PrinceSultanUniversity

Department of Mathematical Sciences

Fall Term, 2015
November 25, 2015

MATH 113

Second Major

Time Allowed : 90 minutes

Name of the student:_____

ID number : _____

Instructor's names: **Dr. Wasfi Shatanawi, Dr. Nabil Mlaiki**

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 6 problems**, some with several parts and a **total of 5 pages**. Make sure your paper has all these problems.

40	20

Problem 1:(12 points, 4points each). Evaluate the following integrals.

a) $\int xsecxtanx\ dx$

b) $\int \frac{\sqrt{x^2-9}}{x^3}\ dx$

c) $\int \frac{4x}{x^3+x^2+x+1}\ dx$

Problem 2:(4 points). Determine whether the following integral is convergent or divergent. Evaluate the integral if it is convergent.

$$\int_e^{\infty} \frac{1}{x(lnx)^3}\, dx$$

Problem 3:(4points). Find the exact length of the curve

$$y = 1 + 6x^{\frac{3}{2}}, 0 \leq x \leq 1.$$

Problem 4:(4 points). Find the exact area of the surface obtained by rotating the curve $y = \sqrt{1 + 4x}, 1 \leq x \leq 5$ about the x −axis.

Problem 5:(4 points). Determine whether the sequence $a_n = \frac{cos^2 n}{2^n}$. If it converges, find the limit.

<u>Problem 6:</u>(12 points, 6 points each). Determine whether the series is convergent or divergent. If it is convergent, find the limit.

a) $\sum_{n=1}^{\infty} \frac{1+2^n}{3^n}$

b) $\sum_{n=1}^{\infty} \frac{\sqrt{n}+4}{n^2}$