

READY, SET, GO!

Name _____

Period _____

Date _____

READY

Topic: Recognizing arithmetic and geometric sequences

Predict the next 2 terms in the sequence. State whether the sequence is arithmetic, geometric, or neither. Justify your answer.

1. 4, -20, 100, -500, ...

Answer: 2500, -12500 -- Geometric

Constant ratio of -5

2. 3, 5, 8, 12, ...

[REDACTED]

3. 64, 48, 36, 27, ...

Answer: 20.25, 15.1875 -- Geometric

Constant ratio of $\frac{3}{4}$ or .75

4. 1.5, 0.75, 0, -0.75, ...

[REDACTED]

5. 40, 10, $\frac{5}{2}$, $\frac{5}{8}$, ...

Answer: $\frac{5}{32}$, $\frac{5}{128}$ -- GeometricConstant ratio of $\frac{1}{4}$

6. 1, 11, 111, 1111, ...

[REDACTED]

7. -3.6, -5.4, -8.1, -12.15, ...

Answer: -18.225, -27.3375 -- Geometric

Constant ratio of 1.5

8. -64, -47, -30, -13, ...

[REDACTED]
constant difference

9. Create a predictable sequence of at least 4 numbers that is NOT arithmetic or geometric.

Answers will vary. Example: 1, 12, 123, 1234, ...

SET

Topic: Discrete and continuous relationships

Identify whether the following statements represent a *discrete* or a *continuous* relationship.10. The hair on your head grows $\frac{1}{2}$ inch per month. A [REDACTED]

11. For every ton of paper that is recycled, 17 trees are saved. Answer: Discrete

12. Approximately 3.24 billion gallons of water flow over Niagara Falls daily. [REDACTED]

13. The average person laughs 15 times per day. Answer: Discrete

14. The city of Buenos Aires adds 6,000 tons of trash to its landfills every day. [REDACTED]

15. During the Great Depression, stock market prices fell 75%. Answer: Discrete

SECONDARY MATH I // MODULE 2
 LINEAR & EXPONENTIAL FUNCTIONS - 2.1

2.1

GO

Topic: Solving one-step equations

Either find or use the unit rate for each of the questions below.

16. Apples are on sale at the market 4 pounds for \$2.00. What is the price for one pound?

[REDACTED]

17. Three apples weigh about a pound. About how much would one apple cost? (Round to the nearest cent.)

Answer: \$.17

18. One dozen eggs cost \$1.98. How much does 1 egg cost? (Round to the nearest cent.)

[REDACTED]

19. One dozen eggs cost \$1.98. If the charge at the register for only eggs, without tax, was \$11.88, how many dozen were purchased?

Answer: 6

20. Best Buy Shoes had a back to school special. The total bill for four pairs of shoes came to \$69.24 (before tax.) What was the average price for each pair of shoes?

[REDACTED]

21. If you only purchased 2 pair of shoes at Best Buy Shoes instead of the four described in problem 20, how much would you have paid, based on the average price?

Answer: \$34.62

Solve for x . Show your work.

22. $6x = 72$

[REDACTED]

23. $4x = 200$

Answer: $x = 50$

24. $3x = 50$

[REDACTED]

25. $12x = 25.80$

Answer: $x = 2.15$

26. $\frac{1}{2}x = 17.31$

[REDACTED]

27. $4x = 69.24$

Answer: $x = 17.31$

28. $12x = 198$

[REDACTED]

29. $1.98x = 11.88$

Answer: $x = 6$

30. $\frac{1}{4}x = 2$

[REDACTED]

31. Some of the problems 22 – 30 could represent the work you did to answer questions 16 – 21. Write the number of the equation next to the story it represents.

Answer: #16 and 23, #17 and 24, #18 and 28, #19 and 29, #20 and 27, #21 and 27



Name

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READY

Topic: Comparing rates of change in linear situations.

