Name: _______________ Score: _____ out of 70

Folder Check Algebra Unit #___6___

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Worksheet Policy

-0 All Questions Done

-1 More than Half Done

-2 Only Groupwork Q's

-3 Less than Half Done

-4 Blank/Absent

Notes Policy

-0 All boxes filled

-1 One Empty Box

-2 Two Empty Boxes

-3 Less than Half Done

-4 Blank/Absent

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Name: ______________________ Date: ______________________

Write the following without using exponents and then simplify: Unit 6 Lesson 1

Product (Multiply)

1. $2^2 \cdot 2^5$

2. $\left(\frac{3}{4}\right)\left(\frac{3}{4}\right)^2$

3. $(-4)^2(-4)^3$

4. $y^3 \cdot y^4$

5. $2x^3 \cdot 4x^4$

6. $(3^4d^2)(3d^4)$

Power Evaluate and/or Simplify.

7. $(2^3)^2$

8. $(5^3)^4$

9. $(x^4)^2$

10. $(2x^3)^3$

11. $(4^3y^2)^3$

Quotient (Divide) Evaluate and/or Simplify.

12. $\frac{2^4}{2^2}$

13. $\frac{x^5}{x^3}$

14. $\frac{10x^7}{2x^2}$

15. $\frac{3y^6}{12y^4}$

16. $\frac{2^5x^4y^5}{2^2x^3y}$

6.1 PRACTICE

Write the following using exponents.

17. $4 \cdot 4 \cdot 4 \cdot 4$	18. $x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x$	19. $2 \cdot 2 \cdot y \cdot y \cdot y$	20. $\left(\frac{1}{4}\right)\left(\frac{1}{4}\right)\left(\frac{1}{4}\right)\left(\frac{1}{4}\right)\left(\frac{1}{4}\right)$

21. $3 \cdot 3 \cdot 3 \cdot x \cdot x \cdot y \cdot y \cdot y \cdot y$	22. $(-2)(-2)(m)(m)(m)$	23. $5 \cdot 5 \cdot m \cdot n \cdot n \cdot n \cdot n \cdot n$

Write the following without using exponents. EXPAND

24. 7^5	25. m^3	26. 6^3y^2	27. $\left(\frac{2}{3}\right)^3$
28. 4^3w^2	29. $\left(\frac{4}{5}\right)^3 x^4$	30. $2a^3b^4$	31. $3^2x^5y^2$

Write the following without using exponents and then simplify. PRODUCT (Multiply)

32. $4^2 \cdot 4^6$	33. $3^3 \cdot 3$	34. $2^4 \cdot 2^3 \cdot 2$	35. $x^4 \cdot x^2$
36. $2x^4 \cdot 3x^2$	37. $3y \cdot y$	38. $z^2 \cdot z \cdot z^3$	39. $3m^4(2m^2)$

Write the following without using exponents and then simplify. POWER

40. $(3^5)^2$	41. $(7^4)^3$	42. $[(-5)^3]^4$
43. $(y^4)^6$	44. $(3n^5)^2$	45. $(7x^2y)^3$

Name: ____________________ Unit # 6 Lesson # 1

Activator

New Vocabulary (1 of 4)

New Vocabulary (2 of 4)

New Vocabulary (3 of 4)

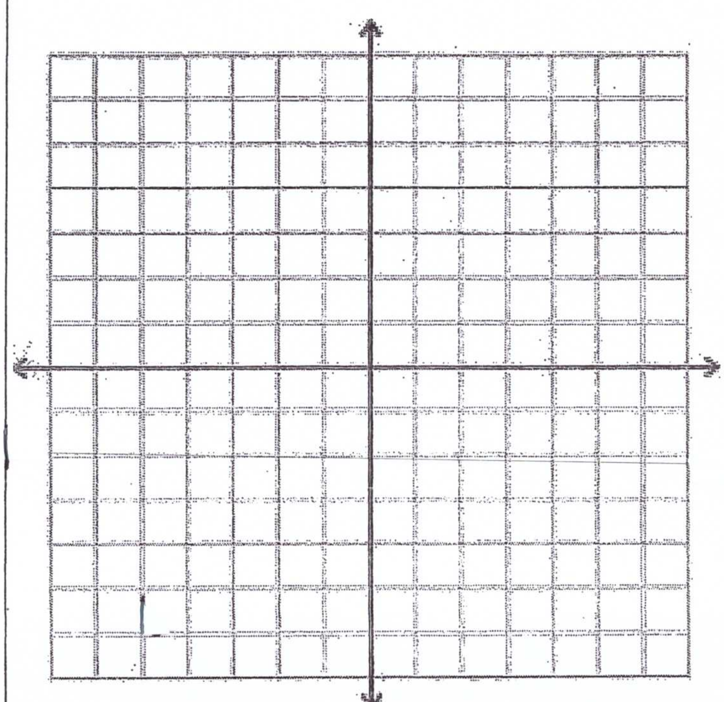
Unit # 6 Lesson # 1

Misconception (4 of 4)

Work Period

Exit Ticket

Extra Graph Paper



Name: ______________________ Date: ______________

Sequences Unit 6 Lesson 2

Algebra

Find the common ratio of each sequence. (what is the pattern?)

C is the Common Multiplier

1. 2, 8, 32, 128, . . .

$2 \xrightarrow{(4)} 8 \xrightarrow{(4)} 32 \xrightarrow{(4)} 128$

Multiply by

$C = \frac{A_2}{A_1} = \frac{8}{2} = 4$

2. -3, -12, -48, -192, . . .

3. -80, 20, -5, 1.25, . . .

4. 0.45, 0.9, 1.8, 3.6

Find the next three terms of each sequence.

