

READY, SET, GO!

Name _____

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READY**Topic: Recognizing Solutions to Equations**

The solution to an equation is the value of the variable that makes the equation true. In the equation $9a + 17 = -21$, "a" is the variable. When $a = 2$, $9a + 17 \neq -19$, because $9(2) + 17 = 35$. Thus $a = 2$ is NOT a solution. However, when $a = -4$, the equation is true $9(-4) + 17 = -19$. Therefore, $a = -4$ must be the solution.

Identify which of the 3 possible numbers is the solution to the equation.

1. $3x + 7 = 13$ ($x = -2$; $x = 2$; $x = 5$)

Answer: $x = 2$

2. $8 - 2b = -2$ ($b = -3$; $b = 0$; $b = 5$)

~~Answer: $b = 5$~~

3. $5 + 4g + 8 = 1$ ($g = -3$; $g = -1$; $g = 2$)

Answer: $g = -3$

4. $6t - 5 + 5t = 105$ ($t = 4$; $t = 7$; $t = 10$)

~~Answer: $t = 10$~~

Some equations have two variables. You may recall seeing an equation written like the following:

$y = 5x + 2$. We can let x equal a number and then work the problem with this x -value to determine the associated y -value. A solution to the equation must include both the x -value and the y -value. Often the answer is written as an **ordered pair**. The x -value is always first. Example: (x, y) . The order matters!

Determine the y -value of each ordered pair based on the given x -value.

5. $y = 6x - 15$; (8,), (-1,), (5,)

Answer: (8, 33), (-1, -21), (5, 15)

6. $y = -4x + 9$; (-5,), (2,), (4,)

~~Answer: (-5, -11), (2, -1), (4, -7)~~

7. $y = 2x - 1$; (-4,), (0,), (7,)

Answer: (-4, -9), (0, -1), (7, 13)

8. $y = -x + 9$; (-9,), (1,), (5,)

~~Answer: (-9, 18), (1, 8), (5, 4)~~

SET

Topic: Using a constant rate of change to complete a table of values

Fill in the table. Then write a sentence explaining how you figured out the values to put in each cell.

9. You run a business making birdhouses. You spend \$600 to start your business, and it costs you \$5.00 to make each birdhouse.

# of birdhouses	1	2	3	4	5	6	7
Total cost to build	605	610	615	620	625	630	635

Explanation:

The start up cost is \$600 so that plus \$5 for each additional one is how you get the total.

10. You make a \$15 payment on your loan of \$500 at the end of each month.

# of months	1	2	3	4	5	6	7
Amount of money owed	485	470	455	440	425	410	395

Explanation: ~~Start with \$500 and subtract \$15 each month.~~

11. You deposit \$10 in a savings account at the end of each week.

# of weeks	1	2	3	4	5	6	7
Amount of money saved	10	20	30	40	50	60	70

Explanation: There is no mention of an initial value but you add 10 every week.

12. You are saving for a bike and can save \$10 per week. You have \$25 when you begin saving.

# of weeks	1	2	3	4	5	6	7
Amount of money saved	35	45	55	65	75	85	95

Explanation: ~~Start with \$25 and add \$10 each week.~~

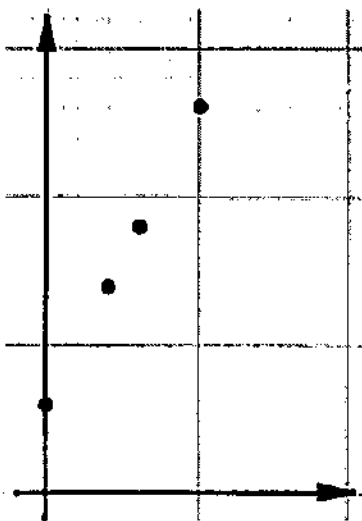
GO

Topic: Graph Linear Equations Given a Table of Values.

Graph the ordered pairs from the tables on the given graphs.

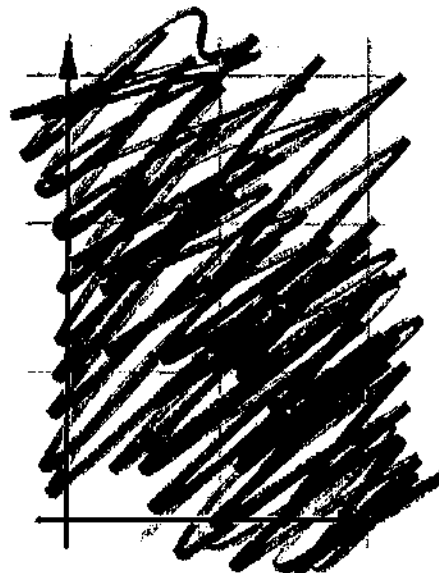
13.

x	y
0	3
2	7
3	9
5	13



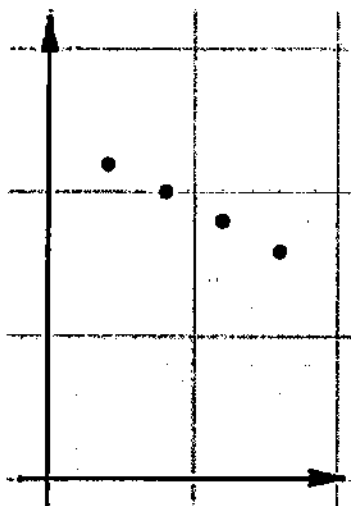
14.

x	y
0	14
4	10
7	7
9	5



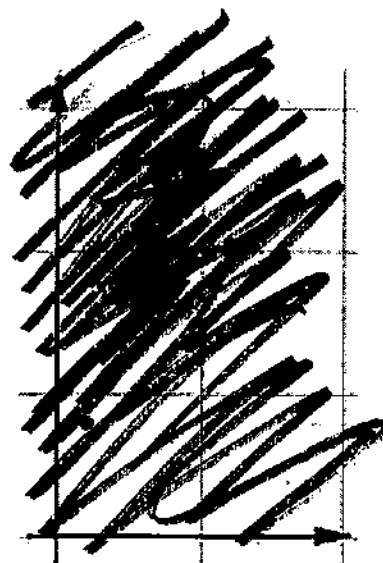
15.

x	y
2	11
4	10
6	9
8	8



16.

x	y
1	4
2	7
3	10
4	13



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Topic: Using function notation

To evaluate an equation such as $y = 5x + 1$ when given a specific value for x , replace the variable x with the given value and work the problem to find the value of y .

Example: Find y when $x = 2$. Replace x with 2. $y = 5(2) + 1 = 10 + 1 = 11$.

Therefore, $y = 11$ when $x = 2$. The point $(2, 11)$ is one solution to the equation $y = 5x + 1$. Instead of using x and y in an equation, mathematicians often write $f(n) = 5n + 1$ because it can give more information. With this notation, the direction to find $f(2)$, means to replace the value of n with 2 and work the problem to find $f(n)$. The point $(n, f(n))$ is in the same location on the graph as (x, y) , where n describes the location along the x -axis, and $f(n)$ is the height of the graph.

