Name:

Student ID #:

Practice Midterm Exam II.

5 problems are given.

Show all the work and Justify your steps.

No notes, books, calculators are allowed.

Problem	Points	Score
1	25	
2	25	
3	25	
4	25	
5	25	
	Total Score:	

Problem 1.

Determine whether the series is absolutely convergent:

a)
$$\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{\sqrt{n^3}}$$

b)
$$\sum_{n=0}^{\infty} \frac{(-5)^n}{n!}$$

c)
$$\sum_{n=1}^{\infty} \frac{(-10)^n}{n^4}$$

Problem 2.

Find the sum of the series:

a)
$$\sum_{n=0}^{\infty}(-1)^n \frac{2^n x^{5n}}{n!}$$

b)
$$\sum_{n=1}^{\infty}(-1)^{n-1}\frac{7^n}{n9^n}$$

c)
$$\sum_{n=0}^{\infty}\frac{(-1)^n \pi^{2n}}{3^{2n}(2n)!}$$

Problem 3

a) Find the Taylor polynomial $T_n(x)$ of degree n for the function $f(x)$ around $x = a$.

b) Use Taylor's Inequality to estimate the accuracy of the approximation $f(x) \approx T_n(x)$ when x lies in the given interval.

1.
$$f(x) = \sqrt{x}, \quad a = 4, \quad n = 2, \quad 4 \le x \le 4.2$$

2.
$$f(x) = x^{2/3}, \quad a = 1, \quad n = 3, \quad 0.8 \le x \le 1.2$$

Problem 4.

a) Find a nonzero vector orthogonal to the plane through the points $P(1, 4, 6), Q(-2, 5, -1)$ and $R(1, -1, 1)$ and find the area of triangle PQR.

b) Use the scalar triple product to determine if the points $A(1, 3, 2)$, $B(3, -1, 6)$, $C(5, 2, 0)$ and $D(3, 6, -4)$ lie in the same plane.

Problem 5.

a) Find parametric and symmetric equations for the line through the points $(2, 4, -1)$ and $(5, -1, 1)$.

b) Find parametric equations for the line segment from $(10, 3, 1)$ to $(5, 6, -3)$.