

Geometric Series

Evaluate each geometric series described.

1) $4 + 20 + 100 + 500\dots, n = 7$

2) $2 + 10 + 50 + 250\dots, n = 8$

3) $-3 - 9 - 27 - 81\dots, n = 6$

4) $-4 - 16 - 64 - 256\dots, n = 6$

5) $\sum_{k=1}^{10} 3 \cdot 2^{k-1}$

6) $\sum_{k=1}^8 (-3)^{k-1}$

7) $\sum_{k=1}^7 2 \cdot 6^{k-1}$

8) $\sum_{k=1}^9 4^{k-1}$

9) $\sum_{k=1}^{10} 2^{k-1}$

10) $\sum_{k=1}^7 -2 \cdot 2^{k-1}$

Determine the number of terms n in each geometric series.

11) $a_1 = 2, r = 5, S_n = 312$

12) $a_1 = 2, r = -6, S_n = -370$

13) $a_1 = -2, r = -5, S_n = 208$

14) $a_1 = 4, r = -2, S_n = 44$

Determine if each geometric series converges or diverges.

15) $4 + 2 + 1 + \frac{1}{2}\dots$

16) $1 - \frac{1}{4} + \frac{1}{16} - \frac{1}{64}\dots$

$$17) 32 + 8 + 2 + \frac{1}{2} \dots$$

$$18) 2 + \frac{2}{5} + \frac{2}{25} + \frac{2}{125} \dots$$

$$19) \sum_{k=1}^{\infty} 2 \cdot 4^{k-1}$$

$$20) \sum_{n=1}^{\infty} -3 \cdot 2^{n-1}$$

Evaluate each infinite geometric series described.

$$21) 1 + \frac{1}{4} + \frac{1}{16} + \frac{1}{64} \dots$$

$$22) 1 + 2 + 4 + 8 \dots$$

$$23) -3 + \frac{3}{2} - \frac{3}{4} + \frac{3}{8} \dots$$

$$24) -1 - \frac{1}{3} - \frac{1}{9} - \frac{1}{27} \dots$$

$$25) \sum_{n=1}^{\infty} \left(-\frac{1}{3}\right)^{n-1}$$

$$26) \sum_{m=1}^{\infty} 0.5^{m-1}$$

$$27) \sum_{n=1}^{\infty} -\frac{3125}{256} \cdot \left(\frac{4}{5}\right)^{n-1}$$

$$28) \sum_{n=1}^{\infty} \frac{75}{16} \cdot \left(\frac{4}{5}\right)^{n-1}$$

Determine the common ratio of the infinite geometric series.

$$29) a_1 = 1.2, S = 0.75$$

$$30) a_1 = 6, S = \frac{15}{2}$$

$$31) a_1 = -45, S = -\frac{135}{2}$$

$$32) a_1 = 3.5, S = 35$$