Given that $f(n) = 8n - 3$ and $g(n) = 3n - 10$, evaluate the following functions with the indicated values.

1. $f(5) =$

2. $g(5) =$

3. $f(-4) =$

4. $g(-4) =$

Answer: $f(5) = 37$

Answer: $f(-4) = -35$

5. $f(0) =$

6. $g(0) =$

7. $f(1) =$

8. $g(1) =$

Answer: $f(0) = -3$

Answer: $f(1) = 5$

Topic: Looking for patterns of change

Complete each table by looking for the pattern.

9.

Term	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th
Value	2	4	8	16	32	64	128	256

10.

Term	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th
Value								

11.

Term	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th
Value	160	80	40	20	10	5	2.5	1.25

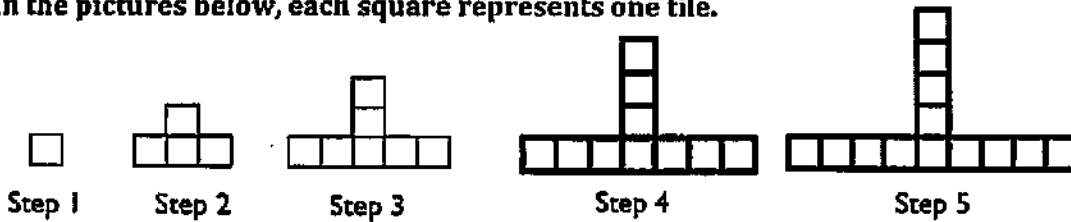
12.

Term	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th
Value								

SET

Topic: Use variables to create equations that connect with visual patterns.

In the pictures below, each square represents one tile.



13. Draw Step 4 and Step 5.

The students in a class were asked to find the number of tiles in a figure by describing how they saw the pattern of tiles changing at each step. Match each student's way of describing the pattern with the appropriate equation below. Note that "s" represents the step number and "n" represents the number of tiles.

- (a) $n = (2s - 1) + (s - 1)$ (b) $n = 3s - 2$ (c) $n = s + 2(s - 1)$

14. ~~Describe the pattern of tiles in the figures below. How many tiles are there in each figure? Write a rule for the number of tiles in the nth figure.~~

15. b Sally counted the number of tiles at each step and made a table. She explained that the number of tiles in each figure was always 3 times the step number minus 2.

step number	1	2	3	4	5	6
number of tiles	1	4	7	10	13	16

16. ~~Nancy found the number of blocks in the figures and the number of blocks along the top. She found that the number of blocks in the top row was always 1 less than the number of blocks in the bottom row. Write a rule for the number of blocks in the nth figure.~~

Step number	# In base + #on top
1	1
2	3
3	5
4	7
5	9

GO

Topic: The meaning of an exponent

Write each expression using an exponent.

17. $6 \times 6 \times 6 \times 6 \times 6$

Answer: 6^5

18. $4 \times 4 \times 4$

~~Answer: 4^3~~

19. $15 \times 15 \times 15 \times 15$

Answer: 15^4

20. $\frac{1}{3} \times \frac{1}{3}$

~~Answer: $\frac{1}{9}$~~

A) Write each expression in expanded form. B) Then calculate the value of the expression.

21. 7^1

Answer: $7 = 7$

22. 3^2

~~Answer: $3 \times 3 = 9$~~

23. 5^3

Answer: $5 \cdot 5 \cdot 5 = 125$

24. 10^4

~~Answer: $10 \times 10 \times 10 \times 10 = 10,000$~~

25. $7(2)^3$

Answer: $7 \cdot 2 \cdot 2 \cdot 2 = 56$

26. $10(8^2)$

~~Answer: $10 \times 8 \times 8 = 640$~~

27. $3(5)^4$

Answer: $3 \cdot 5 \cdot 5 \cdot 5 \cdot 5 = 1875$

28. $16\left(\frac{1}{2}\right)^3$

Answer: ~~$16 \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = 2$~~

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Topic: Interpreting function notation

A) Use the given table to identify the indicated value for n . B) Then using the value for n that you determined in A, use the table to find the indicated value for B.

n	1	2	3	4	5	6	7	8	9	10
$f(n)$	-8	-3	2	7	12	17	22	27	32	37

- 1. A) When $f(n) = 12$, what is the value of n ?
Answer: $n = 5$
- B) What is the value of $f(n - 1)$?
Answer: 7
- 2. A) When $f(n) = 17$, what is the value of n ?
Answer: 6
- B) What is the value of $f(n - 1)$?
Answer: 12
- 3. A) When $f(n) = 32$, what is the value of n ?
Answer: $n = 9$
- B) What is the value of $f(n + 1)$?
Answer: 37

- 4. A) When $f(n) = 2$, what is the value of n ?
Answer: $n = 3$
- B) What is the value of $f(n + 3)$?
Answer: 17
- 5. A) When $f(n) = 27$, what is the value of n ?
Answer: 8
- B) What is the value of $f(n - 6)$?
Answer: -8
- 6. A) When $f(n) = -8$, what is the value of n ?
Answer: 1
- B) What is the value of $f(n + 9)$?
Answer: 37

SET

Topic: Comparing explicit and recursive equations

Use the given information to decide which equation will be the easiest to use to find the indicated value. Find the value and explain your choice.

7. Explicit equation: $y = 3x + 7$
Recursive: $now = previous\ term + 3$

term #	1	2	3	4
value	10	13	16	

Find the value of the 4th term. 19

Explanation:

Answer: Recursive is easiest to use because you know what the 3rd term is so you can add 3 to it to get the 4th term.

8. Explicit equation: $y = 3x + 7$
Recursive: $now = previous\ term + 3$

term #	1	2	...	50
value	10	13	...	

Find the value of the 50th term. 157

Explanation:

Answer: Explicit is easiest to use because you can plug in 50 for x in the equation $y = 3x + 7$.

<p>9. The value of the 8th term is 78. The sequence is increasing by 10 at each step.</p> <p>Explicit equation: $y = 10x - 2$ Recursive: $now = previous\ term + 10$</p> <p>Find the 20th term. <u>198</u></p> <p>Explanation: Answer: Use explicit to plug in 20 for x to get the value of the 20th term.</p>	<p>10. The value of the 8th term is 78. The sequence is increasing by 10 at each step.</p> <p>Explicit equation: $y = 10x - 2$ Recursive: $now = previous\ term + 10$</p> <p>Find the 9th term. <u> </u></p> <p>Explanation: Answer: Use explicit to plug in 9 for x to get the value of the 9th term.</p>
<p>11. The value of the 4th term is 80. The sequence is being doubled at each step.</p> <p>Explicit equation: $y = 5(2^x)$ Recursive: $now = previous\ term * 2$</p> <p>Find the value of the 5th term. <u>160</u></p> <p>Explanation: Answer: Use recursive to multiply the 4th term by 2 to get 160.</p>	<p>12. The value of the 4th term is 80. The sequence is being doubled at each step.</p> <p>Explicit equation: $y = 5(2^x)$ Recursive: $now = previous\ term * 2$</p> <p>Find the value of the 7th term. <u> </u></p> <p>Explanation: Answer: Use recursive to multiply the 4th term by 2 to get 160.</p>

GO

Topic: Evaluating Exponential Equations

Evaluate the following equations when $x = \{1, 2, 3, 4, 5\}$. Organize your inputs and outputs into a table of values for each equation. Let x be the input and y be the output.

