Representing How Data Is Normally Distributed

by Sophia

WHAT'S COVERED

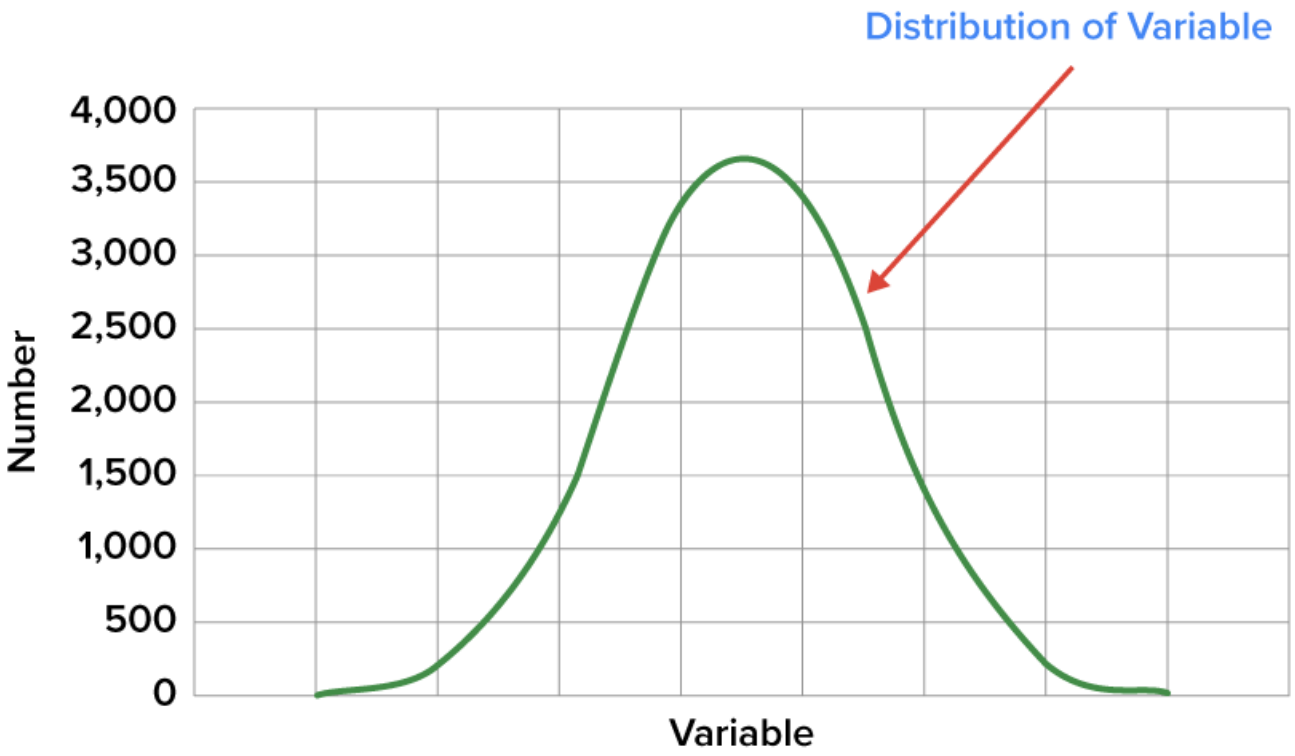
This lesson discusses representing how data is normally distributed. The key objective for this lesson is to understand a normal distribution and be able to identify the mean, median, and mode when looking at a graph of a bell curve. This lesson will cover:

1. Bell-Shaped Curves
2. Normal Distribution
3. Measures of Center

1. Bell-Shaped Curves

Now that you have some basic understanding of data and how it is measured, it is important to know how the data is distributed. Simply knowing the mean, median, or mode is generally not sufficient to explain much about the data. Knowing just how much the data strays away from those measures is important as well.

