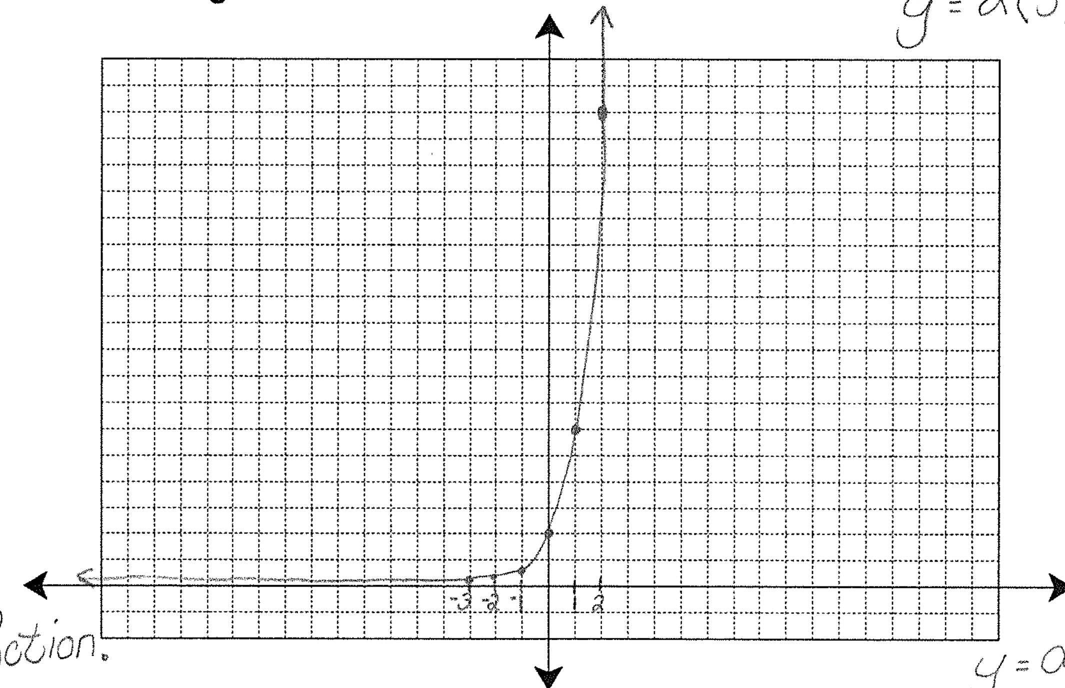
Score: ____________________   NAME: Key

Assessment Training Practice #1A

1.) Write and sketch a graph that shows exponential growth.

$y = a \cdot b^x$
$y = 2(3)^x$



Describe the domain of your graph.

$(-\infty, \infty)$

Describe the range of your graph.

