Module 10: Circles
Topic 3 Content: Finding the Lengths of Intersecting Chords Transcript

Hi guys, welcome to Geometry. In this topic we're going to focus on how to find the lengths of intersecting chords. Now your knowledge of circles and your algebra skills are going to come in handy during this topic. You ready to get started? Let's go.

Okay, now we've discussed before that a chord is a segment that has its endpoints on the circle. So given a circle such as this one, with two intersecting chords and given lengths a and b, and c and d, this is the rule that you can use to determine the lengths of those chords, a times b equals c times d, or the product of a and b is equal to the product of c and d. So keep that rule in mind as we work through the next few examples.

Okay, I'm going to switch to my pen and let's take a look at this one. In example one we're asked to find x. So we're going to apply that rule and use it to determine the length, in this case, of part of one of the chords. So we'll say, x times 3 equals 9 times 5. Okay, so let's go ahead and simplify this, x times 3, that's 3x, 9 times 5, that's 45. I'll divide each side by 3 and I'm left with, let's get a little room here, x equals 15, and you're all done with that one. Now I could have easily done, like I started on this one, with this chord and I found the product of x and 3 and set it equal to the product of 9 and 5. If you would have preferred to start on this segment, and set up your equation as 9 times 5 equals x times 3, that's perfectly okay. So either way would have worked.

All right, let's move onto the next one. Now here we're asked to find LQ. So we actually want to find the length of this entire chord but first we're going to start with applying the rule that we learned at the beginning to solve for x. Once we know it, we'll use that value to figure out the length of segment LQ. Let's get started on this one. X times 9 = 5 times the quantity 2x minus one. So let's simplify this here, X times 9, that's 9x, and we're going to need to apply the distributive property on the right side, so 5 times 2x, that's 10x, 5 times -1, that's -5. Now let's go ahead and subtract 10x from each side. Get a little more space. So we have here -x equals -5 and essentially we know that's like a -1x so we'll divide each side by - 1 and we have that x equals 5. Now remember, we're not done just yet because we were asked to find the length of LQ, but now that we know that x is 5, we can use that value to determine the length of this entire chord.

Okay, so let's see here, I'm going to get this work out of our way so we can get the second part of our work done here. So we know x is 5 from doing this work so we're going to take that value and use it to find LQ. So we're just going to rewrite at the top that I know x is 5. So LQ equals the length of LN, plus the length of NQ, right? We know that from segment addition. Set that up a little differently, let's start with the whole chord. LQ equals LN plus NQ. This is basically where we're going to use this segment addition to figure out what is the length of LQ. We're going to add the lengths of those two segments together and figure it out. LQ equals LN, which is 5, plus 2 times x minus 1, but now that we know that x is 5, let's go ahead and plug it in. So 2 times 5 minus 1. Let's keep going here, so this is 5 plus 10 minus 1, 5 plus 10 is 15, and 15 minus 1 is 14. LQ equals 14, and you're all done with that one.

Just to recap what we did, we used our rule to determine that x equaled 5. We set up the equation that x times 9 equaled 5 times the quantity 2x minus 1. We solve that equation, we figured out that x equaled 5, and once we knew that, we were able to determine that

the length of LQ equaled 5 plus 2 times 5 minus 1. We simplified that right side and we ended up at LQ equal 14. Good job on that one.

Now I want you to go ahead and try one. Press pause, take a few minutes, work your way through this one. Press play when you're ready to check your work.

All right, let's see how you did on this one. Here you were asked to determine, let's see, a company has been hired to etch a logo into a large glass door. The logo consists of two chords that intersect in the interior of a circle given by the model below. Find AB. Let's start out by applying our rule, we'll solve for x, and then we'll use x to figure out the length of segment AB. Make sure I've got my pen still. Let's see, x times 6, I'll start there, equals 9 times the quantity x minus 4. X times, that's 6x equals, use the distributive property here, 9 times x is 9x. 9 times -4, that's -36, and let's keep going solving this equation. Subtract 9x from each side, cancels there, so we have -3x equals -36 and divide each side by -3. We have that x equals 12.

Now that we know that x is 12, let's go back up here, we were asked to determine the length of AB. AB is given by this expression, x minus 4. Right? It's x minus 4 feet in this problem. Let's go ahead and substitute 12 for x and then we'll get the length of AB. I'll do that right over here, I'm going to switch colors. AB equals 12 minus 4. A little more space. 12 minus 4, that's 8, so that means that AB equals 8 feet, and you're all done with that one. Just to recap, just to review what we did, we used our rule to set up the equation to let us solve for x. We did all of our work here, we solved this part, and we found that x equaled 12, and then once we knew that, go back to our circle. AB is given by the length, given by this expression, x minus 4 feet. We substituted 12 for x, and we figured out that AB was 8 feet long. Good job on that.

All right, guys, you've reached the conclusion of this topic, of how to find the lengths of intersecting chords. I hope you saw how your knowledge of circles and your algebra skills came in handy during this topic. Bye.