Geometric Sequences and Series

What you'll Learn About

- Geometric Series: multiplying by the same # each time

Determine if the following series is Geometric. If it is give the common ratio.

2) 3, 12, 48, 192, . . .

$\frac{\text{next}}{\text{previous}}$ = common ratio $= \frac{12}{3} = 4$

$= \frac{48}{12} = 4$

$= \frac{192}{48} = 4$

$r = 4$

4) 1, -2, 4, - 8, ...

$r = -2$

6) 5, 1, .2, .04, . . .

5, 1, .2, .04

$r = .2 = \frac{1}{5}$

10) $\frac{1}{5}, \frac{2}{7}, \frac{3}{9}, \frac{4}{11} \ldots$

NO

Write the first 5 terms of the geometric sequence

12) $a_1 = 4 \quad r = 2$

4, 8, 16, 32, 64

16) $a_1 = 6 \quad r = -1/4$

$\frac{6}{1}, \frac{-6}{4}, \frac{6}{16}, \frac{-6}{64}, \frac{6}{256}$

18) $a_1 = 4 \quad r = \sqrt{3}$

$4(\sqrt{3} \cdot \sqrt{3})$ ($\sqrt{3} \cdot \sqrt{3}$ to the 3rd)

4, $4\sqrt{3}$, 12, $12\sqrt{3}$, 36

$a_n = a_1 + d(n-1)$

$A_n = a_1 r^{n-1}$ when n =1 or $A_n = a_1 r^n$ when n =0	Use the recursive rule to write the first five terms of the sequence. Then, write the sequence as a function of n.

20) $a_1 = 81$ $a_{k+1} = \frac{1}{3}a_k$ $r = \frac{1}{3}$

$a_1 = 81$ $a_{k+1} = \frac{1}{3}a_k$

$81, 27, 9, 3, 1$

a_1

Explicit Formula

$a_n = 81\left(\frac{1}{3}\right)^{n-1}$

$a_n = a_1(r)^{n-1}$

24) $a_1 = 30$ $a_{k+1} = \frac{-2}{3}a_k$

$a_n = 30\left(-\frac{2}{3}\right)^{n-1}$

$a_1 = 30$ $a_{k+1} = -\frac{2}{3}a_k$

$\frac{30}{1}, \frac{-60}{3}, \frac{120}{9}, \frac{-240}{27}, \frac{-480}{81}$