13. $y = 4^x$

14. $y = (-3)^x$

15. $y = -3^x$

16. $y = 10^x$

x input	y output
1	4
2	16
3	64
4	256
5	1024

x input	y output
1	
2	
3	
4	
5	

x input	y output
1	-3
2	-9
3	-27
4	-81
5	-243

x input	y output
1	
2	
3	
4	
5	

17. If $f(n) = 5^n$, what is the value of $f(4)$?

Answer: 625

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Topic: Use function notation to evaluate equations.

Evaluate the given equation for the indicated function values.

1. $f(n) = 5n + 8$

$f(4) = 28$

$f(-2) = -2$

5. $f(n) = 5^n$

$f(2) = 25$

$f(3) = 125$

2. $f(n) = -2n + 1$

$f(10) =$

$f(-1) =$

6. $f(n) = 3^n$

$f(4) =$

$f(1) =$

3. $f(n) = 6n - 3$

$f(-5) = -33$

$f(0) = -3$

7. $f(n) = 10^n$

$f(6) = 1,000,000$

$f(0) = 1$

4. $f(n) = -n$

$f(9) =$

$f(-11) =$

8. $f(n) = 2^n$

$f(0) =$

$f(5) =$

SET

Topic: Finding terms for a given sequence

Find the next 3 terms in each sequence. Identify the constant difference. Write a recursive function and an explicit function for each sequence. Circle where you see the common difference in both functions. (The first number is the 1st term, not the 0th term).

9. A) 3, 8, 13, 18, 23, 28, 33, 38, ...

B) Common Difference: 5

C) Recursive Function: _____

Answer: $f(1) = 3, f(n) = f(n - 1) + 5$

D) Explicit Answer: $f(n) = 5n - 2$ or
Function: $f(n) = 3 + 5(n - 1)$

10. A) 11, 9, 7, 5, 3, 1, -1, -3, ...

B) Common Difference: -2

C) Recursive Function: _____

Answer: ~~_____~~

D) Explicit Answer: ~~_____~~
Function: ~~_____~~

11. A) 3, 1.5, 0, -1.5, -3, -4.5, -6, -7.5, ...

B) Common Difference: -1.5

C) Recursive Function: _____

Answer: $f(1) = 3, f(n) = f(n - 1) - 1.5$

D) Explicit Answer: $f(n) = -1.5n + 4.5$ or
Function: $f(n) = 3 - 1.5(n - 1)$

GO

Topic: Reading a graph

Olaf is a mountain climber. The graph shows Olaf's location on the mountain beginning at noon. Use the information in the graph to answer the following questions.

12. What was Olaf's elevation at noon?

Answer: ~~10,000 ft.~~

13. What was his elevation at 2 pm?

Answer: 6500 ft.

14. How many feet had Olaf descended from noon until 2 pm?

Answer: ~~3,500 ft.~~

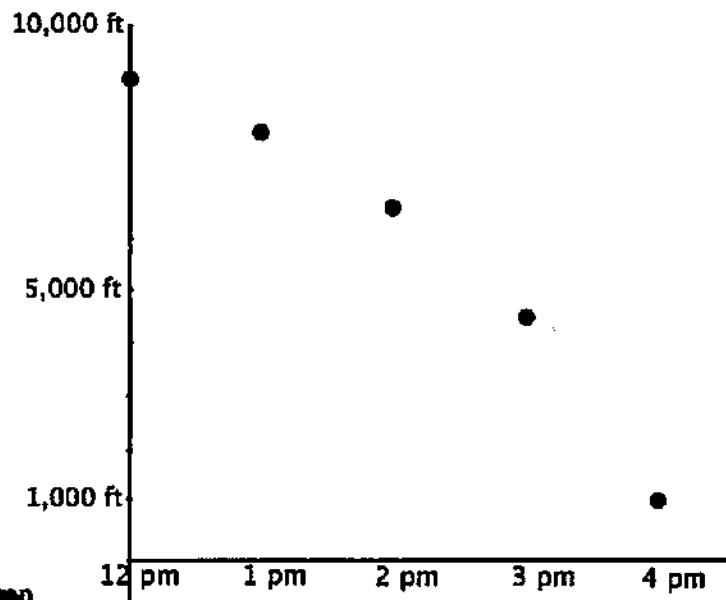
15. Olaf reached the base camp at 4 pm. What is the elevation of the base camp?

Answer: 1000 ft.

16. During which hour was Olaf descending the mountain the fastest? Explain how you know.

Answer: ~~Between 1 pm and 2 pm.~~17. Is the value of $f(x)$ the time or the elevation?

Answer: Elevation



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Topic: Rates of change in a table and a graph

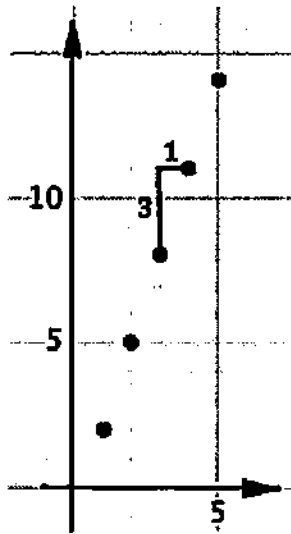
The same sequence is shown in both a table and a graph. Indicate on the table where you see the rate of change of the sequence. Then draw on the graph where you see the rate of change.

1.

n	$f(n)$
1	2
2	5
3	8
4	11
5	14

1 < 3
1 < 3
1 < 3
1 < 3

$m = \frac{3}{1}$ or 3



2.

n	$f(n)$
1	13
2	11
3	9
4	7
5	5

1 < 1
1 < 1
1 < 1
1 < 1

$m = \frac{-2}{1}$ or -2

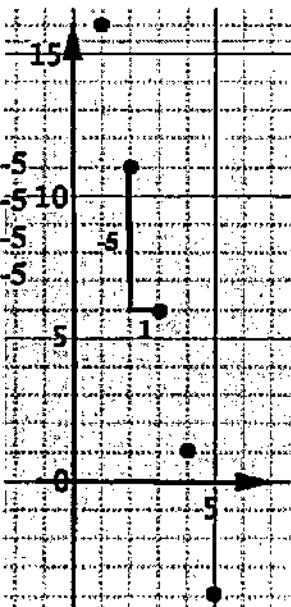


3.

