

# 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,  $u$ .