

# 18 Lecture - MTH101

## Important Subjective

### What is the chain rule in calculus?

The chain rule is a rule in calculus that enables us to differentiate composite functions by taking the derivative of the outer function and multiplying it by the derivative of the inner function.

### Why do we need the chain rule?

We need the chain rule to differentiate complex functions that are composed of multiple functions. Without the chain rule, it would be challenging to find the derivative of such functions.

### What is an example of a composite function?

An example of a composite function is  $f(g(x))$ , where  $f$  and  $g$  are functions of  $x$ .

### How do we apply the chain rule?

To apply the chain rule, we differentiate the outer function with respect to its variable and multiply it by the derivative of the inner function with respect to its variable.

### Can we apply the chain rule to any function?

No, we cannot apply the chain rule to all functions. It only applies to composite functions where one function is nested inside another function.

### What is the derivative of $\sin(x^2)$ ?

The derivative of  $\sin(x^2)$  is  $\cos(x^2) * 2x$ .

### What is the derivative of $e^{(3x+2)}$ ?

The derivative of  $e^{(3x+2)}$  is  $3e^{(3x+2)}$ .

### What is the chain rule formula?

The chain rule formula is  $(f(g(x)))' = f'(g(x)) * g'(x)$ .

### **What is the chain rule used for in real-life applications?**

The chain rule is used in physics, engineering, and other fields where complex functions are encountered. It is essential in calculating rates of change and gradients of complex systems.

### **How can one remember the chain rule?**

One way to remember the chain rule is to think of it as "outside inside," meaning that we differentiate the outer function first and then the inner function. Another way is to use the mnemonic device "DIDLO," which stands for differentiate the outer function, differentiate the inner function, and multiply.