

Unit 1 Test tomorrow

In front of you is the review - if you can complete this and feel confident, you will DOMINATE the test tomorrow.

Take 30 minutes and see how much you can get done - then we will go through the ones you starred - music - one ear bud

Matching: Classify each function on the left with its description on the right.

- D 1. $a_n = \frac{5}{3}(8)^{(n-1)}$ a. Arithmetic, Recursive
- B 2. $a_n = \frac{6}{5}n - 1$ b. Arithmetic, Explicit
- C 3. $a_n = 6 \cdot a_{n-1}, a_1 = 2$ c. Geometric, Recursive
- d. Geometric, Explicit

Matching: Match each sequence on the left with a formula on the right.

- C 4. 3, -5, -13, -21 $d = -8$ ~~$a_n = 3(8)^{n-1}$~~ \rightarrow Geo
- B 5. 4, 20, 100, 500 b. $a_n = 5 \cdot a_{n-1}, a_1 = 4$
- D 6. 36, 18, 9, 4.5, ... c. $a_n = -8n + 11$
- d. $a_n = 36\left(\frac{1}{2}\right)^{(n-1)}$

For each table below, determine if the sequence is **arithmetic** or **geometric**. Then tell what the **constant ratio** or **common difference** is. **Create the recursive** for each.

7. Arith $d = +5$
 $A_1 = 9$
 $A_n = A_{n-1} + 5$

Term Number	Value
0	4
1	9
2	14
3	19

(Handwritten notes: +5, +5, +5)

8. Geo $r = 2$
 $A_1 = 8$
 $A_n = 2(A_{n-1})$

Term Number	Value
2	16
3	32
4	64
5	128

(Handwritten notes: x2, x2, x2)

9. Below is an arithmetic sequence. Complete the table with the missing values.

x	1	2	3	4	5
f(x)	8	21	34	47	60

(Handwritten notes: +13, +13, +13, +13)

10. Find the following: $f(x) = -x - 10$, $g(x) = 3x^2 - 2x + 1$

a) $g(-4)$ *(Handwritten: substitute)*
 $3(-4)^2 - 2(-4) + 1 = 57$

b) $f(3)$ *(Handwritten: -13)*
 $-(3) - 10 = -13$

$\frac{60 - 8}{5 - 1} = +13$

11. Below is a geometric sequence. Complete the table with the missing values. Is there only one ratio that works? Why?

x	1	2	3	4	5
f(x)	8	24	72	216	648

yes → jumped odd #

x3

x3

r=3

x3

$$\frac{216}{8} = 27$$

12. The first term in a sequence is 8. The sequence increases by 15 each time. What would be the recursive equation?

$$A_1 = 8 \quad A_n = A_{n-1} + 15$$

13. The end of a spring is pulled as far back as it will go and then released. On the first bounce back, it extends 152 cm. On its second bounce back, it extends 76 cm. On its third bounce back, it extends 38 cm.

a. Is this scenario Arithmetic or Geometric? How do you know?

$$\times \frac{1}{2}$$

$$\frac{76}{152} = \frac{1}{2}$$

b. Create the recursive and explicit formulas.

Rec: $A_1 = 152 \quad A_n = \frac{1}{2}(A_{n-1})$

Exp: $A_n = 152\left(\frac{1}{2}\right)^{n-1}$

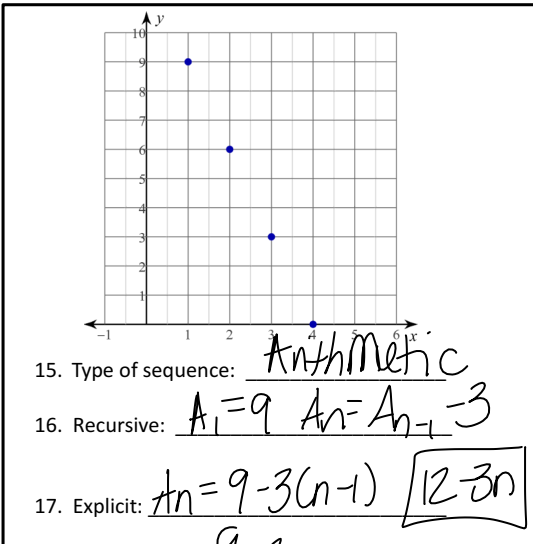
c. How far does the spring extend on its 5th, 6th, and 7th bounce back?

9.5 cm 4.75 cm 2.375 cm

14. A large nursery has 1400 lilies to sell. Every day, the number of lilies available decreases by 70. Write an explicit formula for the number of lilies available to sell, where n is the number of days. Then, find the number of lilies that can be sold on the 8th, 9th, and 10th day.

$$A_n = 1400 - 70n$$

x	0	1	2	8 th	9 th
y	1400	1330	1260	1400 - 70(8) = 840	1400 - 70(9) = 770



15. Type of sequence: Arithmetic

16. Recursive: $A_1 = 9 \quad A_n = A_{n-1} - 3$

17. Explicit: $A_n = 9 - 3(n-1)$ 12-3n
 $9 - 3n + 3$

Sequence: 1, 4, 16, 64, ... 1400 - 70(n)
700

18. Type of sequence: Geo

19. Recursive: $A_1 = 1 \quad A_n = 4(A_{n-1})$

20. Explicit: $a_n = 1(4)^{n-1}$

21. Error Analysis: Who is correct?

Callie and Joseph are trying to find the common ratio, recursive formula, and explicit formula for the sequence $-5, -15, -45, -135, \dots$. Their answers are provided. Is either one correct?

Callie's Work	Joseph's Work
Common ratio: $\frac{-15}{-5} = 3$ ✓	Common ratio: $\frac{-15}{-5} = 3$ ✓
Explicit Formula: $a_n = -5(3)^{(n-1)}$ ✓	Explicit Formula: $a_n = 3(-5)^{(n-1)}$ ✗
Recursive Formula: $a_n = -3 \cdot a_{n-1}$ $a_1 = -5$	Recursive Formula: $a_n = 3 \cdot a_{n-1}$ $a_1 = -5$ ✓

Explanation:

Callie messed up her recursive ratio and made it negative 3 rather than 3. Joseph messed up his explicit by swapping his a_1 and r .

22. The distance (in inches) that a free-falling object falls in each second, starting with the first second, is given by the geometric progression $0.5, 1.5, 4.5, 13.5, \dots$. Create the explicit and recursive function for this situation. Find the distance that the object falls on the 20th and 45th second.

$\frac{1.5}{0.5} = 3$

X	1	2	3	4
Y	0.5	1.5	4.5	13.5

$\downarrow \times 3$ $\downarrow \times 3$ $\downarrow \times 3$

$A_n = 0.5(3)^{n-1}$
 $A_1 = 0.5$ $A_n = 3(a_{n-1})$
 20th $\rightarrow 0.5(3)^{20-1} = 50130733.5$
 45th $\rightarrow 0.5(3)^{45-1} = 4.9 \times 10^{20}$ in

23. **Let's change back and forth between forms!**

Given the recursive definition, write the explicit definition.	Given the explicit definition, write the recursive definition.
$a_1 = 4$ $a_n = 3 \cdot a_{n-1}$ $4(3)^{n-1}$	$a_n = 5(2)^n$ $A_1 = 10$ $A_n = 2(a_{n-1})$
$a_1 = 5$ $a_n = -2 \cdot a_{n-1}$ $5(-2)^{n-1}$	$a_n = 200\left(\frac{1}{2}\right)^n$ $A_1 = 100$ $A_n = \frac{1}{2}(a_{n-1})$