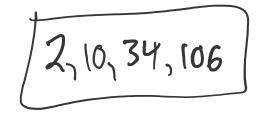
Warmup 12/(# of E's in "Tennessee Titans")

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

- Elmo was asked to find the first four terms of the following sequence: f(1) = 2  $f(n) = 3 \cdot f(n-1) + 4$
- He wrote: 2, 6, 18, 54.
- Find, explain, and correct his error. He didn't add 4.

$$f(x)=2$$
  $3\cdot 2 + 4 = 10$   
 $f(x)=10$   $3\cdot 10 + 4 = 34$   
 $f(x)=34$   $3\cdot 34 + 4 = 106$ 



### **Check Homework**

Domain & Range	p. 10
Slope	p. 11
Slope WITHOUT a graph	p. 12
Slope-Intercept Form	p. 13
Standard Form	p. 14
Point-Slope Form	p. 15
Solving Linear Inequalities	p. 16
Exponent Rules	p. 17
Exponent Rules 2: Power to a Power	p. 18
Linear vs. Exponential	p. 19
Average Rate of Change	p. 20
Exponentials with Percents	p. 21
Compound Interest	p. 22
Intro to Sequences, Recursive Rules	p. 23
Explicit Rules for Sequences	p. 24
<b>BACK TO THIS PAGE</b>	

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  $n \ge 1$ .

A. 
$$f(1) = 8$$
$$f(n+1) = f(n) - 3$$
B. 
$$f(1) = 8$$
$$f(n+1) = f(n) + 3$$
$$f(1) = 8$$
C. 
$$f(1) = 8$$
$$f(n+1) = \frac{9}{4}f(n)$$
$$f(1) = 8$$
D. 
$$f(n+1) = \frac{17}{8}f(n)$$

B

# Find the indicated term of the arithmetic sequence.

## Find $a_{60}$ : 11, 5, -1, -7, ... $a_{60} = 1 - 6(59)$

-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



# Find the indicated term of the arithmetic sequence.

Find  $a_9$ :  $a_1 = 2$  $a_n = a_{n-1} + \frac{3}{4}$ 

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

#### **Explicit Rule**

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

### Explicit Formula for Arithmetic Sequences: $a_n = a_1 + d(n - 1)$

- a<sub>1</sub> 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.

$$a_n = 19 - 10(n - 1)$$
  
 $a_{12} = -91$ 

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

$$a_n = 27 - 27(n-1)$$
  
 $a_{12} = -108$ 

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

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

About 160.84

## Who can figure out the explicit formula for geometric sequences?

 $a_1 = 8; r = 5;$  The 10<sup>th</sup> term  $a_n = 8(5)^{n-1}$  $a_{10} = 8(5)^9 = 15,625,000$ 

#### Explicit Formula for Geometric Sequences: $a_n = a_1(\mathbf{r})^{(n-1)}$

- a<sub>1</sub> is the first term
- r is the common ratio
- n is the position number

#### 3, 12, 48, 192, ... 5<sup>th</sup> term

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a_n = 3(4)^{n-1}
a_5 = 3(4)^4 = 768
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5, 15, 45, ... 10<sup>th</sup> term

 $a_n = 5(3)^{n-1}$  $a_{10} = 5(3)^9 = 98,415$ 

100, 50, 25, ... 8<sup>th</sup> term

 $a_n = 100(1/2)^{n-1}$  $a_8 = 100(1/2)^7 = 0.78125$ 

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

# Find the first four terms using this explicit rule

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

$$\begin{aligned} \alpha_{1} &= \frac{2(1)+1}{2} = \frac{3}{2} = 3\\ \alpha_{2} &= \frac{2(2)+1}{2^{3}} = \frac{5}{8}\\ \alpha_{3} &= \frac{2(3)+1}{3^{3}} = \frac{7}{27}\\ \alpha_{4} &= \frac{2(3)+1}{3^{3}} = \frac{7}{27}\\ \alpha_{4} &= \frac{2(4)+1}{4^{3}} = \frac{9}{64} \end{aligned}$$

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

### Homework

Worksheet