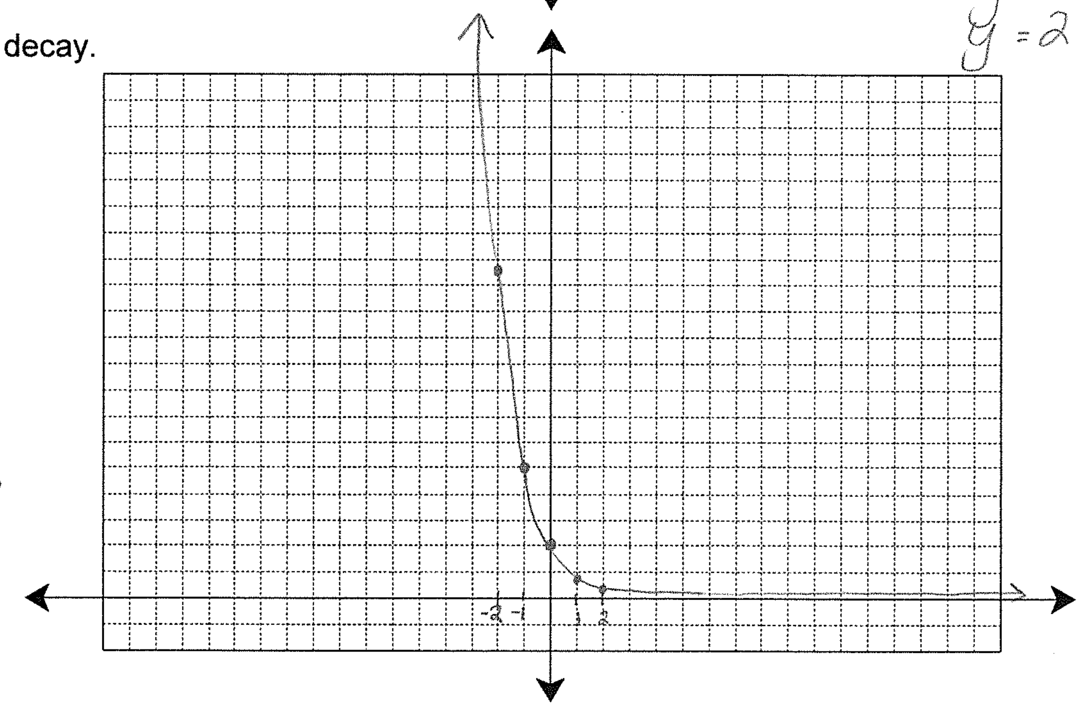
$(0, \infty)$

Describe the growth factor of your graph.

The b value is 3. Since $b > 1$, then this graph is a growth function. Also the a value is 2 and $2 > 0$

2.) Write and sketch a graph that shows exponential decay.

$y = a \cdot b^x$
$y = 2(.4)^x$



Describe the domain of your graph.

$(-\infty, \infty)$

Describe the range of your graph.

$(\infty, 0)$

Describe the decay factor of your graph. The b value is .4. Since $0 < b < 1$, then this graph is a decay function. Also the a value is 2 and $2 > 0$

