Hey, Welcome back to Calculus. So Calculus is a really, really fantastic subject. It really goes back and asks, what can we say about motion, things changing, things growing, things getting bigger, things getting smaller? How do we understand that? So we learn in calculus that in fact, the derivative really gives us the answer. Well, you learned about the derivative and then you learned about the integral. So now why do you come on and take more Calculus? The answer is because there are further adventures yet to be discovered. Well, welcome to second semester or Calculus II. This is an area where we’re going to go back to Calculus and take a look at what summits were left to be explored.

Now, when you think about it, in fact, Calculus I, you just did a couple of little things. This course can be thought of in two different ways. You can think of it as Calculus II, like Calculus II, where we’re going to actually take a look at some really more interesting integrals. Go back and take a look at techniques for integrating functions that previously we didn’t know how to integrate. How do you do that? How do you integrate the natural log of x? I don’t know, but Calculus II will let us figure that out. How do you integrate a really complicated function with cosines to powers and sines powers and so forth? Who knows? It sounds scary. But it really is not that scary, because once you think about it and build some basic ideas, and extend the thinking that we already have with respect to calculus, we can actually conquer - even greater harder looking questions turn out to be easy questions in disguise. So we can actually conquer that. That’s sort of the point of Calculus II, to really dig deeper and get a firmer grasp of the ideas.

But also you can think about Calculus as Calculus, too, T-O-O, where in fact, we’re going to think about things that sort of expand the horizon and allow us to perform Calculus on different regions. For example, instead of just thinking about the world as going over and going up, what if you think about the world in terms of rotating and going out? Well, in fact, then you’ve got a whole world of polar coordinates, and it turns out you can do Calculus there. Suppose you want to find the area of a slice of a pie. You can now use Calculus to do that. You couldn’t do it before. You can do it now. This is going to be great. We’ll have so much fun because we’re going to build up these ideas from the ground floor all the way up, and see how each idea leads to new innovation and new discoveries. So really, that’s what we’re going to be doing here.

Then we’re going to take a look at realms of things you can’t even see. If you take binoculars you can look up, you can only look so far. But what if you want to go to the horizon and go all the way out to infinity? How do you add up infinitely many things? Is that possible? It turns out you can do that. In fact, once you figure out how to add up infinitely many things, you know what? You can actually start to do even harder integrals, more complicated integrals easier, because it turns out you’re looking at infinitely sums, sums that go up forever. You can really, really understand the world in a clear, more focused way. That is what we’re going to be doing here in Calculus II.

Now, how does Calculus II work? Well, here I am. I’m Professor Ed Burger. I’m a professor of mathematics at Williams College, and I just love Calculus and I want to share it all with you. And so the two of us together are going to work together in this space. You can see off to this side here there’s all this sort of white area filled with all sorts of information, and there will be really, really good stuff there, and you can read all about it, and I can also put things there. For example, if I want to say, “Here’s the picture of what? Something about Calculus. Here’s a picture of an airplane flying.” See, there it is. You can see the airplane flying. Now I can manipulate and do anything I want. I’ve got the power. In fact, I’ve got the power right now to do anything I want. I can control everything. What I want us to do is to come together and work together to harness this kind of power to actually figure out all about Calculus.

Behind me it doesn’t look that interesting. It’s sort of just a blue thing, but the world is our oyster. We can do whatever we want. So if we want to go out into outer space and take a look at Calculus from afar, now we’re out in space floating around. If you want to go down on a farm and figure out growth, now we’re on a farm. We can do whatever we want because there are no rules. You and I are going to tackle Calculus II. We’re going to tackle it, understand it, make it our own. So welcome on board and we’ll have a lot of fun. I’ll see you at the first lecture. Bye.