Prince Sultan University
Calculus
MATH 113
Major I
Semester II, Term 072
Saturday, March 22, 2008
Time Allowed: 80 minutes

Student Name: _____

Student ID #: _____ Section #: _____

Teacher's Name: _____

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 4 problems. Make sure your paper has all these problems.

Problems	Max points	Student's Points
1	25	
2	25	
3	25	
4	25	
Total	100	

Question.1

a) (6 pts.) Evaluate the integral: $\int [x^{-3} - 3x^{\frac{1}{4}} + 8x^2]dx.$

b) (7 pts.) Solve the initial value problem: $\frac{dy}{dx} = \sqrt{5x+1}, y(3) = -2.$

c) (7 pts.) Evaluate the integral: $\int_0^1 x^3\sqrt{x^2+3}dx$

Question.2

a) (7 pts.) Evaluate: $\sum_{k=1}^{4} k \sin \frac{k\pi}{2}$.

b) (6 pts.) Write in sigma notation without calculating: $3.1 + 3.2 + 3.3 + \cdots + 3.20$.

c) (7 pts.) Evaluate: $\int_{0}^{\pi/4} \sec^2 x dx$.

Question.3

a) (12 pts.) Find $\int_{3}^{-2} f(x)dx$ if $\int_{-2}^{1} f(x)dx$ and $\int_{1}^{3} f(x)dx$.

b) (13 pts.) Let $F(x)=\int_{0}^{x}\frac{\cos t}{t^2+3t+5}dt$. Find $F(0)$, $F'(0)$ and $F''(0)$.

Question.4

a) (12 pts.) A particle moves with acceleration of $a(t) = t - 2;\ 1 \le t \le 5,\ m/s^2$ along an *s*-axis and has velocity $v_0 = 0, m/s$ at time $t = 0$. Find the distance traveled by the particle during the given time interval.

b) (13 pts.) A particle moves with a velocity of $v(t) = \cos t;\ \frac{\pi}{2} \le t \le 2\pi,\ m/s$ along an *s*-axis. Find the distance traveled by the particle during the given time interval.