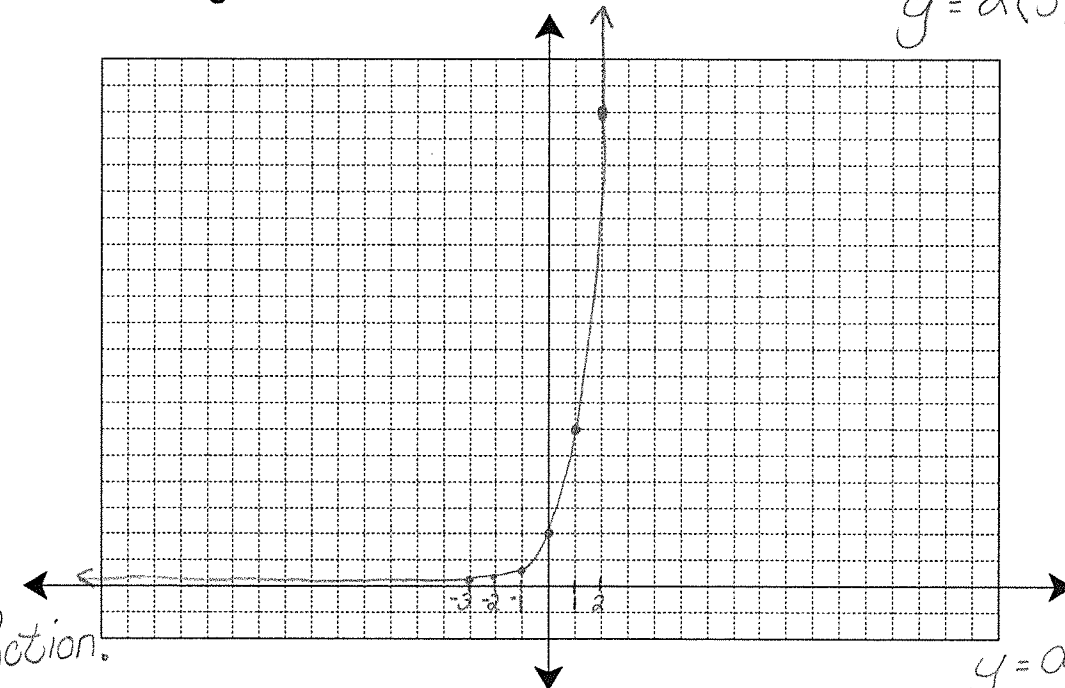
Score: ____________

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.

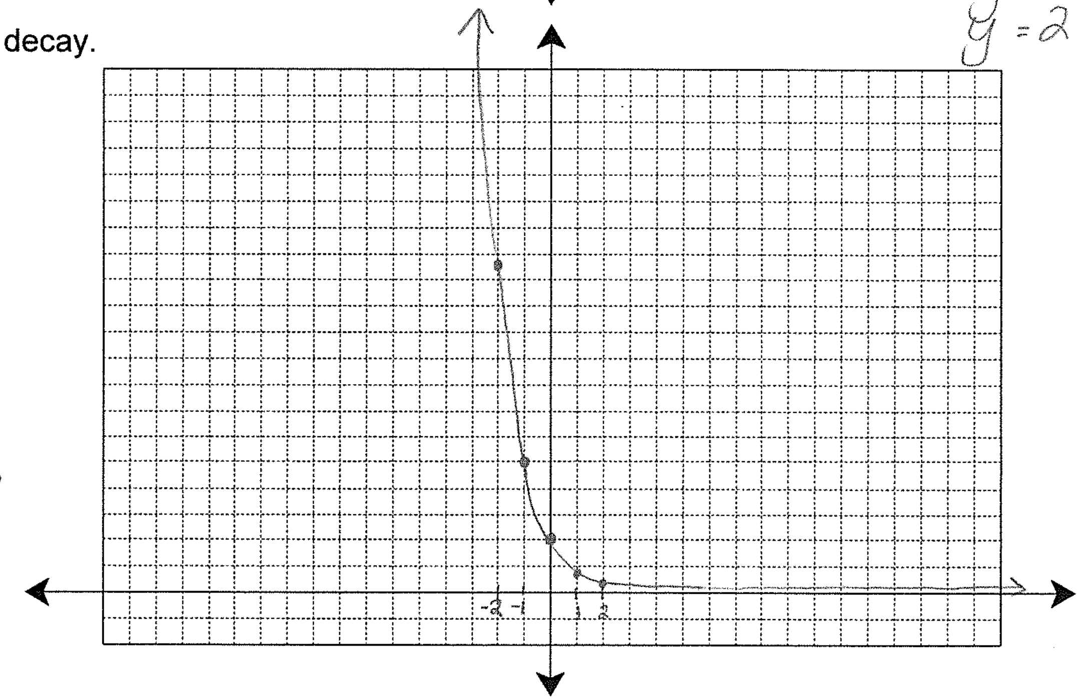
$(0, \infty)$

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

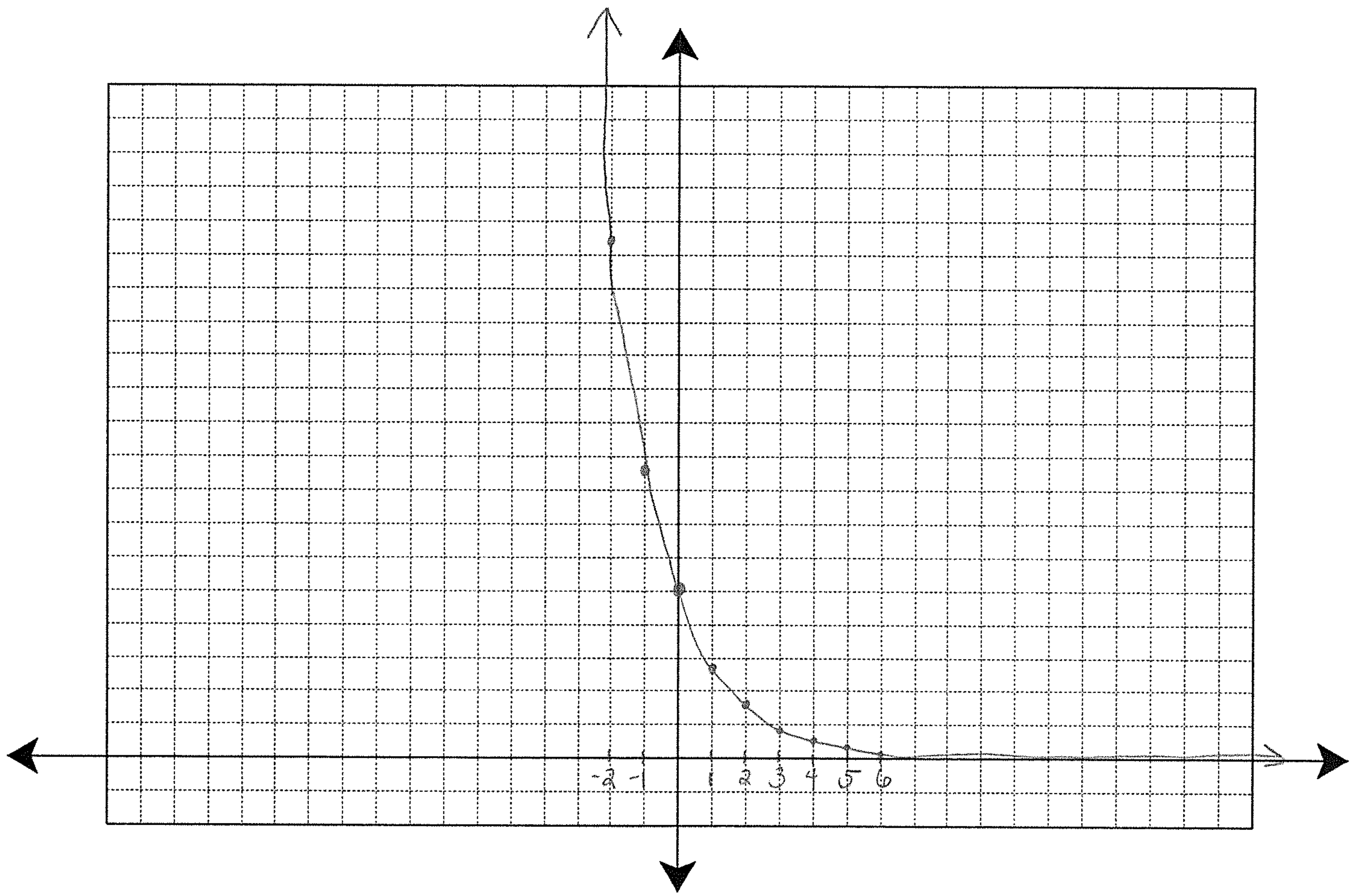
Function: $y = 5(0.57)^x$

$a = 5 \quad b = 0.57$

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

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)

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

$1 - r = .57$

$-1 \quad\quad -1$

$r = 0.43$

Rate of decay is 43%

4.)