5. 3, 6, 12, 24, ___, ___, ___

$3 \xrightarrow{(2)} 6 \xrightarrow{(2)} 12 \xrightarrow{(2)} 24$

#6 243, 81, 27, ___, ___, ___

Determine whether each sequence is *arithmetic* or *geometric*.

#7 2, 14, 98, 686, . . .

What is C? ___

#8 100, 50, 25, ...

What is C?

Find the first, fourth term in the sequence.

9. $A(x) = -5 \cdot 3^x$

x	A(x)
1	
4	

10. $A(x) = 5 \cdot (-3)^x$

x	A(x)
1	
4	

Write a rule and find the given term in each geometric sequence described below.

11. What is the fifth term when the first term is -6 and the common ratio is 2?

_____, _____, _____, _____, _____

1st terms ... fifth term

12. What is the seventh term when the first term is 2 and the common ratio is 3.

_____, _____, _____, _____, _____, _____, _____

1st term ... Seventh Term

13. Write the geometric sequence from #11

$g(x) = \_\_\_(\quad)^{\_\_\_ -1}$

initial, pattern, exponent

14. Write the geometric sequence from #12.

$g(x) = \_\_\_(\quad)^{\_\_\_ -1}$

initial, pattern, exponent

15. Table for #11

X	1	2	3	4	5
g(x)					

Table for #12

X	1	2	3	4	5	6	7
g(x)							

Name: ____________________ Unit # 6 Lesson # 2

Activator

New Vocabulary (1 of 4)

New Vocabulary (2 of 4)

New Vocabulary (3 of 4)

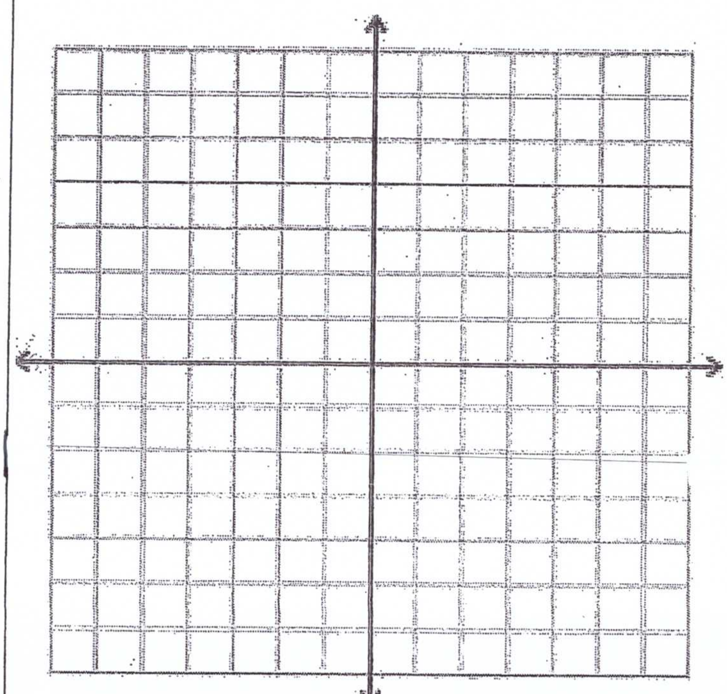
Unit # 6 Lesson # 2

Misconception (4 of 4)

Work Period

Exit Ticket

Extra Graph Paper



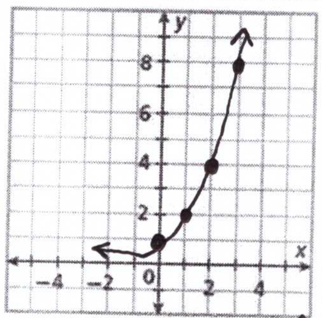
Name ____________________ Date: ____________________

Growth: Tables, Graphs & Evaluating Equations Unit 6 Lesson 3

Complete the tables and graph each function, then answer the questions.

1) $f(x) = (2)^x$

x	$f(x)$
0	1
1	2
2	4
3	8

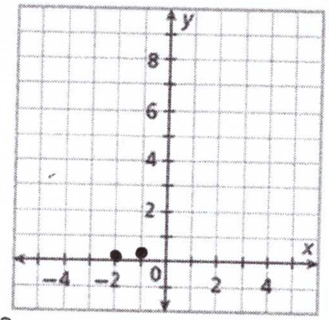


(1B) What is the y-intercept? (0,1)

(1C) What is the multiplier/common ratio? 2

2) $f(x) = (4)^x$

x	$f(x)$
-2	0.0625
-1	0.25
0	
1	
2	16

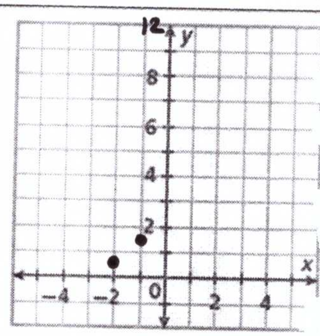


(2B) What is the y-intercept?

(2C) What is the multiplier/common ratio?

3) $f(x) = 3(2)^x$

x	$f(x)$
-2	0.75
-1	1.5
0	
1	
2	



(3B) What is the y-intercept?

(3C) What is the multiplier/common ratio?

#4 Show f(5) for #2, #6, #7

$f(x) = \_\_\_ (\ )^x$

$f(5) = \_\_\_$

$f(5) = (\_)(\_)(\_)(\_)(\_)$

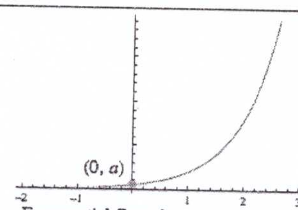
$f(5) = \_\_\_$

Exponential Growth Functions

$f(x) = b \bullet c^x$

$y = zero \bullet (multiplier)^x$

$c > 1$



Exponential Growth: $y = ab^x$ for $b > 1$

$f(x)$ =	b •	c	x

5) Does the equation $y = 6(4)^x$ model exponential growth or exponential decay?

a) What is initial value b?