3.) $y = a \cdot b^x$

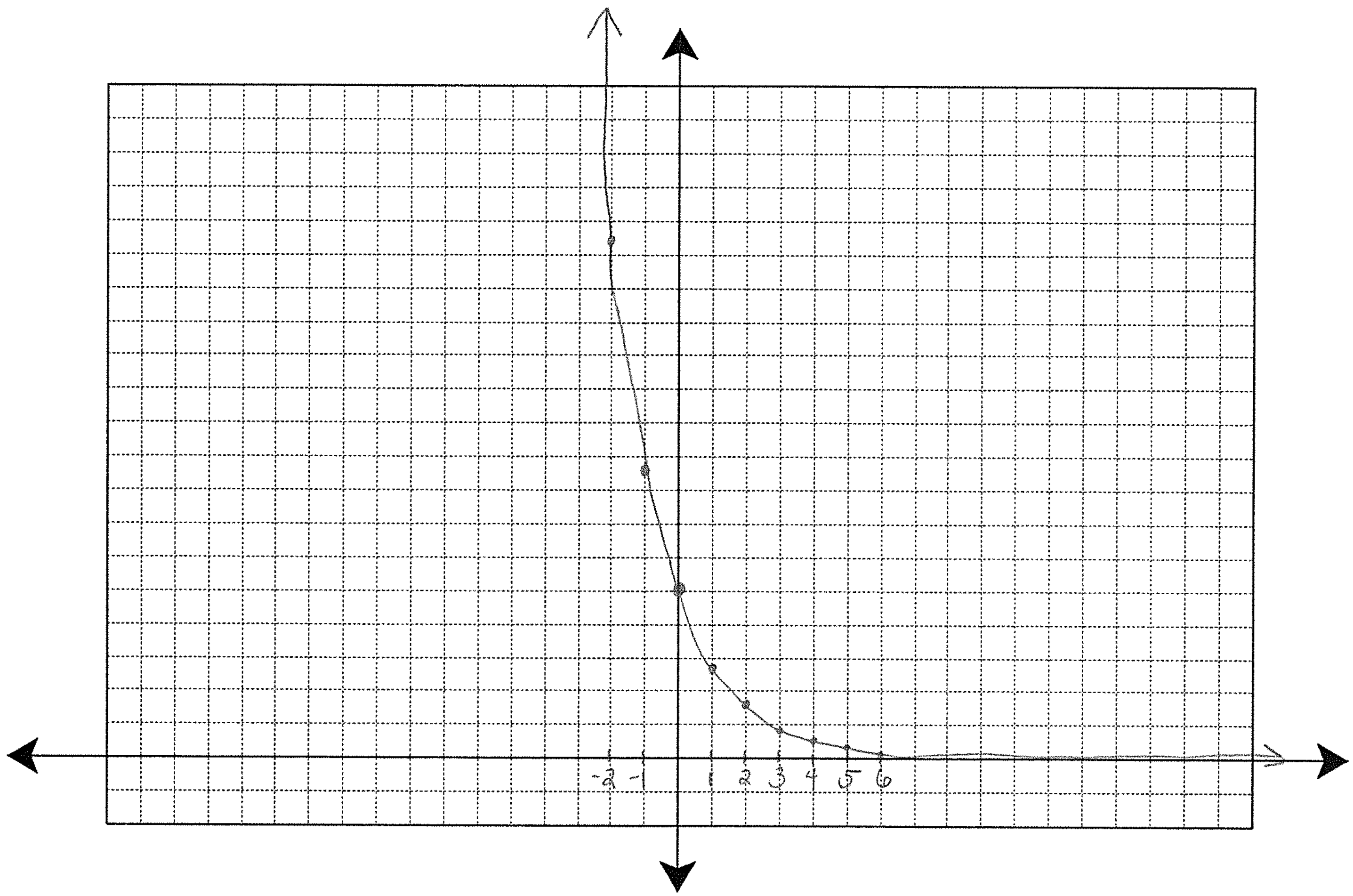
Function: $y = 5(0.57)^x$

$a = 5 \quad b = 0.57$

$a > 0 \quad 0 < 0.57 < 1$

Table

x	y	Show Decay Factor Work
-2	15.4	
		$\frac{8.8}{15.4} \approx .57$
-1	8.8	
		$\frac{5}{8.8} \approx .57$
0	5	
		$\frac{2.9}{5} = .58$
1	2.9	
		$\frac{1.6}{2.9} \approx .55$
2	1.6	
		$\frac{0.9}{1.6} \approx .56$
3	0.9	
		$\frac{0.5}{0.9} \approx .56$
4	0.5	
		$\frac{0.3}{0.5} = .6$
5	0.3	
		$\frac{0.2}{0.3} \approx .67$
6	0.2	



As $x \to +\infty$, $f(x) \to$ 0

As $x \to -\infty$, $f(x) \to$ ∞

Domain: $(-\infty, \infty)$

Range: $(\infty, 0)$

Decay **Factor:** 0.57

Percent of Growth or Decay: 43%

The Initial Value: 5

y-Intercept: (0, 5)

$y = a(1-r)^t$

$1 - r = .57$

$-1 \qquad -1$

$r = 0.43$

Rate of decay is 43%

4.)

