

Exponential Review

Agenda

Warm-Up

HW Check

Review (due tmr for bonus points on test)

Reminders

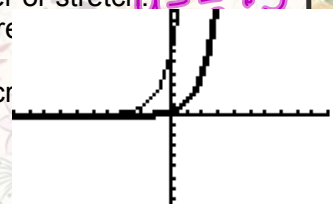
- Notebook Check tmr
- Unit 9 Test
Corrections due by 9AM
- Super Saturday

Warm-Up

1. Which of the following statements best describes the effects of changing the 6 to a $\frac{1}{2}$ in the exponential function $f(x) = 6 \cdot 3^x$?

- A. The graph would become wider or shrink.
- B. The graph would become narrower or stretch.
- C. The graph would change from increasing to decreasing.
- D. The graph would change from decreasing to increasing.

$y = 6 \cdot 3^x$
 $y = \frac{1}{2} \cdot 3^x$



2. How can you tell if a set of data is linear, quadratic, or exponential?

↑
 constant
 Adding/
 subtracting

 ↑
 y-values
 repeat

 ↑
 multiplying/
 dividing
 by same.

x, y

Answers

1. 300 calories
2. \$16.25 per person

3.

x	y
6.0	1.0
4.0	1.5
2.0	3.0
0.5	12

$k=6.0$, because the product of any x value and its corresponding y value is 6.0.

4. 18 columns

5. C

6. $33\frac{1}{3}$ or ~ 33.3 kg

7. 8 amps

8. Electrical current, I , varies directly with voltage, V .
Resistance, R , varies inversely with electrical current, I .

Algebra I – Unit 10 Lesson 6 – Direct and Inverse Variation

Practice – Direct and Inverse Variation

pp 326-331; 851-854

Name _____ Date _____

Per _____

1. The number of calories in a container of milk is directly proportional to the amount of milk in the container. If there are 160 calories in an 8 ounce glass of milk, find the number of calories in a 15 ounce glass of milk.

2. The cost per person to rent a mountain cabin is inversely proportional to the number of people who share the rent. If the cost is \$26 per person when five people share the rent, how much would each person spend if 8 people share the rent?

3. The table below demonstrates a relationship of inverse variation. Complete the table with the appropriate values.

x	y
6	1.0
4.0	1.5
2.0	3.0
5	12

$y = \frac{k}{x}$
 $y = \frac{6}{x}$

$1 = \frac{6}{x}$
 $y = \frac{6}{4}$
 ~~$12 = \frac{6}{x}$~~
 $12x = 6$

What is k for this relationship of inverse variation? Explain your reasoning.

$2 \cdot 3 = \frac{k}{2} \cdot 2$ $6 = k$

4. A marching band can make various rectangular patterns with differing numbers of rows and columns. The number of columns is inversely proportional to the number of rows for a band of fixed size. Suppose that the RHS band can form a rectangle with 12 rows and 9 columns. How many columns would there need to be if there were six rows?

$y = \frac{k}{x}$ $12 \cdot 9 = \frac{k}{12} \cdot 12$
 ↑ ↑
 col. rows
 $108 = k$
 $y = \frac{108}{6}$
18 columns

5. Which of the following equations shows a relationship in which y is inversely proportional to x ?

- I. $(x+1)y - \frac{1}{2}$
- II. $y = 0.625x$
- III. $y = \frac{x+5}{3}$

- A. II only
- B. II and III only
- C. I only
- D. Neither I, II or III
- E. I, II and III

Direct → proportion

6. The number of kilograms of water in a person's body varies directly as the person's mass. A person with a mass of 90 kg contains 60 kg of water. How many kilograms of water are in a person whose mass is 50 kg?

$y = kx$

W	M
60	90
x	50

33.3 kg

7. The current in an electric circuit varies inversely as the amount of resistance in the circuit. The current is 10 amps when the resistance is 24 ohms. Find the current when the resistance is 30 ohm.

$y = \frac{k}{x}$ $24 \cdot 10 = \frac{k}{24} \cdot 24$ $y = \frac{240}{30}$
 ↑ ↑ ↑
 current resistance $240 = k$

the formula for finding electrical current is $I = \frac{V}{R}$
 Where V represents voltage and R represents resistance. Fill in the blanks below.

Electrical current, I , varies _____ with voltage, V .

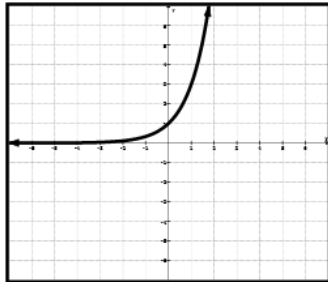
Resistance, R , varies _____ with electrical current, I .