B = ___

b) What is the growth or decay factor (c)? Common Ratio or change

"The multiplier"

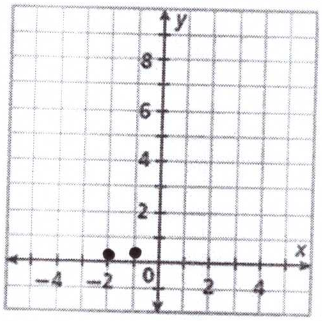
-9-

C = ___

Complete the following tables and graph each function.

6) $f(x) = (6)^x$

x	$f(x)$
-2	0.027
-1	0.16
0	
1	
2	36

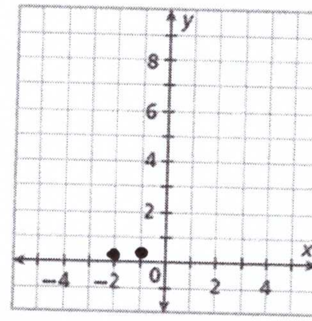


(6B) What is the y-intercept? (0, __)

(6C) What is the multiplier/common ratio?

7) $f(x) = (3)^x$

x	$f(x)$
-2	0.111
-1	0.333
0	
1	
2	

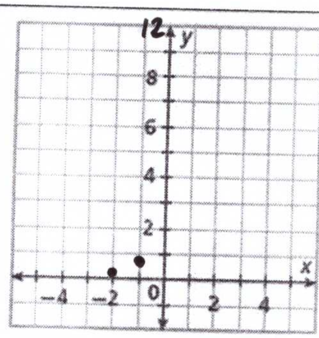


(7B) What is the y-intercept?

(7C) What is the multiplier/common ratio?

8) $f(x) = 3(4)^x$

x	$f(x)$
-2	0.1875
-1	0.75
0	
1	
2	48

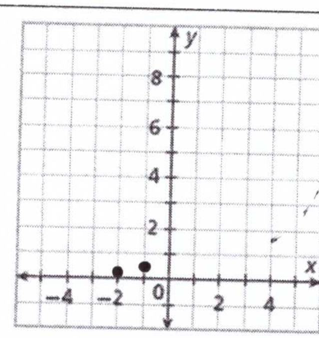


(8B) What is the y-intercept? (0, __)

(8C) What is the multiplier/common ratio?

9) $f(x) = 2(4)^x$

x	$f(x)$
-2	0.125
-1	0.5
0	
1	
2	32



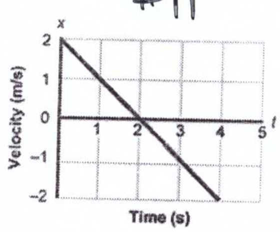
(9B) What is the y-intercept? (0, __)

(9C) What is the multiplier/common ratio?

Identify each function as linear, growth or decay. (straight / curve up / curve down)

#10

#11



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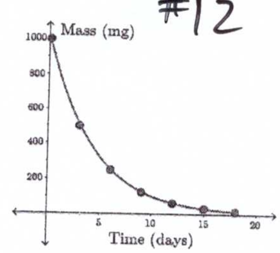
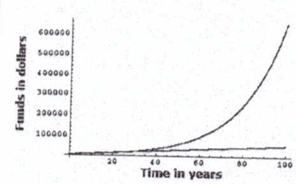


#13



Write an exponential function for each table

#14

x	y
-2	.375
1	1.5
0	6
1	24
2	96

Initial Value

Growth Factor $\frac{24}{6}$

$f(x) = 6(4)^x$

$f(5) =$

#15

x	y
-2	.0123
1	.111
0	1
1	9
2	81

Initial Value

Growth Factor $\frac{9}{1} =$

$f(x) = 1(9)^x$

$f(5) =$

#16

x	y
-2	.041
-1	.286
0	2
1	14
2	98

Initial Value

Growth Factor $\frac{14}{2} =$

$f(x) = 2(7)^x$

$f(5) =$

Name: ______________________ Unit # 6 Lesson # 3

Activator

New Vocabulary (1 of 4)

New Vocabulary (2 of 4)

New Vocabulary (3 of 4)

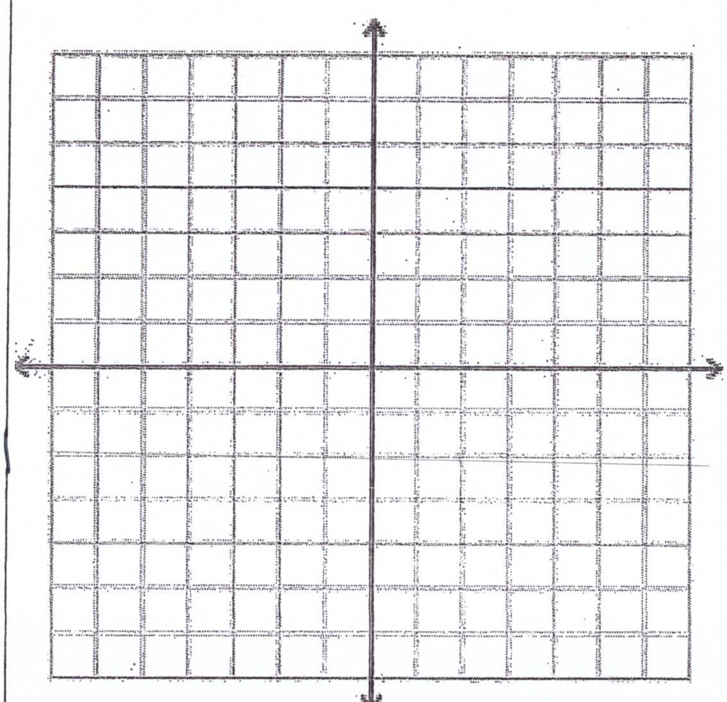
Unit # 6 Lesson # 3

Misconception (4 of 4)

Work Period

Exit Ticket

Extra Graph Paper



Name: ____________________ Date: ____________________

Exponential Functions

Unit 6 Lesson 4

Evaluate each function at the given value. Use substitution and make a table.

