

26 Lecture - MTH101

Important Subjective

What is integration by substitution?

Answer: Integration by substitution is a technique used in calculus to simplify and evaluate complex integrals by changing the variable of integration using a substitution.

How do you find the right substitution for integration by substitution?

Answer: The key to finding the right substitution is to look for a function u that is a composite of the function inside the integral and its derivative, such that $du = f'(x)dx$.

What is the general formula for integration by substitution?

Answer: The general formula is $\int f(g(x))g'(x)dx = \int f(u)du$, where $u = g(x)$.

How do you evaluate the integral after making the substitution?

Answer: After making the substitution, we use standard integration rules to evaluate the integral in terms of the new variable, u .

Can you use integration by substitution to evaluate definite integrals?

Answer: Yes, but you need to adjust the limits of integration based on the substitution you have made.

What is the purpose of integration by substitution?

Answer: The purpose is to simplify complex integrals and make them easier to evaluate using standard integration rules.

Can you use integration by substitution for all integrals?

Answer: No, but it is a powerful technique that can be used for many integrals involving composite functions, trigonometric functions, and other complex functions.

Why is integration by substitution sometimes called u-substitution?

Answer: It is called u-substitution because we typically use the variable u to represent the substitution.

What are some common substitutions used in integration by substitution?

Answer: Some common substitutions include $u = g(x)$, $u = \sin(x)$, and $u = e^x$.

What is the importance of adjusting the limits of integration when using integration by substitution?

Answer: It is important to adjust the limits of integration because the new variable, u , may have a different range than the original variable, x . By adjusting the limits of integration, we ensure that we are integrating over the same range in terms of the new variable, u .