

Homework 12

For each of the following integrals, show algebraic steps that must be used to evaluate the integral using the Fundamental Theorem of Calculus. For example:

$$\int_1^2 x^2 dx = \left[\frac{1}{3} x^3 \right]_1^2 = \frac{1}{3} (2)^3 - \frac{1}{3} (1)^3 = \boxed{\frac{7}{3}}$$

The answers are given to help you check your work.

(a) $\int_0^{\pi/8} \sin(4x) dx$ (Answer: 1/4)

(b) $\int_1^9 \frac{1}{\sqrt{x}} dx$ (Answer: 4)

(c) $\int_0^2 (3x^2 e^{3x} + 2x e^{3x}) dx$ (Answer: $4e^6$)

(d) $\int_0^{\pi/2} \sin^2(x) \cos(x) dx$ (Answer: 1/3)

(e) $\int_1^e \frac{(\ln x)^2}{x} dx$ (Answer: 1/3)

(f) $\int_0^2 \frac{3x^2}{1+x^3} dx$ (Answer: $\ln 9$)