1) $f(x) = \frac{1}{3} \cdot 6^x$ at $x = 2$

$f(2) = \frac{1}{3}(6)^2$

$f(2) = \frac{1}{3}(36)$

$f(2) = 12$

x	f(x)
2	12

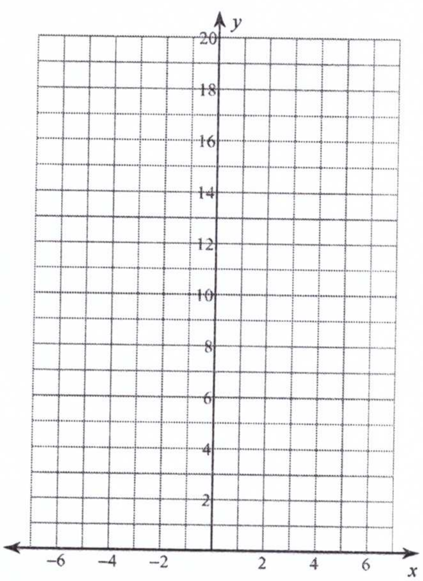
2) $f(n) = 10 \cdot 2^n$ at $n = 5$

3) $f(n) = 10 \cdot 2^n$ at $n = -2$

4) $g(x) = \frac{1}{5} \cdot \left(\frac{1}{3}\right)^x$ at $x = 3$

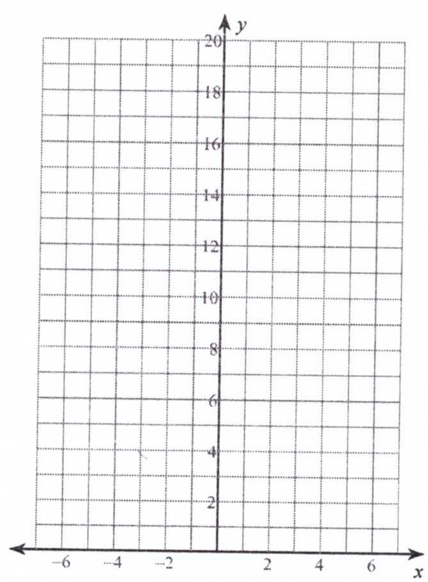
Sketch the graph of each function.

5) $f(x) = 4 \cdot 2^x$



x	-2	-1	0	1	2
y					

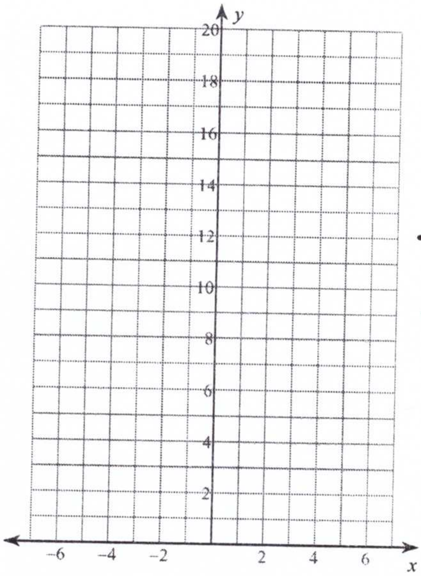
6) $f(x) = 4 \cdot \left(\frac{1}{2}\right)^x$



x							
y							

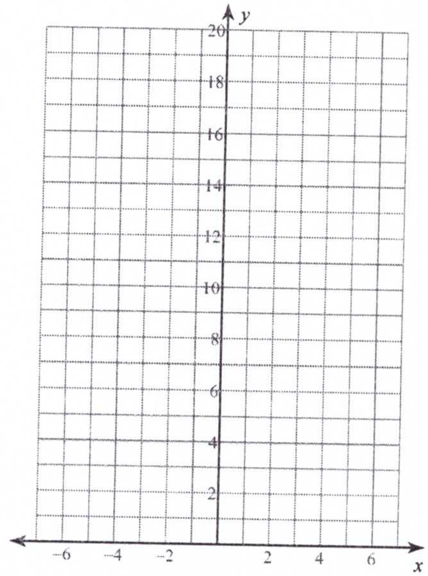
Unit 6
Lesson 4

7) $f(x) = 2 \cdot 3^x$



x	f(x)
0	
1	
2	

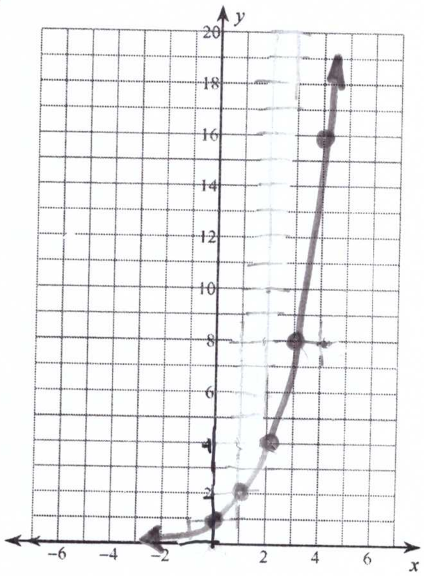
8) $f(x) = 4 \cdot \left(\frac{1}{2}\right)^x$



x	f(x
-2	
-1	
0	
1	
2	

Write an equation for each graph.

