

Math 141: u -Substitution Practice

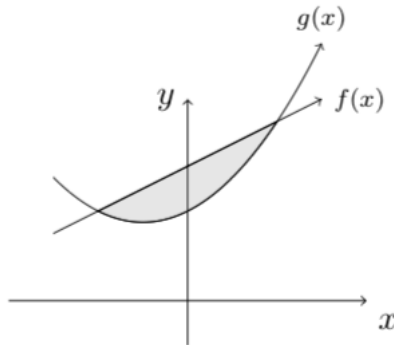
Warm-Up/Review Problems

1. Evaluate the following integrals

(a) $\int x^2(\sqrt{x} + 5) + e^2 dx$

(b) $\int_1^2 \frac{3x^3 + 1}{4x} dx$

2. Find the area bounded between the line $f(x) = x + 3$ and the parabola $g(x) = x^2 + x + 2$.



- (a) Find where $f(x)$ and $g(x)$ intersect by setting them equal and solving for x .

- (b) Set up the integral and evaluate to find the area bounded by $f(x)$ and $g(x)$.

Practicing u/du Substitution

3. Find the following indefinite integrals using substitution.

(a) $\int \frac{\cos(\sqrt{x})}{\sqrt{x}} dx$

(b) $\int \frac{e^x}{e^x + 1} dx$

4. Evaluate the following definite integrals using substitution.

(a) $\int_2^3 \frac{xe^{x^2}}{3} dx$

(b) $\int_0^1 \frac{x}{1 + 3x^2} dx$

5. Show the following two integrals are equivalent:

$$\int_0^2 3x\sqrt{9-x^2} dx = \int_5^9 \frac{3\sqrt{u}}{2} du.$$