Invisible 1

$y = a \cdot b^x$

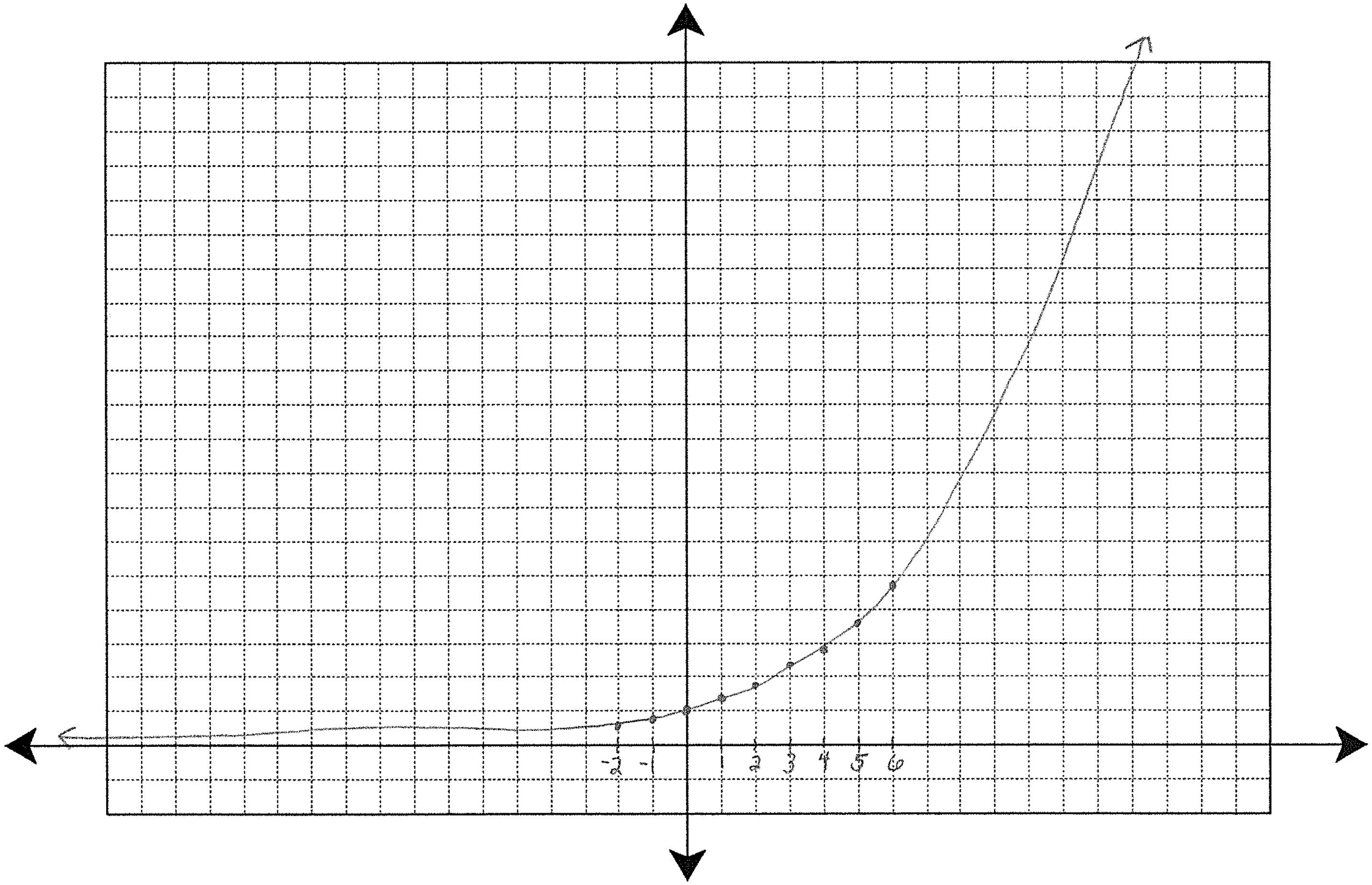
Function: $y = 1.3^x$

$a = 1 \quad b = 1.3$

$a > 0 \quad b > 1$

Table

x	y	Show Growth Factor Work
-2	0.6	
		$\frac{0.8}{0.6} \approx 1.3$
-1	0.8	
		$\frac{1}{0.8} \approx 1.3$
0	1	
		$\frac{1.3}{1} = 1.3$
1	1.3	
		$\frac{1.7}{1.3} \approx 1.3$
2	1.7	
		$\frac{2.2}{1.7} \approx 1.3$
3	2.2	
		$\frac{2.9}{2.2} \approx 1.3$
4	2.9	
		$\frac{3.7}{2.9} \approx 1.3$
5	3.7	
		$\frac{4.8}{3.7} \approx 1.3$
6	4.8	



