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:

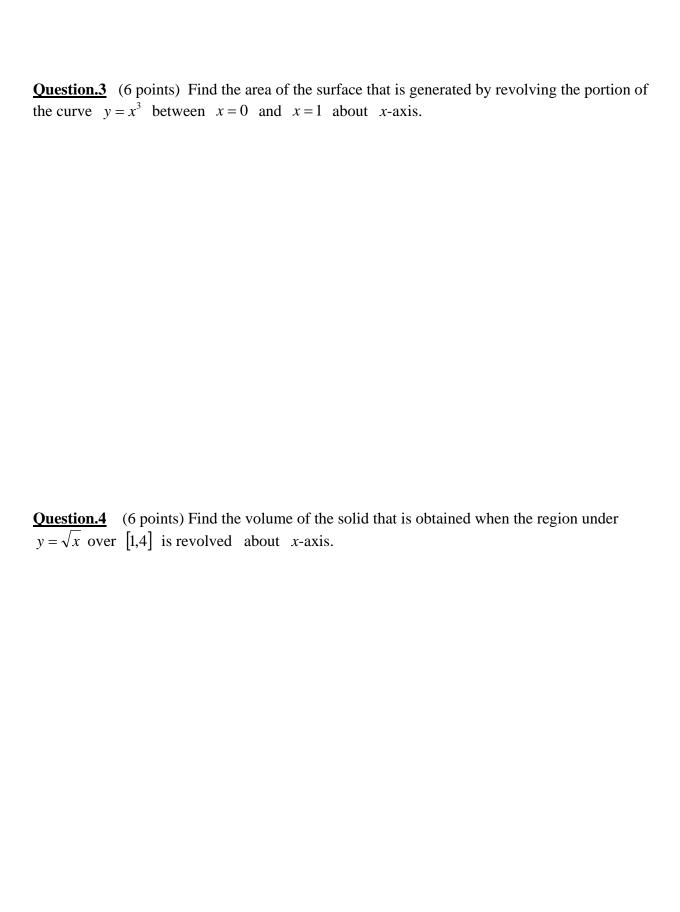
Instructions:

- 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.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)
$$\int \tan^2 x \sec^4 x dx$$