

PRINCE SULTAN UNIVERSITY
Department of Mathematical Sciences
MATH 211-Business Calculus
Second Examination
May 2005

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Time Allowed: One and a half Hours

Name:	ID
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Q1. Compute the derivative $\frac{dy}{dx}$ of the following functions.

١. $y = \sqrt{u} + 5u$ and $u = 5x + 1$.

٢. $y = x^2(2x + 3)^5$

٣. $y = x^2 e^{5x}$

٤. $y = \ln\left(\frac{(2x^2 - 5)^3}{x\sqrt{x-3}}\right)$

- Q2. a. A manufacturer's total cost is $C(q) = 0.1q^3 - 0.5q^2 + 500q + 200$ dollars, where q is the number of units produced. Use **marginal analysis** to estimate the cost of manufacturing the tenth unit.
- b. Find the absolute maximum and minimum of the function $f(t) = 3t^5 - 5t^3$ on the interval $[-2, 0]$.
- c. A manufacturer estimates that if x units of a particular commodity are produced, the total cost will be $C(x) = x^3 - 24x^2 + 350x = 338$ dollars. At what level of production will the marginal cost be minimized?
- Q3. a. Determine the intervals of increasing, decreasing, concave up and down intervals of the given function

- b. Use **Calculus** to sketch the graph of the function
$$y = x^3 - 3x^2.$$

- c. Sketch a possible graph for a function $f(x)$ with the following properties:
 $f'(x) > 0$ on the interval $[-1, 1]$ and $f'(x) < 0$ otherwise
 $f''(x) > 0$ on the interval $(-2, 0) \cup (2, \infty)$ and $f''(x) < 0$ otherwise.
 $f(0) = 0.$

- Q4. a. How quickly will money double if it is invested at an annual interest rate of 2% compounded continuously?
- b. The marginal revenue derived from producing q units of a certain commodity is $4q - 1.2q^2$ riyals per unit. If the revenue from producing 20 units is SR 30,000, how much revenue should be expected from producing the 20th unit?

- c. Find the indicated integral

١. $\int (x^2 - 3)^2 dx$

٢. $\int \sqrt{x} - \frac{5x+2}{x} dx$