9)

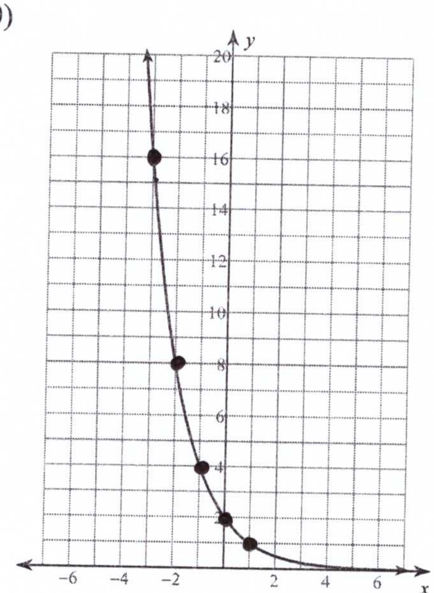


1, 2, 4, 8, 16

$y = B(C)^x$

$y = \_\_(\_\_)^x$

10)



16, 8, 4, 2, 1

$y = B(C)^x$

$y = \_\_(\_\_)^x$

Name: ______________ Unit # 6 Lesson # 4

Activator	New Vocabulary (1 of 4)
New Vocabulary (2 of 4)	**New Vocabulary (3 of 4)**

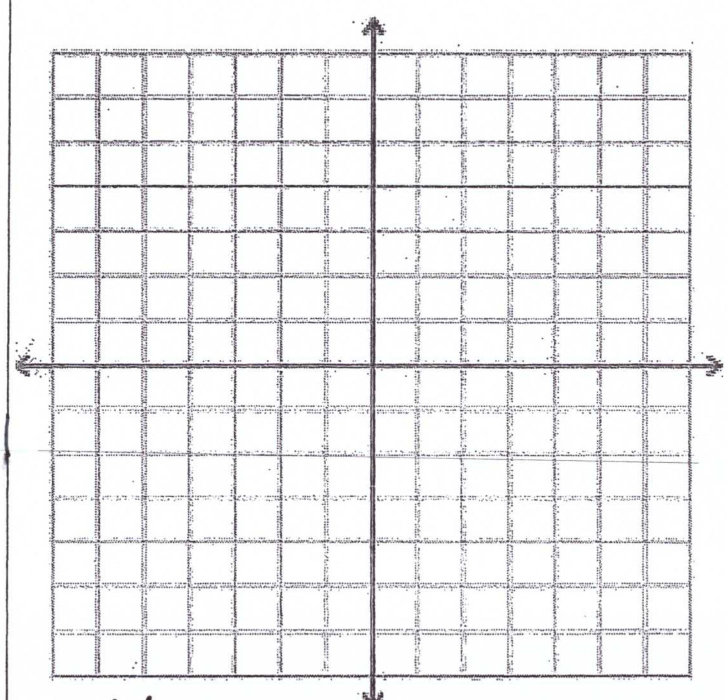
Unit # 6 Lesson # 4

Misconception (4 of 4)

Work Period

Exit Ticket

Extra Graph Paper



Name________________________________ Date________________________

Algebra I 6.5 **Recursive Arithmetic Sequences**

u have been writing equations for arithmetic sequences so that you could find the value of any term in the sequence, such as the 100th term, directly, using the equation found once you understood the pattern. Today you will investigate recursive sequences. A term in a *recursive sequence* depends on the term(s) before it.

#1 . Look at the following sequence:

-14, −8, −2, 4, 10, ...

t(0) term1 term2 term3 term4

1a. What are two ways that you could find the 10^{th} term of the sequence? What is the 10^{th} term?

___, ___, ___, ___, ___, ___

term5 term10

1b. If you have not done so already, write an equation that lets you find the value of any term $t(n)$. **Remember from our previous lesson, this kind of equation is called an *explicit equation.***

$y = mx + B \qquad t(n) = \_\_ x \quad \_\_\_$

sign

1c. The next term after $t(n)$ is called $t(n + 1)$. Write an equation to find $t(n + 1)$ if you know what $t(n)$ is. **An equation that depends on knowing other terms is called a *recursive equation.***

$$t(n+1) = t(n) + \_\_\_$$

$$t(0) = \_\_\_$$

#2. Alejandro used his recursive equation, $t(n + 1) = t(n) + 6$, from part (c) of problem 5-71 to write the following sequence:

0, 6, 12, 18, 24

2a. Does Alejandro's sequence match the recursive equation from problem #1?

2b. Why did he get a different sequence than the one from problem #1? Because, he started with a different ______. But, the pattern is the ______.

Lesson 6.5

\# 3. Avery and Collin were trying to challenge each other with equations for sequences. Avery wrote:

$t(1) = 3$

$t(n+1) = t(n) - 5$

Notice the different notation: $t(1)$ represents the first term.

Help Collin write the first 4 terms of this sequence.

____, ____, ____, ____
term 1 term 2 term 3 term 4

3a. How do you know that Avery's sequence is arithmetic?

Because, you are ______ a different number.

3b. Describe to Collin how he could find the 10^{th} term of this sequence.