Invisible 1

$y = a \cdot b^x$

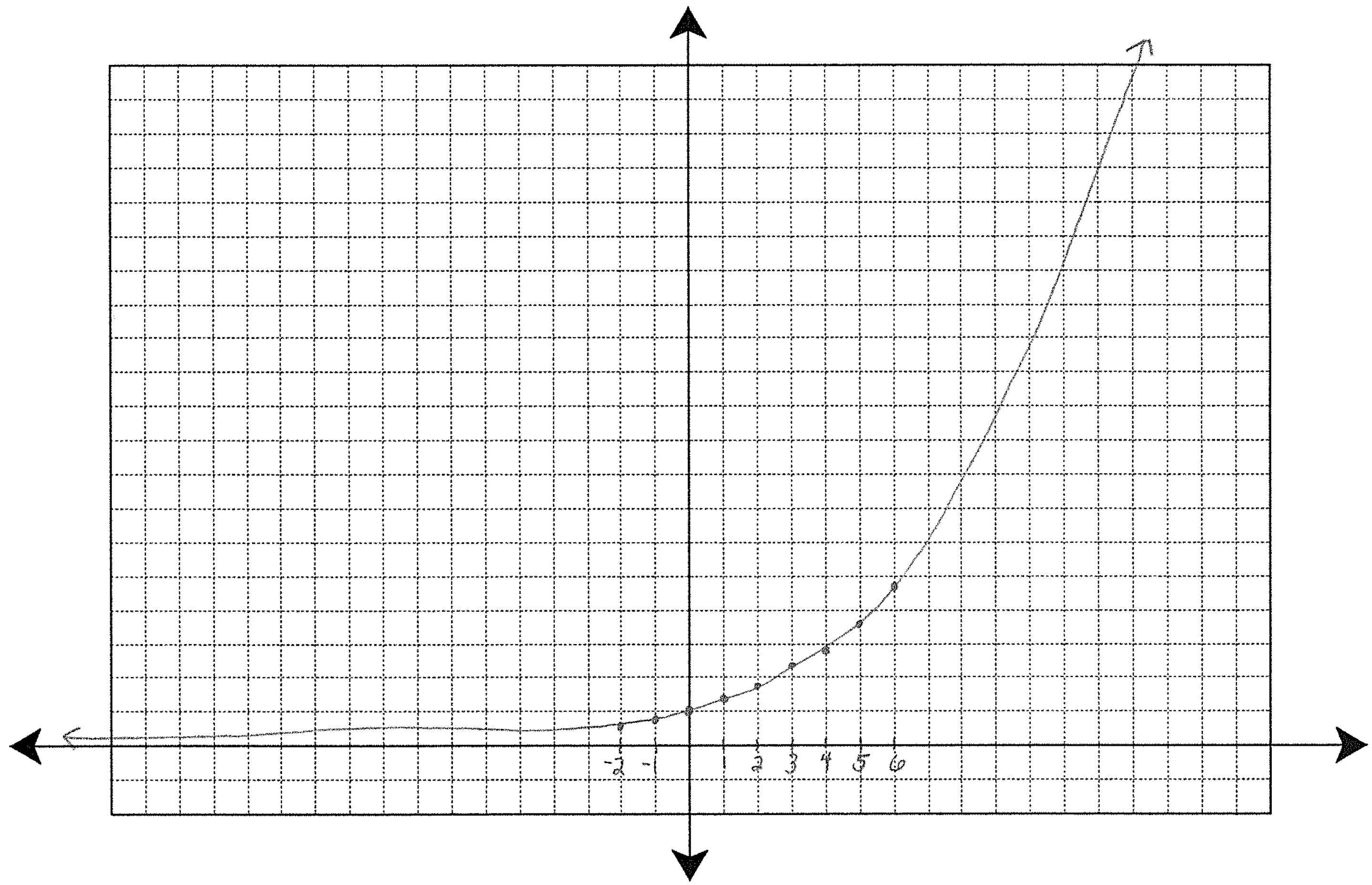
Function: $y = 1.3^x$

$a = 1 \quad b = 1.3$

$a > 0 \quad b > 1$

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%

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

$1 + r = 1.3$

$-1 \quad -1$

$r = .3$

The Initial Value: 1

Rate of growth is 30%

y-Intercept: (0, 1)

