PRE-CALCULUS: by Finney, Demana, Watts and Kennedy

Geometric Sequences and Series

What you'll Learn About

- Geometric Series

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

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

yes $r = 4$

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

yes $r = -2$

Common ratio = $\frac{\text{next term}}{\text{previous term}}$

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

5, 1, .2, .04, ...

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

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

Not Geometric

$6 \cdot \frac{1}{4} = -\frac{6}{4} \cdot \frac{-1}{4}$

Write the first 5 terms of the geometric sequence

$a_1 = 4$

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

(a_1 = a sub 1) First Term; r = common ratio

4, 8, 16, 32, 64

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

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

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

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

$4(\sqrt{3} \cdot \sqrt{3}) =$

$4\sqrt{9}$

$4 \cdot 3$

Exp → Geometric

$A_n = a_1 r^{n-1}$ when n = 1

$= a_1 r^{n-1}$

or

$A_n = a_0 r^n$ when n = 0

$a_0 r^n$

n = 0

2

Use the general rule to write the first five terms of the sequence.

1st term, common ratio

A) $a_{n-1} = 2(4)^{n-1}$

n=1 n=2 n=3 n=4 n=5

2 , 8 , 32 , 128 , 512

B) $a_n = 100\left(\frac{-1}{2}\right)^n$

n = 0

100 , -50, 25, -12.5, 6.25

Use the recursive rule to write the first five terms of the sequence. Then, write the sequence as a function of n.

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

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