

**Geometric Sequences and Series**

**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) ..., 4, \_\_, \_\_, 108, ...

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

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