n	$f(n)$
1	16
2	11
3	6
4	1
5	-4

1 < -5
1 < -5
1 < -5
1 < -5

$m = \frac{-5}{1}$ or -5

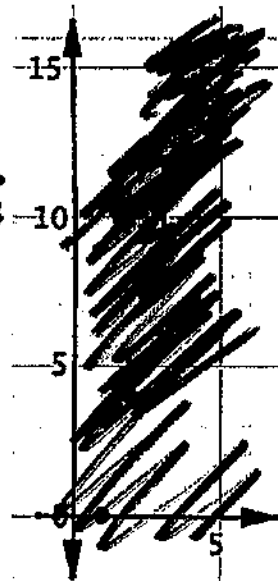


4.

n	$f(n)$
1	0
2	4
3	8
4	12
5	16

1 < 4
1 < 4
1 < 4
1 < 4

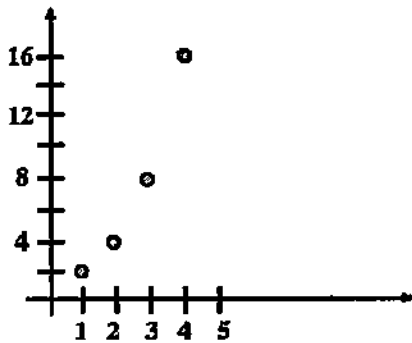
$m = \frac{4}{1}$ or 4



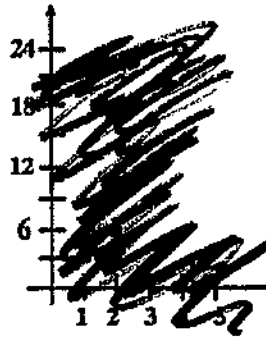
SET

Topic: Recursive and explicit functions of geometric sequencesBelow you are given various types of information. Write the recursive and explicit functions for each geometric sequence. Finally, graph each sequence, making sure you clearly label your axes.

5. 2, 4, 8, 16, ...

Recursive: $f(1) = 2, f(n) = f(n-1) \cdot 2$ Explicit: $f(n) = 2(2)^{n-1}$ or 2^n

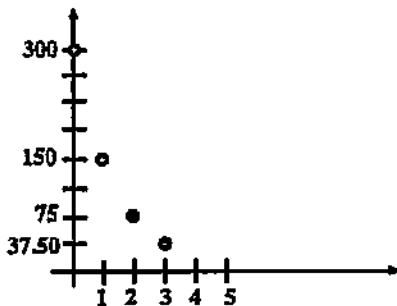
6.



Time (days)	Number of cells
1	3
2	6
3	12
4	24

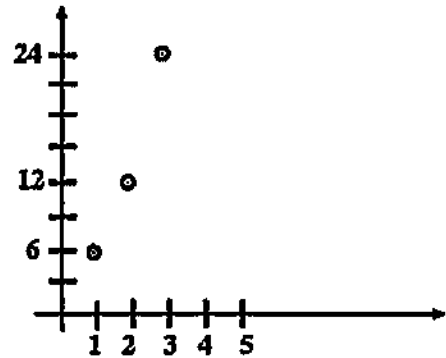
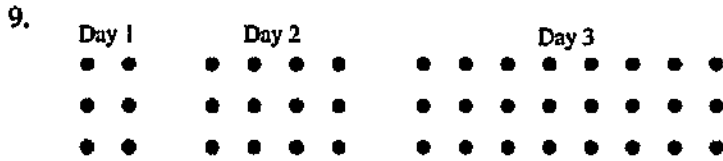
Recursive: ~~scribbled out~~Explicit: ~~scribbled out~~

7. Claire has \$300 in an account. She decides she is going to take out half of what's left in there at the end of each month.

Recursive: $f(0) = 300, f(n) = f(n-1) \cdot \frac{1}{2}$ Explicit: $f(n) = 300 \cdot \frac{1}{2}^n$

8. Tania creates a chain letter and sends it to four friends. Each day each friend is then instructed to send it to four friends and so forth.

Recursive: ~~scribbled out~~Explicit: ~~scribbled out~~



Recursive: $f(1) = 6, f(n) = f(n - 1) \cdot 2$

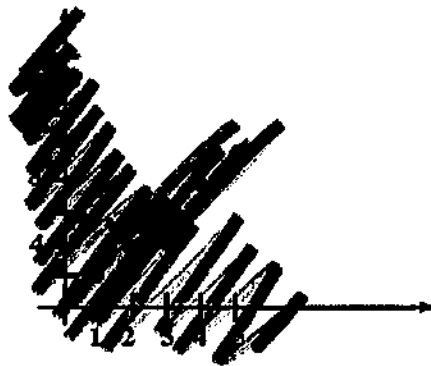
Explicit: $f(n) = 6(2)^{n-1}$

GO

Topic: Recursive and explicit functions of arithmetic sequences

Below you are given various types of information. Write the recursive and explicit functions for each arithmetic sequence. Finally, graph each sequence, making sure you clearly label your axes.

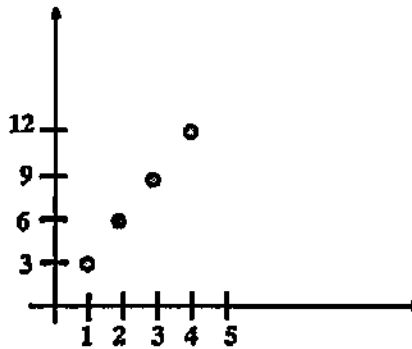
10. 2, 4, 6, 8, ...



Recursive: ~~scribbled out~~

Explicit: ~~scribbled out~~

11.

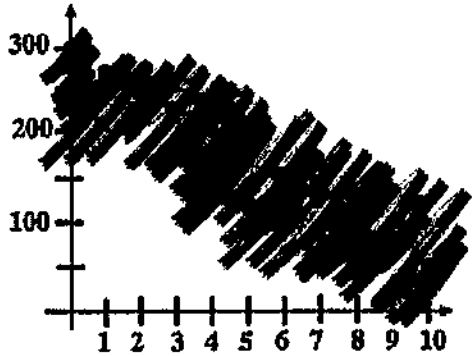


Time (days)	Number of cells
1	3
2	6
3	9
4	12

Recursive: $f(1) = 3, f(n) = f(n - 1) + 3$

Explicit: $f(n) = 3n$ or $3(n - 1) + 3$

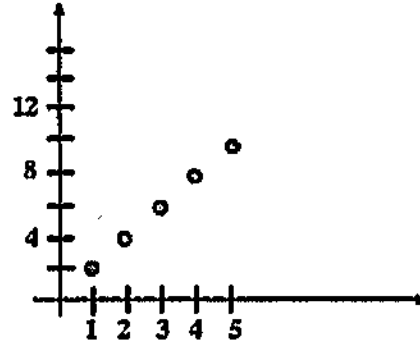
12. Claire has \$300 in an account. She decides she is going to take out \$25 each month.



Recursive: ~~_____~~

Explicit: ~~_____~~

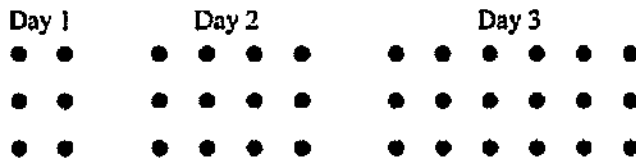
13. Each day Tania decides to do something nice for 2 strangers. What is the relationship between the number people helped and days?