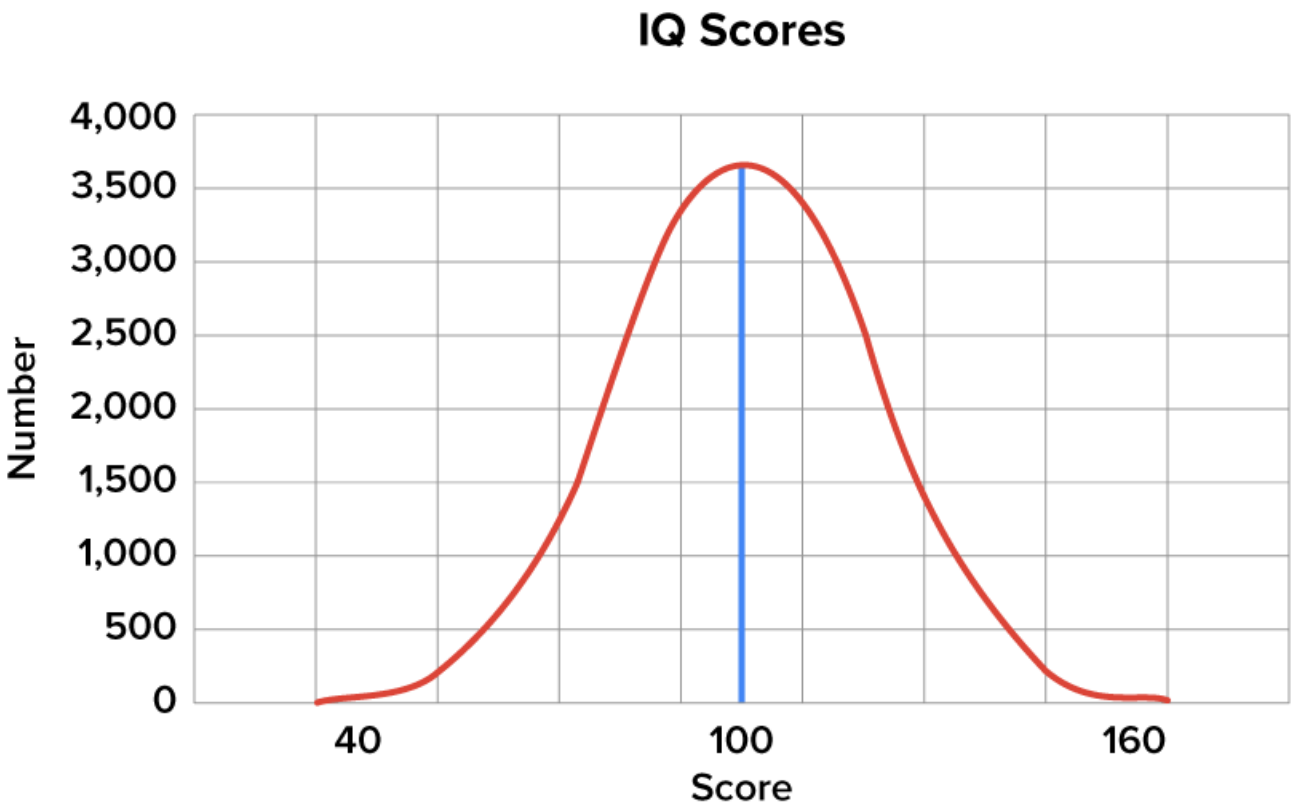
Knowing how data is distributed allows us to make predictions about what to expect and what not to expect for a given data set. Graphically, smooth curves, called density curves, can be used to show the distribution of variables. Look at the graph shown here. Notice how the curve is smooth and shaped like a bell.



What's useful about a density curve is that it shows how often a given value was recorded. What happens to create this curve is that a large number of observations are taken, and how often they happen is plotted out. Eventually, you'll get a shape that resembles a bell.

2. Normal Distribution

Take a look at this curve that represents IQ scores, which are a measure of intelligence. The horizontal axis represents the actual score. Notice that the bell-shaped curve is drawn above the horizontal axis. It's centered at 100, which is the average IQ.