State which situation has the greatest rate of change

- 1. The amount of stretch in a short bungee cord stretches 6 inches when stretched by a 3 pound weight. A slinky stretches 3 feet when stretched by a 1 pound weight.

Answer: Slinky

- 2. A sunflower that grows 2 inches every day or an amaryllis that grows 18 inches in one week.



- 3. Pumping 25 gallons of gas into a truck in 3 minutes or filling a bathtub with 40 gallons of water in 5 minutes.

Answer: 25 gallons in 3 minutes

- 4. Riding a bike 10 miles in 1 hour or jogging 3 miles in 24 minutes.



SET

Topic: Discrete and continuous relationships

Identify whether the following items best fit with a *discrete* or a *continuous* model. Then determine whether it is a *linear (arithmetic)* or *exponential (geometric)* relationship that is being described.

- 5. The freeway construction crew pours 300 ft of concrete in a day. Answer: Continuous, linear

- 6. For every hour that passes, the amount of area infected by the bacteria doubles.

- 7. To meet the demands placed on them the brick layers have started laying 5% more bricks each day.

- 8. The average person takes 10,000 steps in a day. Answer: Discrete, geometric

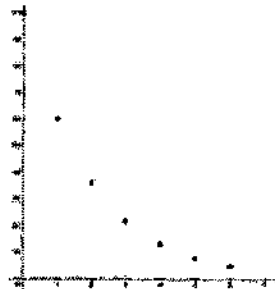
- 9. The city of Buenos Aires has been adding 8% to its population every year. Answer: Discrete, geometric

- 10. At the headwaters of the Mississippi River the water flows at a surface rate of 1.2 miles per hour.

11. a. $f(n) = f(n - 1) + 3; f(1) = 5$

Answer: Discrete, linear

b.



Answer: Discrete, geometric

c. $g(x) = 2^x(7)$

Answer: Continuous, exponential

GO

Topic: Solving one-step equations

Solve the following equations. Remember that what you do to one side of the equation must also be done to the other side. (Show your work, even if you can do these in your head.)

Example: Solve for x . $1x + 7 = 23$ Add -7 to both sides of the equation.

$$\begin{array}{r} 1x + 7 = 23 \\ -7 = -7 \\ \hline 1x + 0 = 16 \\ \text{Therefore } 1x = 16 \end{array}$$

Example: Solve for x . $9x = 63$ Multiply both sides of the equation by $\frac{1}{9}$.

$$\begin{array}{r} 9x = 63 \\ \left(\frac{1}{9}\right) 9x = \left(\frac{1}{9}\right) 63 \\ \left(\frac{9}{9}\right) x = \frac{63}{9} \\ 1x = 7 \end{array}$$

Note that multiplying by $\frac{1}{9}$ gives the same result as dividing everything by 9.

