

Geometric Sequences and Series

Date_____ Period_____

Determine if the sequence is geometric. If it is, find the common ratio, the 8th term, and the explicit formula.

1) $-1, -3, -9, -27, \dots$

2) $2, \frac{1}{2}, \frac{1}{8}, \frac{1}{32}, \dots$

3) $148, 1488, 14888, 148888, \dots$

4) $0.75, 3, 12, 48, \dots$

Given the explicit formula for a geometric sequence find the common ratio, the term named in the problem, and the recursive formula.

5) $a_n = -3 \cdot \left(\frac{1}{2}\right)^{n-1}$
Find a_{11}

6) $a_n = -1.5 \cdot (-2)^{n-1}$
Find a_{10}

Given two terms in a geometric sequence find the common ratio, the explicit formula, and the recursive formula.

7) $a_4 = -\frac{1}{4}$ and $a_1 = 2$

8) $a_5 = -24$ and $a_4 = -12$

Find the missing term or terms in each geometric sequence.

9) $\dots, 4, _, _, 108, \dots$

10) $\dots, -25, _, _, _, -\frac{1}{25}, \dots$

Evaluate each geometric series described.

11) $-3 + 15 - 75 + 375 \dots, n = 8$

12) $2 + 8 + 32 + 128 \dots, n = 8$

13) $a_1 = 1, r = 4, n = 7$

14) $a_1 = 3, r = 2, n = 7$

15) $\sum_{k=1}^8 -2 \cdot 6^{k-1}$

16) $\sum_{m=1}^8 32 \cdot \left(\frac{1}{2}\right)^{m-1}$

17) $\sum_{i=1}^{10} 0.2 \cdot 5^{i-1}$

18) $\sum_{n=1}^{10} -2 \cdot 2^{n-1}$

Determine the number of terms n in each geometric series.

19) $\sum_{i=1}^n -4^{i-1} = -341$

20) $a_1 = -1, r = -5, S_n = 104$

Determine if each geometric series converges or diverges.

21) $-1 + 2 - 4 + 8 \dots$

22) $-16 - 4 - 1 - \frac{1}{4} \dots$

23) $\sum_{k=1}^{\infty} -3 \cdot \left(\frac{2}{5}\right)^{k-1}$

24) $\sum_{i=1}^{\infty} 2 \cdot 2^{i-1}$

Evaluate each infinite geometric series described.

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

26) $\sum_{i=1}^{\infty} 0.4 \cdot 0.9^{i-1}$

27) $\sum_{m=1}^{\infty} \left(-\frac{2}{3}\right)^{m-1}$

28) $\sum_{k=1}^{\infty} -4^{k-1}$