Review Questions 1

Differentials and Basic Integration

1. Compute the differentials of the functions below.

a. $y = x^2 - 3x + 1, \quad dy =$

b. $u = e^{x^2-3x+1}, \quad du =$

2. Use differentials to estimate $\sqrt[3]{28}$. Express your answer as a simple fraction, a/b, **not** in decimal form.

3. Compute the indefinite integrals below.

a. $\displaystyle\int 3x^4 - 2x^3 + 6x^2 + 2x - 1\,dx =$

b. $\displaystyle\int \sqrt[5]{x^3}\,dx =$

c. $\displaystyle\int \frac{3x^2 - 4x + 1}{x^5}\,dx =$

4. Find the function $y = f(x)$, given that $y' = x - \dfrac{1}{x}$, and $f(1) = 3$.

5. Find the function $y = g(x)$, given that $y'' = x^2 - 1$, $y'(1) = 2$ and $y(1) = 2$.

6. The marginal revenue function for a firm is

$$\frac{dr}{dq} = 200 - q^{2/3}.$$

Find the firm's demand function.

7. A firm's fixed cost is \$12000, and their marginal cost function is

$$\frac{dc}{dq} = (q + 1000)^{1/3} + 50.$$

Find the firm's cost function.