Prince Sultan University

Department of Mathematics and Physical Sciences

Math 113
Second Midterm Exam
Semester II, Term 132
Thursday, May 8, 2014

Time Allowed: 80 minutes

Name:		
Student Number:		
Instructor's Name:	Nabil Mlaiki,	Jehad Alzabut
Section:	222 223	220 221

Statement of Ethics:

I agree to complete this exam without unauthorized assistance from any person, materials, or device.

Signature:

A deal: Calculators are allowed but you have to show the details of your all work.

Total/60:

Total/20:

Problem.1 (5 points) Determine whether the sequence $a_n = \frac{\ln n}{\sqrt{n}}$ is convergent or divergent. If it is convergent find its limit.

Problem.2 (5 points) Use the comparison theorem to determine whether the integral $\int_o^{\pi} \frac{\sin^2 x}{\sqrt{x}} dx$ is convergent or divergent.

Problem.3 (6 points) Write down the form of partial fraction decomposition of the function $\frac{x^2+8x-3}{x^3+3x^2}$. Determine the coefficients and **do not** evaluate the integral.

Problem.4 (8+6 points) Evaluate the integrals:

a) $\int \cos\theta \cos^5(\sin\theta) d\theta$

b) $\int_o^\infty \frac{e^x}{e^{2x}+3} dx$

Problem.5 (9 points) Find the exact area of the surface obtained by rotating the curve $y = \sin \pi x$, $0 \le x \le 1$, about the *x*-axis.

Problem.6 (5+5+6+5 points) Determine whether the series is convergent or divergent:

a) $\sum_{n=1}^{\infty} \frac{(-1)^n e^{1/n}}{n}$

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

c) $\sum_{n=3}^{\infty} \frac{3n-4}{n^2-2n}$

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