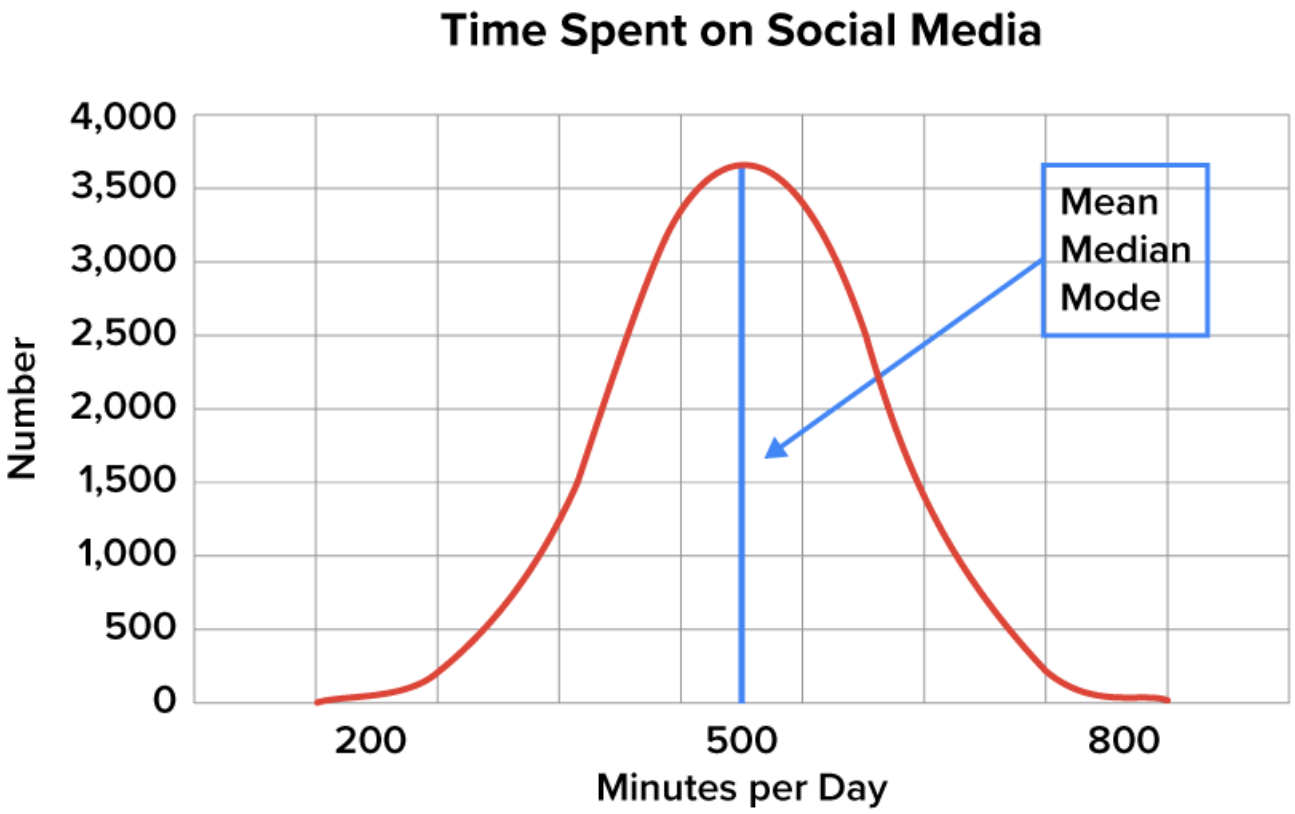
The range of this bell-shaped curve goes from 40 at the low end to 160 at the high end. This type of curve is called a normal distribution curve, and they occur quite often in many different situations.

3. Measures of Center

This next graph represents the time spent on social media per day by teenagers. It is another bell-shaped curve. You can see that the average, or the mean, is centered at 500 minutes per day. The range is 200 to 800 minutes per day. The total number of hypothetical teenagers surveyed is 10,000. This large number of observations is necessary before real data will take on the characteristic smooth and uniform normal distribution curve.

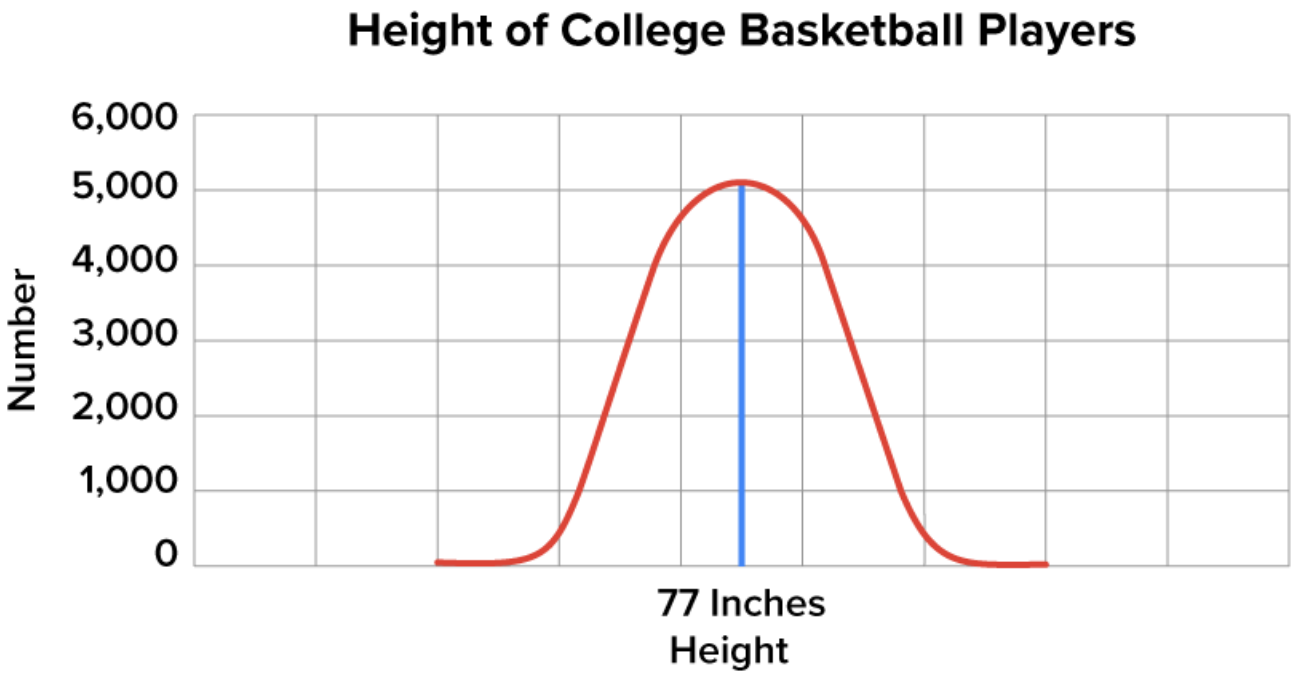
THINK ABOUT IT

How might this plot look different if you surveyed only 100 teenagers?



