

PfaffModule5L07

📅 Thu, 2/3 3:45PM ⌚ 7:02

SUMMARY KEYWORDS

function, squared, equal, emphasize, replace, 2x, sine, cover, little bit, respect, exponent, cosine, write, chain rule, clear, define, identify, alter, variable, notation

SPEAKERS

Catherine Pfaff

Welcome. In this lecture, we're just going to go through a little bit of practice on how to define, like, identify the inside or outside, inside and outside in the chain rule. So I know this kind of, it takes a little bit of work at first. So let's go ahead and do this. So the first function I'm going to look at, so I have one, the first function that I'm going to look at here, so I'm going to have H of T is going to equal I've got a cosine of T squared. Okay? And if you're looking at this, hopefully you can see that there, here's kind of an inside function. And once you kind of see that, it's easier to see what the outside is. So let's kind of write that for ourselves. So the inside is equal to cosine of T . Right? And then if I'm looking at this, I can see if I replace that with a U , then it's easy to see the outside is U , you get U squared, right? Okay, so the outside is equal to is equal to, and I'm going to kind of write this with this coloring, but, so it's squared with U in the inside, right? Because this is, they're squared if I kind of cover that up for myself, and then replace the inside with U . Okay, so it's just U squared. Just to be kind of clear, this is actually just the function, this is just U squared. Okay? And then we'd want to be taking a derivative of that with respect to U . Okay, so now let's look at another example.

So in this example, I'm going to look at the function, I'm going to kind of mix things up a little bit in terms of notation. So this is E to the sine of Y . Okay, on my inside is what's kind of inside the function of E to the U , okay? So this is actually my inside. So I'm going to have that my inside is going to equal, is going to equal this, what I have here, so that's my sine of Y . And then if I kind of cover up sine of Y and replace that with U , I'm going to get E to the U . Right? So that tells me that my outside is going to equal E to the, cover it up, put a U , and so it's U . Oh, sorry, yeah, E to the U . Okay, so, you know, and just to be clear, this is just E to the U . Okay? Now let's do another one.

So in this example, we're going to do G of X is going to equal and then I have 1 over X squared minus E to the X . Okay, so the whole bottom is actually going to be my inside. Okay, so I'm going to have that the inside is going to equal, so I have X squared minus E to the X . And then when I kind of cover that up and replace it with U , I get 1 over U . Right? So my outside is going to equal, I'm going to have 1 over and then the U , right? Just to be clear, this is 1 over U . Okay? And then finally, oh, and okay, I kind of want to emphasize here. No, it's in the next one I want to emphasize that. So let's do one more, which is that I'm going to have S of T is going to equal, so I have E to the $2X$. So now again, this is similar to that one where this is actually my inside. So my inside is going to equal $2X$, I can cover it

and replace it with U, right? So my outside is going to equal E to the U, right, or E to the U. Okay, this is the one where I actually wanted to emphasize something, which is kind of fun, which is that we could do this in an alternative kind of way.

Right? So let me show you. So this function, so when I have S of T equals E to the 2X, right, that's the same thing as E to the X squared. Okay, and then looking at this, I just thought this was fun. While emphasizing some different things that it's good to get used to. This is my, it's not my outside, it's my inside. So this is my inside. So my inside is equal to E to the X. And now my outside is equal to right, cover that with a U, so I get U squared. Okay, so this is the same thing. So it's just one of these circumstances by where if I slightly alter how I've written an exponent, it actually gives me a new way to kind of work with something. Okay? So in each of these, the way to kind of look at it is what's on the inside of a function, right? And then I kind of find it helpful to like, kind of cover that up, replace it with a U and then you can see what your outside function is, okay? And then of course, you're going to be differentiating your inside with respect to whatever the proper variable is in there, and then you're outside with respect to U, okay? So I hope that made some sense, and I'll see you in the next lecture.