As $x \to +\infty$, $f(x) \to$ ∞

As $x \to -\infty$, $f(x) \to$ 0

Domain: $(-\infty, \infty)$

Range: $(0, \infty)$

Growth **Factor:** 1.3

Percent of Growth or Decay: 30%

$y = a(1+r)^t$

$1 + r = 1.3$

$-1 \quad -1$

$r = .3$

Rate of growth is 30%

The Initial Value: 1

y-Intercept: $(0, 1)$

5.) $y = a \cdot b^x$

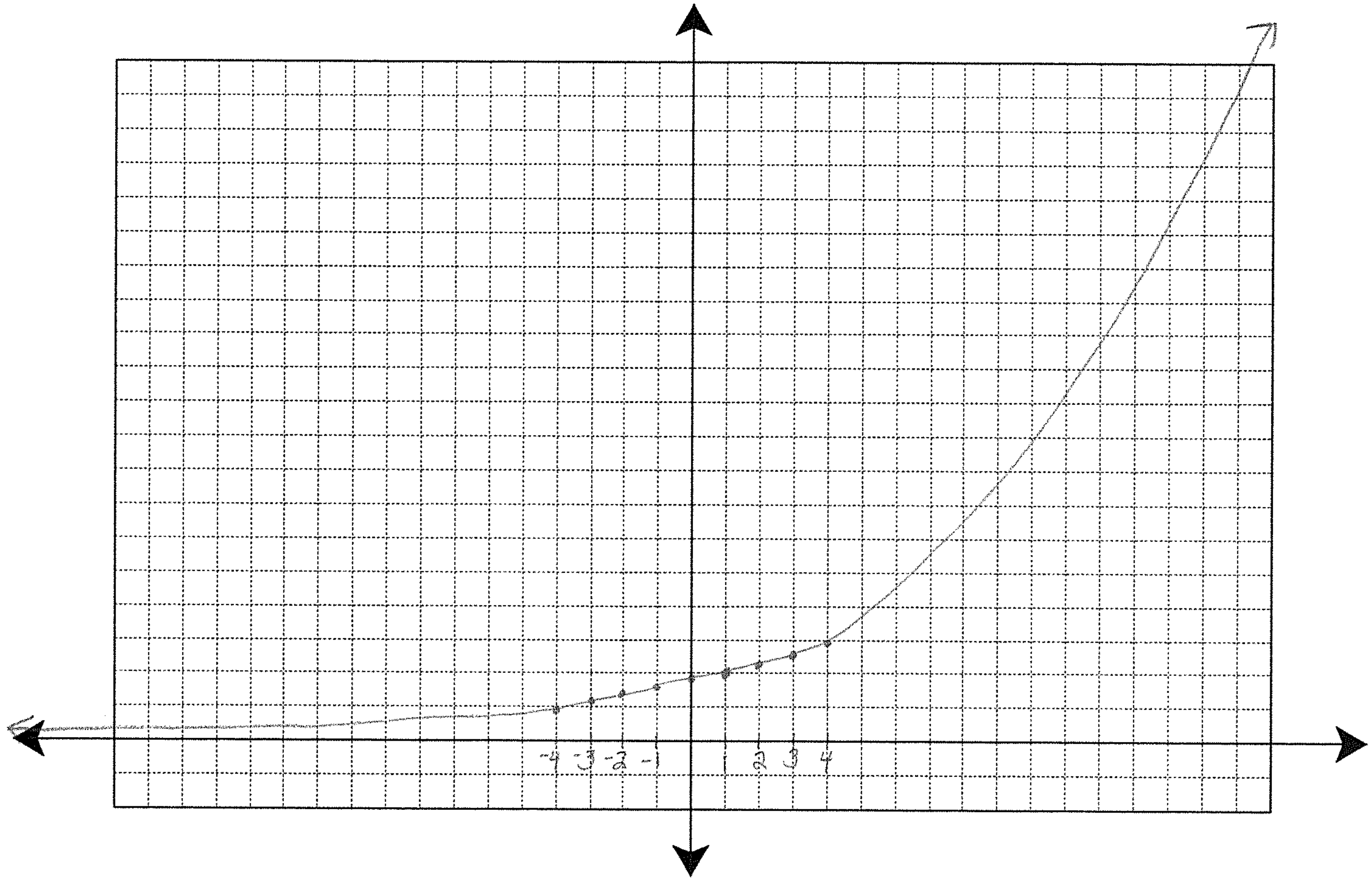
Function: $y = 1.4(1.09)^x$

$a = 1.4$ $b = 1.09$

$a > 0$ $b > 1$

Table

x	y	Show Growth Factor Work
-4	0.99	
		$\frac{1.1}{0.99} \approx 1.11$
-3	1.1	
		$\frac{1.2}{1.1} \approx 1.09$
-2	1.2	
		$\frac{1.3}{1.2} \approx 1.08$
-1	1.3	
		$\frac{1.4}{1.3} \approx 1.08$
0	1.4	
		$\frac{1.5}{1.4} \approx 1.07$
1	1.5	
		$\frac{1.7}{1.5} \approx 1.13$
2	1.7	
		$\frac{1.8}{1.7} \approx 1.06$
3	1.8	
		$\frac{1.98}{1.8} = 1.1$
4	1.98	



