

Warm Up

March 28, 2019

1.) The sequence below shows the total number of days Francisco used his gym membership at the end of weeks 1, 2, 3, and 4.

1 2 3 4
4, 9, 14, 19,...

Assuming the pattern continued, which function could be used to find the total number of days Francisco used his gym membership?

~~A. $f(n) = n + 5$~~

C. $f(n) = 5n + 4$

B. $f(n) = 5n - 1$

~~D. $f(n) = n$~~

2.) Solve for x:

$20\left(\frac{3}{4}x + 5\right) = \left(\frac{1}{5}x - \frac{21}{20}\right) - 14(6x - 3) + 4x - 21 = 36 - 3(10x + 4)$

$$\begin{array}{r} 15x + 100 = 4x - 21 \\ -4x \quad -4x \\ \hline 11x + 100 = -21 \end{array}$$

$$\begin{array}{r} 11x + 100 = -21 \\ -100 \quad -100 \\ \hline 11x = -121 \end{array}$$

$$\begin{array}{r} 11x = -121 \\ \hline x = -11 \end{array}$$

$$\begin{array}{r} -84x + 42 + 4x - 21 = \\ 36 - 30x - 12 \end{array}$$

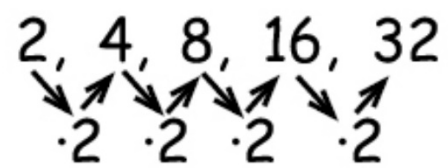
$$\begin{array}{r} -80x + 21 = -30x + 24 \\ +80x \quad +80x \\ \hline \end{array}$$

$$\begin{array}{r} 21 = 50x + 24 \\ -24 \quad -24 \\ \hline \end{array}$$

$$\begin{array}{r} -3 = 50x \\ 50 \quad 50 \\ \hline \end{array}$$

$$\begin{array}{r} x = -\frac{3}{50} \end{array}$$

Geometric Sequences



What is it?

<i>Geometric Sequences</i>	a pattern of repeated multiplication (or division)
<i>Common Ratio</i>	the number being repeatedly multiplied; r



multiplication
or division

Determine whether the sequence is geometric. If yes, identify the common ratio and give the next three terms.

<p>1. $\{6, 12, 24, 48, \dots\}$ <input checked="" type="radio"/> Yes or No $r = 2$ 96, 192, 384</p>	<p>2. $\{810, 270, 90, 30, \dots\}$ <input checked="" type="radio"/> Yes or No $r = \frac{1}{3}$ 10, $\frac{10}{3}$, $\frac{10}{9}$</p>
<p>3. $\{-2, 10, -50, 250, \dots\}$ <input checked="" type="radio"/> Yes or No $r = -5$ -1250, 6250, -31250</p>	<p>4. $\{4, 8, 20, 60, \dots\}$ Yes or <input checked="" type="radio"/> No $r =$ _____</p>
<p>5. $\{4, -1, \frac{1}{4}, -\frac{1}{16}, \dots\}$ <input checked="" type="radio"/> Yes or No $r = -\frac{1}{4}$ $\frac{1}{64}$, $-\frac{1}{256}$, $\frac{1}{1024}$</p>	<p>6. $\{2, 4, 16, 256, \dots\}$ Yes or <input checked="" type="radio"/> No $r =$ _____</p>
<p>7. $\{-2, -14, -98, -686, \dots\}$ <input checked="" type="radio"/> Yes or No $r = 7$ -4802, -33614, -235298</p>	<p>8. $\{3.2, 8, 20, 50, \dots\}$ <input checked="" type="radio"/> Yes or No $r = 2.5$ 125, 312.5, 781.25</p>

Formulas and their Purpose

Geometric Sequences

Explicit Formula: $A_n = a_1 \cdot r^{n-1}$

“Finds a specific term”

Current
Term

First Term

Common Ratio

Previous
Term

Recursive Formula: $A_n = A_{n-1} \cdot r$

“Uses previous terms to find the next terms”

5



Write a rule for each sequence, then find a_6 .

9. {1, 5, 25, 125, ...}

$$a_n = 1 \cdot 5^{n-1} \text{ explicit} \quad r = \underline{5}$$

$$a_n = a_{n-1} \cdot 5 \text{ RECURSIVE} \quad a_1 = \underline{1}$$

$$n = \underline{6}$$

$$a_6 = 1 \cdot 5^{6-1} \quad a_6 = 3125$$

$$a_6 = 1 \cdot 5^5$$

10. {130, 65, 32.5, 16.25, ...}

$$a_n = 130 \cdot \frac{1}{2}^{n-1} \text{ explicit} \quad r = \underline{\frac{1}{2}}$$

$$a_n = a_{n-1} \cdot \frac{1}{2} \text{ RECURSIVE} \quad a_1 = \underline{130}$$

$$n = \underline{6}$$

$$a_6 = 130 \cdot \frac{1}{2}^{6-1}$$

$$= 130 \cdot \frac{1}{2^5}$$

$$a_6 = 4.0625$$

11. {2, -8, 32, -128, ...}

$r = -4$

$a_1 = 2$

$n = 6$

$a_n = 2 \cdot (-4)^{n-1}$ explicit

$a_n = a_{n-1} \cdot -4$ RECURSIVE

$a_6 = -2048$

12. {8, 24, 72, 216, ...}

$r = 3$

$a_1 = 8$

$a_n = 8 \cdot 3^{n-1}$

$a_n = a_{n-1} \cdot 3$ explicit

$a_6 = 1944$ RECURSIVE

You Try:

13. {135, 90, 60, 40, ...}

$r = \frac{2}{3}$

$a_1 = 135$

$a_n = 135 \cdot \left(\frac{2}{3}\right)^{n-1}$ explicit

$a_n = a_{n-1} \cdot \frac{2}{3}$ RECURSIVE

$a_6 = \frac{160}{9}$

14. {-3200, 800, -200, 50, ...}

$r = -\frac{1}{4}$

$a_1 = -3200$

$a_n = -3200 \cdot \left(-\frac{1}{4}\right)^{n-1}$

$a_n = a_{n-1} \cdot -\frac{1}{4}$

$a_6 = 3.125$

Use the information given to find the indicated value.

15. $a_1 = 7$ and $r = 4$; Find a_8

$$a_n = 7 \cdot 4^{n-1}$$
$$a_8 = 7 \cdot 4^{8-1}$$
$$a_8 = 114,688$$

16. $a_5 = -68$ and $r = -0.5$; Find a_1

$$a_1 \quad a_2 \quad a_3 \quad a_4 \quad a_5$$
$$-1088, 544, -272, 136, -68$$
$$a_1 = 1088$$

Jackson bought a brand new car for \$38,000. If the car depreciates in value by 20% each year, what will the car be worth in 8 years?

Application

