

PHILADELPHIA UNIVERSITY
DEPARTMENT OF BASIC SCIENCES

Exam 1

Mathematics for Computing

02–11–2011

Choose four problems.

1. Evaluate the geometric series, if convergent.

$$\sum_{n=2}^{\infty} \frac{4}{3^n} - \frac{7}{5^{n-1}}$$

2. Determine convergent conditionally, convergent absolutely, or divergent.

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

3. Find the interval of convergence for the given power series.

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

4. Use the Taylor series formula $f(x) = \sum \frac{f^{(n)}(0)}{n!} x^n$ to find the Taylor series representation for

$$f(x) = \frac{1}{(1-x)^2}$$

Do not find the interval of convergence.

5. Use the Taylor series representation $\cos x = \sum (-1)^n \frac{x^{2n}}{(2n)!}$ to approximate the value of the following definite integral using three terms.

$$\int_0^1 \frac{1 - \cos x}{x^2}$$