Prince Sultan university
Department of Mathematics
Major II Exam
Semester I ,2007-2008 Fall(071)
03.11.2007
Math 113-Calculus II

Time Allowed: 90 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
Grade							

Question 1. Find $\frac{dy}{dx}$ if

a) $y = \ln\left(1 - xe^{-2x}\right)$.

b) $y = \sin^2(\ln x)$.

Question 2. Evaluate the following integrals

a) $\int_0^{\ln 3} e^x \left(1+e^x\right)^{1/2} dx.$

b) $\int \frac{t+1}{t} dt.$

Question 3. Evaluate the limits

a) $\lim_{x\to 0}\dfrac{1-\cos x}{x^2}$ b) $\lim_{t\to 0}\dfrac{te^t}{1-e^t}$ c) $\lim_{x\to\infty} x\sin\dfrac{\pi}{x}$

Question 4. Evaluate the integrals:

a) $\int \frac{3}{1+16x^2} dx$

b) $\int \frac{5}{\sqrt{2-x^2}} dx$

c) $\int \frac{7x}{x^2\sqrt{x^2-1}} dx$

Question 5. Find $\frac{dy}{dx}$ if

a) $y = e^x \sec^{-1} x$.

b) $y = 3\cot^{-1}(\sqrt{x})$.

Question 6. Evaluate the integrals:

a) $\int \frac{dx}{\sqrt{4x^2-9}}, \quad x > \frac{3}{2}.$

b) $\int \frac{dx}{\sqrt{1-e^{2x}}}, x < 0.$

c) $\int \frac{\sin x}{\sqrt{1+\cos^2 x}} dx$

Question 7. Find $\frac{dy}{dx}$ if

a) $y = 5x^3 \tanh^2\left(\sqrt{x}\right)$. b) $y = \cosh^{-1}\left(\sinh^{-1} x\right)$. c) $y = 34\coth\left(\ln x^2\right)$.