____, ____, ____, ____, ____, ____
terms term 10

\# 4. Write both an explicit equation and a recursive equation for the sequence:
5, 8, 11, 14, 17, …

$y = mx + b$

$t(n) = \_\_ n + \_\_$

explicit equation

$t(0) = \_\_$

$t(n+1) = t(n) + \_\_$

Name: ______________________ Unit # 6 Lesson # 5

Activator

New Vocabulary (1 of 4)

New Vocabulary (2 of 4)

New Vocabulary (3 of 4)

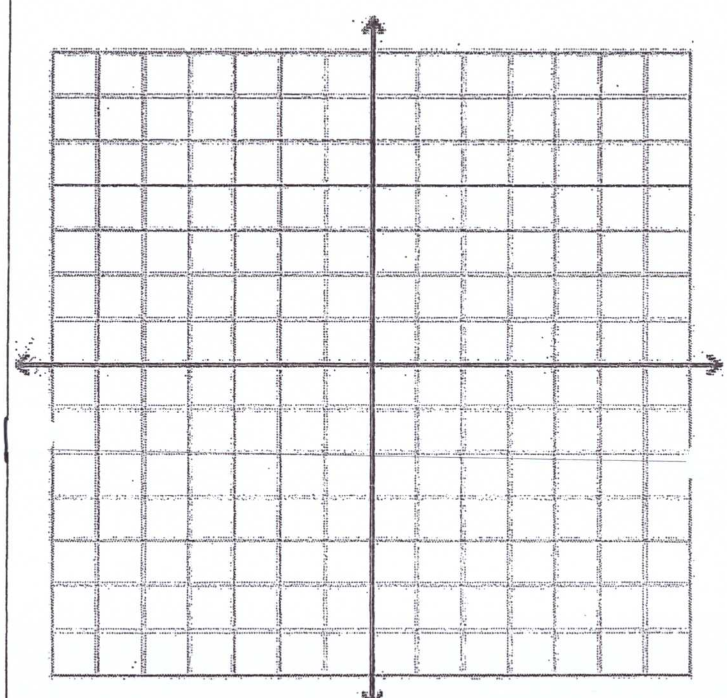
Unit # 6 Lesson # 5

Misconception (4 of 4)

Work Period

Exit Ticket

Extra Graph Paper



Name: ____________________ Date: ____________________

Unit 6 Lesson 6

Linear vs. Exponential Word Problems

At separate times in the course, you've learned about linear functions and exponential functions, and done word problems involving each type of function. Today's assignment combines those two types of problems. In each problem, you'll need to make a choice of whether to use a linear function or an exponential function. Below is some advice that will help you decide.

Linear Function	**Exponential Function**
$f(x) = mx + b$ or $f(x) = m(x - x_1) + y_1$	$f(x) = b \cdot c^x$
b is the *starting value*, *m* is the *rate* or the *slope*. *m* is positive for growth, negative for decay.	*b* is the *starting value*, *c* is the *base* or the *multiplier*. $c > 1$ for growth, $0 < c < 1$ for decay. See below for ways to find the base *c*.

Choosing linear vs. exponential

In growth and decay problems (that is, problems involving a quantity increasing or decreasing), here's how to decide whether to choose a linear function or an exponential function.

- If the growth or decay involves increasing or decreasing by a fixed number, use a **linear** function. The equation will look like:

$$y = mx + b$$

$$f(x) = (\textbf{rate})\,x + (\textbf{starting amount}).$$

- If the growth or decay is expressed using multiplication (including words like "doubling" or "halving") use an **exponential** function. The equation will look like:

$$f(x) = (\textbf{starting amount}) \cdot (\textbf{base})^x.$$

PRACTICE

1. **Decide whether the word problem represents a linear or exponential function. Circle either linear or exponential. Then, write the function formula.**

a. "A library has 8000 books, and is adding 500 more books each year."

Linear or exponential? $y =$ ____________________.

b. "A gym's customers must pay \$50 for a membership, plus \$3 for each time they use the gym."

Linear or exponential? $y =$ ____________________.

c. "A bank account starts with \$10. Every month, the amount of money in the account is tripled."

Linear or exponential? y = ____________________.

5. A science experiment involves periodically measuring the number of mold cells present on a piece of bread. At the start of the experiment, there are 50 mold cells. Each time a periodic observation is made, the number of mold cells triples. For example, at observation #1, there are 150 mold cells.

a. Write a function formula equation ($y = \cdots$) for the number of mold cells present, where x stands for the observation number.

b. Fill in the missing outputs of this table.

x = observation number	0	1	2	3	4	5	6	7
y = mold cell count	50	150						

c. Suppose that the mold begins to be visible as green coloration when the mold cell count exceeds 100,000. On which observation will this happen?

d. What will be the mold cell count on the 7th observation?

6. Julie gets a pre-paid cell phone. Initially, she has a $20 per month bill. plus, Each minute of talking costs $0.15.

Let x stand for the amount of time in minutes that Julie has talked on the phone, and let $f(x)$ stand for the remaining dollar value of the phone.

a. Is $f(x)$ a linear function or an exponential function? Explain how you know.

b. Find a function formula equation $f(x) =$ ______________________

c. Find the value of $f(0)$ and explain its meaning in terms of the cell phone.

d. Find the value of $f(40)$ and explain its meaning in terms of the cell phone.

e. Find the value of x that makes $f(x) = 20$, and explain its meaning in terms of the cell phone.

How many minutes?

______ = $20

Name: ____________________ Unit # 6 Lesson # 6

Activator

New Vocabulary (1 of 4)

New Vocabulary (2 of 4)

New Vocabulary (3 of 4)

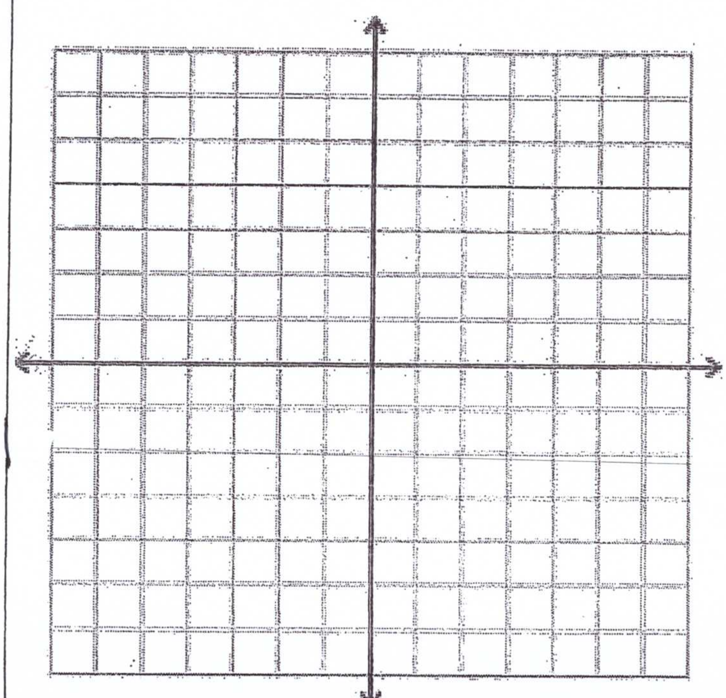
Unit # 6 Lesson # 6

Misconception (4 of 4)

