Hi, this is Anthony Varela. And today, I'm going to introduce you to inequalities. So we're going to take a look at an equation versus an inequality. We're going to draw inequality solutions on a number line, and then we're going to look at a number line and write the inequality that describes the solutions.

So first, what is an inequality? And I'm going to explain inequalities by comparing it to an equation. So here's an equation. 3 plus 2 equals 5. It relates 3 plus 2 and 5 as being equal to each other. Well, an inequality then might say that 3 plus 1 does not equal 5. So inequality says that two quantities are not equal to each other. So it's a mathematical statement that two quantities are not equal in value.

Well, there are a couple of inequality symbols that I'd like to introduce next. So here, we see the statement that 17 is less than 22. So inequalities are more specific than just saying not equal to. Here, we're saying that 17 is less than 22. And here is the symbol to show something being less than another value. On the other side, we have 33 is greater than 4. And here's the inequality symbol we use to show that one number is greater than another.

Well, we can have inequalities with variables as well. So here, we have x is less than negative 2, which means that any value of x which is less than negative 2 is a solution to this inequality statement. On the right side, we see x is greater than 5. So this means that any value of x that is greater than 5 is a solution to this inequality statement. It satisfies the statement that x is greater than 5.

We also have variations of these symbols that include exact solutions or exact values, I mean. So here, we see that x is less than or equal to negative 2. And it's very similar to this statement here except the exact value of negative 2 isn't included in the solution. It still satisfies the inequality here.

And same thing over here. We have x is greater than or equal to 5. And it's very similar to this statement here except that the exact value of x equals 5 is included in the solution. So we also have these symbols that include or equal to.

So next, let's plot solutions to inequalities on the number line. And we're going to look at the top 1 first-- x is less than negative 2. Now, the first thing that you're going to want to do on your number line is put in that important number that we see-- negative 2. Mark that on our number line. Now, don't worry about zero, positive, negative. Just put a mark down the center and label that negative 2.

Next, we need to decide if our inequality statement allows us to include the exact value of negative 2 or not. And our inequality symbol here does not let us include the exact value of negative 2 in our

solution. So we use an open circle to show that we're excluding the exact point negative 2. And now, we need to shade in all x values that are less than negative 2. So that would be the left side of negative 2 on the number line.

Taking a look at our next inequality, we have x is greater than or equal to 4. So what I'm going to do is mark down on a number line 4. And now, I'm going to use an open circle or a closed circle then to show if we're including or excluding the exact value of 4 as part of our solution. And here, our inequality symbol allows for x to equal 4. So I'm going to use a closed circle to show that we are including x equals 4.

And now, let's shade in all x values that are greater than 4, which would be everything that we see to the right of 4 on our number line. So the important thing here is that we use open circles to exclude exact values. And we used closed circles to include exact values.

Now, we can see an inequality that looks something like this. We have our x value that's in between two values. And this is actually called a compound inequality because we have two inequality symbols here.

And to plot this solution on a number line, what we're going to do is mark down our important numbers. That would be negative 3 and 5. And here, we do have to pay attention to what's positive and what's negative. It wouldn't make sense on our number line to have positive 5 over here and negative 3 over here.

So now, we're going to think about using open circles or closed circles. Now, this is interesting because we see one inequality symbol that does not include an exact value. And here, we have a symbol that does. So taking a look at interpreting this part of our inequality, we cannot include exact value-- the exact value negative 3. So I'm going to put in an open circle there.

Here, however, we can include the exact value of 5. So I'm going to put a closed circle there. And now, we're looking for x values that are in between negative 3 and positive 5. So that would be part of our number line that's in between negative 3 and negative 5.

Now, what we're going to do is take a look at a number line solution and write the inequality that represents this number line solution. So what do we see here? Well, my important number is negative 6. So that's going to be part of my inequality.

I see that the number line is highlighting all values greater than negative 6. And I see that we're not including the exact value of negative 6. So here, my inequality could read that x is greater than

negative 6 not including the exact value of negative 6.

Let's take a look at another number line. Here, we see the important number 17 marked on our number line. I see that all x values that are less than 17 have been highlighted. And my closed circle tells me that we're including the exact value of 17. So my inequality is going to read x is less than or equal to 17.

And we'll go through one more example here that highlights a range of values on our number line. So I know that x is going to be in between two numbers. And those two numbers are 5 and 13. And I know that we can include the exact value of 5 in our solution. But we cannot include the exact value of 13 in our solution.

So it's going to affect what inequality symbols we use. So to write this out as an inequality, we would say that x is in between and including 5 but not including 13. So we would write 5 is less than or equal to x, which is less than 13.

So let's review our notes on this introduction to inequalities. We talked about an inequality being a statement that two quantities are not equal in value. We saw some inequality symbols, our less than symbol and our greater than symbol, and that we just include another little line here to show that we can include or equal to in the solution.

And when we're writing down solutions on the number line, we used open circles to exclude the exact values that's associated with these two symbols here. And we used closed circles to include the exact values that's associated with these two symbols here. Well, thanks for watching this introduction to inequalities. Hope to see you next time.