As $x \to +\infty$, $f(x) \to$ ∞

As $x \to -\infty$, $f(x) \to$ 0

Domain: $(-\infty, \infty)$

Range: $(0, \infty)$

Growth **Factor:** 1.09

Percent of Growth or Decay: 9%

$y = a(1+r)^t$

$1 + r = 1.09$

-1 -1

$r = .09$

The Initial Value: 1.4

y-Intercept: $(0, 1.4)$

Rate of growth is 9%

6.) $y = a \cdot b^x$

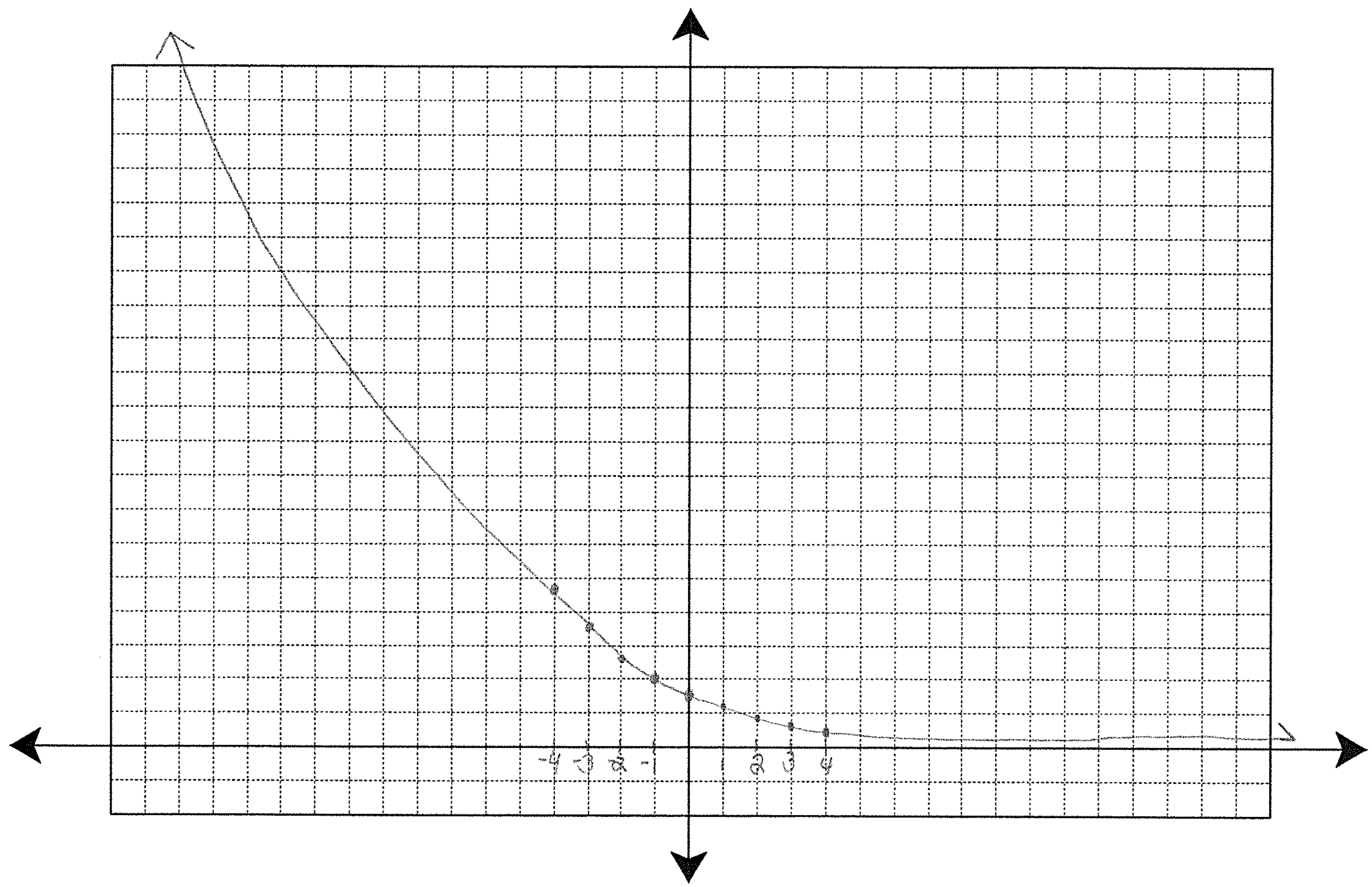
Function: $y = 1.5(0.75)^x$

$a = 1.5$ $b = 0.75$

$a > 0$ $0 < 0.75 < 1$

Table

x	y	Show Decay Factor Work
-4	4.7	
-3	3.6	$\frac{3.6}{4.7} \approx .77$
-2	2.7	$\frac{2.7}{3.6} = .75$
-1	2	$\frac{2}{2.7} \approx .74$
0	1.5	$\frac{1.5}{2} = .75$
1	1.3	$\frac{1.3}{1.5} \approx .87$
2	0.8	$\frac{0.8}{1.3} \approx .62$
3	0.6	$\frac{0.6}{0.8} = .75$
4	0.5	$\frac{0.5}{0.6} \approx .83$



