

In this tutorial, you're going to learn about the range and the interquartile range. These are similar ideas in that they're both actually measured by subtraction, so they're not particularly difficult to calculate. But they do measure different measures of variation.

So let's first take a look. This is the height of the Chicago Bulls basketball team for a particular year. It's easy to see from the list that the minimum value was 71, right here, and the maximum value was 84, right here. The range is actually the easiest measure of spread or variation to find.

It's just the maximum value, in this case, the tallest person, minus the minimum value, in this case, the shortest person. 71 taken away from 84 is 13 inches. This means that every individual on the team falls within a 13 inch range.

A little bit of review. The interquartile range is another measure of spread, but it's median based, so it's worth reminding you exactly what the median is and what the quartiles are. The median is the middle number of an ordered data set.

So first, you should order the data set and then work your way in towards the center until you find the median. Once you have two data sets, a small half and a high half, as shown by these brackets, you can work your way in from those. And so now you have three numbers called quartiles.

They're called Q1, first quartile, the median, which is the second quartile, and Q3, the third quartile. One fourth of the data falls at or below the first quartile. Half the data falls at or below the median, and 3/4 of the data falls at or below the third quartile.

The interquartile range, also abbreviated IQR, is the difference between the two quartiles. So the third quartile and the first quartile. 81 minus 74 is 7. What that means is that half, the middle half, of the data set falls within a 7 inch range, whereas the entire data set fell within a 13 inch range.

Visually, the IQR is the box on a box plot. This is the first quartile. This is the third quartile. The range gives the entire spread of the data set lowest to highest whereas the IQR gives the range of the middle 50%.

The advantage of using IQR over range is if there are outliers, which would disproportionately affect the range, the IQR will not be affected by them. So to recap, the range is not the most useful measure of variation but it is the easiest to calculate.

The interquartile range is more useful and not quite terribly difficult to calculate either and measures the range of

the middle 50%, the most typical middle 50% of the data. It's a useful measure of spread for distributions with outliers or skewness. In fact, you should use that as your measure of variation when there are outliers or skewness.

And because the IQR is based on finding the median, it should only be used as the measure of spread when the median is the measure of center. You shouldn't mix and match saying the mean is the measure of center and then reporting IQR as the measure of spread. So we talked about range and interquartile range. Good luck and we'll see you next time.