

Warmup 12/(# of E's in "Tennessee Titans")

*****Get a calculator, whiteboard, marker, & eraser!*****

- Elmo was asked to find the first four terms of the following sequence:

$$f(1) = 2 \qquad f(n) = 3 \cdot f(n-1) + 4$$

- He wrote: 2, 6, 18, 54 .
- Find, explain, and correct his error. He didn't add 4.

$$\begin{array}{l} f(1) = 2 \\ f(2) = 10 \\ f(3) = 34 \end{array} \qquad \begin{array}{l} 3 \cdot 2 + 4 = 10 \\ 3 \cdot 10 + 4 = 34 \\ 3 \cdot 34 + 4 = 106 \end{array}$$

$$\boxed{2, 10, 34, 106}$$

Check Homework

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The first term in a sequence is 8. Consecutive terms in the sequence have a common difference. The fourth term in the sequence is 17.

Select the function, $f(n)$, that represents this sequence for $n \geq 1$.

A. $f(1) = 8$
 $f(n + 1) = f(n) - 3$

B. $f(1) = 8$
 $f(n + 1) = f(n) + 3$

C. $f(1) = 8$
 $f(n + 1) = \frac{9}{4}f(n)$

D. $f(1) = 8$
 $f(n + 1) = \frac{17}{8}f(n)$

B

Find the indicated term of the arithmetic sequence.

Find a_{60} : 11, 5, -1, -7, ...

$$a_{60} = 11 - 6(59)$$

-343

Find the indicated term of the arithmetic sequence.

Find a_{100} :

$$a_1 = 6$$

$$a_n = a_{n-1} + 4$$

- Need to add 4
99 times

$$a_{100} = 402$$

Find the indicated term of the arithmetic sequence.

Find a_9 :

$$a_1 = 2$$

$$a_n = a_{n-1} + \frac{3}{4}$$

$$a_9 = 2 + \frac{3}{4}(8)$$

8

Explicit Rule



- **Explicit rule**: a rule that tells you how to get the **n th** term of the sequence without having to find the previous terms

Explicit Formula for Arithmetic Sequences:

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

- a_1 is the first term
- d is the common difference
- n is the position number

Write the Explicit Formula for the Sequence

9, 13, 17, 21,...

$$a_n = 9 + 4(n - 1)$$

Write the Explicit Formula for the Sequence

10, 8, 6, 4, ...

$$a_n = 10 - 2(n - 1)$$

Write the Explicit Formula for the Sequence. Then find the indicated term.

19, 9, -1, -11, ...the 12th term

$$a_n = 19 - 10(n - 1)$$

$$a_{12} = -91$$

Write the Explicit Formula for the Sequence. Then find the indicated term.

27, 0, -27, ...the 6th term

$$a_n = 27 - 27(n - 1)$$

$$a_{12} = -108$$

**Find the indicated term of the
geometric sequence.**

The 25th term: $a_1 = 100$; $r = 1.02$

$$100 \cdot 1.02^{24}$$

About 160.84

- **Who can figure out the explicit formula for geometric sequences?**

Write the explicit formula of the geometric sequence, then use it to find the given term.

$a_1 = 8$; $r = 5$; The 10th term

$$a_n = 8(5)^{n-1}$$

$$a_{10} = 8(5)^9 = 15,625,000$$

Explicit Formula for Geometric Sequences:

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

- a_1 is the first term
- r is the common ratio
- n is the position number

Write the explicit formula of the geometric sequence, then use it to find the given term.

3, 12, 48, 192, ... 5th term

$$a_n = 3(4)^{n-1}$$

$$a_5 = 3(4)^4 = 768$$

Write the explicit formula of the geometric sequence, then use it to find the given term.

5, 15, 45, ... 10th term

$$a_n = 5(3)^{n-1}$$

$$a_{10} = 5(3)^9 = 98,415$$

Write the explicit formula of the geometric sequence, then use it to find the given term.

100, 50, 25, ... 8th term

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

$$a_8 = 100\left(\frac{1}{2}\right)^7 = 0.78125$$



What about explicit rules for sequences that are neither arithmetic nor geometric?

Find the first four terms
using this explicit rule

$$a_n = \frac{2n + 1}{n^3}$$

$$a_1 = \frac{2(1)+1}{1^3} = \frac{3}{1} = 3$$

$$a_2 = \frac{2(2)+1}{2^3} = \frac{5}{8}$$

$$a_3 = \frac{2(3)+1}{3^3} = \frac{7}{27}$$

$$a_4 = \frac{2(4)+1}{4^3} = \frac{9}{64}$$

$$3, \frac{5}{8}, \frac{7}{27}, \frac{9}{64}$$

Homework

Worksheet