Algebra I **+10 bonus points**
 Review: Non-Linear, Non-Quadratic Function

Name _____
 Date _____ Period _____

For #1 – 6, identify each function as linear, quadratic or exponential:

1. _____



2. _____

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

3. _____

x	y
-1	13
0	7
1	5
2	7
3	13

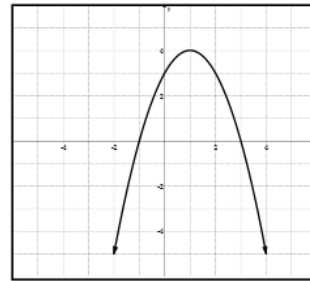
4. _____

x	y
-2	5
-1	7
0	9
1	11
2	13

5. _____

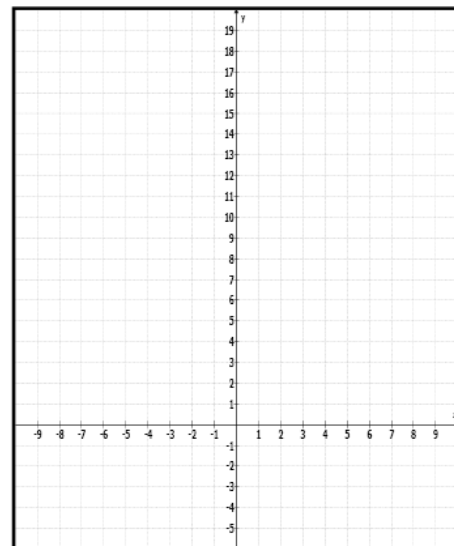
$$f(x) = x^2 - 2$$

6. _____



7. A. Complete the table of values below for the exponential function: $f(x) = 3 \cdot \left(\frac{1}{2}\right)^x$. Then graph the function.

x	Process $f(x) = 3 \cdot \left(\frac{1}{2}\right)^x$	f(x)	(x, y)
-2			
-1			
0			
1			
2			



Use the graph to answer the following questions.

- B. Determine the y-intercept of your graph. _____
- C. Determine the value of x where $f(x) = 0$. _____
- D. Is $f(x)$ an increasing or decreasing function? _____
- E. What is the domain of the function? _____ The range? _____

Exponential Growth & Decay
 $y = a(1+r)^t$ $y = a(1-r)^t$

8. In 2009 the Johnson family bought a boat for \$4000. The boat depreciates at a rate of 7% annually. In 2012 a person offers to buy the boat for \$3000. This depreciation is represented by the equation $p = 4000(.93)^t$. Should the Johnson family sell the boat? Explain your answer.

9. According to one analyst, over one 18 month period, the number of blogs in existence doubled about every 6 months. The analyst estimated that there were about 600,000 blogs at the beginning of the period.

A. Which of the following is the function rule for this problem?

a. $y = 600,000\left(\frac{1}{2}\right)^x$

b. $y = 600,000(2)^x$

c. $y = 600,000(3)^x$

d. $y = 600,000(6)^x$

B. How many blogs were there at the end of the period?

a. 660,000

b. 1,200,000

c. 4,800,000

d. 16,200,000

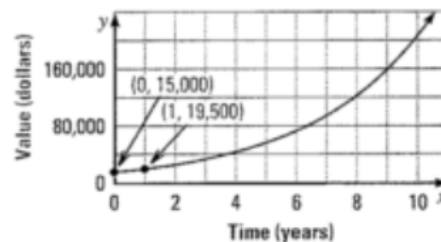
10. The graph of an exponential growth function below shows the value of a business over time. Which of the following equations models the value v (in dollars) of the business over time t (in years)?

A. $v = 15,000(1.30)^t$

B. $v = 15,000(0.70)^t$

C. $v = 15,000(0.50)^t$

D. $v = 15,000(0.30)^t$



11. Write an equation of variation for $y = 0.225$ when $x = 20$, where y varies inversely as x .

12. The number of hours, h , it takes for a block of ice to melt varies inversely as the temperature, t . If it takes 2 hours for a square inch of ice to melt at 65° , find the constant of proportionality.

13. Which of the following equations shows a relationship in which y is inversely proportional to x ? ↑ ↓

A. I only

~~B. II and III only~~

~~C. I, II and III~~

D. II only

E. I and II only

I. $xy = \frac{1}{-3}$

II. $y = \frac{1}{x+1}$

~~III. $y = x - 5$~~

For #14 – 17, The type of bacteria that causes Norovirus has a very high exponential growth rate at 80% every hour. If a sample at Richardson High School began with 10 bacteria, use the table below to answer the following questions. #RHSplague

Hours	Amount of Bacteria
0	10
1	18
2	32.4
3	58.32
4	104.976

14. What is the function that represents this situation?

15. How many bacteria will there be in 5 hours? (Round to the nearest whole number)

16. How many bacteria will there be in 1 day? (Round to the nearest whole number)

17. If there are 20,000 bacteria present, about how long has the bacteria been growing?

18. If y varies inversely as x and $y = 15$ when $x = 6$, then what is the value of the constant of proportionality, k ?

19. A theater company plans to hire people to build a stage set. The work time t (in hours per person) varies inversely with the number p of people hired. The company estimates that 25 people working for 300 hours each can complete the job. Find the work time per person if the company hires 30 people.

20. Which of the following tables indicates that x and y vary directly?

x	y
1	2
2	4
3	4
4	5
5	8

x	y
1	1
2	4
3	9
4	16
5	25

x	y
1	5
2	4
3	3
4	4
5	5

x	y
1	3
2	6
3	9
4	12
5	15

