

Math 1b. Integration by Substitution

Spring 2006

1. Evaluate each of the following integrals

(a) $\int \cos(2x + 3) dx$

(b) $\int (3x - 2)^4 dx$

(c) $\int \frac{2x^3}{1 + x^4} dx$

(d) $\int \frac{dx}{1 + \sqrt{x}}$

$$(e) \int \frac{\arcsin x}{\sqrt{1-x^2}} dx$$

$$(f) \int \frac{e^x}{(2e^x + 3)^2} dx$$

$$(g) \int \sin^3 x dx$$

$$(h) \int_0^\pi \sin^3 \theta \cos \theta d\theta$$

2. Find real numbers a and b such that the equality

$$\int_1^2 x^2 e^{x^{3/4}} dx = \frac{4}{3} \int_a^b e^u du$$

holds.

3. Suppose that $\int_0^{12} g(x) dx = \pi$. Evaluate $\int_0^4 g(3x) dx$.