Recursive: $f(1) = 2, f(n) = f(n - 1) + 2$

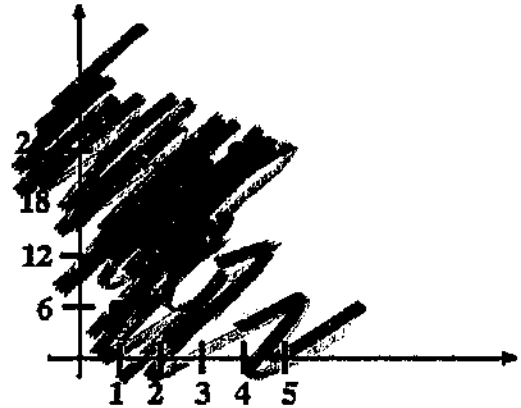
Explicit: $f(n) = 2n$ or $2(n - 1) + 2$

14.



Recursive: ~~_____~~

Explicit: ~~_____~~



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Topic: Finding the common difference

Find the missing terms for each arithmetic sequence and state the common difference.

1. 5, 11, 17, 23, 29, 35...

Common Difference = 6

3. 8, 21, 34, 47, 60...

Common Difference = 13

5. 5, 10, 15, 20, 25...

Common Difference = 5

2. 7, 3, -1, ~~5~~, ~~9~~, -13...

Common Difference = ~~4~~

4. 0, ~~1~~, ~~2~~, 2, $\frac{8}{3}$...

Common Difference = ~~1~~

6. 3, ~~1~~, ~~-1~~, ~~-3~~, -13 ...

Common Difference = ~~-2~~

SET

Topic: Writing the recursive function

Two consecutive terms in an arithmetic sequence are given. Find the recursive function.

7. If $f(3) = 5$ and $f(4) = 8$...

$f(5) = \underline{11}$, $f(6) = \underline{14}$. Recursive Function: $f(n) = f(n - 1) + 3, f(1) = -1$

8. If $f(2) = 20$ and $f(3) = 12$...

$f(4) = \underline{4}$, $f(5) = \underline{-8}$. Recursive Function: ~~$f(n) = f(n - 1) - 8, f(1) = 28$~~

9. If $f(5) = 3.7$ and $f(6) = 8.7$...

$f(7) = \underline{13.7}$, $f(8) = \underline{18.7}$. Recursive Function: $f(n) = f(n - 1) + 5, f(1) = -16.3$

Two consecutive terms in a geometric sequence are given. Find the recursive function.

10. If $f(3) = 5$ and $f(4) = 10$...

$f(5) =$ ~~_____~~ $f(6) =$ ~~_____~~. Recursive Function: ~~_____~~

11. If $f(2) = 20$ and $f(3) = 10$...

$f(4) =$ 5 $f(5) =$ 2.5. Recursive Function: $f(n) = \frac{1}{2}f(n-1), f(1) = 40$

12. If $f(5) = 20.58$ and $f(6) = 2.94$...

$f(7) =$ ~~_____~~ $f(8) =$ ~~_____~~. Recursive Function: ~~_____~~

GO

Topic: Evaluating using function notation

Find the indicated values of $f(n)$.

13. $f(n) = 2^n$ Find $f(5)$ and $f(0)$.

Answer: $f(5) = 32, f(0) = 1$

14. $f(n) = 5^n$ Find $f(4)$ and $f(1)$.

Answer: ~~_____~~ $f(1) = 5$

15. $f(n) = (-2)^n$ Find $f(3)$ and $f(0)$.

Answer: $f(3) = -8, f(0) = 1$

16. $f(n) = -2^n$ Find $f(3)$ and $f(0)$.

Answer: ~~_____~~

17. In what way are the problems in #15 and #16 different?

Answer: In #15, the calculation is $(-2)(-2)(-2) = -8$ and $(-2)^0 = 1$. In #16, the calculation is $-(2 \cdot 2 \cdot 2) = -8$ and $-(2)^0 = -1$.

18. $f(n) = 3 + 4(n-1)$ Find $f(5)$ and $f(0)$.

Answer: ~~_____~~

19. $f(n) = 2(n-1) + 6$ Find $f(1)$ and $f(6)$.

Answer: $f(1) = 6, f(6) = 16$

READY, SET, GO!

Name _____

Period _____

Date _____

READY

Topic: Distinguishing between arithmetic and geometric sequences

Find the missing values for each arithmetic or geometric sequence. Underline whether it has a constant difference or a constant ratio. State the value of the constant difference or ratio. Indicate if the sequence is arithmetic or geometric by circling the correct answer.

1. 5, 10, 15, ____, 25, 30, ____
Answers: 20, 35

Common difference or ratio?

Common Difference/ratio = 5

Arithmetic or geometric?

3. 2, 5, 8, ____, 14, ____, ...
Answers: 11, 17

Common difference or ratio?

Common Difference/ratio = 3

Arithmetic or geometric?

2. 20, 10, ____, 2.5, ____, ...
Answers: ~~5, 1.25~~

~~Common difference~~ or ~~ratio~~?

Common Difference/ratio = ~~_____~~

~~Arithmetic~~ or ~~geometric~~?

4. 30, 24, ____, 12, 6, ...
Answers: ~~18, 3~~

~~Common difference~~ or ~~ratio~~?

Common Difference/ratio = ~~3~~

~~Arithmetic~~ or ~~geometric~~?**SET**

Topic: Recursive and explicit equations

Determine whether the given information represents an arithmetic or geometric sequence. Then write the recursive and the explicit equation for each.

5. 2, 4, 6, 8, ...

Arithmetic or geometric?

Recursive:
 $f(1) = 2, f(n) = f(n-1) + 2$

Explicit:
 $f(n) = 2n$

6. 2, 4, 8, 16, ...

Recursive:
~~_____~~Explicit:
~~_____~~

7.

Time (in days)	Number of dots
1	3
2	7
3	11
4	15

Arithmetic or geometric?

Recursive: $f(1) = 3, f(n) = f(n - 1) + 4$

Explicit: $f(n) = 4n - 1$ or $4(n - 1) + 3$

8.

Time (In days)	Number of cells
1	5
2	8
3	12.8
4	20.48

Recursive: ~~Handwritten scribbles~~

Explicit: ~~Handwritten scribbles~~

9. Michelle likes chocolate but it causes acne. She chooses to limit herself to three chocolate bars every 5 days. (So, she eats part of a bar each day.)

Arithmetic or geometric?

Recursive: $f(1) = 2, f(n) = f(n - 1) + 2$

Explicit: $f(n) = -2n$

10. Scott decides to add running to his exercise routine and runs a total of one mile his first week. He plans to double the number of miles he runs each week.

Recursive: ~~Handwritten scribbles~~

Explicit: ~~Handwritten scribbles~~

11. Vanessa has \$60 to spend on rides at the state fair. Each ride costs \$4.

Arithmetic or geometric?