12. $1x + 16 = 36$

13. $1x - 13 = 10$

Answer: $x = 23$

14. $1x - 8 = -3$

15. $8x = 56$

Answer: $x = 7$

16. $-11x = 88$

17. $425x = 850$

Answer: $x = 2$

18. $\frac{1}{6}x = 10$

19. $-\frac{4}{7}x = -1$

Answer: $x = \frac{7}{4}$

20. $\frac{3}{4}x = -9$



Name _____

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Date _____

READY

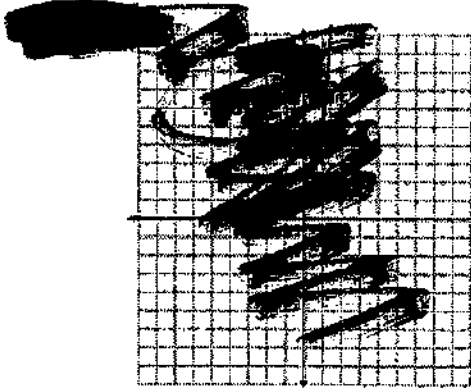
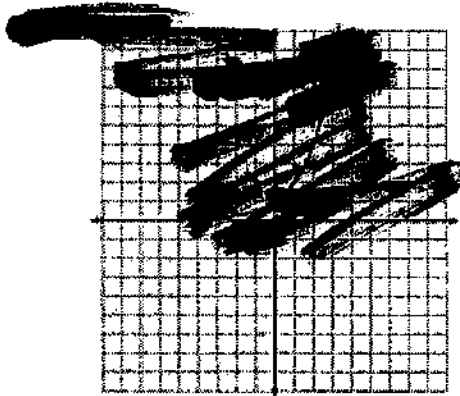
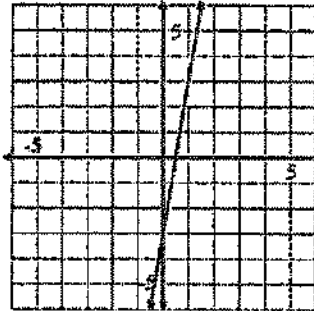
Topic: Comparing rates of change in both linear and exponential situations.

Identify whether situation "a" or situation "b" has a greater rate of change.

1. a.

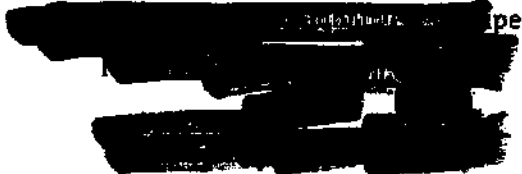
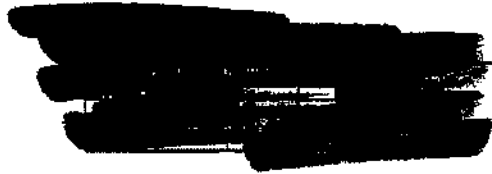
x	y
-10	-48
-9	-43
-8	-38
-7	-33

b.



3. a. Lee has \$25 withheld each week from his salary to pay for his subway pass.

b. Jose owes his brother \$50. He has promised to pay half of what he owes each week until the debt is paid.



5. a. $y = 2(5)^x$

b. In the children's book, *The Magic Pot*, every time you put one object into the pot, two of the same object come out. Imagine that you have 5 magic pots.

SET

Topic: Recognizing linear and exponential functions.

Based on each of the given representations of a function determine if it is linear, exponential or neither.

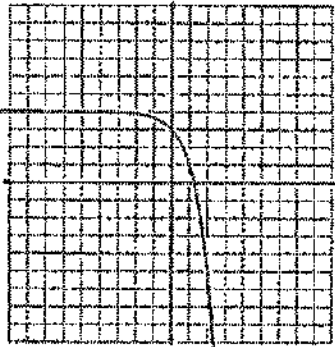
6. The population of a town is decreasing at a rate of 1.5% per year.



8. $3x + 4y = -3$



10.



7. Joan earns a salary of \$30,000 per year plus a 4.25% commission on sales.

Answer: Exponential

9. The number of gifts received each day of "The 12 Days of Christmas" as a function of the day.

("On the 4th day of Christmas my true love gave to me, 4 calling birds, 3 French hens, 2 turtledoves, and a partridge in a pear tree.")

Answer: Neither

Side of a square	Area of a square
1 inch	1 in ²
2 inches	4 in ²
3 inches	9 in ²
4 inches	16 in ²

Answer: Neither

GO

Topic: Geometric means

For each geometric sequence below, find the missing terms in the sequence.

12.

x	1	2	3	4	5
y					

13.

x	1	2	3	4	5
y	1/9	-1/3	1	-3	9

14.

x	1	2	3	4	5
y					

SECONDARY MATH I // MODULE 2
 LINEAR & EXPONENTIAL FUNCTIONS - 2.3

2.3

15.

x	1	2	3	4	5
y	g	gz	gz ²	gz ³	gz ⁴

16.

x	1	2	3	4	5
y	-3	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Find the rate of change (slope) in each of the exercises below.

