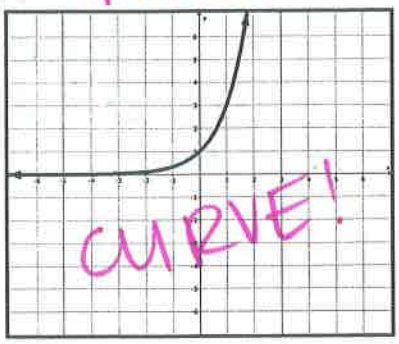
Algebra I
Review: Non-Linear, Non-Quadratic Function

Name Key
Date _____ Period _____

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

1. Exponential



2. exponential

$f(x) = -3^x$

x is in the exponent

3. Quadratic

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

y's repeat!

4. Linear

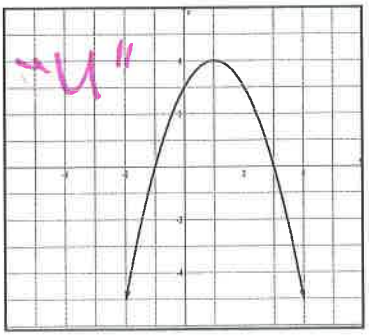
x	y	
-2	5	+2
-1	7	+2
0	9	+2
1	11	+2
2	13	

5. quadratic

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

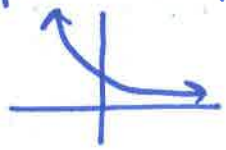
squared

6. Quadratic



7. **Answer the following equations using the exponential function :** $f(x) = 3 \cdot \left(\frac{1}{2}\right)^x$

↑ type into y=



A. Determine the *y*-intercept of your graph. (0,3)

B. Determine the value of *x* where *f(x)* = 0. D.N.E.

C. Is *f(x)* an increasing or decreasing function? decreasing

D. What is the domain of the function? IR The range? y > 0 (above x-axis)

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.

$t = 3$

$p = 4000(.93)^3$

$p = \$3217.43$

↑ boat is worth!

NO! The boat is worth more than $3000.

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

multiplier=2
y-int=600000

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

will multiply 3 times (18÷6)

$y = 600{,}000(2)^3$

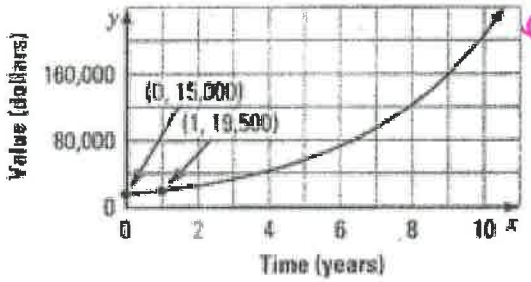
10. The graph of an exponential growth function below shows the value of a business over time. Which of the following equations models the value v (in dollars) of the business over time t (in years)?

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

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

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

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



exponential

$a = 15000$ (y-intercept)

$b = \frac{19500}{15000} = 1.3$

11. Write an equation of variation for $y_1 = 0.225$ when $x_1 = 20$, where y varies inversely as x.

$\frac{20}{x} = \frac{y}{0.225}$

$\frac{x_1}{x_2} = \frac{y_2}{y_1}$

$20(0.225) = yx$

$\frac{4.5}{x} = \frac{xy}{x}$

$y = \frac{4.5}{x}$

12. The mass of a substance varies directly with the volume of the substance. The volume of 100 kilograms of the substance is 80 liters. What is the volume, in liters, of 3.2 kilograms of this substance?

$\frac{x_1}{x_2} = \frac{y_1}{y_2}$

MASS VOLUME

$\frac{100}{3.2} = \frac{80}{y}$

$3.2(80) = 100y$

$y = 2.56$ liters

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. $\frac{xy}{x} = \frac{1}{-3x}$ $y = -\frac{1}{3x}$

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

III. $y = x - 5$

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

*solve for y

NO adding or subtracting!

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	×1.8
1	18	×1.8
2	32.4	×1.8
3	58.32	×1.8
4	104.976	

y-intercept

$b = \frac{18}{10} = 1.8$

multiplier

14. What is the function that represents this situation?

$a = 10$

$b = 1.8$

$y = 10 \cdot (1.8)^x$

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

$x = 5$

$y = 10(1.8)^5$

$y = 188.9568$

189 bacteria

16. How many bacteria will there be in 1 day? (Round to the nearest whole number) $x = 24$

$y = 10(1.8)^{24}$

133825.88 bacteria

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

$y = 20000$

≈13 hours

check your table in the calculator

18. 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.

people · hours

$\frac{25}{30} = \frac{y}{300}$

$250 = y$

250 hours

19. 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
3	9	+5
4	16	+7
5	25	

x	y	
1	5	+1
2	4	−1
3	3	+1
4	4	+1
5	5	

0|0

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

✓