



Chapter 12A Review Sheet #2

Test each series for convergence or divergence. Identify the test used and show all your work.

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

9.
$$\sum_{n=0}^{\infty} \frac{n!}{2 \cdot 5 \cdot 8 \cdot \dots \cdot (3n + 2)}$$

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

10.
$$\sum_{i=1}^{\infty} \frac{1}{\sqrt{i(i+1)}}$$

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

11.
$$\sum_{n=1}^{\infty} (-1)^n 2^{1/n}$$

4.
$$\sum_{k=1}^{\infty} k^{-1.7}$$

12.
$$\sum_{k=1}^{\infty} (-1)^k \frac{\ln k}{\sqrt{k}}$$

5.
$$\sum_{n=1}^{\infty} \frac{n}{e^n}$$

13.
$$\sum_{n=1}^{\infty} \frac{(-2)^{2n}}{n^n}$$

6.
$$\sum_{n=2}^{\infty} \frac{2}{n(\ln n)^3}$$

14.
$$\sum_{j=1}^{\infty} \frac{2^j}{(2j+1)!}$$

7.
$$\sum_{n=1}^{\infty} \frac{3^n n^2}{n!}$$

15.
$$\sum_{n=1}^{\infty} (\sqrt[n]{2} - 1)^n$$

8.
$$\sum_{j=1}^{\infty} \frac{3^j}{5^j + j}$$

16.
$$\sum_{n=1}^{\infty} \sin n$$





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- Diverges by n th term test.
- Converges by either direct or limit comparison with $\sum_{n=1}^{\infty} \frac{1}{n^2}$
- Converges by alternating series or ratio test or rewriting as geometric series.
- Converges: p -series.
- Converges by ratio test or root test.
- Converges by integral test.
- Converges by ratio test.
- Converges by direct comparison with $\sum_{n=1}^{\infty} \left(\frac{3}{5}\right)^n$
- Converges by ratio test.
- Diverges by limit comparison with harmonic series.
- Diverges by n th term test.
- Converges: alternating series.
- Converges by root test.
- Converges by ratio test.
- Converges by root test.
- Diverges by n th term test.