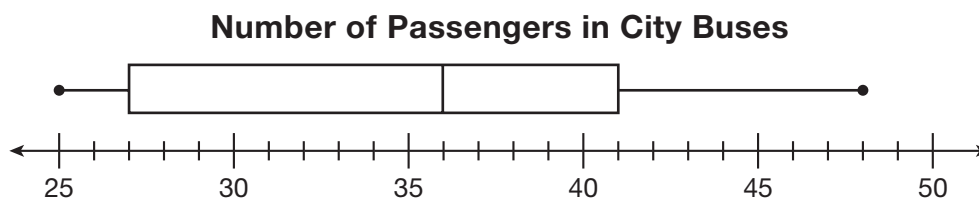
The minimum value is 25, and the maximum value is 48. These will be the end points of the box plot.

The median is the number in the middle of the data set. The value 36 is directly in the middle of the data set, so 36 is the median.

To find the first quartile, take the median of the lower half of the data set: 25, 27, 27, 27, 32, 35, 35. The number in the middle is 27, so 27 is the first quartile.

To find the third quartile, take the median of the upper half of the data set: 39, 40, 40, 41, 42, 45, 48. The number in the middle is 41, so 41 is the third quartile.

Use the first and third quartiles to form the borders of the box. Draw a line in the box to show the median.



Histograms

A **histogram** shows continuous data in a set. The horizontal axis is labeled using intervals, and the bars are always connected to each other. The height of each bar represents the frequency.

▶ Example

Tyler recorded the distances traveled by the first 25 participants in a 100-mile bike tour after 5 hours. Plot the following data points in a histogram.

54, 69, 72, 44, 65, 18, 88, 91, 75, 62, 48, 51, 83, 70, 65, 54, 76, 63, 34, 82, 67, 77, 65, 59, 79

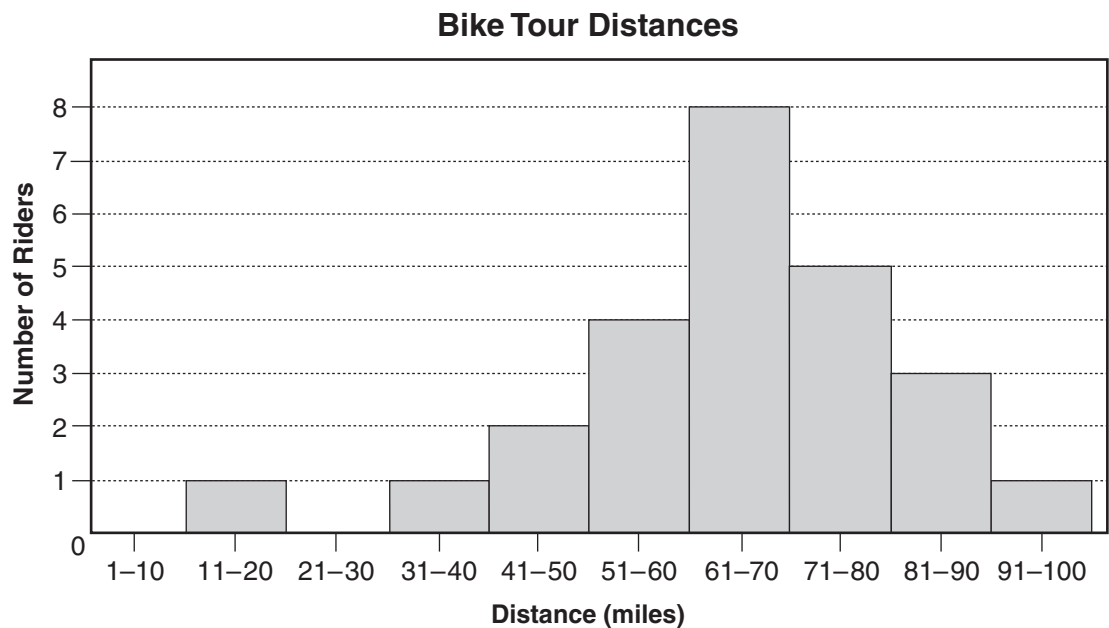
First, put the numbers in order from least to greatest.

18, 34, 44, 48, 51, 54, 54, 59, 62, 63, 65, 65, 65, 67, 69, 70, 72, 75, 76, 77, 79, 82, 83, 88, 91

To plot these data points in a histogram, you can choose intervals. Tyler's data points begin at 18 and go to 91. To show the data, let the intervals of the histogram be in 10s of miles; 1–10, 11–20, and so on until 91–100.