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

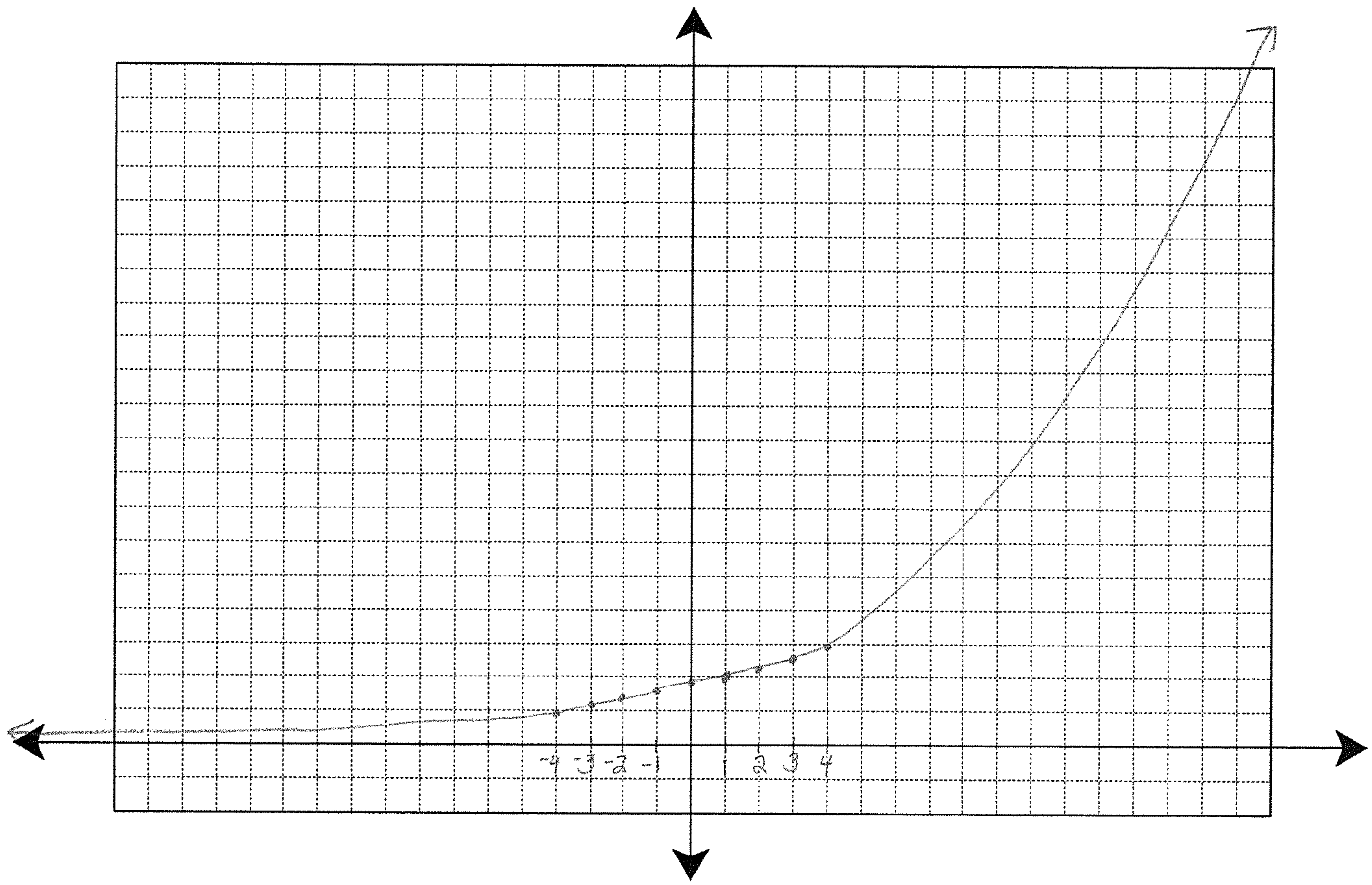
Function: $y = 1.4(1.09)^x$

$a = 1.4$ $b = 1.09$

$a > 0$ $b > 1$

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%

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

$1 + r = 1.09$

$-1 \quad -1$

$r = .09$

The Initial Value: 1.4

Rate of growth is 9%

y-Intercept: $(0, 1.4)$

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

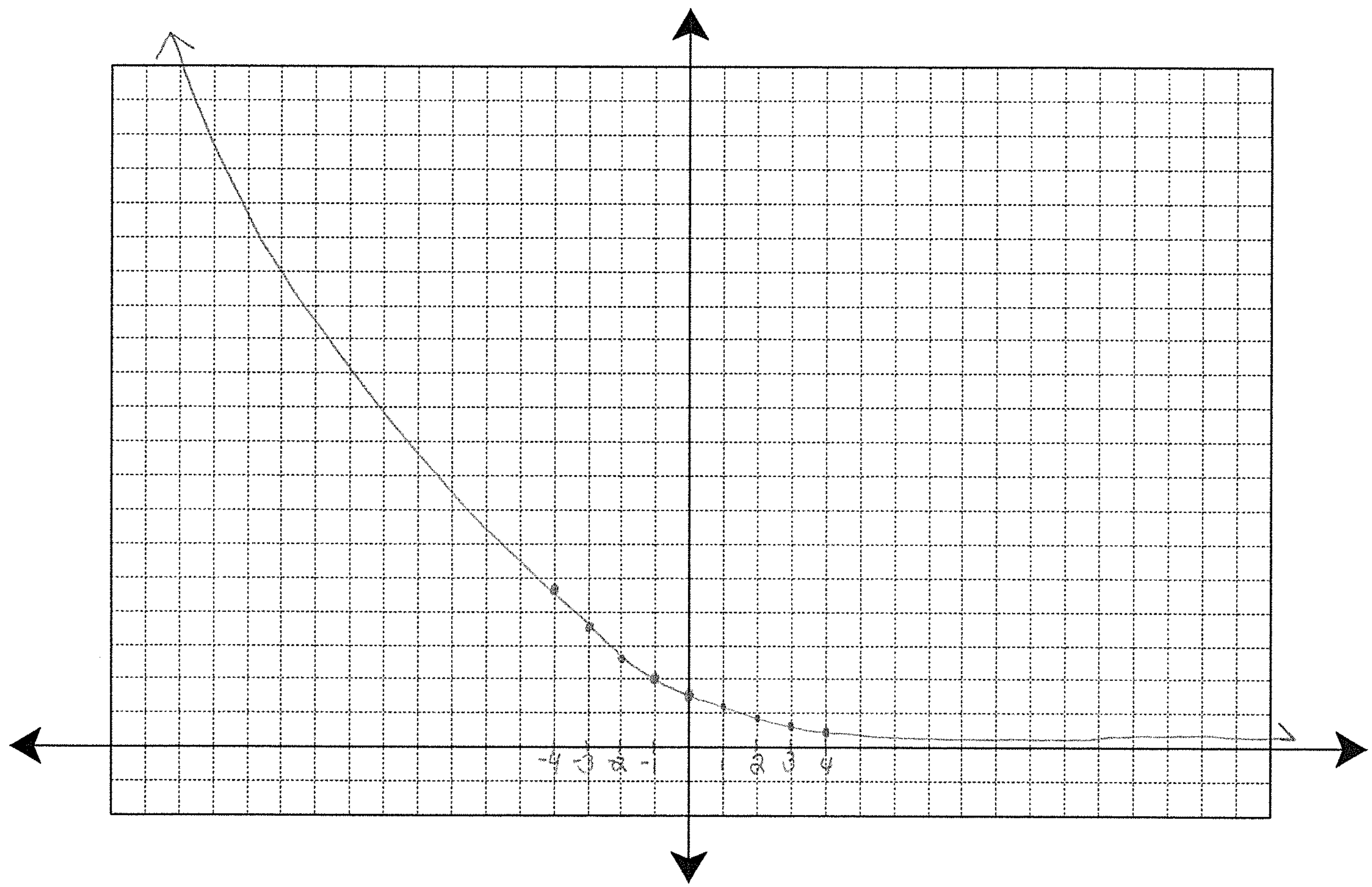
Function: $y = 1.5(0.75)^x$

$a = 1.5 \quad b = 0.75$

$a > 0 \quad 0 < 0.75 < 1$

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

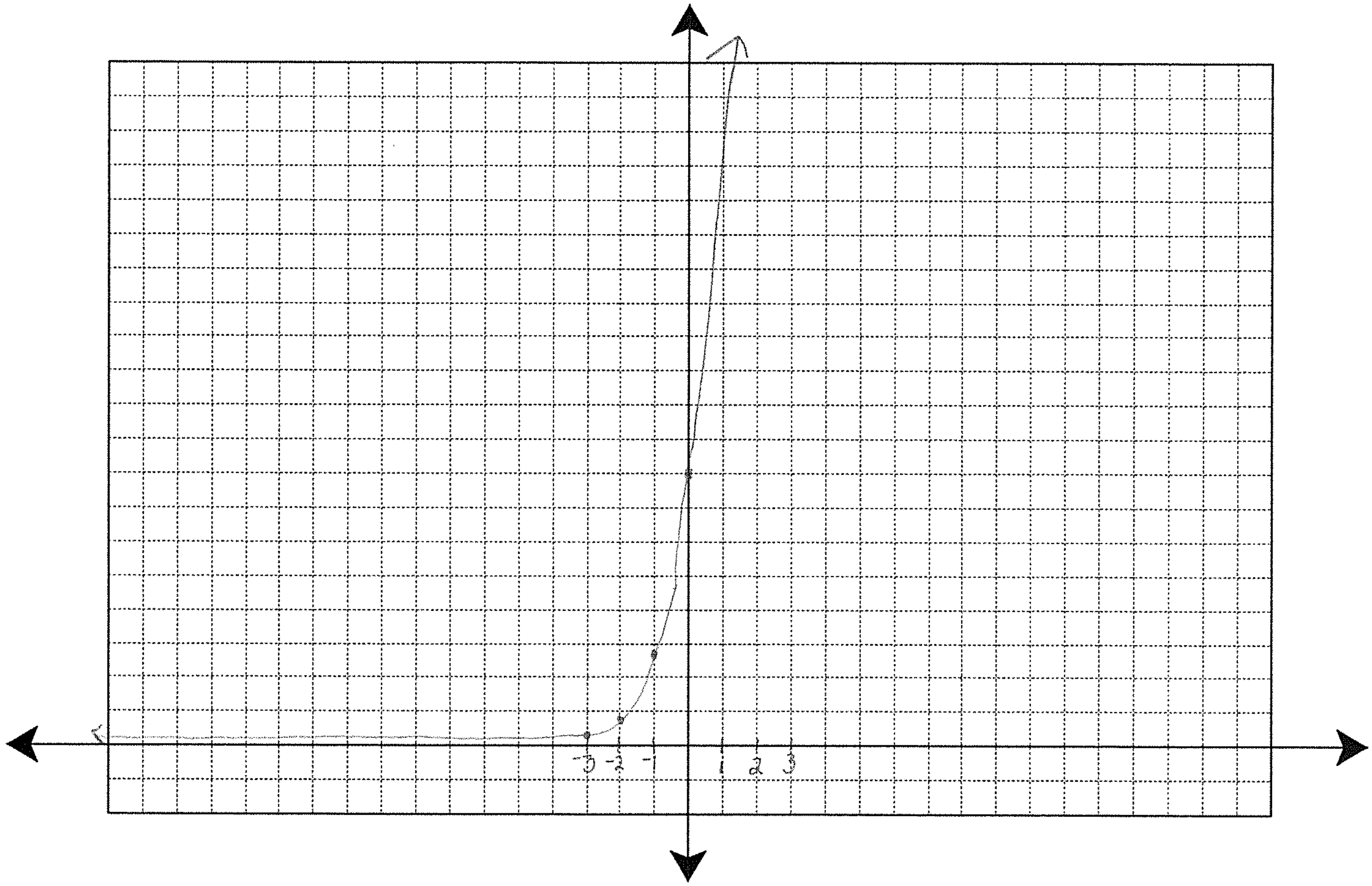
Function: $y = 8(3)^x$

$a = 8 \quad b = 3$

$a > 0 \quad b > 1$

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

NAME: Key

Assessment Training Practice #2A

1.) Examine the quadratic function below. Label the graph with parts a – g.

a.) Find the y-intercept (0,8)

b.) What are the different names for the x-intercepts? zeros, roots and solutions

c.) Find the x-intercept(s) (2,0), (4,0)

d.) Identify the vertex (3,-1)

e.) Is the vertex a maximum or a minimum? Why? The vertex of (3,-1) is a minimum because it is the lowest point on the graph.

f.) Write the equation of the axis of symmetry $x = 3$

g.) Write an equation for this quadratic function (a = 1 or a = -1) $y = x^2 - 6x + 8$

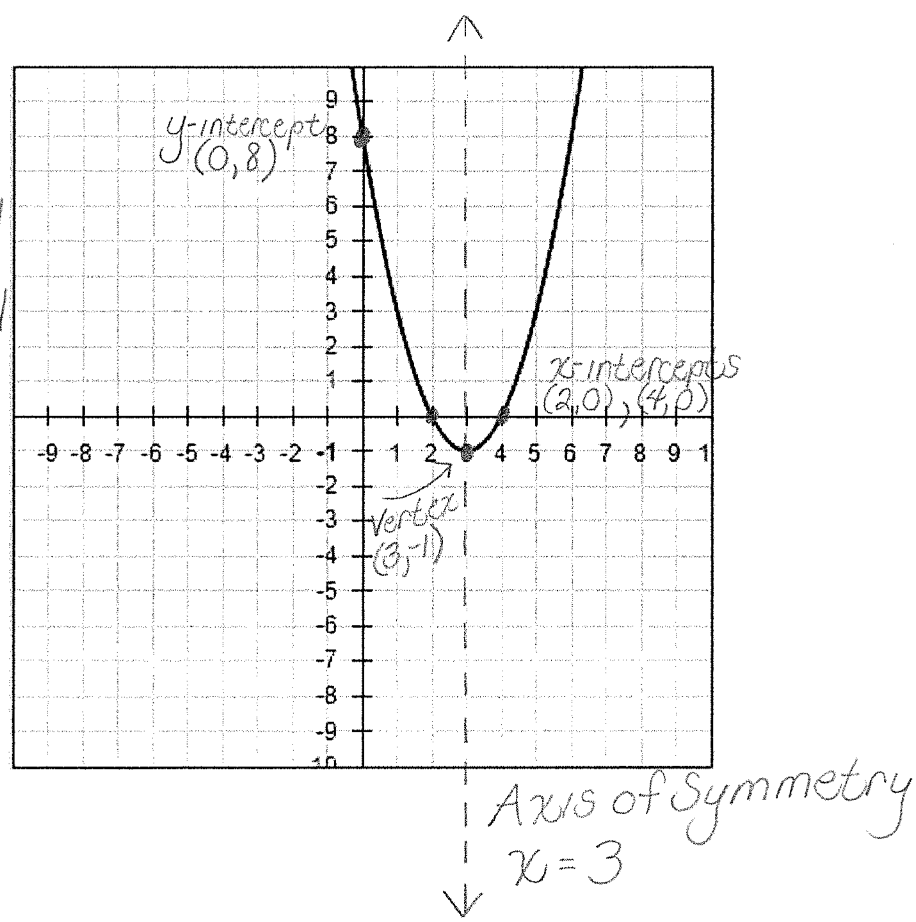
$y = a(x-h)^2 + K$

$y = 1(x-3)^2 + -1$

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

$y = x^2 - 3x - 3x + 9 + -1$

$y = x^2 - 6x + 8$



2.) Examine the quadratic function below. Label the graph with parts a – f.

a.) Find the y-intercept (0, 3)

b.) Find the x-intercept(s)/Zero(s)/ root(s)/ solution(s) (-3, 0) , (1, 0)