Recursive: $f(0) = 60, f(n) = f(n - 1) - 4$

Explicit: $f(n) = 60 - 4n$

12. Cami invested \$6,000 into an account that earns 10% interest each year. (Hint: Make a table of values to help yourself.)

Recursive: ~~Handwritten scribbles~~

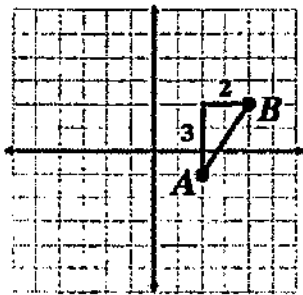
Explicit: ~~Handwritten scribbles~~

GO

Topic: Graphing and counting slope between two points.

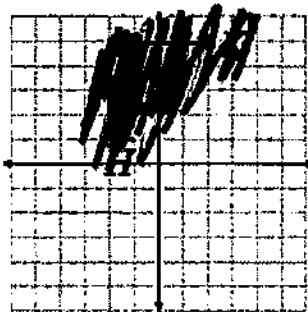
For the following problems two points and a slope are given. Plot and label the 2 points on the graph. Draw the line segment between them. Then sketch on the graph how you count the slope of the line by moving up or down and then sideways from one point to the other.

13. $A(2, -1)$ and $B(4, 2)$



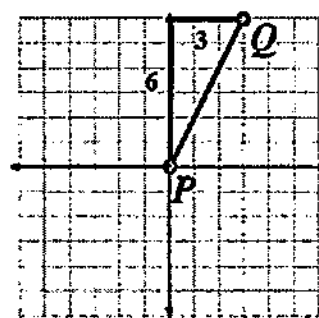
Slope: $m = \frac{3}{2}$

14. $H(-2, 1)$ and $K(2, 5)$



Slope: $m = 1$ or $\frac{1}{1}$

15. $P(0, 0)$ and $Q(3, 6)$



Slope: $m = 2$ or $\frac{2}{1}$

For the following problems, two points are given. Plot and label these points on the graph. Then count the slope.

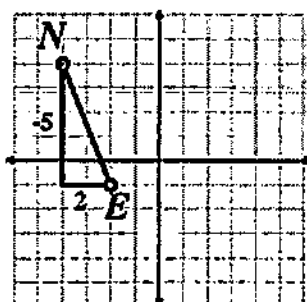
16. $C(-3, 0)$ and $D(0, 5)$



Slope: $m =$



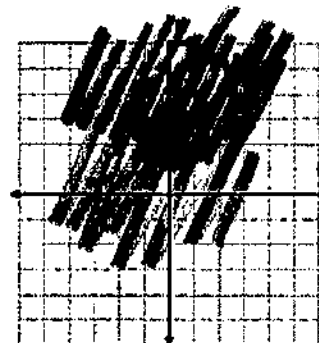
17. $E(-2, -1)$ and $N(-4, 4)$



Slope: $m =$

Answer: $-\frac{5}{2}$

18. $S(0, 3)$ and $W(1, 6)$



Slope: $m =$

Answer:

READY, SET, GO!

Name _____

Period _____

Date _____

READY

Topic: Common Ratios

Find the common ratio for each geometric sequence.

1. 2, 4, 8, 16...

Answer: 2

2. $\frac{1}{2}, 1, 2, 4, 8...$

~~Answer: 2~~

3. -5, 10, -20, 40...

Answer: -2

4. 10, 5, 2.5, 1.25...

Answer: ~~1/2~~

SET

Topic: Recursive and explicit equations

Fill in the blanks for each table; then write the recursive and explicit equation for each sequence.

5. Table 1

x	1	2	3	4	5
y	5	7	9	11	13

Recursive: $f(1) = 5, f(n) = f(n - 1) + 2$

Explicit: $f(n) = 2(n - 1) + 5$ or $2n + 3$

6. Table 2

x	y
1	3
2	9
3	27
4	81
5	243

Recursive: Answer: ~~$f(1) = 3, f(n) = f(n - 1) \cdot 3$~~
 Explicit: ~~$f(n) = 3^n$~~
 Answer: ~~$f(n) = 3^n$~~

7. Table 3

x	y
1	3
2	9
3	27
4	81
5	243

Recursive: Answer: $f(1) = 3,$
 $f(n) = f(n - 1) \cdot 3$
 Explicit: $f(n) = 3^n$
 Answer: $f(n) = 3^n$

8. Table 4

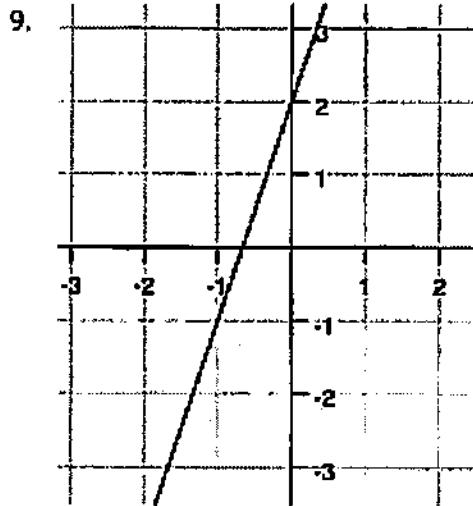
x	y
1	3
2	9
3	27
4	81
5	243

Recursive: Answer: ~~$f(1) = 3, f(n) = f(n - 1) \cdot 3$~~
 Explicit: ~~$f(n) = 3^n$~~
 Answer: ~~$f(n) = 3^n$~~

GO

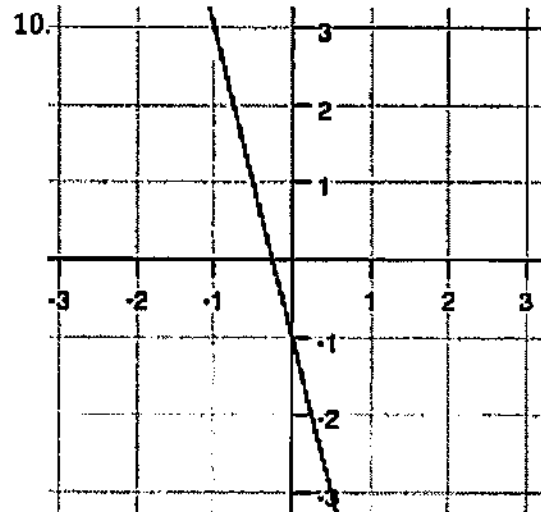
Topic: Writing equations of lines given a graph.

Write each equation of the line in $y = mx + b$ form. Name the value of m and b . Recall that m is the slope or rate of change and b is the y -intercept.



