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 ?f(g(x))g'(x)dx = ?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.