Work Period

Exit Ticket

Extra Graph Paper



Name: ______________________ Date: ______________________

Writing Exponential Functions Worksheet #1

Unit 6 Lesson 7

Directions: Answer all questions. Show all work!!!

For each of the following situations, write an exponential model of the form $y = b(c)^x$

1.

x	y
-2	.375
1	1.5
0	6
1	24
2	96

$$\frac{A_2}{A_1} = C$$

Growth/Decay?

b =

C =

Equation ______________________

2.

x	y
-2	.041
-1	.286
0	2
1	14
2	98

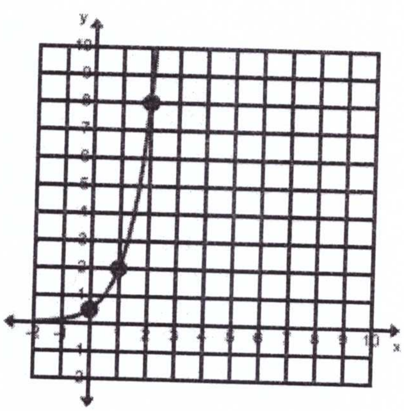
Growth/Decay?

b =

C =

Equation ______________________

3.



x	y

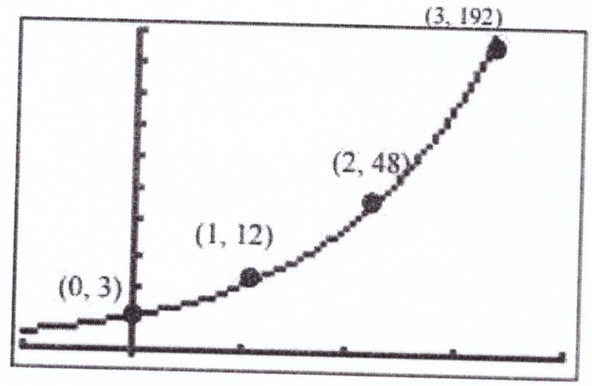
Growth/Decay?

b = 0.___ ← decimal Answer

C =

Equation ______________________

4.



x	y

Growth/Decay?

b =

C =

Equation ______________________

Unit 6
Lesson 7

5.

x	y
-2	.0097
-1	.078
0	.625
1	5
2	40

Next to the zero

Growth/Decay?

b= ← decimal Answer

c=

Equation ______________________

6.

x	y
-2	.0123
1	.111
0	1
1	9
2	81

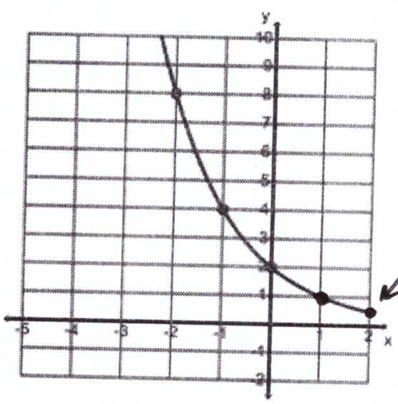
Growth/Decay?

b =

c =

Equation ______________________

7.



$A_2=0.5$

Growth/Decay?

b=

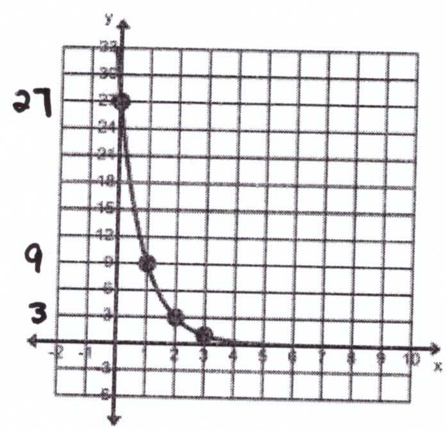
c=

Equation

x	y
2	

____

8.



Growth/Decay?

b=

c=

x	y
3	1

Equation ______________________

Name: ______________________ Unit # 6 Lesson # 7

Activator

New Vocabulary (1 of 4)

New Vocabulary (2 of 4)

New Vocabulary (3 of 4)

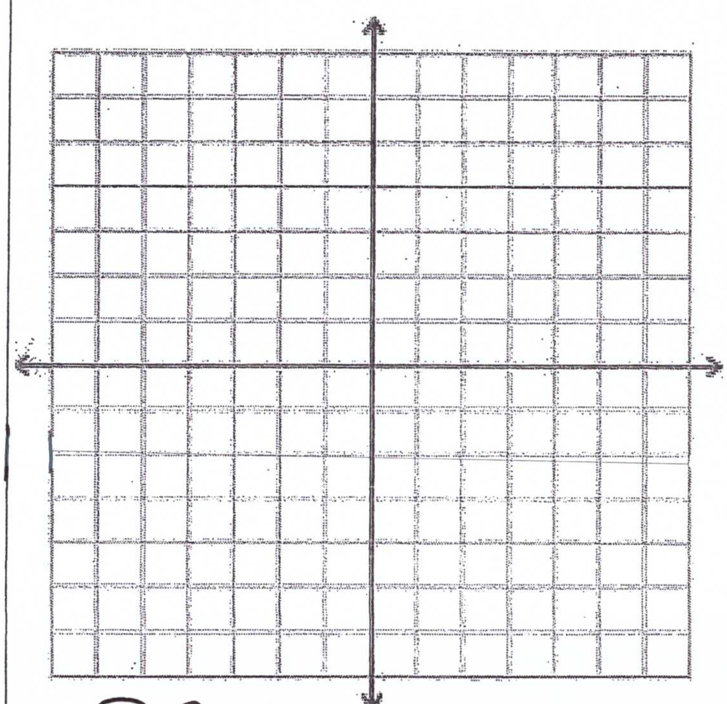
Unit # 6 Lesson # 7

Misconception (4 of 4)