17.

x	g(x)
-5	11
-3	4
-2	0.5
0	-6

Answer: $m = -3.5$

18.

t	h(t)
3	13
8	23
18	43
23	53

19.

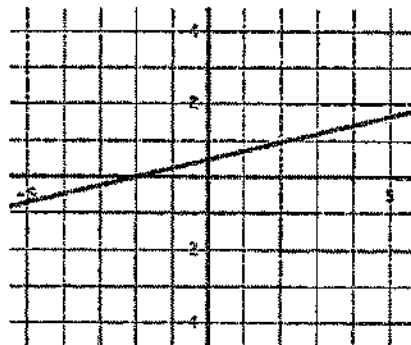
n	f(n)
-7	20
-5	24
-1	32
2	38

Answer: $m = 2$

20. (2, 5) (8, 29)

[REDACTED]

21.



Answer: $m = \frac{1}{4}$

22. (-3, 7) (8, 29)

[REDACTED]

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READY

Topic: Comparing arithmetic and geometric sequences.

The first and fifth terms of a sequence are given. Fill in the missing numbers if it is an arithmetic sequence. Then fill in the numbers if it is a geometric sequence.

Example:		+80	+80	+80	+80	
Arithmetic	4	84	164	244	324	
Geometric	4	12	36	108	324	

$\xrightarrow{\times 3}$ $\xrightarrow{\times 3}$ $\xrightarrow{\times 3}$ $\xrightarrow{\times 3}$

1.

Arithmetic	3	14.25	25.5	36.75	48
Geometric	3	6	12	24	48

2.

Arithmetic	████████	████████	████████	████████	████████
Geometric	████████	████████	████████	████████	████████

3.

Arithmetic	-12	-9.1875	-6.375	-3.5625	-0.75
Geometric	-12	-6	-3	-1.5	-0.75

SET

Topic: Distinguishing specifics between sequences and linear or exponential functions.

Answer the questions below with respect to the relationship between sequences and the larger families of functions.

 4. If a relationship is modeled with a continuous function which of the domain choices is a possibility?

 A. $\{x \mid x \in \mathbb{R}, x \geq 0\}$ B. $\{x \mid x \in \mathbb{Q}, x \geq 0\}$ C. $\{x \mid x \in \mathbb{Z}, x \geq 0\}$ D. $\{x \mid x \in \mathbb{N}\}$

5. Which one of the options below is the mathematical way to represent the Natural Numbers?

 A. $\{x \mid x \in \mathbb{R}, x \geq 0\}$ B. $\{x \mid x \in \mathbb{Q}, x \geq 0\}$ C. $\{x \mid x \in \mathbb{Z}, x \geq 0\}$ D. $\{x \mid x \in \mathbb{N}\}$

6. Only one of the choices below would be used for a continuous exponential model, which one is it?

[Redacted choices]

7. Only one of the choices below would be used for a continuous linear model, which one is it?

- A. $f(x) = f(x - 1) \cdot 4, f(1) = 3$
- B. $g(x) = 4^x(5)$
- C. $h(t) = 3t - 5$
- D. $k(n) = k(n - 1) - 5, k(1) = 32$

8. What domain choice would be most appropriate for an arithmetic or geometric sequence?

[Redacted choices]

9. What attributes will arithmetic or geometric sequences always have?
(There could be more than one correct choice. Circle all that apply.)

- A. Continuous
- B. Discrete
- C. Domain: $\{x \mid x \in N\}$
- D. Domain: $\{x \mid x \in R\}$
- E. Negative x-values
- F. something constant
- G. Recursive Rule

10. What type of sequence fits with linear mathematical models?

What is the difference between this sequence type and the overarching umbrella of linear relationships? (Use words like discrete, continuous, domain and so forth in your response.)

[Redacted response]

11. What type of sequence fits with exponential mathematical models? **Answer: Geometric**

What is the difference between this sequence type and the overarching umbrella of exponential relationships? (Use words like discrete, continuous, domain and so forth in your response.)

