Determine whether the series is:

- absolutely convergent,
- conditionally convergent, or
- divergent

for 1 - 37 odd (omit 29).

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

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

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

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

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

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

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

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

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

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

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

20. $\sum_{k=1}^{\infty} \frac{k+5}{5^k}$

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

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

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

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

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

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

33. $\sum_{n=1}^{\infty} \frac{\sin(1/n)}{\sqrt{n}}$

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

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

22. $\sum_{n=1}^{\infty} \frac{\sqrt{n^2-1}}{n^3 + 2n^2 + 5}$

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

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

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

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

Source: Stewart, ET, 6th ed. §11.7, Strategy For Testing Series.