Prince Sultan University
MATH 211
Major I Exam
Second Semester 2009/2010, Term 092

Time Allowed: 90 minutes

Name: _____ ID _____

Q1. Find the equation of the line passes through the point (3, -2) and parallel to the line $2y - 4x + 3 = 0$.

Q2. At a certain factory, the total cost of manufacturing units during the daily production run is $C(q) = q^2 - 2q + 251$. On a typical day, $q(t) = 19t$ units are manufactured during the first hours of a production run.

a) How much is spent during the first 3 hours of production?

b) How much is spent during the 3rd hour of production?

c) Find the minimum cost and how long will it take research it?

Q3. What is the domain of the function $f(t) = \dfrac{\sqrt{t^2 - 1}}{t - 3}$

Q4. Study the continuity of the function

$$f(x) = \begin{cases} 2x - 5 & if \ \ x < 1 \\ 3 & if \ \ x = 1 \\ x^2 - 4 & if \ \ x > 1 \end{cases} \quad \text{at} \quad x = 1.$$

Q5. Evaluate the following limits

a) $\lim_{x \to 3} \frac{2x^2 - 18}{x - 3}$

b) $\lim_{x \to 1} \frac{\sqrt{x+3} - 2}{x - 1}$

c) $\lim_{x \to \infty} \frac{3x^2 - 4x + 1}{5x^2 - 4x^5 - 1}$

Q6. Use the definition to find the derivative of the function $f(x) = 2x^2 - 2$

Q7. The gross annual earnings (GAE) of Ford were $A(t) = 0.2t^2 + 20t + 40$ billion dollars t years after 2001. At what percentage rate were the GAE with respect to time in 2008?

Q8. Find the derivative of the function

a) $y = 3\sqrt{x} - 5x^3 + \frac{5}{x} - 2$

b) $y = \frac{x^2-5}{2x+3}$

c) $y = (5x^3 - 5x + 1)(3x^{-3} + 3)$

Q9. The manager of the Many Facets jewelry store models total sales by the function $S(t) = \frac{2000t}{4+0.3t}$ thousand SR, where t is the time (years) since the year 2006.

a) At what rate were sales changing in the year 2010?

b) What happens to the sales in the long run?