PrinceSultanUniversity
Math113, Major Exam 2
Term 182

Time Allowed: 75 minutes

Student Name:_____ _____ _____

Student ID #: _____

Serial Class #:_____ Section #:_____

Instructor'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. Talking during the examination is NOT allowed.
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 6 problems, some with several parts. Make sure your paper has all these problems.

Problems	Max marks	Student's marks
Q#1	8	
Q#2, Q#3	8	
Q#4	12	
Q#5, Q#6, Q#7	12	
Total	40	

Q1) [8 Marks]

a) Write out the form of the partial fraction decomposition of the function

$$f(x) = \frac{x^3 + 4x^2 + x - 1}{x^3 + x^2}$$

b) Evaluate the integral $\int f(x)\, dx$

Q2) [4 Marks] Determine whether the integral $\int_1^{\infty} \frac{dx}{(2x+1)^3}$ is convergent or divergent. Evaluate the integral if it is convergent.

Q3) [4 Marks] Evaluate $\int e^{-x}cos^2(2x)\ dx$

Q#4) [12 Marks] Evaluate the following integral:

a) $\int \tan^5\theta \sec^3\theta \, d\theta$

b) $\int \frac{x^2}{\sqrt{9-25x^2}} \, dx$

c) $\int x \tan^2 x \, dx$

Q5) [4 marks] Find the exact area of the surface obtained by rotating the curve $y = x^3;\ \ 0 \leq x \leq 2$ about the x-axis.

Q6) [4 Marks] Determine whether the sequence $a_n = \frac{\sin(n)}{n^3}$ converges or diverges.

Q7) [4 Marks] Determine whether the sequence $\sum_{n=1}^{\infty} \frac{5n^4}{7n^4+17}$ converges or diverges.