Prince Sultan University

Math 113
Major 2
First Semester, Term 111
Saturday, 17th December, 2011

Time Allowed: 90 minutes

Student Name:
Student ID #:
Serial Class #:

Important Instructions:

1. You may use a scientific calculator that does not have programming or graphing capabilities.
2. You may NOT borrow a calculator from anyone.
3. You may NOT use notes or any textbook.
4. There should be NO talking during the examination.
5. Your exam will be taken immediately if your mobile phone is seen or heard.
6. Looking around or making an attempt to cheat will result in your exam being cancelled.
7. This examination has 3 problems, some with several parts. Make sure your paper has all these problems.

Problems	Max points	Student's Points
1	64	
2	16	
3	20	
Total	100	

1. (54 points) Evaluate the following integrals:

i. $\int \frac{\ln x}{x^3} dx$

ii. $\int x \sec^{-1} x \, dx$

iii. $\int e^{2x+1} \cosh^2 x \, dx$

iv. $\int \frac{\sin x}{\cos^2 x - 3\cos x + 2}\, dx =$

v. $\int e^x \sqrt{1 - e^{2x}}\, dx =$

vi. $\int e^{\sqrt{x}}\, dx$

vii. $\int \frac{1}{\sqrt{x^2+1}} dx =$

viii. $\int \frac{1}{4x^2-8x+13}\, dx$

ix. $\int \tan^3 x \sec^3 x \, dx$

2. (16 points) Find $\frac{dy}{dx}$ for the following:

a. $y = \dfrac{(x^3-5)^7 \ \sqrt[4]{x^3+7} \ \sec^3 x}{\sqrt{2x+3} \ \tan x}$

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

3. (20 points) Evaluate the following limits:

a. $\lim_{x\to 0} \frac{xe^{3x} - x}{1-\cos(2x)} =$

b. $\lim_{x\to 0} [\ln(1-\cos x) - \ln(x^2)] =$

c. $\lim_{x\to +\infty} (\ln x)^{1/x} =$