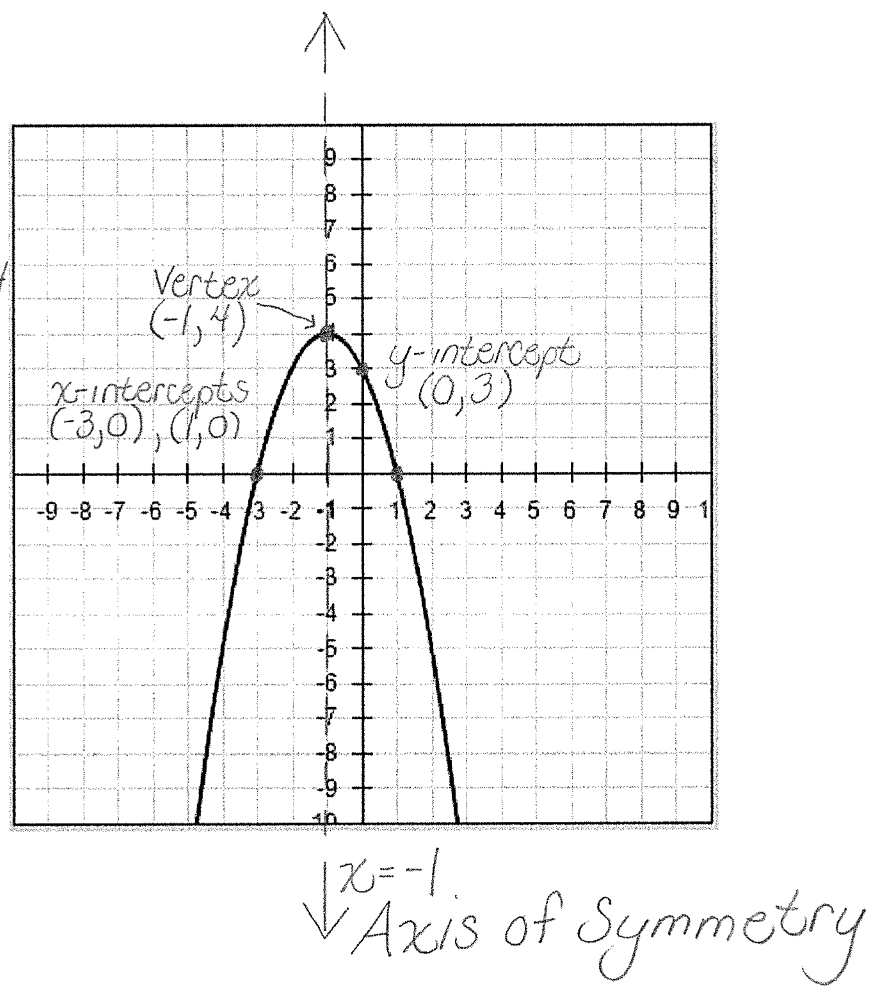
c.) Identify the vertex (-1, 4)

d.) Is the vertex a maximum or a minimum? Why? The vertex of (-1, 4) is a maximum because it is the highest point on the graph.

e.) Write the equation of the axis of symmetry $x = -1$

f.) Write an equation for this quadratic function (a = 1 or a = -1) $y = -x^2 - 2x + 3$

$y = a(x-h)^2 + k$
$y = -1(x-(-1))^2 + 4$
$y = -1(x+1)^2 + 4$
$y = -1(x+1)(x+1) + 4$
$y = -1(x^2 + 1x + 1x + 1) + 4$
$y = -1(x^2 + 2x + 1) + 4$
$y = -x^2 - 2x - 1 + 4$
$y = -x^2 - 2x + 3$



3.) Examine the quadratic function below. Label the graph with parts a – f.

a.) Find the y-intercept $(0, -3)$

b.) Find the x-intercept(s)/Zero(s)/ root(s)/ solution(s) $(1, 0)$, $(3, 0)$

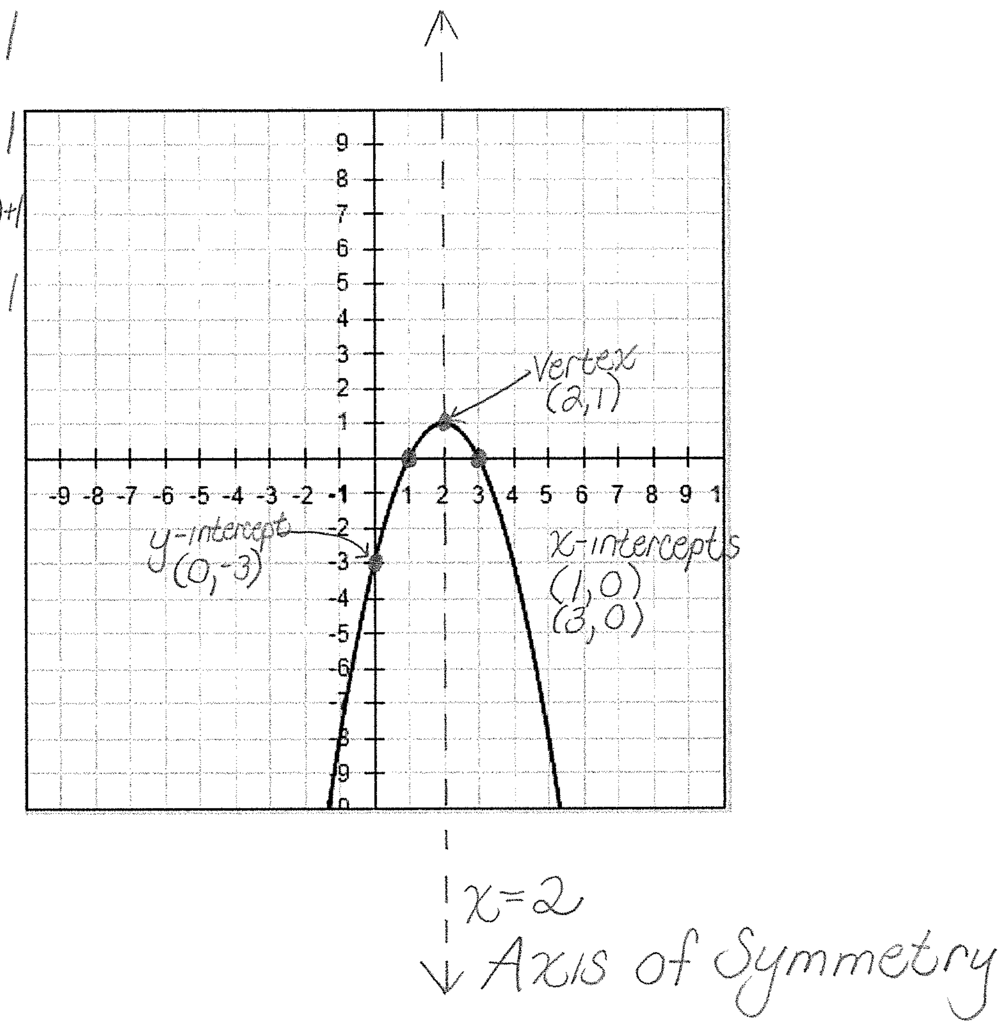
c.) Identify the vertex $(2, 1)$

d.) Is the vertex a maximum or a minimum? Why? The vertex of $(2,1)$ is a maximum because it is the highest point on the graph.

e.) Write the equation of the axis of symmetry $x = 2$

f.) Write an equation for this quadratic function (a = 1 or a = -1) $y = -x^2 + 4x - 3$

$$y = a(x-h)^2 + k$$
$$y = -1(x-2)^2 + 1$$
$$y = -1(x-2)(x-2) + 1$$
$$y = -1(x^2 - 2x - 2x + 4) + 1$$
$$y = -x^2 + 2x + 2x - 4 + 1$$
$$y = -x^2 + 4x - 3$$



4.) Examine the quadratic function below. Label the graph with parts a – f.

a.) Find the y-intercept $(0, -3)$

b.) Find the x-intercept(s)/Zero(s)/ root(s)/ solution(s) $(-3, 0)$, $(1, 0)$

c.) Identify the vertex $(-1, -4)$

d.) Is the vertex a maximum or a minimum? Why? The vertex of $(-1, -4)$ is a minimum because it is the lowest point on the graph.

e.) Write the equation of the axis of symmetry $x = -1$

f.) Write an equation for this quadratic function (a = 1 or a = -1) $y = x^2 + 2x - 3$