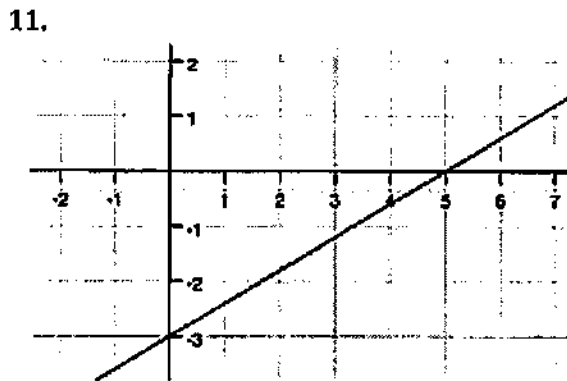
$m =$ $b =$ Equation:

Answer: $m = 3$, $b = 2$, $y = 3x + 2$



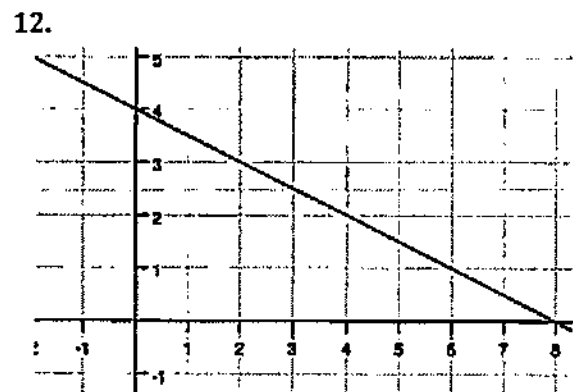
$m =$ $b =$ Equation:

Answer: ~~scribbled out~~



$m =$ $b =$ Equation:

Answer: $m = \frac{3}{5}$, $b = -3$, $y = \frac{3}{5}x - 3$



$m =$ $b =$ Equation:

Answer: ~~scribbled out~~

GO

Topic: Sequences

Determine the recursive and explicit equations for each. (If the sequence is not arithmetic or geometric, identify it as neither and don't write the equations).

7. 5, 9, 13, 17, ... This sequence is: Arithmetic, Geometric, Neither

Recursive Equation: _____ Explicit Equation: _____

Answer: $f(1) = 5, f(n) = f(n - 1) + 4$ Answer: $f(n) = 4(n - 1) + 5$ or $4n + 1$

8. 60, 30, 0, -30, ... This sequence is: ~~Arithmetic, Geometric, Neither~~

Recursive Equation: _____ Explicit Equation: _____

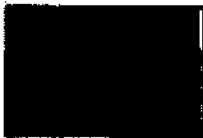
Answer: ~~Arithmetic, Geometric, Neither~~ Answer: ~~Arithmetic, Geometric, Neither~~

9. 60, 30, 15, $\frac{15}{2}$, ... This sequence is: Arithmetic, Geometric, Neither

Recursive Equation: _____ Explicit Equation: _____

Answer: $f(1) = 60, f(n) = \frac{1}{2}f(n - 1)$ Answer: $f(n) = 120 \cdot \frac{1}{2}^n$ or $60 \cdot \frac{1}{2}^{n-1}$

10.



(The number of black tiles above) This sequence is: ~~Arithmetic, Geometric, Neither~~

Recursive Equation: _____ Explicit Equation: _____

Answer: ~~Arithmetic, Geometric, Neither~~ Answer: ~~Arithmetic, Geometric, Neither~~

11. 4, 7, 12, 19, ... This sequence is: Arithmetic, Geometric, Neither

Recursive Equation: _____ Explicit Equation: _____

Answer: $f(1) = 4, f(n) = f(n - 1) + 2n + 1$ Answer: $f(n) = n^2 + 3$

READY, SET, GO!

Name _____

Period _____

Date _____

READY

Topic: Arithmetic and geometric sequences

For each set of sequences, find the first five terms. Then compare the growth of the arithmetic sequence and the geometric sequence. Which grows faster? When?

1. Arithmetic sequence: $f(1) = 2$, common difference, $d = 3$
Geometric sequence: $g(1) = 2$, common ratio, $r = 3$

Arithmetic	Geometric
$f(1) = 2$	$g(1) = 2$
$f(2) = 5$	$g(2) = 6$
$f(3) = 8$	$g(3) = 18$
$f(4) = 11$	$g(4) = 54$
$f(5) = 14$	$g(5) = 162$

- a) Which value do you think will be more, $f(100)$ or $g(100)$? b) Why? Answer: Function g is growing faster than f .

2. Arithmetic sequence: $f(1) = 2$, common difference, $d = 10$
Geometric sequence: $g(1) = 128$, common ratio, $r = \frac{1}{2}$

Arithmetic	Geometric
$f(1) = 2$	$g(1) = 128$
$f(2) = 12$	$g(2) = 64$
$f(3) = 22$	$g(3) = 32$
$f(4) = 32$	$g(4) = 16$
$f(5) = 42$	$g(5) = 8$

- a) Which value do you think will be more, $f(100)$ or $g(100)$? b) Why?

3. Arithmetic sequence: $f(1) = 20$, $d = 10$
Geometric sequence: $g(1) = 2$, $r = 2$

Arithmetic	Geometric
$f(1) = 20$	$g(1) = 2$
$f(2) = 30$	$g(2) = 4$
$f(3) = 40$	$g(3) = 8$
$f(4) = 50$	$g(4) = 16$
$f(5) = 60$	$g(5) = 32$

- a) Which value do you think will be more, $f(100)$ or $g(100)$? b) Why? Answer: Function g is multiplying so it is growing faster.

4. Arithmetic sequence: $f(1) = 50$, common difference, $d = -10$
 Geometric sequence: $g(1) = 1$, common ratio, $r = 2$

Arithmetic	Geometric
$f(1) = 50$	$g(1) = 1$
$f(2) = 40$	$g(2) = 2$
$f(3) = 30$	$g(3) = 4$
$f(4) = 20$	$g(4) = 8$
$f(5) = 10$	$g(5) = 16$

- a) Which value do you think will be more, $f(100)$ or $g(100)$? b) Why?

Answer: $f(100)$ will be more because it is a linear function and $g(100)$ is an exponential function.

5. Arithmetic sequence: $f(1) = 64$, common difference, $d = -2$
 Geometric sequence: $g(1) = 64$, common ratio, $r = \frac{1}{2}$

Arithmetic	Geometric
$f(1) = 64$	$g(1) = 64$
$f(2) = 62$	$g(2) = 32$
$f(3) = 60$	$g(3) = 16$
$f(4) = 58$	$g(4) = 8$
$f(5) = 56$	$g(5) = 4$

- a) Which value do you think will be more, $f(100)$ or $g(100)$? b) Why?

Answer: Function f will be negative and g will be a small fraction close to 0.

6. Considering arithmetic and geometric sequences, would there ever be a time that a geometric sequence does not out grow an arithmetic sequence in the long run as the number of terms of the sequences becomes really large? Explain.

Answer: No.

SET

Topic: Finding missing terms in a geometric sequence

Each of the tables below represents a *geometric sequence*. Find the missing terms in the sequence. Show your method.

7. Table 1

x	1	2	3
y	3	6 or -6	12

Method:

$$\frac{12}{3} = 4 \text{ and since } 3 - 1 = 2, \text{ take the square root of 4: } \sqrt{4} = \pm 2$$

So 2 or -2 is the constant ratio.

