

11.7 EXERCISES

I-38 Test the series for convergence or divergence.

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|-----------------------------|--|--------------------------------------|---|--------------------------------------|--|--------------------------------------|---|
| C, comp 1/3 ⁿ | 1. $\sum_{n=1}^{\infty} \frac{1}{n+3^n}$ | C, ratio* but easier with root | 2. $\sum_{n=1}^{\infty} \frac{(2n+1)^n}{n^{2n}}$ | C, AST or ratio | 21. $\sum_{n=1}^{\infty} \frac{(-2)^{2n}}{n^n}$ | C, LCT, 1/n ² | 22. $\sum_{n=1}^{\infty} \frac{\sqrt{n^2-1}}{n^3+2n^2+5}$ |
| D, div test | 3. $\sum_{n=1}^{\infty} (-1)^n \frac{n}{n+2}$ | C, AST | 4. $\sum_{n=1}^{\infty} (-1)^n \frac{n}{n^2+2}$ | D, LCT, 1/n | 23. $\sum_{n=1}^{\infty} \tan(1/n)$ | D, div test | 24. $\sum_{n=1}^{\infty} n \sin(1/n)$ |
| C, ratio | 5. $\sum_{n=1}^{\infty} \frac{n^2 2^{n-1}}{(-5)^n}$ | D, LCT, 1/n | 6. $\sum_{n=1}^{\infty} \frac{1}{2n+1}$ | C, ratio | 25. $\sum_{n=1}^{\infty} \frac{n!}{e^{n^2}}$ | C, ratio | 26. $\sum_{n=1}^{\infty} \frac{n^2+1}{5^n}$ |
| D, int test | 7. $\sum_{n=2}^{\infty} \frac{1}{n\sqrt{\ln n}}$ | D, ratio | 8. $\sum_{k=1}^{\infty} \frac{2^k k!}{(k+2)!}$ | C, ELCT, 1/k ^{3/2} * | 27. $\sum_{k=1}^{\infty} \frac{k \ln k}{(k+1)^3}$ | C, int test | 28. $\sum_{n=1}^{\infty} \frac{e^{1/n}}{n^2}$ |
| C, ratio | 9. $\sum_{k=1}^{\infty} k^2 e^{-k}$ | C, int test | 10. $\sum_{n=1}^{\infty} n^2 e^{-n^3}$ | C, AST* | 29. $\sum_{n=1}^{\infty} \frac{(-1)^n}{\cosh n}$ | C, AST | 30. $\sum_{j=1}^{\infty} (-1)^j \frac{\sqrt{j}}{j+5}$ |
| C, AST | 11. $\sum_{n=2}^{\infty} \frac{(-1)^{n+1}}{n \ln n}$ | D, div test | 12. $\sum_{n=1}^{\infty} \sin n$ | D, div test | 31. $\sum_{k=1}^{\infty} \frac{5^k}{3^k+4^k}$ | D, ratio* but easier with root | 32. $\sum_{n=1}^{\infty} \frac{(n!)^n}{n^{4n}}$ |
| C, ratio | 13. $\sum_{n=1}^{\infty} \frac{3^n n^2}{n!}$ | C, abs conv, comp test | 14. $\sum_{n=1}^{\infty} \frac{\sin 2n}{1+2^n}$ | C, LCT, 1/n ^{3/2} | 33. $\sum_{n=1}^{\infty} \frac{\sin(1/n)}{\sqrt{n}}$ | D, comp 1/(2n) | 34. $\sum_{n=1}^{\infty} \frac{1}{n+n \cos^2 n}$ |
| C, ratio | 15. $\sum_{n=0}^{\infty} \frac{n!}{2 \cdot 5 \cdot 8 \cdots (3n+2)}$ | D, LCT, 1/n | 16. $\sum_{n=1}^{\infty} \frac{n^2+1}{n^3+1}$ | C, ratio* but easier with root | 35. $\sum_{n=1}^{\infty} \left(\frac{n}{n+1} \right)^{n^2}$ | C, comp* 1/n ² | 36. $\sum_{n=2}^{\infty} \frac{1}{(\ln n)^{\ln n}}$ |
| D, div test | 17. $\sum_{n=1}^{\infty} (-1)^n 2^{1/n}$ | C, AST | 18. $\sum_{n=2}^{\infty} \frac{(-1)^{n-1}}{\sqrt{n}-1}$ | C, ratio* but easier with root | 37. $\sum_{n=1}^{\infty} (\sqrt[3]{2}-1)^n$ | D, LCT*, 1/n | 38. $\sum_{n=1}^{\infty} (\sqrt[3]{2}-1)^n$ |
| C, AST | 19. $\sum_{n=1}^{\infty} (-1)^n \frac{\ln n}{\sqrt{n}}$ | C, ratio | 20. $\sum_{k=1}^{\infty} \frac{k+5}{5^k}$ | | | | |