Math 123 Practice Midterm 3

Name (printed):

Discussion Time:

Please *turn off all electronic devices*. You may use both sides of a 8.5×11 sheet of paper for notes while you take this exam. No calculators, no course notes, no books, no help from your neighbors. **Show all work**—the grading will be based on your work shown as well as the end result. Remember to put your name at the top of this page. Good luck.

Problem	**Score (out of)**
1	(10)
2	(10)
3	(10)
4	(10)
5	(10)
6	(10)
7	(10)
Total	(70)

1. (10 pts) Evaluate the following limit. Carefully justify your answer.

$$lim_{n\to\infty}\frac{sin(n)ln(n)}{n}$$

2. (10 pts) Evaluate the following series

$$\Sigma_{n=0}^{\infty} \frac{3^{n-1} + 4^{n+1} + 1}{5^n}$$

3. (10 pts) Find all values of k for which the following series converges. Carefully justify your answer.

$$\Sigma_{n=1}^{\infty} \frac{n+1}{kn^3+n^2+n+1}$$

4. (10 pts) Determine if the following series converges or diverges. Carefully justify your answer.

$$\Sigma_{n=1}^{\infty}(1+\frac{1}{n})^{\frac{1}{100}n^2}$$

5. Show that the following series converges conditionally. Carefully justify your answer.

$$\Sigma_{n=1}^{\infty} \frac{(-1)^n ln(n)}{n}$$

6. (10 pts) Find the interval of convergence for the following power series.

$$\Sigma_{n=1}^{\infty} \frac{(n!)^2 x^n}{(2n)!}$$