

Geometric Sequences & Series

Date _____ Period _____

Find the common ratio, the term named in the problem, the explicit formula, and the recursive formula.

1) 4, -12, 36, -108, ...

Find a_{12}

2) -3, -6, -12, -24, ...

Find a_{12}

3) -1, -4, -16, -64, ...

Find a_{10}

4) -4, -8, -16, -32, ...

Find a_{12}

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

5) $a_5 = 768, r = -4$

Find a_9

6) $a_5 = -243, r = -3$

Find a_{11}

7) $a_3 = 16, r = -4$

Find a_{10}

8) $a_2 = 6, r = 3$

Find a_{10}

Evaluate each geometric series described.

9) $4 + 8 + 16 + 32\dots, n = 9$

10) $3 + 12 + 48 + 192\dots, n = 8$

11) $\sum_{i=1}^7 4 \cdot 6^{i-1}$

12) $\sum_{n=1}^8 6^{n-1}$

13) $\sum_{n=1}^7 2^{n-1}$

Evaluate each infinite geometric series described.

14) $\frac{2}{5} + \frac{2}{15} + \frac{2}{45} + \frac{2}{135} \dots$

15) $16 + 8 + 4 + 2 \dots$

16) $1 + \frac{4}{5} + \frac{16}{25} + \frac{64}{125} \dots$

17) $\sum_{m=1}^{\infty} 512 \cdot \left(\frac{1}{4}\right)^{m-1}$

18) $\sum_{i=1}^{\infty} \left(\frac{1}{2}\right)^{i-1}$

19) $\sum_{i=1}^{\infty} -\frac{4}{5} \cdot \left(\frac{3}{4}\right)^{i-1}$

Answers to Geometric Sequences & Series

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|---|--|--|
| 1) Common Ratio: $r = -3$
$a_{12} = -708588$
Explicit: $a_n = 4 \cdot (-3)^{n-1}$
Recursive: $a_n = a_{n-1} \cdot -3$
$a_1 = 4$ | 2) Common Ratio: $r = 2$
$a_{12} = -6144$
Explicit: $a_n = -3 \cdot 2^{n-1}$
Recursive: $a_n = a_{n-1} \cdot 2$
$a_1 = -3$ | 3) Common Ratio: $r = 4$
$a_{10} = -262144$
Explicit: $a_n = -4^{n-1}$
Recursive: $a_n = a_{n-1} \cdot 4$
$a_1 = -1$ |
| 4) Common Ratio: $r = 2$
$a_{12} = -8192$
Explicit: $a_n = -4 \cdot 2^{n-1}$
Recursive: $a_n = a_{n-1} \cdot 2$
$a_1 = -4$ | 5) $a_9 = 196608$
Explicit: $a_n = 3 \cdot (-4)^{n-1}$
Recursive: $a_n = a_{n-1} \cdot -4$
$a_1 = 3$ | 6) $a_{11} = -177147$
Explicit: $a_n = -3 \cdot (-3)^{n-1}$
Recursive: $a_n = a_{n-1} \cdot -3$
$a_1 = -3$ |
| 7) $a_{10} = -262144$
Explicit: $a_n = (-4)^{n-1}$
Recursive: $a_n = a_{n-1} \cdot -4$
$a_1 = 1$ | 8) $a_{10} = 39366$
Explicit: $a_n = 2 \cdot 3^{n-1}$
Recursive: $a_n = a_{n-1} \cdot 3$
$a_1 = 2$ | 9) 2044 |
| 10) 65535 | 11) 223948 | 12) 335923 |
| 14) $\frac{3}{5}$ | 15) 32 | 16) 5 |
| 18) 2 | 19) $-\frac{16}{5}$ | 13) 127
17) $\frac{2048}{3}$ |