M251 Practice Exam for 8.8-9.6

For every problem that states "determine the convergence or divergence of the series" also ***justify your answer by identifying the theorem or test and showing how the condition or conditions were satisfied***.

1. Write the first five terms of the sequence.

$$a_n = \left(-\frac{4}{5}\right)^n$$

2. Write the first five terms of the sequence.

$$a_n = (-1)^{n+4}\left(\frac{17}{n}\right)$$

3. Write the first five terms of the sequence.

$$a_n = 5 - \frac{3}{n} - \frac{7}{n^2}$$

4. Determine the convergence or divergence of the sequence with the given *n*th term. If the sequence converges, find its limit.

$$a_n = \frac{\ln\left(n^{10}\right)}{6n}$$

5. Determine the convergence or divergence of the sequence with the given *n*th term. If the sequence converges, find its limit.

$$a_n = \frac{\ln\left(\sqrt[9]{n}\right)}{8n}$$

6. Determine the convergence or divergence of the sequence with the given *n*th term. If the sequence converges, find its limit.

$$a_n = \frac{2^n}{5^n}$$

7. Write the first five terms of the sequence of partial sums.

$$5 + \frac{5}{4} + \frac{5}{9} + \frac{5}{16} + \frac{5}{25} + \cdots$$

8. Write the first five terms of the sequence of partial sums.

$$-5 + \frac{25}{6} - \frac{125}{36} + \frac{625}{216} - \frac{3125}{1296} + \cdots$$

9. Write the first five terms of the sequence of partial sums.

$$\sum_{n=1}^{\infty} \frac{5}{(4)^{n-1}}$$

10. Find the sum of the convergent series.

$$\sum_{n=1}^{\infty} \frac{6}{(n+4)(n+6)}$$

11. Find the sum of the convergent series.

$$\sum_{n=1}^{\infty} (-1)^n \frac{4}{(n+9)(n+11)}$$

12. Find the sum of the convergent series.

$$\sum_{n=0}^{\infty} 9\left(\frac{10}{11}\right)^n$$

13. Find the sum of the convergent series.

$$\sum_{n=0}^{\infty} 2\left(-\frac{9}{10}\right)^n$$

14. Determine the convergence or divergence of the series.

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

15. Determine the convergence or divergence of the series.

$$\sum_{n=0}^{\infty} \frac{2}{2^n}$$

16. Find all values of x for which the series converges. For these values of x, write the sum of the series as a function of x.

$$\sum_{n=0}^{\infty} \frac{x^n}{9^n}$$

17. Find all values of x for which the series converges. For these values of x, write the sum of the series as a function of x.

$$\sum_{n=0}^{\infty} 10\left(\frac{x-4}{10}\right)^n$$

18. Use the Integral Test to determine the convergence or divergence of the series. Show your work.

$$\sum_{n=1}^{\infty} \frac{7}{10n+2}$$

19. Use the Integral Test to determine the convergence or divergence of the series. Show your work.

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

20. Use the Integral Test to determine the convergence or divergence of the series. Show your work.

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

21. Use the Integral Test to determine the convergence or divergence of the series. Show your work.

$$\sum_{n=2}^{\infty} \frac{4}{n\sqrt{\ln n}}$$

22. Use the p-series theorem to determine the convergence or divergence of the series.

$$\sum_{n=1}^{\infty} \frac{8}{n^{\frac{10}{7}}}$$

23. Use the p-series theorem to determine the convergence or divergence of the series.

$$1+\frac{1}{\sqrt[3]{2^2}}+\frac{1}{\sqrt[3]{3^2}}+\frac{1}{\sqrt[3]{4^2}}+\frac{1}{\sqrt[3]{5^2}}+\cdots$$

24. Use the p-series theorem to determine the convergence or divergence of the series.

$$\sum_{n=1}^{\infty} \frac{1}{n^{0.78}}$$

25. Determine the convergence or divergence of the series.

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

26. Determine the convergence or divergence of the series.

$$\sum_{n=1}^{\infty} \frac{7}{n \cdot \sqrt[8]{n}}$$

27. Determine the convergence or divergence of the series.

$$3 \cdot \sum_{n=1}^{\infty} \frac{1}{n^{0.95}}$$

28. Determine the convergence or divergence of the series.

$$\sum_{n=0}^{\infty}\left(\frac{5}{3}\right)^n$$

29. Use the Ratio Test to determine the convergence or divergence of the series.

$$\sum_{n=1}^{\infty} n\left(\frac{3}{4}\right)^n$$

30. Use the Ratio Test to determine the convergence or divergence of the series.

$$\sum_{n=1}^{\infty}\frac{n^9}{4^{-n}}$$

31. Use the Ratio Test to determine the convergence or divergence of the series.

$$\sum_{n=1}^{\infty}\frac{(-1)^{n-1}\left(\frac{10}{8}\right)^n}{n^2}$$

32. Use the Root Test to determine the convergence or divergence of the series.

$$\sum_{n=1}^{\infty}\left(\frac{8n}{8n+1}\right)^n$$

33. Use the Root Test to determine the convergence or divergence of the series.

$$\sum_{n=1}^{\infty}\left(\frac{4n+1}{8n-1}\right)^n$$

34. Use the Root Test to determine the convergence or divergence of the series.

$$\sum_{n=1}^{\infty}\left(\frac{7n^2+1}{4n^2-1}\right)^n$$

35. Determine the convergence or divergence of the series using any appropriate test from this chapter. Identify the test used.

$$\sum_{n=1}^{\infty}\frac{(-1)^n 8}{3n}$$

36. Determine the convergence or divergence of the series using any appropriate test from this chapter. Identify the test used.

$$\sum_{n=1}^{\infty}\frac{6}{n^2}$$

37. Determine the convergence or divergence of the series using any appropriate test from this chapter. Identify the test used.

$$\sum_{n=1}^{\infty} \frac{5}{n^{-8}}$$

38. Determine the convergence or divergence of the series using any appropriate test from this chapter. Identify the test used.

$$\sum_{n=1}^{\infty} \frac{8n}{n+2}$$