

MathQuest: Series

Convergence Tests

1. The sum of the series

$$\frac{15}{2} + \frac{45}{8} + \frac{135}{32} + \frac{405}{128} + \frac{1215}{512} + \cdots$$

- (a) Exists
- (b) Does not exist

2. The series $\sum_{n=1}^{\infty} \frac{n}{10}$

- (a) Converges
- (b) Diverges

3. If $a_n \rightarrow 0$ as $n \rightarrow \infty$, then $\sum_{n=1}^{\infty} a_n$ converges.

- (a) Always true
- (b) Not always true

4. If a_n is a convergent sequence, then $\sum_{n=1}^{\infty} a_n$ is a convergent series.

- (a) True
- (b) False

5. The series $\sum_{n=1}^{\infty} \frac{1}{n^{1/2}}$

- (a) Converges
- (b) Diverges

6. For what values of p does the series $\sum_{n=1}^{\infty} 1/n^p$ converge?

- (a) This series converges for all values of p .
- (b) This series converges only if $p > 2$.
- (c) This series converges only if $p > 1$.
- (d) This series converges only if $p > 0$.
- (e) This series does not converge for any values of p .

7. The series $\sum_{n=1}^{\infty} \left(\frac{10}{n^5} + \frac{(-3)^n}{4^n} \right)$

- (a) Converges
- (b) Diverges

8. The series $\sum_{n=1}^{\infty} \left(\frac{1}{2^n} + \frac{1}{n} \right)$

- (a) Converges
- (b) Diverges

9. The series $\sum_{n=1}^{\infty} \frac{1}{n(1 + \ln n)}$

- (a) Converges
- (b) Diverges

10. The series $\sum_{n=1}^{\infty} \left(\frac{1}{2^n} + \frac{1}{n} \right)$

- (a) Converges
- (b) Diverges

11. Does the series $\sum_{n=1}^{\infty} \frac{100}{n^2+2}$ converge?

- (a) Yes, this series converges.
- (b) No, this series does not converge.
- (c) It is impossible to tell.

12. If $a_n > b_n$ for all n and $\sum b_n$ converges, then

- (a) $\sum a_n$ converges
- (b) $\sum a_n$ diverges
- (c) Not enough information to determine convergence or divergence of $\sum a_n$

13. The best way to test the series $\sum_{n=1}^{\infty} \frac{\ln n}{n}$ for convergence or divergence is

- (a) Looking at the sequence of partial sums
- (b) Using rules for geometric series
- (c) The Integral Test
- (d) Using rules for p -series
- (e) The Comparison Test
- (f) The Limit Comparison Test

14. Does the series $\sum_{n=1}^{\infty} \frac{\ln(n)}{n}$ converge?

- (a) This series converges.
- (b) This series diverges.
- (c) It is impossible to tell.

15. The series $\sum_{n=1}^{\infty} \frac{\cos^2 n}{n^2 + 1}$

- (a) Converges
- (b) Diverges

16. The series $\sum_{n=1}^{\infty} (n^{-1.4} + 3n^{-1.2})$

- (a) Converges
- (b) Diverges

17. The series $\sum_{n=1}^{\infty} \frac{1}{ne^n}$

- (a) Converges
- (b) Diverges

18. The series $\sum_{n=1}^{\infty} \frac{(n-1)!}{5^n}$
- (a) Converges
 - (b) Diverges
19. Does the series $\sum_{n=1}^{\infty} \frac{n^3}{3^n}$ converge?
- (a) This series converges.
 - (b) This series diverges.
 - (c) It is impossible to tell.
20. Does the series $\sum_{n=1}^{\infty} \frac{n!}{(2n)!}$ converge?
- (a) This series converges.
 - (b) This series diverges.
 - (c) It is impossible to tell.
21. Does the series $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$ converge?
- (a) This series converges.
 - (b) This series diverges.
 - (c) It is impossible to tell.