

MA122 In-class Practice Problem Set 1

(1) Find the indefinite integrals:

(a) $\int x e^{-2x^2} dx$

Answer: $-\frac{1}{4}e^{-2x^2} + C$

(b) $\int \frac{(\ln x)^2}{x} dx$

Answer: $\frac{(\ln x)^3}{3} + C$

(2) Evaluate the definite integrals:

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

Answer: $\frac{9}{20}$

(b) $\int_1^1 x^2 \ln x dx$

Answer: 0

(3) If the marginal profit for producing x units per day is given by

$$P'(x) = 100 - 0.02x \quad P(0) = 0$$

where $P(x)$ is the profit in dollars. Find the profit function $P(x)$ and the profit on 10 units of production per day.

Answer: $P(x) = 100x - 0.01x^2$, $P(10) = \$999$