Answer: Geometric sequences are a specific type of exponential relationship that are discrete and have a domain in the natural numbers.

GO

Topic: Writing explicit equations for linear and exponential models.

Write the explicit equations for the tables and graphs below. This is something you really need to know. Persevere and do all you can to figure them out. Remember the tools we have used.

(#21 is bonus. Give it a try.)

 12.

x	$f(x)$
2	-4
3	-11
4	-18
5	-25

 13.

x	$f(x)$
-1	$\frac{2}{5}$
0	2
1	10
2	50

 14.

x	$f(x)$
2	-24
3	-48
4	-96
5	-192

 15.

x	$f(x)$
-4	81
-3	27
-2	9
-1	3

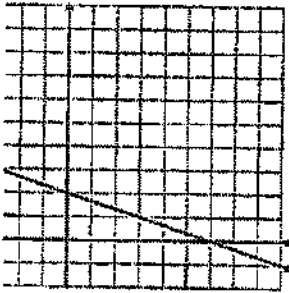
Answer:

Answer: $f(x) = 2(5)^x$

An

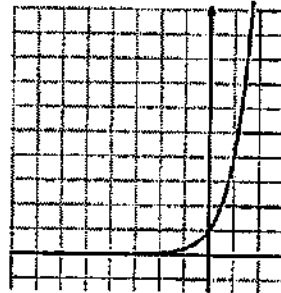
Answer: $f(x) = \frac{1}{3}^x$

16.



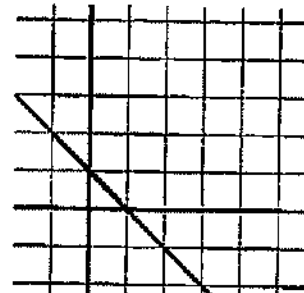
An

17.

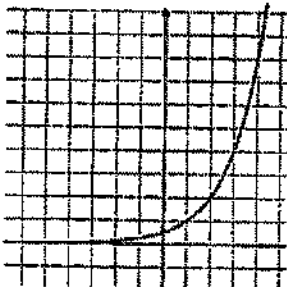


Answer: $f(x) = 4^x$

18.

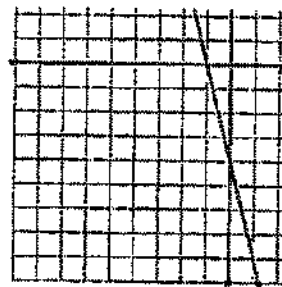


19.

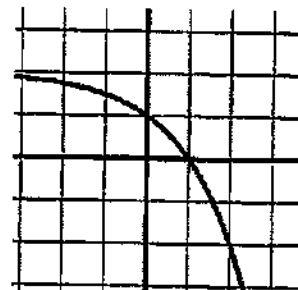


Answer: $f(x) = 2^{x-1}$

20.



21.



Answer: $f(x) = -2^x + 2$

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READY

Topic: Writing equations of lines.

Write the equation of a line in slope-intercept form: $y = mx + b$, using the given information.

1. $m = -7, b = 4$

2. $m = 3/8, b = -3$

3. $m = 16, b = -1/5$

Answer: $y = -7x + 4$

[REDACTED]

Answer: $y = 16x - \frac{1}{5}$

Write the equation of the line in point-slope form: $y = m(x - x_1) + y_1$, using the given information.