$y = a(x-h)^2 + K$

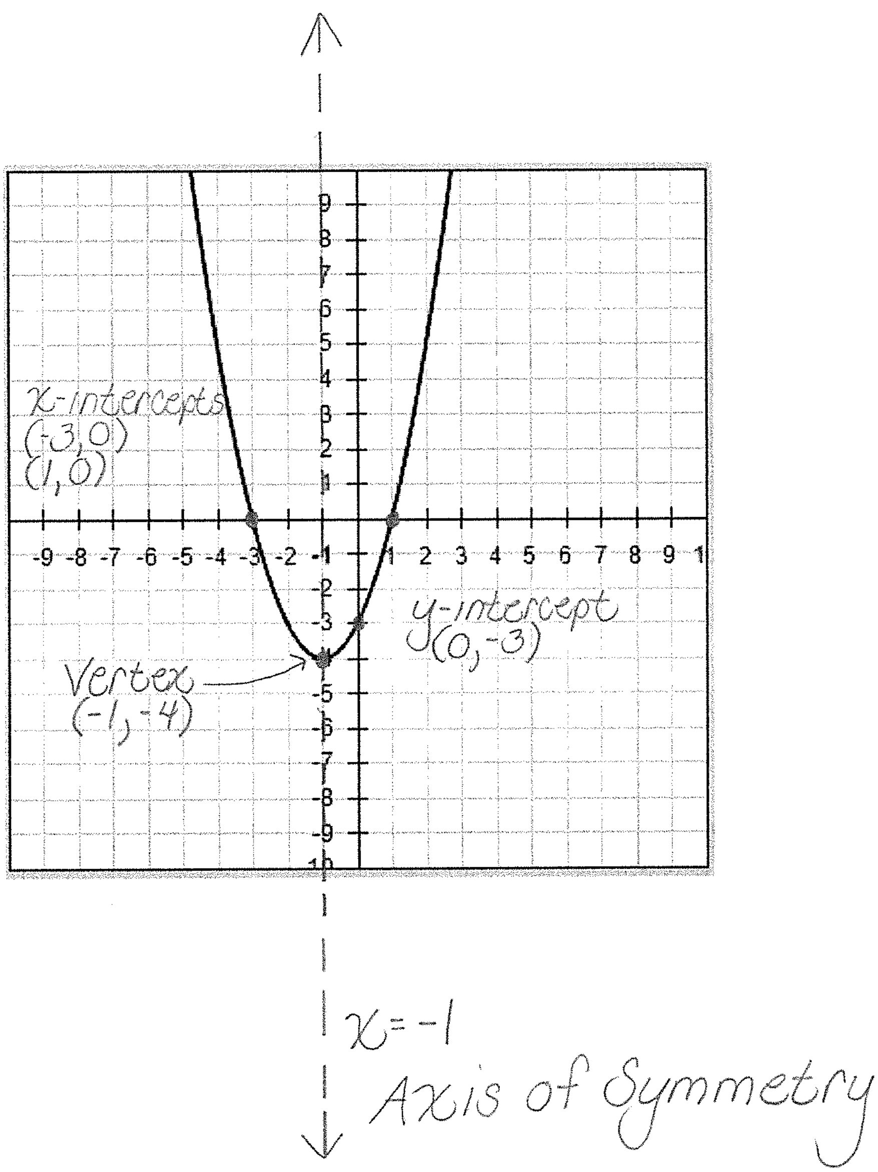
$y = 1(x-(-1))^2 + -4$

$y = (x+1)^2 + -4$

$y = (x+1)(x+1) + -4$

$y = x^2 + 1x + 1x + 1 + -4$

$y = x^2 + 2x - 3$



Factor each expression for 5 – 8.

5.) $6x^5 + 3x^4 - 9x^2$ GCF: $3x^2$

$3x^2(2x^3 + x^2 - 3)$

6.) $49r^2 - 144$

$7r^2 - 12^2$ $(7r+12)(7r-12)$

7.) $2y^2 - 2y - 112$ GCF: 2

$2(y^2 - y - 56)$ $2(y-8)(y+7)$

8.) $12d^2 - 8d + 1$

12 + -2 -6 -8

	$2d$	-1
$6d$	$12d^2$	$-6d$
-1	$-2d$	1

$(2d-1)(6d-1)$

9.) Explain what can be determined by looking at each form of a quadratic function.

a.) Standard form $y = ax^2 + bx + c$

In the standard form, the value of c represents the y-intercept.

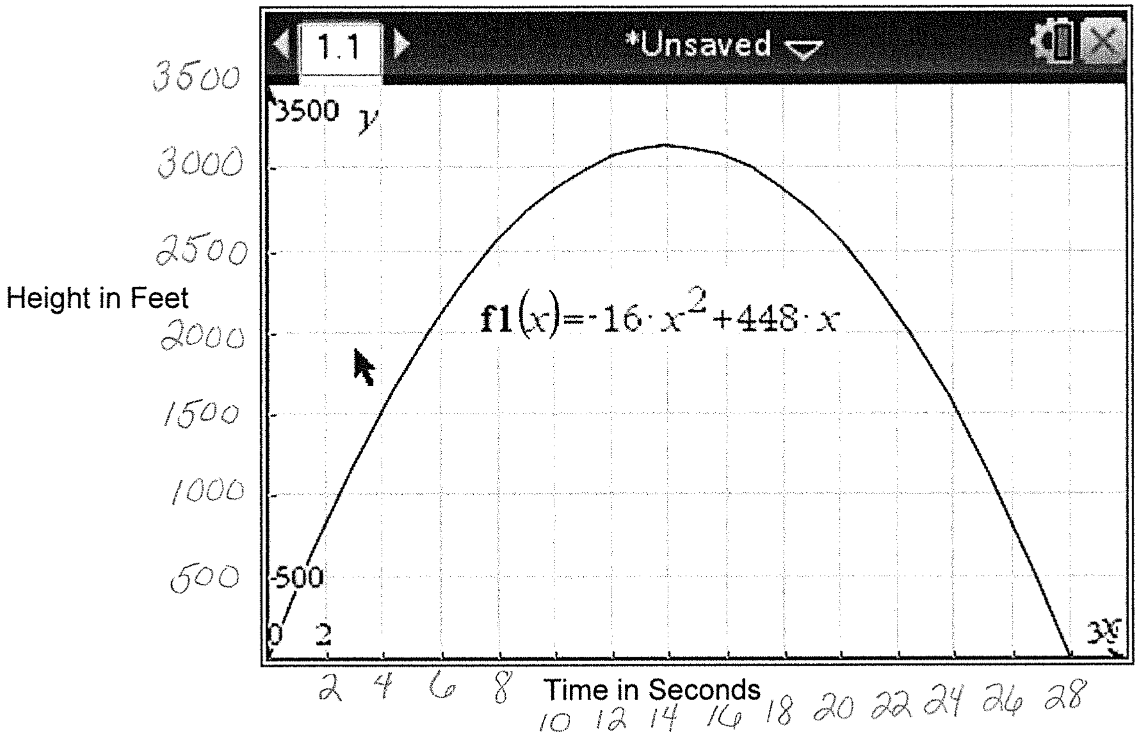
b.) Factored form $y = a(x - p)(x - q)$

In the factored form, you set $x-p=0$ and $x-q=0$ Solve for p and q to obtain the solutions

c.) Vertex form $y = a(x - h)^2 + k$

In the vertex form, the vertex is represented by (h, k). The form inside the parentheses must be $x-h$. If it is written as $x+h$, rewrite it as $(x-(-h))^2$.

The following is a graph of the path of a rocket after it is launched.



10.) Explain the real world meaning of the following points. Height is in feet and time is in seconds. $x=\frac{-b}{2a}$ $x=\frac{-448}{-32}$ $x=14$ $y=-16\cdot 14^2+448\cdot 14$ $y=3136$

a.) Vertex (14, 3136) At 14 seconds, the rocket was at the maximum height of 3136 feet.

b.) x-intercept(s) (0,0) At 0 seconds, the rocket flew 0 feet
(28,0) At 28 seconds, the rocket hit the ground.

11.) What does the x represent in the function?

Time

12a.) How long does it take for the rocket to reach the ground?

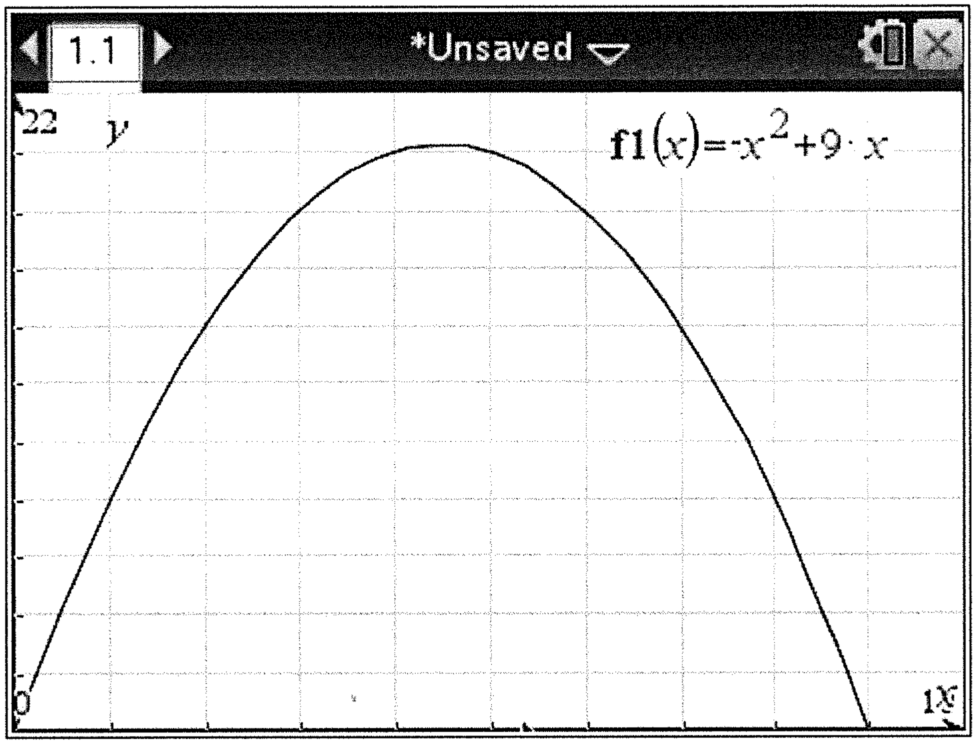
28 seconds

12b.) What is the fall time of the rocket?

14 seconds

13.) Examine the function below.

x	y
0	0
1	8
2	14
3	18
4	20
5	20
6	18
7	14
8	8
9	0



13.) What point is missing from the table?

The vertex

14a.) How can you find the vertex of this graph?

$x = \frac{-b}{2a}$

14b.) Find the vertex. Show your work.

