

MAT 127 Midterm 1.
February 22, 2012 8:30pm-10:00pm

Name: _____

ID: _____

DO NOT OPEN THIS EXAM YET

- (1) Fill in your name and Stony Brook ID number.
 - (2) This exam is closed-book and closed-notes; no calculators, no phones.
 - (3) Please write legibly to receive credit. Circle or box your final answers.
If your solution to a problem does not fit on the page on which the problem is stated, please indicate on that page where in the exam to find (the rest of) your solution.
 - (4) You may continue your solutions on additional sheets of paper provided by the proctor. If you do so, please write your name and ID number at the top of each of them and staple them to the back of the exam (stapler available); otherwise, these sheets may get lost.
 - (5) Anything handed in will be graded; incorrect statements will be penalized even if they are in addition to complete and correct solutions. If you do not want something graded, please erase it or cross it out.
 - (6) Show your work; correct answers only will receive only partial credit (unless noted otherwise).
 - (7) Be careful to avoid making grievous errors that are subject to heavy penalties.
 - (8) If you need more blank paper, ask a proctor.
- Out of fairness to others, please stop working and close the exam as soon as the time is called. A significant number of points will be taken off your exam score if you continue working after the time is called. You will be given a two-minute warning before the end.

1	2	3	4	5	
6	7	8	9	10	Total

Find the limit of the following sequences and justify your answer:

1. (10 points)

$$\lim_{n \rightarrow \infty} (-1)^n \frac{9n^4 + 11n + 12}{7n^5 + 3n^4 - 2n^2 + 1}.$$

2. (10 points)

$$\lim_{n \rightarrow \infty} \frac{\ln n}{\sqrt[3]{n}}.$$

Test the following series for convergence and justify your answer:

3. (10 points)

$$\sum_{n=1}^{\infty} (-1)^n \frac{7^n}{4^n}.$$

4. (10 points)

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

5. (10 points)

$$\sum_{n=1}^{\infty} \frac{\cos^3 n}{n\sqrt{n}}$$

6. (10 points)

$$\sum_{n=1}^{\infty} n! \cdot 3^{-2n}$$

7. (10 points)

$$\sum_{n=1}^{\infty} \frac{n^2}{7^n}$$

8. (10 points)

$$\sum_{n=2}^{\infty} \frac{(-1)^n}{\ln n + 2}$$

9. (10 points)

$$\sum_{n=1}^{\infty} \left(\frac{1}{5n} - \frac{1}{5n+3} \right).$$

10.(10 points) How many terms of the series

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

should one use to estimate the sum with the error less than $1/10000$?