4. $m = 9, (0, -7)$

5. $m = 2/3, (-6, 1)$

6. $m = -5, (4, 11)$

[REDACTED] Answer: $y = \frac{2}{3}(x + 6) + 1$

[REDACTED]

7. $(2, -5) (-3, 10)$

8. $(0, -9) (3, 0)$

9. $(-4, 8) (3, 1)$

Answer: $y = -3(x - 2) - 5$

or

$y = -3(x + 3) + 10$

[REDACTED]

or

[REDACTED]

Answer: $y = -1(x + 4) + 8$

or

$y = -1(x - 3) + 1$

SECONDARY MATH 1 // MODULE 2
 LINEAR & EXPONENTIAL FUNCTIONS ~ 2.5

2.5

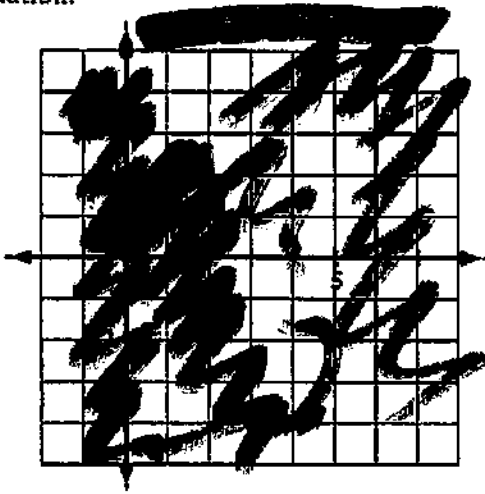
SET

Topic: Graphing linear and exponential functions

Make a graph of the function based on the following information. Add your axes. Choose an appropriate scale and label your graph. Then write the equation of the function.

10. The beginning value is 5 and its value is 3 units smaller at each stage.

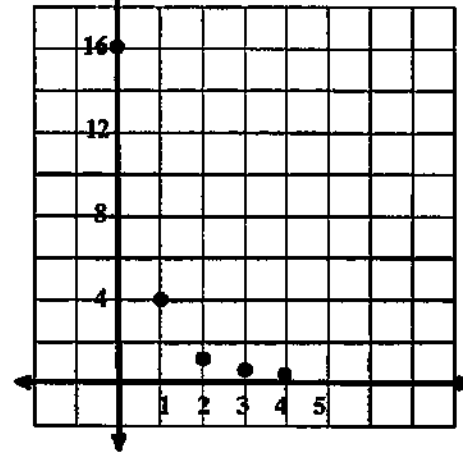
Equation:



11. The beginning value is 16 and its value is $\frac{1}{4}$ smaller at each stage.

Equation:

Answer: $y = 16 \cdot \frac{1}{4}^x$



12. The beginning value is 1 and its value is 10 times as big at each stage.

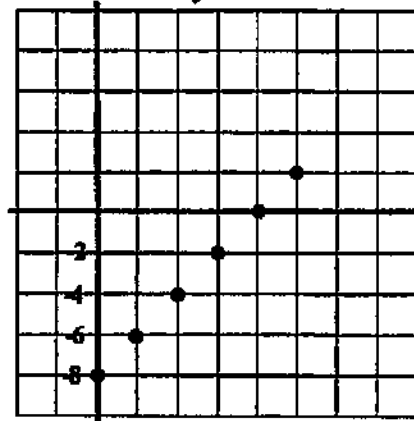
Equation:



13. The beginning value is -8 and its value is 2 units larger at each stage.

Equation:

Answer: $y = 2x - 8$



GO

Topic: Equivalent equations

Prove that the two equations are equivalent by simplifying the equation on the right side of the equal sign. The justification in the example is to help you understand the steps for simplifying. You do NOT need to justify your steps.

Example:	Justification
$2x - 4 = 8 + x - 5x + 6(x - 2)$	Add $x - 5x$ and distribute the 6 over $(x - 2)$
$= 8 - 4x + 6x - 12$	Combine like terms.
$= -4 + 2x$	
$2x - 4 = 2x - 4$	Commutative property of addition

14. $x - 5 = 5x - 7 + 2(3x + 1) - 10x$

[Redacted work for problem 14]

15. $6 - 13x = 24 - 10(2x + 8) + 62 + 7x$

Answer: $6 - 13x = 24 - 20x - 80 + 62 + 7x$
 $6 - 13x = -13x + 6$
 $6 - 13x = 6 - 13x$

