

For #1 - 24, determine whether each series converges or diverges.

1. $\sum \frac{1}{2k+4}$

2. $\sum \frac{\ln k}{k}$

3. $\sum \frac{1}{k^2-1}$

4. $\sum \left(\frac{3}{2}\right)^{-k}$

5. $\sum \frac{\ln k}{k^3}$

6. $\sum \frac{1}{k(k+1)(k+2)}$

7. $\sum \frac{(-1)^k}{\sqrt{k}}$

8. $\sum \frac{1}{\sqrt{k}}$

9. $\sum \frac{1}{k^{3/2}}$

10. $\sum \frac{(-1)^k}{1+2 \ln k}$

11. $\sum \frac{3k-1}{2k^5+3k+7}$

12. $\sum \frac{k^{3/2}}{k^{5/2}+k^2+1}$

13. $\sum \frac{2k+1}{\sqrt{k^3+2}}$

14. $\sum \frac{2+\cos k}{k^2-1}$

15. $\sum \frac{k}{2^k}$

16. $\sum k^2 2^{-k}$

17. $\sum \left(-\frac{3}{4}\right)^{k-1}$

18. $\sum \frac{3^k}{k!}$

19. $\sum \frac{k!}{k^k}$

20. $\sum \left(\frac{k}{2k+1}\right)^k$

21. $\sum \frac{(\ln k)^2}{k}$

22. $\sum \frac{2k+\sqrt{k}}{k^3+\sqrt{k}}$

23. $\sum \frac{k^2}{e^k}$

24. $\sum \frac{1}{k^3+1}$

(25-28) Determine if the following series converge absolutely, converge conditionally or diverge.

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

26. $\sum_{n=1}^{\infty} \frac{\cos \pi n}{n^2}$

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

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

29. Find a power series centered at 0 for the

$$\text{function } f(x) = \frac{1}{3x-2}$$

30. Find the interval of convergence for the power

$$\text{series: } \sum_{n=0}^{\infty} \frac{1}{3^n} (x-1)^n$$

31. Find the radius of convergence for the power

$$\text{series } \sum_{n=1}^{\infty} \frac{(2x)^n}{n}$$

32. Find the radius of convergence for the power

$$\text{series } \sum_{n=0}^{\infty} \left(\frac{x}{2}\right)^n$$

33. Find the interval of convergence for the power

$$\text{series: } \sum_{n=0}^{\infty} \frac{1}{3^n} (x-1)^n$$

34. Find the interval of convergence for the power

$$\text{series: } \sum_{n=1}^{\infty} \frac{(-1)^n}{n} (x-3)^{n-1}$$