

MA241 Practice on Series – Support your answer

1. Geometric Series – Converge or Diverge? If Converges, find the sum.

a.)  $3 + \frac{3}{4} + \dots + \frac{3}{4^{n-1}} + \dots$       b.)  $\sum_{n=1}^{\infty} 2^{-n} 3^{n-1}$

2. Nth Term Test - Test for Divergence – If inconclusive, use another test.

a.)  $\sum_{n=1}^{\infty} \frac{3n}{5n-1}$       b.)  $\sum_{n=1}^{\infty} \frac{1}{n^2+3}$

3. Telescoping – Converge or Diverge? If Converges, find the sum.

a.)  $\sum_{n=1}^{\infty} \frac{5}{(n+2)(n+3)}$

4. P-Series – Convergent or Divergent?

a.)  $\sum_{n=1}^{\infty} \frac{1}{n^6}$       b.)  $\sum_{n=1}^{\infty} \frac{1}{\sqrt[3]{n^2}}$

5. Integral Test – Converge or Diverge?

a.)  $\sum_{n=1}^{\infty} \frac{1}{(3+2n)^2}$       b.)  $\sum_{n=1}^{\infty} \frac{1}{4n+7}$

6. Comparison Test – Converge or Diverge?

a.)  $\sum_{n=1}^{\infty} \frac{1}{n^4 + n^2 + 1}$       b.)  $\sum_{n=1}^{\infty} \frac{1}{n3^n}$

7. Limit Comparison – Converge or Diverge?

a.)  $\sum_{n=1}^{\infty} \frac{\sqrt{n}}{n+4}$       b.)  $\sum_{n=1}^{\infty} \frac{1}{\sqrt{4n^3 - 5n}}$

8. Alternating Series – Absolute Convergent, Convergent, or Divergent?

a.)  $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{2n-1}$       b.)  $\sum_{n=1}^{\infty} \frac{(-1)^n n^2}{n^2+1}$

9. Ratio Test – Absolute Convergent, Convergent, Divergent?

a.)  $\sum_{n=1}^{\infty} \frac{n!}{3^n}$       b.)  $\sum_{n=1}^{\infty} \frac{2^n}{n^2}$

# KEY

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a.)  $3 + \frac{3}{4} + \dots + \frac{3}{4^{n-1}} + \dots$

Con

b.)  $\sum_{n=1}^{\infty} 2^{-n} 3^{n-1}$

Di

2. Nth-Term Test - Test for Divergence - If inconclusive, use another test.

a.)  $\sum_{n=1}^{\infty} \frac{3n}{5n-1}$

Di

b.)  $\sum_{n=1}^{\infty} \frac{1}{n^2+3}$

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3. Telescoping - Converge or Diverge? If Converges, find the sum.

a.)  $\sum_{n=1}^{\infty} \frac{5}{(n+2)(n+3)}$

Con

$S = 5/3$

4. P-Series - Convergent or Divergent?

a.)  $\sum_{n=1}^{\infty} \frac{1}{n^6}$

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

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5. Integral Test - Converge or Diverge?

a.)  $\sum_{n=1}^{\infty} \frac{1}{(3+2n)^2}$

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b.)  $\sum_{n=1}^{\infty} \frac{1}{4n+7}$

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a.)  $\sum_{n=1}^{\infty} \frac{1}{n^4 + n^2 + 1}$

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b.)  $\sum_{n=1}^{\infty} \frac{1}{n3^n}$

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7. Limit Comparison - Converge or Diverge?

a.)  $\sum_{n=1}^{\infty} \frac{\sqrt{n}}{n+4}$

Di

b.)  $\sum_{n=1}^{\infty} \frac{1}{\sqrt{4n^3 - 5n}}$

Con

8. Alternating Series - Absolute Convergent, Convergent, or Divergent?

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

Conditionally Con

b.)  $\sum_{n=1}^{\infty} \frac{(-1)^n n^2}{n^2+1}$

Di

9. Ratio Test - Absolute Convergent, Convergent, Divergent?

a.)  $\sum_{n=1}^{\infty} \frac{n!}{3^n}$

Di

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Di