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SPEAKERS

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Welcome. Something that you might have guessed over the last few lectures, right, is that as the rectangles get thinner and thinner, you're actually getting a better and better approximation for the area under the curve, right. As I get as I cut my interval up into more and more pieces, right, so my N is bigger, so I have thinner slices, and I have more of them. And I'm actually going to get a better approximation to the curve. And this is totally how these things work. Okay. So what do I mean is that N and N gets bigger, I'm taking a limit, right? So the area under a curve. So area under a curve. Make this suggestively green. So the area under curve is going to end up equaling, so this is going to be the limit as N goes to infinity. So we have the limit as this N goes to infinity of that left hand limit, is going to equal the area, is going to equal the limit as N goes to infinity of the right hand limit.

And then there's like a qualification on here, which is when these limits are equal, okay. So this works when these limits are equal. So when these limits are equal to each other, right, the left hand limit and the right hand limit when they're equal to each other, those are going to give you the area under the curve. So you're going to want an example where they're equal. Okay, so an example where they're equal. So example where equal.

Well, this is going to be any time when we have, so when we have some kind of, so we have that this curve F is greater than like, so the function is greater than or equal to zero. And so that like F of X, let's let's write it this way. I think that it may not be clear what we mean when we say that a function is greater than or equal to zero. What we mean by that is F of X is always greater than or equal to zero, is greater than or equal to zero. On, right, so on this interval A, B, meaning for each X in this interval we have that that's greater than or equal to zero. And so that's one thing we need. The other thing is that F is actually continuous on A, B. So F has to be continuous, again, on that interval. And as long as we're in this circumstance, there'll be other circumstances where this holds. But for now, you know, for sure, if you have a function that's like above the X axis, and is continuous on the interval, then you can actually just do this whole Riemann Sum thing and get the area under the curve. So here's our picture.

And the picture is that I've got so, right, I've got my interval A, B. And I've got some kind of Y equals F

And the picture is that I've got so, right, I've got my interval A, B. And I've got some kind of Y equals F of X up here. Y equals F of X. And then I'm looking at what am I doing? It's like I'm dividing this up, right? I'm trying to decide. I guess I was trying these with blue before. So let's go ahead and do that again. Right. So I'm kind of looking at where I'm chopping up A, B into more and more pieces and and I'm getting these rectangles above and what's going to happen so I guess I've decided here to do that on that side.

Okay, wait, no one more. Okay, so what's happening is that these actually gets smaller and smaller. I know that N is getting bigger, but these get smaller and smaller. So these get smaller and smaller or your delta X gets smaller and smaller, so these gets smaller and smaller. As we have that N goes to infinity, right? Because we're chopping it into more and more pieces, then that tells me that these delta X, right, more and more pieces mean less and less width, right? And so this delta X is actually getting smaller and smaller, or this width is getting smaller and smaller. But then this actually kind of gives us a better approximation of the curve and in the limit, that's actually giving us the area under the curve. Okay? So, I hope that made some sense and I will see you in the next lecture.