

Math 102 Fall 2008 Exam 2

Instructor: S. Cautis

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Instructions: This is a closed book, closed notes exam. Use of calculators is not permitted. You have **fifty minutes**. Do all 5 problems. Please do all your work on the paper provided. You must show your work to receive full credit on a problem. An answer with no supporting work or explanation will receive little to no credit.

Please print your name clearly here.

Print name: _____

Upon finishing please sign the pledge below:

On my honor I have neither given nor received any aid on this exam.

Grader's use only:

1. _____ /10

2. _____ /10

3. _____ /10

4. _____ /10

5. _____ /10

1. [10 points]

Determine whether the following sequences converge or diverge. If they converge find the limit.

a) $a_n = \sqrt[3]{\frac{n^2+1}{3n^2+n+7}}$

b) $a_n = \frac{\cos n}{\sqrt{n}}$

c) $a_n = \frac{n}{\ln n}$

2. [10 points]

Determine whether the following series converge or diverge. If they converge find the sum.

a) $\sum_{n=0}^{\infty} \frac{1+2^n}{5^n}$

b) $\sum_{n=0}^{\infty} \sqrt[n]{3}$

3. [10 points]

Determine if the following series converges or diverges

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

Make sure to give sufficient explanation to justify your answer.

4. [10 points]

How many terms do you need to add up in the series

$$\sum_{n=1}^{\infty} \frac{1}{n^2 + \sqrt[3]{n}}$$

so that the error is at most 10^{-3} ? Make sure you justify your answer clearly.

5. [10 points]

(a) What is the power series of $\frac{1}{1+x}$ and what is its **radius** of convergence?

(b) What is the power series of $\ln(1+x)$?

(c) What is the power series of $\ln(2+x^2)$ and what is its **radius** of convergence?