

11-3: Geometric Sequence ①

2, 6, 18, 54, 162

What's the pattern?

it's multiply by three !!!

This is a Geometric Sequence.

Def: A geometric sequence is one in which each term after the first is found by multiplying the previous term by a constant called the "common ratio", r .

Two formulas for Geo. Seq.

$$a_n = a_{n-1} \cdot r$$

↑ previous term ↑ ratio

$$\textcircled{\text{OR}} \quad a_n = a_1 \cdot r^{n-1}$$

↑ first term ↙ multiples of the ratio

(2)

You can always find r
by dividing any term by the
previous term

$$r = \frac{a_n}{a_{n-1}}$$

Ex.) 3, 12, 48...

Find r

$$\frac{12}{3} = 4 = r$$

P. 667 Geometric Seq.

(10) 20, 30, 45, 67.5, 101.25

Find $r = \frac{30}{20} = 1.5$

(Note: In the original image, an arrow points from the 30 in the denominator to the 67.5 in the numerator of the sequence above, and another arrow points from the 20 in the denominator to the 101.25 in the numerator of the sequence above.)

(11) $-\frac{1}{4}, \frac{1}{2}, -1, 2, -4$

$$r = -2$$

(3)

(12) Find the first 5 terms:

$$a_1 = -2, r = 3$$

$$-2, \underline{-6}, \underline{-18}, \underline{-54}, \underline{-162}$$

(13) Find the n^{th} term:

$$a_1 = 7, n = 4, r = 2$$

$$7, \underline{14}, \underline{28}, \underline{56}$$

Formula:

$$a_n = a_1 \cdot r^{n-1}$$

$$a_4 = 7 \cdot 2^3$$

$$= 7 \cdot 8 = \underline{56}$$

(14) Find a_n when $a_3 = 32, n = 6, r = -.5$

$$a_6 = a_1 \cdot r^{n-1}$$

Let's think of 32 as the 1st term

$$a_6 = 32 * \overset{3}{-.5}$$

$$= 32 * -0.125 = \underline{-4}$$

15. find a_9 for 60, 30, 15

$$a_n = a_1 \cdot r^{n-1}$$

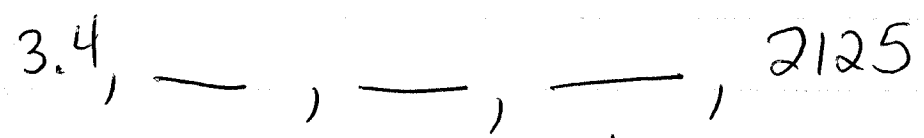
$$a_9 = 60 \cdot 0.5^8$$
$$= 60 \cdot \left(\frac{1}{2}\right)^8$$

$$= 60 \cdot \frac{1}{256} = 0.234375$$

or

$$\frac{60}{256} = \boxed{\frac{15}{64}}$$

Ex 5 Find the ³ Geometric means between 3.4 and 2125.



$$a_5 = a_1 * r^{n-1}$$

$$\frac{2125}{3.4} = \frac{3.4}{3.4} * r^4 \quad \text{Solve for } r$$

$$\sqrt[4]{625} = \sqrt[4]{r^4} \quad r = 625^{\frac{1}{4}}, r = 5$$

3.4, 17, 85, 425, 2125

Assignment: P. 667

18-42
all