

11.7 Exercises

1–38 Test the series for convergence or divergence.

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

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

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

$$7. \sum_{n=2}^{\infty} \frac{1}{n\sqrt{\ln n}}$$

$$9. \sum_{k=1}^{\infty} k^2 e^{-k}$$

$$19. \sum_{n=1}^{\infty} (-1)^n \frac{\ln n}{\sqrt{n}}$$

$$21. \sum_{n=1}^{\infty} (-1)^n \cos(1/n^2)$$

$$23. \sum_{n=1}^{\infty} \tan(1/n)$$

$$25. \sum_{n=1}^{\infty} \frac{n!}{e^{n^2}}$$

$$27. \sum_{k=1}^{\infty} \frac{k \ln k}{(k+1)^3}$$

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

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

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

$$8. \sum_{k=1}^{\infty} \frac{2^k k!}{(k+2)!}$$

$$10. \sum_{n=1}^{\infty} n^2 e^{-n^2}$$

$$20. \sum_{k=1}^{\infty} \frac{\sqrt[3]{k}-1}{k(\sqrt{k}+1)}$$

$$22. \sum_{k=1}^{\infty} \frac{1}{2+\sin k}$$

$$24. \sum_{n=1}^{\infty} n \sin(1/n)$$

$$26. \sum_{n=1}^{\infty} \frac{n^2+1}{5^n}$$

$$28. \sum_{n=1}^{\infty} \frac{e^{1/n}}{n^2}$$

$$11. \sum_{n=1}^{\infty} \left(\frac{1}{n^3} + \frac{1}{3^n} \right)$$

$$13. \sum_{n=1}^{\infty} \frac{3^n n^2}{n!}$$

$$15. \sum_{k=1}^{\infty} \frac{2^{k-1} 3^{k+1}}{k^k}$$

$$17. \sum_{n=1}^{\infty} \frac{1 \cdot 3 \cdot 5 \cdots (2n-1)}{2 \cdot 5 \cdot 8 \cdots (3n-1)}$$

$$18. \sum_{n=2}^{\infty} \frac{(-1)^{n-1}}{\sqrt{n}-1}$$

$$29. \sum_{n=1}^{\infty} \frac{(-1)^n}{\cosh n}$$

$$31. \sum_{k=1}^{\infty} \frac{5^k}{3^k + 4^k}$$

$$33. \sum_{n=1}^{\infty} \left(\frac{n}{n+1} \right)^{n^2}$$

$$35. \sum_{n=1}^{\infty} \frac{1}{n^{1+1/n}}$$

$$37. \sum_{n=1}^{\infty} (\sqrt[4]{2}-1)^n$$

$$12. \sum_{k=1}^{\infty} \frac{1}{k\sqrt{k^2+1}}$$

$$14. \sum_{n=1}^{\infty} \frac{\sin 2n}{1+2^n}$$

$$16. \sum_{n=1}^{\infty} \frac{n^2+1}{n^3+1}$$

$$30. \sum_{j=1}^{\infty} (-1)^j \frac{\sqrt{j}}{j+5}$$

$$32. \sum_{n=1}^{\infty} \frac{(n!)^n}{n^{4n}}$$

$$34. \sum_{n=1}^{\infty} \frac{1}{n+n\cos^2 n}$$

$$36. \sum_{n=2}^{\infty} \frac{1}{(\ln n)^{\ln n}}$$

$$38. \sum_{n=1}^{\infty} (\sqrt[3]{2}-1)$$