$f(x) = -x^2+9x$

$x = \frac{-9}{2\cdot -1}$

$x = \frac{-9}{-2}$

$x = 4.5$

$f(4.5) = -1(4.5)^2+9\cdot 4.5$

$f(4.5) = 20.25$

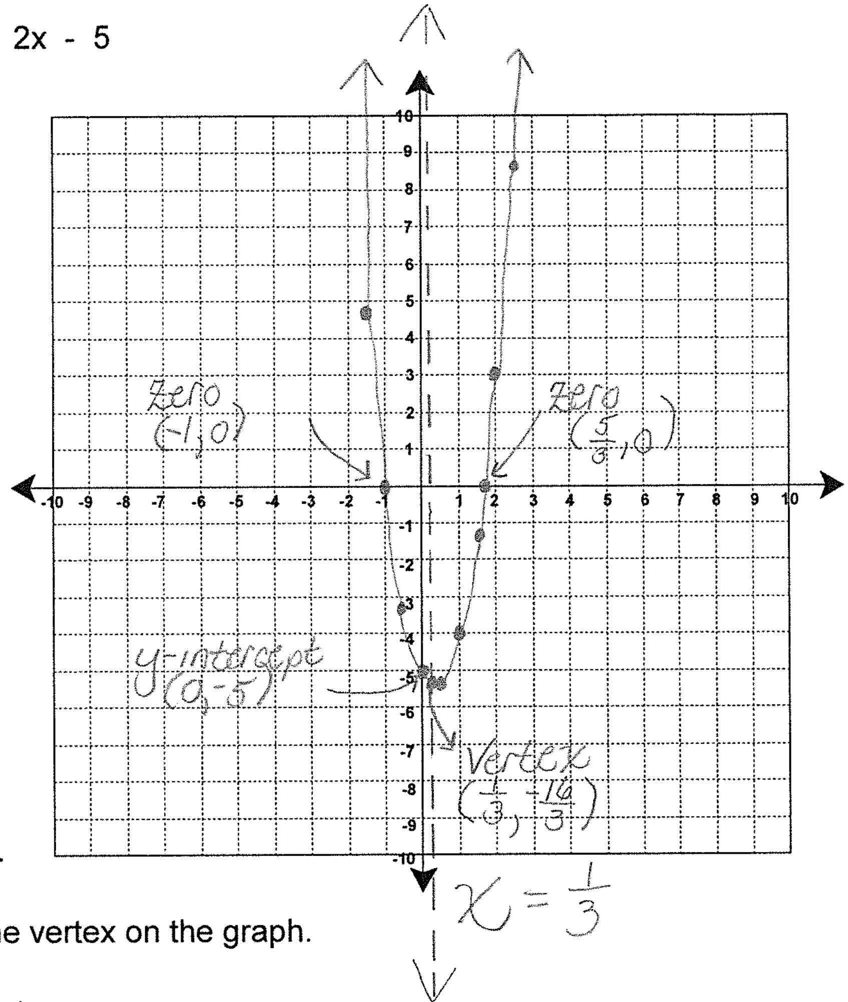
$(4.5, 20.25)$

15.) Explain why you could not see the vertex in the table.

The x values were increasing by increments of one. The x value of 4.5 ~~is~~ is between 4 and 5 so we could not see it.

16.) Graph the function: $f(x) = 3x^2 - 2x - 5$

x	y
-1.5	4.75
-1	0
-.5	-3.25
0	-5
.5	-5.25
1	-4
1.5	-1.25
2	3
2.5	8.75



✓ Plot the parabola correctly.

✓ Label the coordinates of the vertex on the graph.

If necessary, use the formula.

$x = \frac{-b}{2a}$ $\quad x = \frac{2}{2\cdot 3}$ $\quad x = \frac{2}{6}$ $\quad x = \frac{1}{3}$

$\left(\frac{1}{3}, -\frac{16}{3}\right)$

$f\left(\frac{1}{3}\right) = 3\left(\frac{1}{3}\right)^2 - 2\left(\frac{1}{3}\right) - 5$

$f\left(\frac{1}{3}\right) = -\frac{16}{3}\ (-5.\overline{3})$

✓ Label the coordinates of the y-intercept on the graph.

✓ Show the Axis of Symmetry

✓ Write the equation of the Axis of Symmetry. $x = \frac{1}{3}$

✓ Label the zeros on the graph. $(-1, 0)$ $\left(\frac{5}{3}, 0\right)$

If necessary, use the quadratic formula.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{2 \pm \sqrt{4 - 4\cdot 3\cdot -5}}{2\cdot 3}$$

$$x = \frac{2 \pm \sqrt{64}}{6}$$

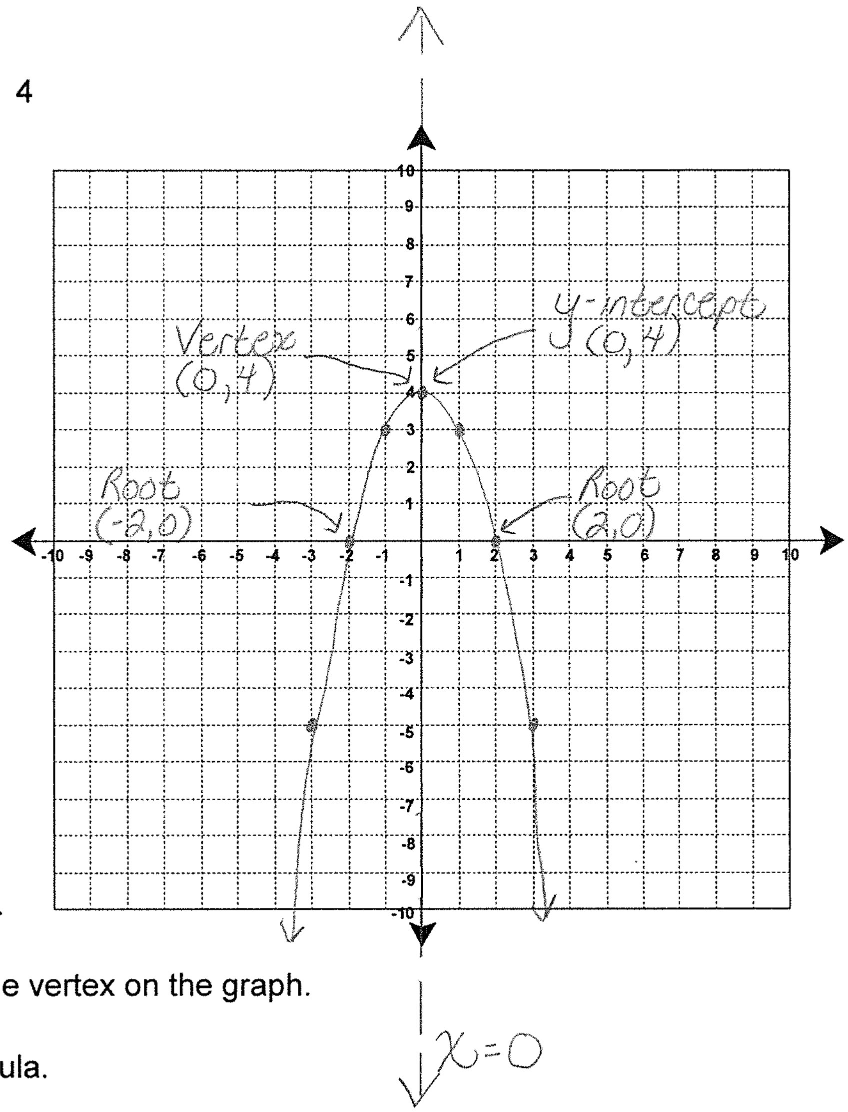
$$x = \frac{2 \pm 8}{6}$$

$$x = \frac{2+8}{6} \qquad x = \frac{2-8}{6}$$

$$x = \frac{10}{6} \text{ or } \frac{5}{3} \qquad x = \frac{-6}{6} \text{ or } -1$$

17.) Graph the function: $f(x) = -x^2 + 4$

x	y
-3	-5
-2	0
-1	3
0	4
1	3
2	0
3	-5



✓ ______ Plot the parabola correctly.

✓ ______ Label the coordinates of the vertex on the graph.

If necessary, use the formula.

(0,4)

✓ ______ Label the coordinates of the y-intercept on the graph.

✓ ______ Show the Axis of Symmetry

✓ ______ Write the equation of the Axis of Symmetry. $x=0$

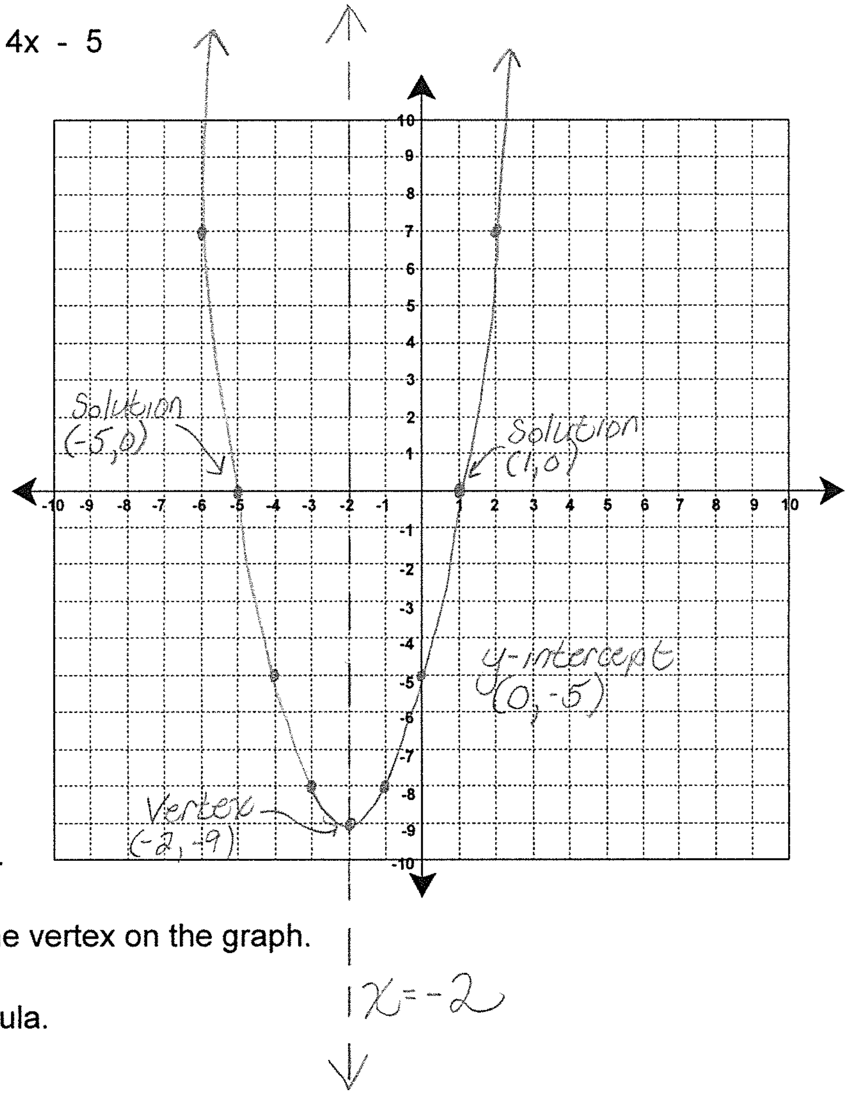
✓ ______ Label the roots on the graph.

