

CALCULUS II HOMEWORK

Infinite Series

Name: _____

Date: _____

Directions: Show enough work to support each conclusion. Do not use a calculator unless instructed.

1. The nth-Term Test — Five Problems

1. Use the nth-term test to determine whether the series diverges.

$$\sum \text{from } n = 1 \text{ to } \infty (7n - 4)/(2n + 5)$$

2. Use the nth-term test to determine whether the series diverges.

$$\sum \text{from } n = 1 \text{ to } \infty (5n^2 + 1)/(n^2 - 3)$$

3. Find the limit of the nth term. State exactly what the nth-term test allows you to conclude.

$$\sum \text{from } n = 1 \text{ to } \infty 4/(\sqrt{n} + 2)$$

4. Use the nth-term test to determine whether the series diverges.

$$\sum \text{from } n = 1 \text{ to } \infty (-1)^n(n + 1)/n$$

5. Find the limit of the nth term. Then use another rule already learned to classify the series.

$$\sum \text{from } n = 1 \text{ to } \infty 3/2^n$$

2. Geometric Series

6. Identify a and r . Determine whether the series converges. If it does, find its infinite sum.

$$20 + 10 + 5 + 5/2 + \cdots$$

7. Identify a and r . Determine whether the series converges. If it does, find its infinite sum.

$$-12 + 4 - 4/3 + 4/9 - \cdots$$

3. Geometric Series in Sigma Notation

8. Determine whether the series converges. If it does, find its sum.

$$\sum \text{from } n = 1 \text{ to } \infty 7(2/5)^{n-1}$$

9. Determine whether the series converges. If it does, find its sum.

$$\sum \text{from } n = 1 \text{ to } \infty 9(-2/3)^{n-1}$$

4. Improper Integrals

10. Rewrite the improper integral as a limit. Evaluate it and classify it as convergent or divergent.

$$\int \text{from } 3 \text{ to } \infty 1/x^2 dx$$

11. Rewrite the improper integral as a limit. Evaluate it and classify it as convergent or divergent.

$$\int \text{from } 4 \text{ to } \infty 1/\sqrt{x} dx$$

5. p-Series

12. Use the p-series rule to classify the series. Identify p.

$$\sum \text{from } n = 1 \text{ to } \infty \ 1/n^{(7/3)}$$

13. Use the p-series rule to classify the series. Identify p.

$$\sum \text{from } n = 1 \text{ to } \infty \ 1/n^{(3/4)}$$