SECONDARY MATH I // MODULE 1

SEQUENCES - 1.10

1.10

8. Table 2

x	y
1	
2	
3	
4	

Method:

9. Table 3

x	y
1	5
2	10, -10
3	20
4	40, -40

Method: $\frac{20}{5} = 4$ and $\sqrt[3]{4} =$
 $\sqrt[2]{4} = \pm 2$

10. Table 4

x	y
1	
2	
3	
4	
5	

Method:

GO

Topic: Writing the explicit equations of a geometric sequence

Given the following information, determine the explicit equation for each geometric sequence.

11. $f(1) = 8$, common ratio $r = 2$

Answer: $f(n) = 8(2)^{n-1}$

12. $f(1) = 4$, $f(n) = 3f(n-1)$

Answer:

13. $f(n) = 4f(n-1)$; $f(1) = \frac{5}{3}$

Answer: $f(n) = \frac{5}{3}(4)^{n-1}$

14. Which geometric sequence above has the greatest value at $f(100)$?

Answer:

READY, SET, GO!

Name _____

Period _____

Date _____

READY

Topic: Comparing linear equations and arithmetic sequences

1. Describe the similarities and differences between linear equations and arithmetic sequences.

Similarities	Differences
<p>Answers will vary. Possible answers below:</p> <p><i>They both have a constant rate of change.</i></p> <p><i>When graphed, they make the shape of a line.</i></p> <p><i>They can be represented by the equation, $y = mx + b$.</i></p>	<p>Answers will vary. Possible answers below:</p> <p><i>Linear equations have a line going through its points on a graph.</i></p> <p><i>Sequences are just points and not any of the numbers in between.</i></p>

SET

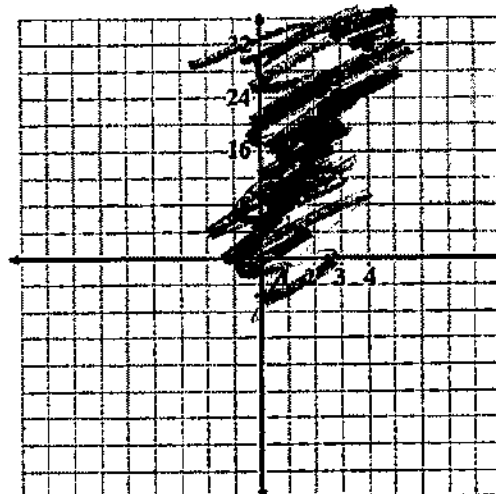
Topic: Representations of arithmetic sequences

Use the given information to complete the other representations for each arithmetic sequence.

2. Recursive Equation: Answer: ~~_____~~ + 8 GraphExplicit Equation: Answer: ~~_____~~

Days	Cost
1	8
2	16
3	24
4	32

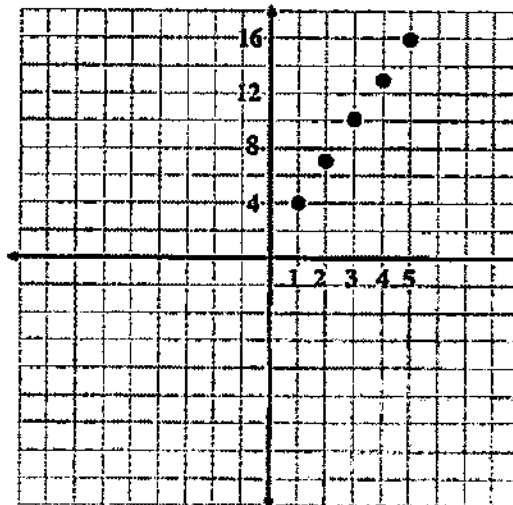
Create a context

~~_____~~

3. Recursive Equation: $f(1) = 4$, $f(n) = f(n - 1) + 3$

Explicit Equation: Answer: $f(n) = 4 + 3(n - 1)$ Graph

Table	
Day	Cookies
1	4
2	7
3	10
4	13
5	16



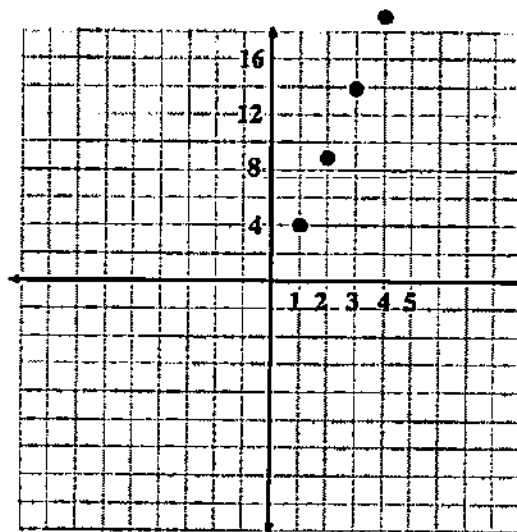
Create a context

Answers will vary. Example:
 Johnny eats 4 cookies one
 day and then eats 3 cookies
 each day after that.

4. Recursive Equation: Answer: ~~scribbled out~~ Graph

Explicit Equation: ~~scribbled out~~

Table	
Day	Cents
1	4
2	9
3	14
4	19
5	24



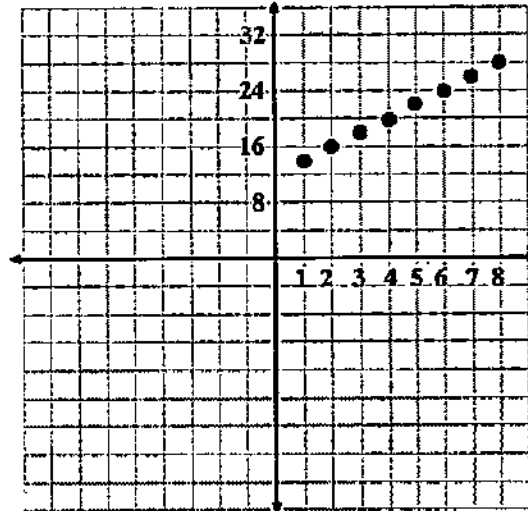
Create a context

Answers will vary. Example:
 Johnny has 4 cents and then
 saves 5 cents each day
 after that.

5. Recursive Equation: Answer: $f(1) = 14, f(n - 1) + 2$ Graph

Explicit Equation: Answer: $f(n) = 14 + 2(n - 1)$

Table	
Row	Seats
1	14
2	16
3	18
4	20



Create a context

Janet wants to know how many seats are in each row of the theater. Jamal lets her know that each row has 2 seats more than the row in front of it. The first row has 14 seats.

GO

Topic: Writing explicit equations

Given the recursive equation for each arithmetic sequence, write the explicit equation.

6. $f(n) = f(n - 1) - 2; f(1) = 8$

Answer: ~~_____~~

7. $f(n) = 5 + f(n - 1); f(1) = 0$

Answer: $f(n) = 5(n - 1)$

8. $f(n) = f(n - 1) + 1; f(1) = \frac{5}{3}$

Answer: ~~_____~~