Hi. This tutorial covers percentiles. Let's start with the definition of what a percentile is. So a percentile is a way of ranking data, where the r-th percentile-- so you can put a number in for r, so the 50th or the 90th percentile-- is the value that is larger than or equal to r percent of the data. So again, the 50th percentile would be a value that is larger than or equal to 50% of the data. So if it's the 90th percentile, larger than or equal to 90% of the data.

So just a quick example-- if a baby's weight is at the 80th percentile, the baby is heavier or as heavy as 80% of babies of the same age. A lot of times these percentiles on standardized tests.

So if a student scored in the 90th percentile for the ACT, that means they did better on the ACT than 90% of the other ACT takers. So generally, if you're talking about a test score, you want to be in a high percentile. So you don't want to be in the 3rd or the 20th percentile. You'd rather be in the 80th or the 90th percentile.

OK, so let's take a look at how percentiles are calculated. OK, so if we have a data set, we want to know at what percentile is 35? OK, so if we're looking at 35, the data, first of all, should be an order. So we want to know what percentile that is. So what percent of the data is equal to 35 or less than 35?

So if we take a look at that, we're talking about these values, 10 to 35, equal to or less than. So we have 1, 2, 3, 4, 5, 6, 7, 8, so 8 out of 9, 10, 11, 12. So it's greater than or equal to 8 of the 12 values.

So as a decimal, let's calculate that. So 8 out of 12 is 0.667 if we round it. So that's 0.667. So we will say that 35 is at the 67th percentile, OK? Just for fun, also, let's look at 24. OK, so this is for 35. Now, let's determine 24.

So if we look at 24, now, we want to know, well, first of all, there's two 24s. But remember the definition. It needs to be greater than or equal to, so we want to know, well, how many values are greater than or equal to 24. 24 is greater than 3 values and equal to 2, so this is 5. This should be 5/12. And if we do that, that ends up being about 0.416 or 0.417 if we round. So this ends up being about the 42nd percentile.

Sometimes there are some issues with rounding here. Sometimes this is also going to be called the 66th percentile because, technically, it's not bigger than 67%. The next largest would be 66th. So sometimes, this is interpreted as the 66th, and sometimes this would be interpreted as only the 41st

percentile.

All right, let's take a look at another example but this time where we have a relative frequency table instead of just some raw data. So consider the following 2000 US Census data on commute time for adult workers. So commute time is how long it takes them to get to work. So what we have here is that relative frequency is basically the proportion of people that fall in a certain category.

So this is a 0 to less than 10 minute commute time, and the relative frequency is 0.17. So that means 17% these adult workers have a commute time between zero and less than 10 minutes. 33% had a commute time between 10 and less than 20, 19, 20 to less than 30. 31% percent have a 30 minute or more commute time.

So what's nice is that these boundaries, you can determine percentiles for each of these boundaries. So if we look at 10, 10 is right at this boundary. So we want to know what percent of people are at 10 or fewer, and that's just simply going to be the 17th percentile. If we look at the next boundary, 20, well, we want to know, well, what percent of people are at 20 or less? And we could just add these two, so that's really like the cumulative relative frequency. So that'd be at the 50th percentile. So 50% of people take fewer than 20 minutes. 50% take more than 20 minutes. We could also go to 30. 30 would end up being the 69th percentile.

OK, now, since we don't have an upper boundary-- it says 30 or more-- we can't really come up with any more percentiles. But the hundredth percentile would have to be above everything else. But we can at least calculate these three percentiles pretty easily. So 10 is at the 17th, 20 at the 59th, 30 at the 69th percentile. So that is the tutorial on percentiles. Thanks for watching.