16. $14x + 2 = 2x - 3(-4x - 5) - 13$

[Redacted work for problem 16]

17. $x + 3 = 6(x + 3) - 5(x + 3)$

Answer: $x + 3 = 6x + 18 - 5x - 15$
 $x + 3 = x + 3$

18. $4 = 7(2x + 1) - 5x - 3(3x + 1)$

[Redacted work for problem 18]

19. $x = 12 + 8x - 3(x + 4) - 4x$

Answer: $x = 12 + 8x - 3x - 12 - 4x$
 $x = x$

20. Write an expression that equals $(x - 13)$. It must have at least two sets of parentheses and one minus sign. Verify that it is equal to $(x - 13)$.

[Redacted work for problem 20]

READY, SET, GO!

Name _____

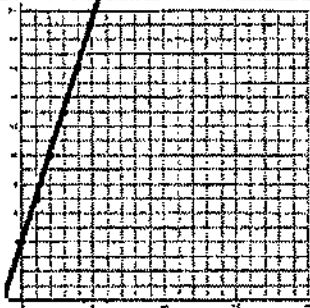
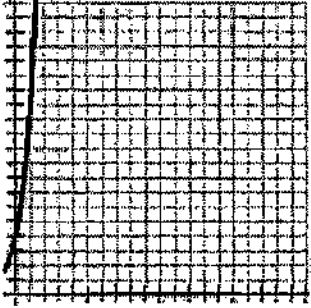
Period _____

Date _____

READY

Topic: Comparing linear and exponential models.

Comparing different characteristics of each type of function by filling in the cells of each table as completely as possible.

	$y = 4 + 3x$	$y = 4(3^x)$																								
1. Type of growth	Linear	Exponential																								
2. What kind of sequence corresponds to each model?	[REDACTED]	[REDACTED]																								
3. Make a table of values	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>-1</td> <td>1</td> </tr> <tr> <td>0</td> <td>4</td> </tr> <tr> <td>1</td> <td>7</td> </tr> <tr> <td>2</td> <td>10</td> </tr> <tr> <td>3</td> <td>13</td> </tr> </tbody> </table>	x	y	-1	1	0	4	1	7	2	10	3	13	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>-1</td> <td>4/3</td> </tr> <tr> <td>0</td> <td>4</td> </tr> <tr> <td>1</td> <td>12</td> </tr> <tr> <td>2</td> <td>36</td> </tr> <tr> <td>3</td> <td>108</td> </tr> </tbody> </table>	x	y	-1	4/3	0	4	1	12	2	36	3	108
x	y																									
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0	4																									
1	12																									
2	36																									
3	108																									
4. Find the rate of change	[REDACTED]	[REDACTED]																								
5. Graph each equation. Compare the graphs. What is the same? What is different?																										
6. Find the y-intercept for each function.	[REDACTED]	[REDACTED]																								

SECONDARY MATH I // MODULE 2
 LINEAR & EXPONENTIAL FUNCTIONS - 2.6

2.6

7. Find the y-intercepts for the following equations

a) $y = 3x$ Answer: (0,0)

b) $y = 3^x$ Answer: (0,1)

8. Explain how you can find the y-intercept of a linear equation and how that is different from finding the y-intercept of a geometric equation.

[REDACTED]

ex: [REDACTED]

SET

Topic: Efficiency with different forms of linear and exponential functions.

For each exercise or problem below use the given information to determine which of the forms would be the most efficient to use for what is needed. (See task 2.6, Linear: slope-intercept, point-slope form, recursive, Exponential: explicit and recursive forms)

9. Jasmine has been working to save money and wants to have an equation to model the amount of money in her bank account. She has been depositing \$175 a month consistently, she doesn't remember how much money she deposited initially, however on her last statement she saw that her account has been open for 10 months and currently has \$2475 in it. Create an equation for Jasmine.

Which equation form do you choose?