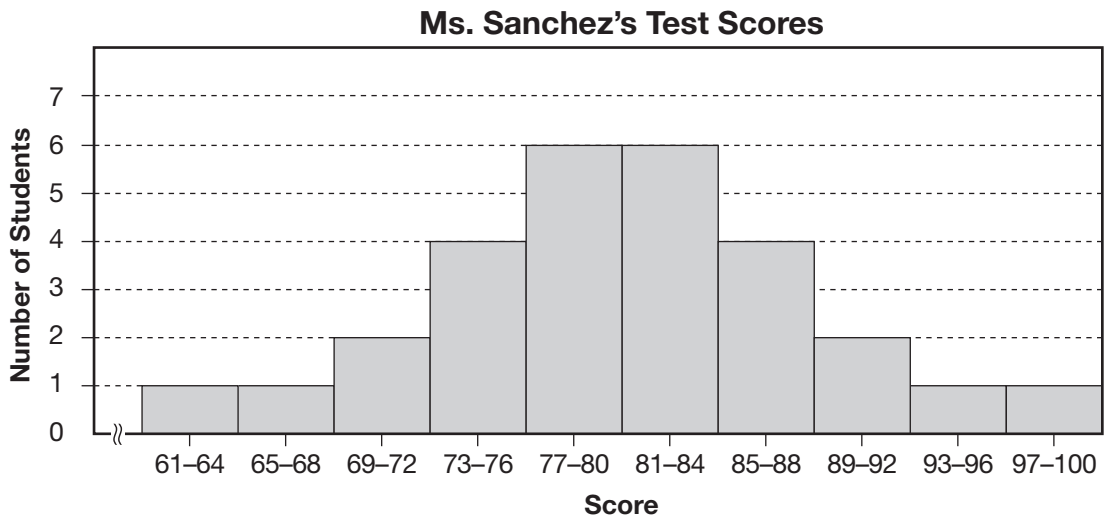
The height of each bar should represent the number of values in the interval. For example, if there is one value in an interval, draw a bar that goes to 1 on the y-axis.

Tyler's results are shown in the following histogram.



Example

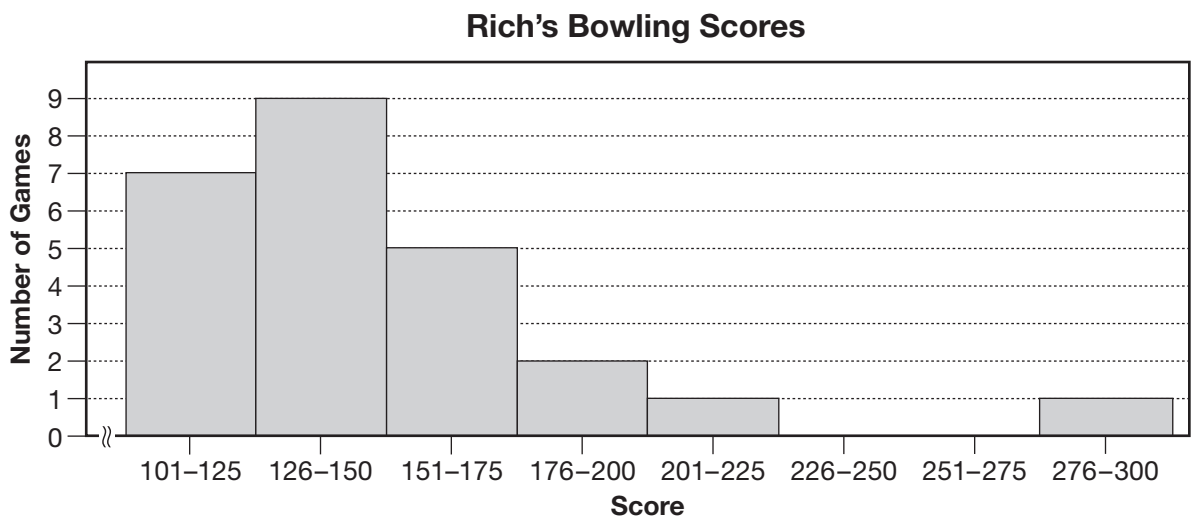
Ms. Sanchez graded the tests for her 28 students and made the following histogram to show the distribution of the scores. Describe the distribution of the data in her histogram.



Ms. Sanchez's histogram has left and right sides mirror images of each other. It is a **bell-shaped histogram** because it is in the shape of a bell.

Example

Rich made the following histogram to show his bowling scores from his last 25 games. Describe the distribution of the data in his histogram.



Unlike Ms. Sanchez's histogram, it is classified as a **right-skewed histogram** because the right side of the histogram is longer.