As $x \to +\infty$, $f(x) \to$ 0

As $x \to -\infty$, $f(x) \to$ ∞

Domain: $(-\infty, \infty)$

Range: $(\infty, 0)$

Decay **Factor:** 0.75

Percent of Growth or Decay: 25%

$y = a(1-r)^t$

$1 - r = .75$

$-1 \quad -1$

$-r = -.25$

$r = .25$

The Initial Value: 1.5

y-Intercept: $(0, 1.5)$

7.) $y = a \cdot b^x$

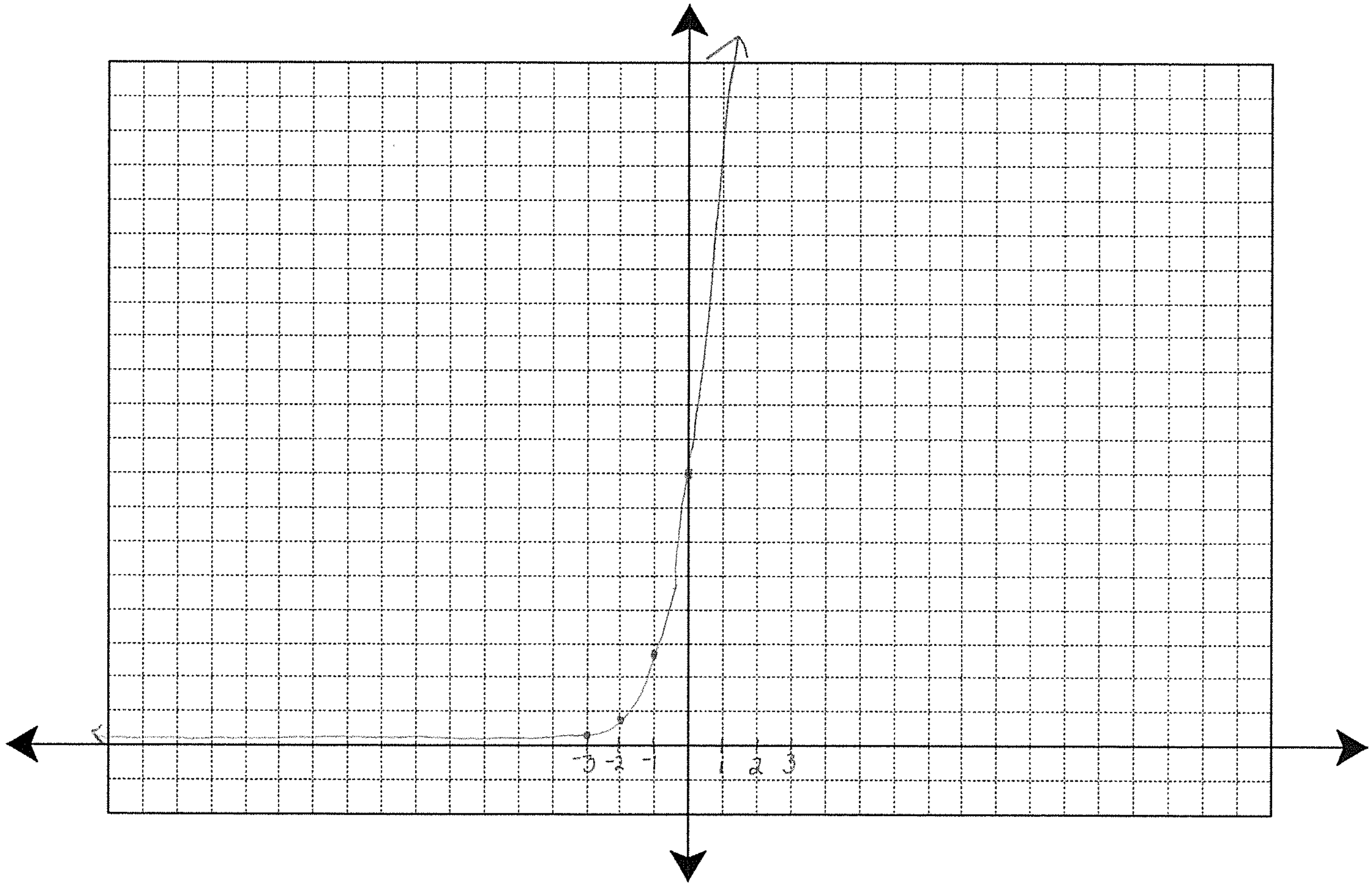
Function: $y = 8(3)^x$

$a = 8$ $b = 3$

$a > 0$ $b > 1$

Table

x	y	Show Growth Factor Work
-3	0.3	
		$\frac{0.9}{0.3} = 3$
-2	0.9	
		$\frac{2.7}{0.9} = 3$
-1	2.7	
		$\frac{8}{2.7} \approx 3$
0	8	
		$\frac{24}{8} = 3$
1	24	
		$\frac{72}{24} = 3$
2	72	
		$\frac{216}{72} = 3$
3	216	
		$\frac{648}{216} = 3$
4	648	
		$\frac{1944}{648} = 3$
5	1944	



As $x \to +\infty$, $f(x) \to$ ∞

As $x \to -\infty$, $f(x) \to$ 0

Domain: $(-\infty, \infty)$

Range: $(0, \infty)$

Growth **Factor:** 3

Percent of Growth or Decay: 200%

$y = a(1+r)^t$

$1 + r = 3$

$-1 \quad -1$

$r = 2$

Rate of Growth is 200%

The Initial Value: 8

y-Intercept: $(0,8)$

8.) Of #3 – 7, which shows the greatest growth? How do you know? #7 which is $y = 8(3)^x$

By looking at the table and graph, the y values increase at the greatest amount.

9.) The population in 2012 of a small Upper Peninsula town was approximately 2,500. The following equation can be used to model the change, g(t), over time, t, in years: $g(t) = 2500\,(1.15)^t$.

a.) what is the percent of growth or decay per year in this town? The percent of growth is : $1+r = 1.15$

$r = .15$ % of growth 15%

b.) Is the population increasing or decreasing? Explain how you know. The population is increasing at 15% per year as evidenced by the b value of 1.15