If necessary, use the quadratic formula.

(-2,0) (2,0)

18.) Graph the function: $f(x) = x^2 + 4x - 5$

x	y
-6	7
-5	0
-4	-5
-3	-8
-2	-9
-1	-8
0	-5
1	0
2	7



✓ Plot the parabola correctly.

✓ Label the coordinates of the vertex on the graph.

If necessary, use the formula.

(-2, -9)

✓ Label the coordinates of the y-intercept on the graph.

✓ Show the Axis of Symmetry

✓ Write the equation of the Axis of Symmetry. $x = -2$

✓ Label the solutions on the graph.

If necessary, use the quadratic formula.

(-5,0) (1,0)

Score: ____________________ NAME: Key

Assessment Training Practice #3A

1.) Show all your work to find the x-intercept(s)/zero(s)/solution(s) of:

1a.) $f(x) = (x + 7)(x - 3)$

$x + 7 = 0$ or $x - 3 = 0$

$x = -7$ or $x = 3$

1b.) $f(x) = 2x^2 + 5x - 3$

-6

6 -1

5

	$2x$	-1
x	$2x^2$	$-1x$
3	$6x$	-3

$(2x-1)(x+3) = 0$

$2x - 1 = 0$ or $x + 3 = 0$

$2x = 1$ or $x = -3$

$x = \frac{1}{2}$ or $x = -3$

1c.) $f(x) = x(2x + 5)$

$x(2x+5) = 0$

$x = 0$ or $2x + 5 = 0$

$x = 0$ or $2x = -5$

$x = 0$ or $x = \frac{-5}{2}$

1d.) f(x) = $6x^2 + 7x - 20$

-120
$\cdot$
15 -8
+
7

	$3x$	-4
$2x$	$6x^2$	$-8x$
5	$15x$	-20

$(2x+5)(3x-4)=0$

$2x+5=0$ or $3x-4=0$

$2x=-5$ or $3x=4$

$x=\frac{-5}{2}$ or $x=\frac{4}{3}$

1e.) f(x) = $x^2 - x - 12$

-12
$\cdot$
3 -4
+
-1

	x	-4
x	x^2	$-4x$
3	$3x$	-12

$(x-4)(x+3)=0$

$x-4=0$ or $x+3=0$

$x=4$ or $x=-3$

1f.) f(x) = $3(4x - 3)(x - 1)$

$3(4x-3)(x-1)=0$

$4x-3=0$ or $x-1=0$

$4x=3$ or $x=1$

$x=\frac{3}{4}$ or $x=1$

2.) Find the vertex of each function. Identify if the vertex is a maximum or a minimum.

2a.) $f(x) = -5(x + 3)^2 - 4$

$f(x) = -5(x-\underset{h}{(-3)})^2 + \underset{K}{-4}$

Vertex: $(-3, -4)$ Maximum or Minimum

2b.) $f(x) = 2x^2 - 4x + 1$

$x = \frac{-b}{2a}$ $x = \frac{4}{4}$ $x = 1$

$y = 2 \cdot (1)^2 - 4 \cdot 1 + 1$

$y = 2 - 4 + 1$

$y = -1$

Vertex: $(1, -1)$ Maximum or Minimum

2c.) $f(x) = 3x^2 + 6x - 5$

$x = \frac{-b}{2a}$ $x = \frac{-6}{6}$ $x = -1$

$y = 3(-1)^2 + 6 \cdot -1 - 5$

$y = 3 + -6 - 5$

$y = -8$

Vertex: $(-1, -8)$ Maximum or Minimum

2d.) $f(x) = -(x - 3)^2$

$f(x) = -1(x-\underset{h}{3})^2 + \underset{K}{0}$

Vertex: $(3, 0)$ Maximum or Minimum

2e.) $f(x) = x^2 - 1$

$f(x) = (x-\underset{h}{0})^2 + \underset{K}{-1}$

Vertex: $(0, -1)$ Maximum or Minimum

2f.) $f(x) = (x - \underset{h}{5})^2 + \underset{K}{3}$

Vertex: $(5, 3)$ Maximum or Minimum

3.) Find the x-intercept(s) and y-intercept of each function.

3a.) $f(x) = x^2 - 4x + 2$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$$x = \frac{4 \pm \sqrt{16-4\cdot1\cdot2}}{2\cdot1}$$

$$x = \frac{4 \pm \sqrt{8}}{2}$$

$$x = \frac{4 \pm \sqrt{4}\sqrt{2}}{2}$$

$$x = \frac{4 \pm 2\sqrt{2}}{2}$$

$$x = 2 \pm \sqrt{2}$$

x-intercept(s): $x = 2+\sqrt{2}$, $x = 2-\sqrt{2}$

c value

y-intercept: $(0, 2)$

3b.) $f(x) = x^2 + 6x - 16$

-16

-2   8

+

6

	x	8
x	x^2	$8x$
-2	$-2x$	-16

$$(x+8)(x-2) = 0$$

$$x+8 = 0 \text{ or } x-2 = 0$$

$$x = -8 \text{ or } x = 2$$

x-intercept(s): $x = -8$, $x = 2$

c value

y-intercept: $(0, -16)$

3c.) $f(x) = x^2 - 2x - 24$

-24

4   -6

+

-2

	x	-6
x	x^2	$-6x$
4	$4x$	-24

$$(x-6)(x+4) = 0$$

$$x-6 = 0 \text{ or } x+4 = 0$$

$$x = 6 \text{ or } x = 4$$

x-intercept(s): $x = 6$, $x = 4$

c value

y-intercept: $(0, -24)$

4.) What is the vertex of $g(x) = (x - 3)^2 + 2$?

$h \quad k$

Vertex: $(3, 2)$

Which of the following has the **same vertex** as g(x)? Identify/show work for the vertex for each function.

a.) $h(x) = -2(x - 3)^2 - 2$

$h(x) = -2(x-3)^2 + -2$

$h \quad k$

Vertex: $(3, -2)$ Same or Different

b.) $f(x) = (x + 3)^2 + 2$

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

$h \quad k$

Vertex: $(-3, 2)$ Same or Different

c.) $p(x) = x^2 - 6x + 11$

$x = \frac{-b}{2a} \quad x = \frac{6}{2 \cdot 1} \quad x = \frac{6}{2} \quad x = 3$

$y = 3^2 - 6 \cdot 3 + 11$

$y = 9 - 18 + 11$

$y = 2$

Vertex: $(3, 2)$ Same or Different

d.) $q(x) = (x - 3)(x + 2)$

$x^2 + 2x - 3x - 6$

$x^2 - x - 6$

$x = \frac{-b}{2a} \quad x = \frac{1}{2}$

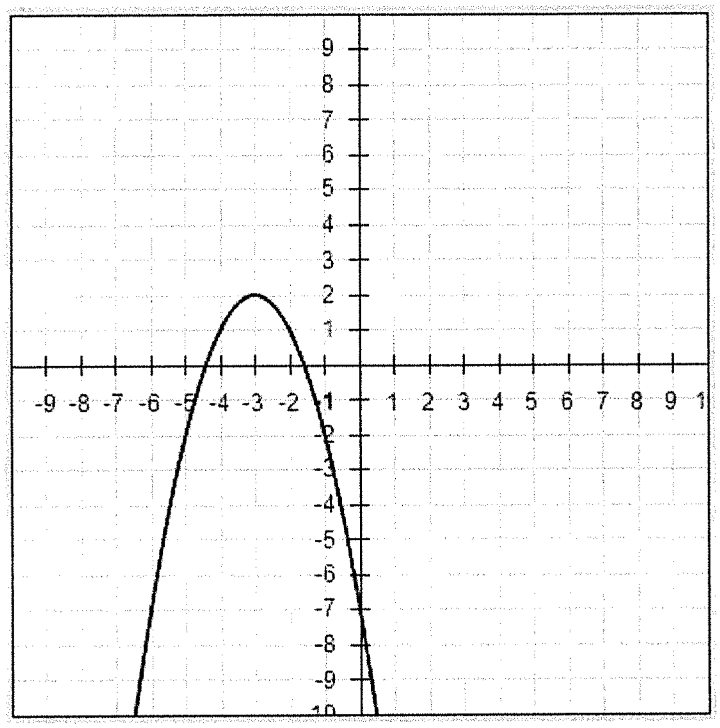
$y = \left(\frac{1}{2}\right)^2 - \frac{1}{2} - 6$

$y = \frac{1}{4} - \frac{1}{2} - 6$

Vertex: $\left(\frac{1}{2}, -\frac{25}{4}\right)$ Same or Different

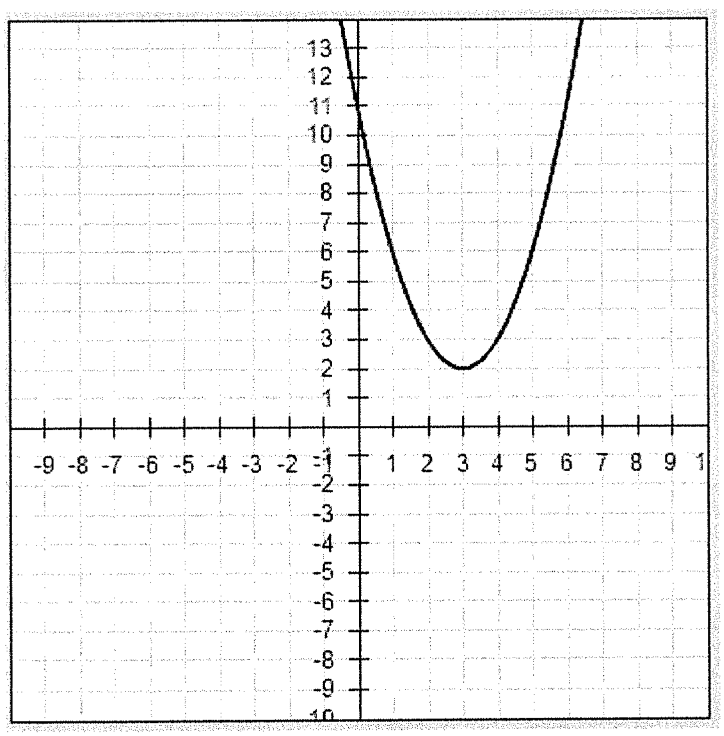
$(.5, -6.25)$

e.)



