

Second Midterm Exam
Math 102 – Section 001 – Chesebro
Spring 2008

Instructions: This is a 50 minute exam. You may not consult any notes or books during the exam, and no calculators are allowed. Show all of your work on each problem. Attach extra paper if you need more space.

Name:

Honor Pledge: On my honor, I have neither received nor given any unauthorized aid on this exam.

Signature:

Problem	Score
1	
2	
3	
4	
5	
6	
7	
Total	

1. **Problem 1 (5 pts)**

What does it mean for the infinite series $\sum_{n=1}^{\infty} a_n$ to converge to a number L ?

2. **Problem 2 (10 pts)**

Find the interval of convergence for the power series $\sum_{n=1}^{\infty} \frac{(-1)^n (3x)^n}{n^2}$.

3. Problem 3 (20 pts)

Determine whether the following infinite series converge or diverge.

(a)
$$\sum_{n=2}^{\infty} \frac{1}{n\sqrt{\ln n}}.$$

(b)
$$\sum_{n=1}^{\infty} \frac{\ln n}{n^3}.$$

4. **Problem 4 (10 pts)**

Does the series $\sum_{n=1}^{\infty} -3 \frac{2^{n+2}}{5^n}$ converge or diverge? If it converges, find its sum.

5. **Problem 5 (10 points)**

Consider the series $\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{2n+3}}$.

(a) Does the series converge?

(b) Does the series converge absolutely?

6. Problem 6 (10 points)

Find the Taylor polynomial of degree 3 for $f(x) = \ln(1 + x)$ at $a = 0$.

7. Problem 7 (5 points)

Use the Taylor series for e^x to find a power series representation of xe^{-x^2} .