Prince Sultan University

Department of Mathematics and Physical Sciences
Final Exam
Semester II ,2007-2008 Spring Semester (072)
Math 113-Calculus II

Time Allowed: 120 minutes

Name:

ID Number:

Instructions:

1. Answer all the questions.
2. Show your work in the spaces provided for each question.

Question	Q.1	Q.2	Q.3	Q.4	Q.5	Q.6	Q.7	Q.8	Total
Grade									

Question.1 (6 points) Find the area bounded by $f(x) = 5 - x^2$ and $g(x) = 2 - 2x$.

Question.2 (6 points) Solve the initial value problem $\frac{dy}{dx} + 4y = e^{-3x}$, y(0)=2.

Question.3 (6 points) Find the area of the surface that is generated by revolving the portion of the curve $y = x^3$ between $x = 0$ and $x = 1$ about x-axis.

Question.4 (6 points) Find the volume of the solid that is obtained when the region under $y = \sqrt{x}$ over $[1,4]$ is revolved about x-axis.

Question.5

a. (6 points) Show that $\lim_{x\to 0}(1+2x)^{1/x} = e^2$.

b. (6 points) Evaluate $\lim_{x\to 0^+}\left(\frac{1}{x} - \frac{1}{\sin x}\right)$.

Question.6 Define $F(x)$ by $F(x) = \int_1^x (3t^2 - 3)dt$.

a. (6 points) Use Fundamental Theorem of Calculus to find $F'(x)$.

b. (6 points) Check the result in part (a) by first integrating then differentiating.

Question.7 Evaluate the integrals:

a. (4 points) $\int_0^{+\infty} \frac{dx}{1+x^2}$

b. (4 points) $\int \frac{2x^2-9x-9}{x^3-9x} dx$

c. (4 points) $\int \ln(x+4) dx$

d. (4 points) $\int \left[\frac{10}{x^{\frac{3}{4}}} - \sqrt[3]{x} + \frac{4}{\sqrt{x}} \right] dx$

Question.8 Evaluate the integrals:

a. (4 points) $\int \frac{dx}{\sqrt{2-x^2}}$

b. (4 points) $\int \sinh^6 x \cosh x dx$

c. (4 points) $\int \frac{dx}{1+3x^2}$

d. (4 points) $\int \tan^2 x \sec^4 x dx$