Integration By Substitution

Student Activity

Name ___________________

Class ___________________

Problem 1 – Introduction

1. Consider the integral $\int \sqrt{2x+3}dx$. Let ***u* = 2*x* + 3.** Evaluate the integral using substitution.

   Use the table below to guide you.

$f(x) =$	$\sqrt{2x+3}$
$u =$	2x + 3
$du =$	
$g\ (u) =$	
$\int g(u)du =$	
$\int f(x)dx =$	

2. Try using substitution to integrate $\int \sin(x)\cos(x)dx$. Let ***u* = sin(*x*)**.

3. Now integrate the same integral, but let ***u* = cos(*x*)**. How does this result compare to the previous result?

4. The expression $\sin(x)\cos(x)dx$ can be rewritten as $\frac{1}{2}\sin(2x)$ using the Double Angle formula.

   What is the result when you integrate $\int \frac{1}{2}\sin(2x)$ using substitution?

Problem 2 – Common Feature

Find the result of the following integrals using substitution.

5. $\int \frac{x+1}{x^2+2x+3}dx$

6. $\int \sin(x)\, e^{\cos(x)}dx$

7. $\int \frac{x}{4x^2+1}dx$

8. What do these integrals have in common that makes them suitable for the substitution method?

Extension

Use trigonometric identities to rearrange the following integrals and then use the substitution method to integrate.

9. $\int \tan(x)dx$

10. $\int \cos^3(x)$