Answer: Point-Slope

Write the equation.

Answer: $y = 175(x - 10) + 2475$

10.

The table below shows the number of rectangles created every time there is a fold made through the center of a paper. Use this table for each question.

Folds	Rectangles
1	2
2	4
3	8
4	16

A. Find the number of rectangles created with 5 folds.

[REDACTED]

[REDACTED]

[REDACTED]

B. Find the number of rectangles created with 14 folds.

[REDACTED]

A [REDACTED]

[REDACTED]

11. Using a new app that I just downloaded I want to cut back on my calorie intake so that I can lose weight. I currently weigh 90 kilograms, my plan is to lose 1.2 kilograms a week until I reach my goal. How can I make an equation to model my weight loss for the next several weeks.

Which equation form do you chose?

Write the equation.

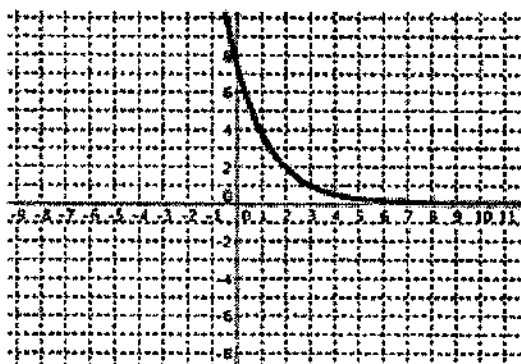
Answer: Slope-intercept

Answer: $y = -1.2x + 90$

12. Since Scott started doing his work out plan Janet has been inspired to set her self a goal to do more exercise and walk a little more each day. She has decided to walk 10 meters more every day. On the day 20 she walked 800 meters. How many meters will she walk on day 21? On day 60?

For each equation provided state what information you see in the equation that will help you graph it, then graph it. Also, use the equation to fill in any four coordinates on the table.

13. $y = \left(\frac{1}{2}\right)^x 8$



What do you know from the equation that helps you to graph the function?

Answer: The y-intercept is 8 and each number after is half of the one before. (Exponential)

14. $y = 5(x - 2) - 6$



What do you know from the equation that helps you to graph the function?

Answer: [Redacted]

SECONDARY MATH I // MODULE 2
 LINEAR & EXPONENTIAL FUNCTIONS - 2.6

2.6

GO

Topic: Solving one-step equations with justification.

Recall the two properties that help us solve equations.


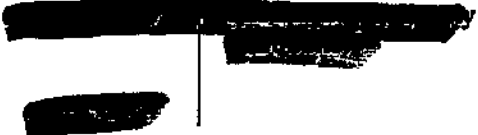

The Additive property of equality states:

You can add any number to both sides of an equation and the equation will still be true.

The Multiplicative property of equality states:

You can multiply any number to both sides of an equation and the equation will still be true.

Solve each equation. Justify your answer by identifying the property(s) you used to get it.

Example 1: $x - 13 = 7$ $+13 \quad +13$ $x + 0 = 20$ $x = 20$		<u>Justification</u> additive property of equality addition additive identity (You added 0 and got x.)	
Example 2: $5x = 35$ $\frac{5}{5}x = \frac{35}{5}$ $1x = 7$		<u>Justification</u> multiplicative property of equality (multiplied by $\frac{1}{5}$) multiplicative identity (A number multiplied by its reciprocal = 1)	
15. $\frac{3x}{3} = \frac{15}{3}$ $x = 5$	<u>Justification</u> Division Property of Equality	16. $x - 10 = 2$ 	<u>Justification</u>
17. $-16 = x + 11$ $-11 \quad -11$ $x = -27$	<u>Justification</u> Subtraction Property of Equality	18. $6 + x = 10$ 	<u>Justification</u>
19. $\frac{6x}{6} = \frac{18}{6}$ $x = 3$	<u>Justification</u> Division Property of Equality	20. $-3x = 2$ 	<u>Justification</u>