Notice how a large number of observations are concentrated more toward the center. When you're looking at normal distributions, they all have density curves that are symmetric and bell-shaped. The mean, median, and mode of the normal distribution are all the same and equal to the center value of the density curve, which in this case is 500.

Check out a distribution curve for the height of college basketball players indicated in this graph:



TRY IT

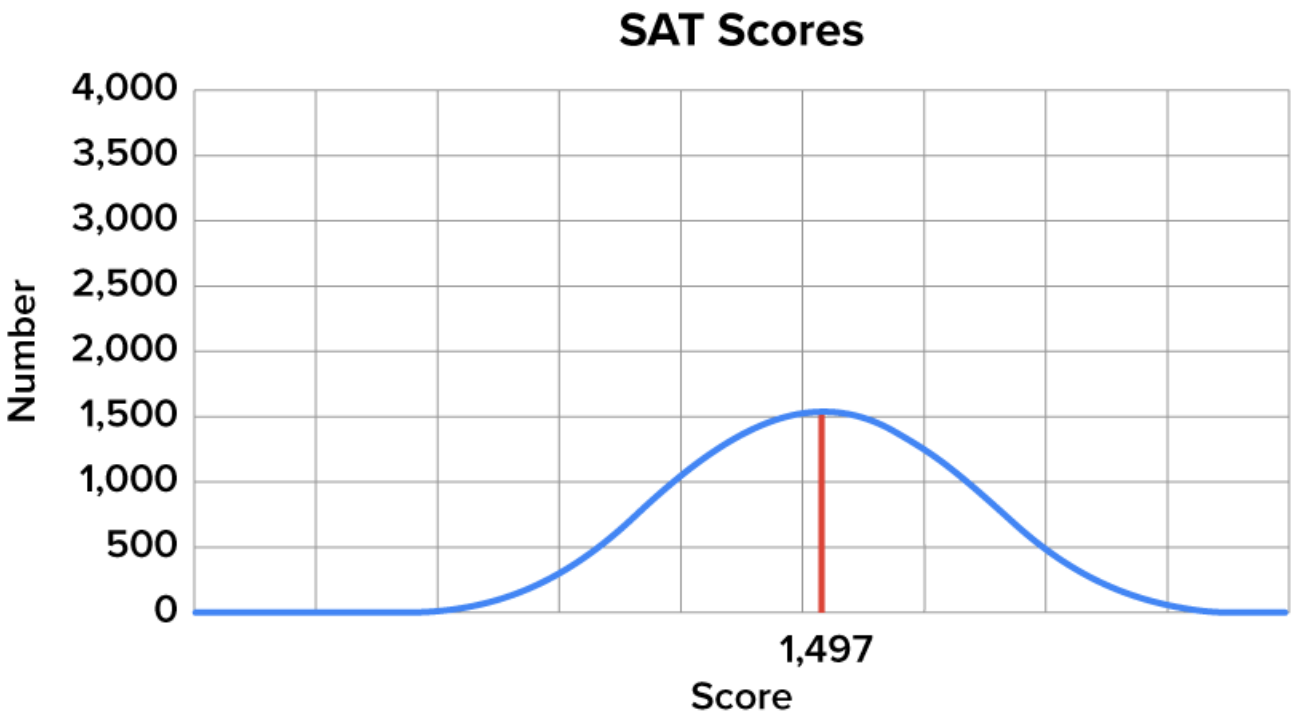
Use the distribution curve above to answer the question.

Determine the mean, median, and mode for the curve. +

Notice that the mean, median, and mode are all the same: 77 inches.

The distribution is relatively narrow. Most of the players are clustered right around that midpoint. There's not a whole lot of variation from the mean of 77 inches, though we really need more labeling on the x-axis to quantify the spread.

Now here's a distribution of SAT scores. The average in this case is 1497, which was actually the average SAT score in the year 2012. Notice how this curve deviates a little further from the mean, median, and mode. The curve looks a little flatter in this instance, with a wider distribution with regard to how the observations actually fall.



SUMMARY

In this lesson, you were introduced to **bell-shaped curves**. You also came to understand what a **normal distribution** is. By looking at this type of graph, you learned how to easily identify the **measures of center**, mean, median, and mode. It's going to be that center point at the very top of the bell curve that has the most observations.

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