



SERIES

**Problem 1.** The series  $3 - 4 + \frac{16}{3} - \frac{64}{9} + \cdots$  is geometric. Determine whether it converges or diverges. If it converges, what is its sum?

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**Problem 2.** The series  $\sum_{k=1}^{\infty} \frac{(-3)^{k-1}}{4^k}$  is geometric. Determine whether it converges or diverges. If it converges, what is its sum?

**Problem 3.** Determine whether the series  $\sum_{k=1}^{\infty} \frac{2+k}{1-2^k}$  converges or diverges. If it converges, find its sum.

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**Problem 4.** Determine whether the series  $\sum_{k=1}^{\infty} \frac{1}{4+2^{-k}}$  converges or diverges. If it converges, find its sum.

**Problem 5.** Determine whether the series  $\sum_{k=1}^{\infty} \frac{2}{k^2-1}$  converges or diverges. If it converges, find its sum.

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**Problem 6.** Determine whether the series  $\sum_{k=1}^{\infty} \frac{3}{k(k+3)}$  converges or diverges. If it converges, find its sum.

**Problem 7.** Find the values of  $x$  for which the series converges and find the sum:  $\sum_{k=1}^{\infty} (-5)^k x^k$ .

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**Problem 8.** Find the values of  $x$  for which the series converges and find the sum:  $\sum_{k=1}^{\infty} \frac{(x-2)^k}{3^k}$ .



**Problem 9.** Find the values of  $x$  for which the series converges and find the sum:  $\sum_{k=0}^{\infty} \frac{2^k}{x^k}$ .

**Problem 10.** Use the integral test to determine whether  $\sum_{k=1}^{\infty} k^{-3}$  is convergent or divergent.

**Problem 11.** Use the integral test to determine whether  $\sum_{k=1}^{\infty} \frac{2}{5k-1}$  is convergent or divergent.

**Problem 12.** Use the integral test to determine whether  $\sum_{k=1}^{\infty} k^2 e^{-k^3}$  is convergent or divergent.

**Problem 13.** Use the integral test to determine whether  $\sum_{k=1}^{\infty} \frac{1}{k \ln k}$  is convergent or divergent.

**Problem 14.** Use the integral test to determine whether  $\sum_{k=1}^{\infty} ke^{-k}$  is convergent or divergent.