c.) Where will the graph of the function cross the vertical axis: Explain how you know. The graph will cross the vertical axis (y-intercept) at 2500. The a value is 2500 which represents initial value or y-intercept.

d.) What does the vertical intercept indicate in the context of the problem? The population for this problem began in 2012, so in 2012 the population was 2500.

e.) How would an increase in the percentage rate of growth affect the graph of the function? The graph gets steeper by getting closer to the y-axis

f.) What will be the predicted population in 2020? 7648

10.) A certain stock is worth $42 at the beginning of the day. Every hour the stock does down by 5%.

a.) Can this information be represented by exponential growth or decay? Explain. This information is an exponential decay because the stock is going down by 5% each hour

b.) What is the growth or decay factor for this information? Explain how you found it. The decay factor is: $y=a\cdot b^x$ so $y=42(.95)^x$ The decay factor is the b value or .95

c.) Write an equation to model this information. Explain what each part means. $y=42(.95)^x$; the 42 is the beginning amount; .95 is obtained by $1-r$, so $1-.05=.95$

d.) How much will the stock be worth in 8 hours? Show work. $42(.95)^8 \approx \$27.86$

11.) A dust bunny gathers dust at a rate of 11% per week. The dust bunny originally weighs 0.7 oz.

a.) Write a function that represents the weight of the dust bunny at a given time. Use x for weeks and y for the weight of the dust bunny. $y=a\cdot b^x$ $y=.7(1.11)^x$

b.) Find the weight of the dust bunny after 7 weeks. Show work. $y=.7(1.11)^7 \approx 1.45$ oz