Prince Sultan University

Department of Mathematics and Physical Sciences

Math 113
Final Examination
Semester II, Term 132
Saturday, May 24, 2014

Time Allowed: 120 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/80:

Total/40:

Problem A

1. (6 points) Find The derivative of the function $f(x) = \int_{\sqrt{x}}^{x} \frac{e^t}{t} dt$.

2. (7 points) Find the area bounded by the curves $y = x^2$ and $y = 4x - x^2$.

3. (7 points) Find the length of the curve $y = 1 + 6x^{3/2}$, $0 \le x \le 1$.

Problem B: (6+7 points) Evaluate the integrals:

1. $\int_0^1 (x^2+1)e^{-x}\,dx$

2. $\int \frac{x-9}{(x+5)(x-2)}\,dx$

Problem C: (7 points) Find the volume of the solid obtained by rotating the region bounded by the curves $y = e^{-x}$, $y = 1$, $x = 2$ about $y = 2$.

Problem D: (6+6 points) Determine whether the series is absolutely convergent, conditionally convergent or divergent:

1. $\sum_{n=2}^{\infty}\left(\frac{-2n}{n+1}\right)^{5n}$

2. $\sum_{n=1}^{\infty}\frac{10^n}{(n+1)4^{2n+1}}$

Problem E: (10 points) Find the radius of convergence and interval of convergence of the series $\sum_{n=1}^{\infty}\frac{3^n(x+4)^n}{\sqrt{n}}$.

Problem F: (4.5 points each: 18 points) Test the series for convergence or divergence :

1. $\sum_{n=1}^{\infty} \frac{n!}{e^{n^2}}$

2. $\sum_{n=1}^{\infty} \left(\frac{1}{n^3} + \frac{1}{3^n} \right)$

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

4. $\sum_{n=1}^{\infty} (-1)^{n-1} e^{2/n}$