Work Period

Exit Ticket

Extra Graph Paper



Name: ______________________

UNIT #6 Study Guide
COMMON CORE ALGEBRA I

Study Guide

PART I QUESTIONS: Show all of your work.

1. If $f(x)=5^x$, then which of the following is the value of $f(-3)$?

Fraction Answer

$f(\ )=$ ___ fraction answer

2. The population of deer in a forest was measured to be 1800 in the year 2010. If the population increased by a steady 6% per year, which of the following calculations would predict its population in 2015 ?

$f(x)=1800(1.06)^x$

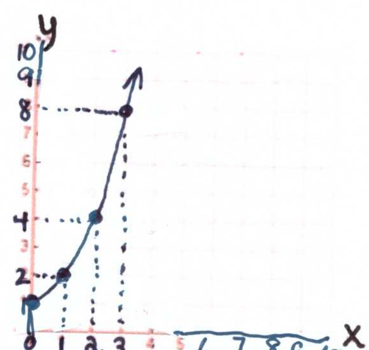
decimal answer

$f(5)=$

3. $(7^2)^8$ then what does x equal in 7^x ?

4. Which of the following exponential equations could describe the graph shown below?

$y=B(c)^x$



x	y

5. A t-shirt was originally priced at $25 but was placed on sale for 20% off the original price.
What is the cost of the shirt now?

x	0	1
y		

$25\left(\frac{\ }{100}\right)=$ \$ off

SG Unit 6 Alg

6. The number of new visits to a website is decreasing exponentially. It can be modeled by the function $h(d) = 2530(0.88)^d$, where h is the number of new site hits and d is the number of days since the site opened. Which of the following is the number of hits on $d = 3$

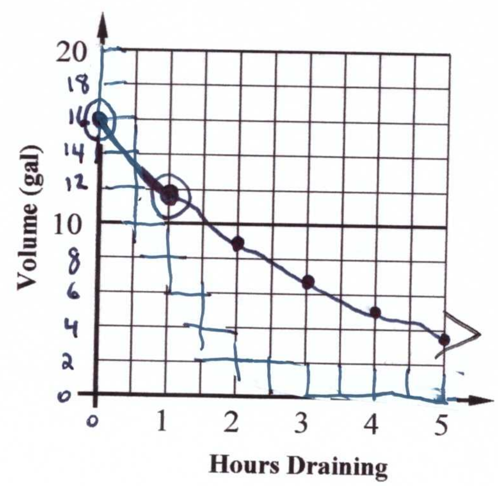
7. If the first two terms of a geometric sequence are $a_1 = 28$ and $a_2 = 112$ then which of the following is the third term, a_3?

$\underline{\quad}_{a_1}, \underline{\quad}_{a_2}, \underline{\quad}_{a_3}$

8. Jenna's rent is increasing from \$750 per month to \$850 per month next year. What is the Linear equation?

9. A tank is draining water such that the volume is given with an exponentially decreasing graph as shown in the graph below. If the volume was modeled with an equation of the form $V = B(C)^t$, where t is the number of hours, then which of the following is the best value for b?

hours	volume
1	
0	



Name: ____ $(6x^2)^3 (4x)^2$ ____ Date: Study Guide Unit 6 Algebra

10. The expression $(6x^2)^3 (4x)^2$ is the same as

( )( )( ) ( )( )

PART II QUESTIONS: Show all of your work.

11. Jeremy was taking a quiz in his Algebra I class. He decided that the expression $3^{-1} + 4^0$ had a value of $1\frac{1}{3}$
Is Jeremy correct?

12. Write the following expression in simplest form. $(2x^7)^6$

( )( )( )( )( )( )

PART III QUESTIONS: Show all of your work.

Write the equations of the linear and exponential functions that pass through the points (0, 15) and (1, 5)

13. Linear Equation, $y = mx + b$

What is m ? ____

x	y

pattern?
subtract
by

14. Exponential Equation, $y = b(c)^x$:

x	y

pattern
divide
by

15. The population of Nottingham High School can be modeled using the equation $P(t) = 1,700(.95)^t$, where t is the number of years since 2000. Is the population of Nottingham increasing or decreasing? Explain how you can tell using the equation.

16. From #15, how do you interpret the statement that P(11)? $p(11) = 1,700(.95)^{11}$

$p(11) =$ ________

17. Given the geometric sequence with the first three terms shown below, answer the following questions.
The sequence 3, 12, 48, what is 9th term of this sequence?

3 , ___ , ___ , ___ , ___ , ___ , ___ , ___ , ___ , ___

A_0 A_1 A_2 A_3 A_9

18. From #17, write the pattern in sequence 3, 12, 48, ...

$$\frac{A_2}{A_1} =$$

PART IV QUESTION: Show all of your work.

19. The population of Ashmore was 1200 in 2000 and 1440 in 2001. The linear model for Ashmore's population is $P = M(t) + B$, where t is the years since 2000. Write a Linear model, of Ashmore's population

t	$P(t)$
0	
1	
2	
9	

20. From #19, What is the population predicted by the linear model for the year 2009? Let t = 9 years.