Vertex: (-3, 2) Same or Different

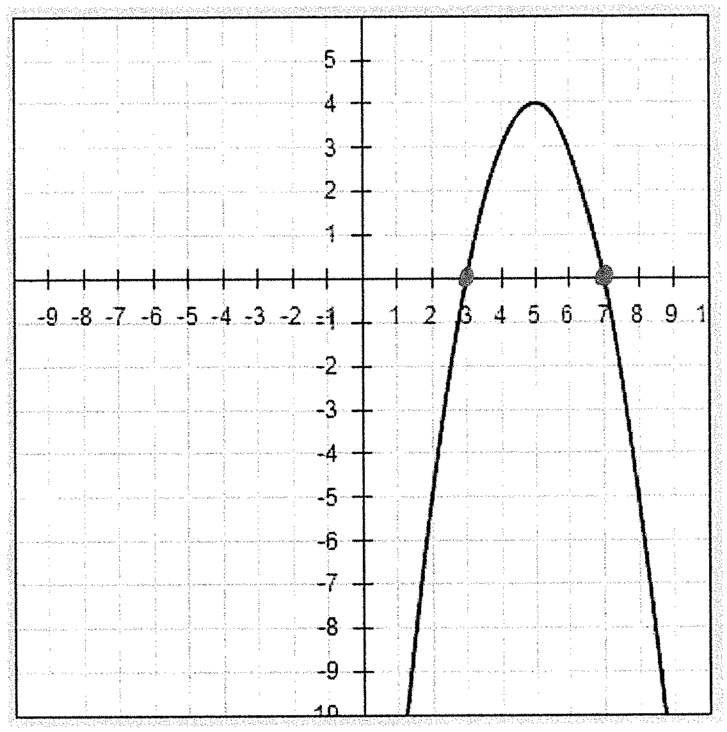
f.)



Vertex: (3, 2) Same or Different

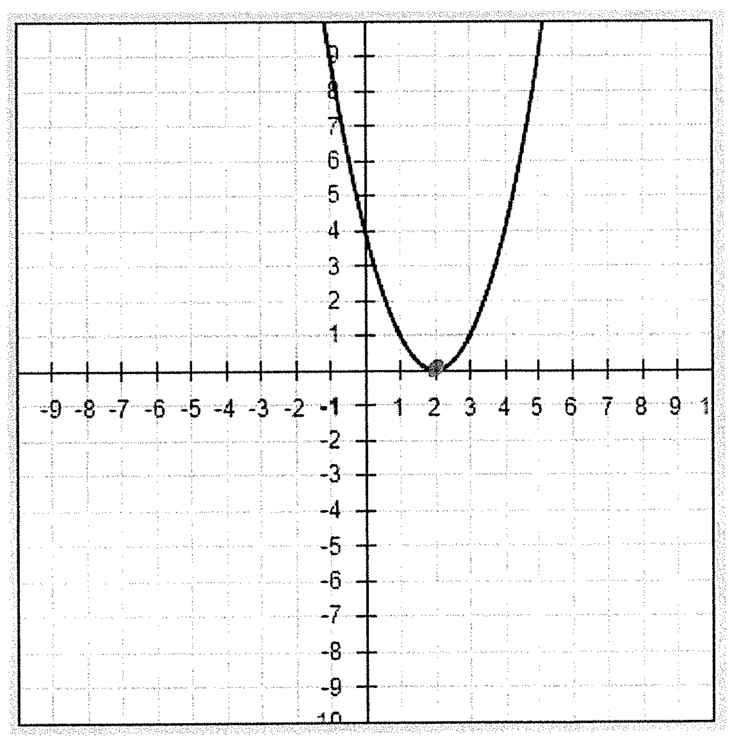
5.) Determine the number of **real number** solutions for the following quadratic function. Show the solutions on the graph. Explain how you know the number of real number solutions.

There are 2 x-intercepts on the graph therefore there are 2 real number solutions.



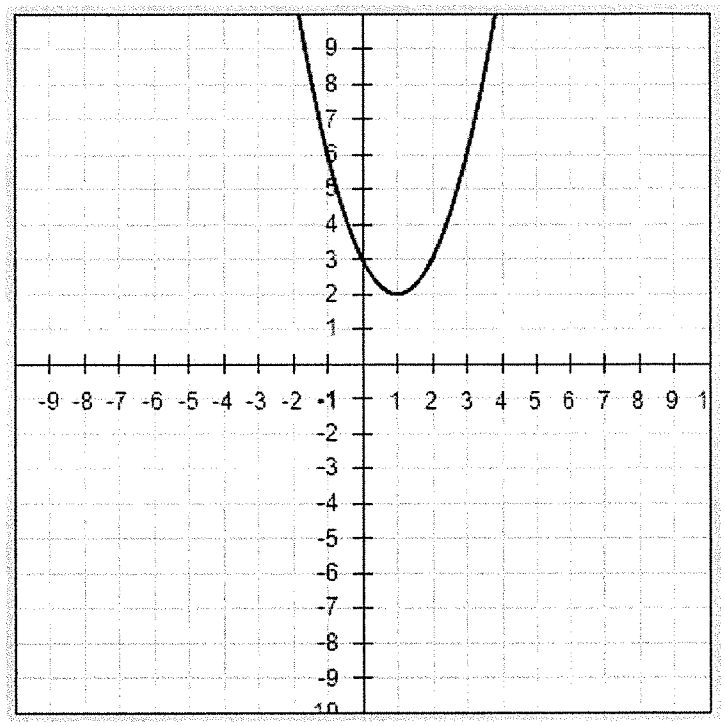
6.) Determine the number of **real number** solutions for the following quadratic function. Show the solutions on the graph. Explain how you know the number of real number solutions.

There is 1 x-intercept on the graph therefore there is 1 real number solution.



7.) Determine the number of **real number** solutions for the following quadratic function. Show the solutions on the graph. Explain how you know the number of real number solutions.

There are no x-intercepts on the graph therefore there are 0 real number solutions.
There are two imaginary solutions.



8.) Find the roots of $4x^2 - 15 = 9$ **Show all work! Round answers to the nearest hundredth if necessary.**

$$4x^2 - 15 = 9$$
$$-9 \quad -9$$
$$4x^2 - 24 = 0$$

$a = 4$
$b = 0$
$c = -24$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{0 \pm \sqrt{0^2 - 4 \cdot 4 \cdot -24}}{2 \cdot 4}$$

$$x = \frac{0 \pm \sqrt{384}}{8}$$

$$x = \frac{0 \pm \sqrt{64}\sqrt{6}}{8}$$

$$x = \frac{0 \pm 8\sqrt{6}}{8}$$

$$x = \frac{8\sqrt{6}}{8}$$

$$x = \frac{-8\sqrt{6}}{8}$$

$$\boxed{\begin{array}{ll} x = \sqrt{6} & x \approx 2.45 \\ x = -\sqrt{6} & x \approx -2.45 \end{array}}$$

9.) Find the zeros of $z^2 + 6z - 27 = 0$ **Show all work! Round answers to the nearest hundredth if necessary.**

$a = 1$
$b = 6$
$c = -27$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-6 \pm \sqrt{36 - 4 \cdot 1 \cdot -27}}{2 \cdot 1}$$

$$x = \frac{-6 \pm \sqrt{144}}{2}$$

$$x = \frac{-6 \pm 12}{2}$$

$$x = \frac{-6 + 12}{2}$$

$$x = \frac{6}{2}$$

$$x = 3$$

$$x = \frac{-6 - 12}{2}$$

$$x = \frac{-18}{2}$$

$$x = -9$$

$$\boxed{\begin{aligned} x &= 3 \\ x &= -9 \end{aligned}}$$

10.) Solve the equation: $c^2 - 3c = 0$ **Show all work! Round answers to the nearest hundredth if necessary.**

$a = 1$
$b = -3$
$c = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{3 \pm \sqrt{9 - 4 \cdot 1 \cdot 0}}{2 \cdot 1}$$

$$x = \frac{3 \pm \sqrt{9}}{2}$$

$$x = \frac{3 \pm 3}{2}$$

$$x = \frac{3 + 3}{2}$$

$$x = \frac{3 - 3}{2}$$

$$\boxed{\begin{aligned} x &= 3 \\ x &= 0 \end{aligned}}$$

11.) Solve: $10x^2 - 7x = 33$

Show all work! Round answers to the nearest hundredth if necessary.

$$\begin{aligned} 10x^2 - 7x &= 33 \\ -33 \quad & \;\; -33 \end{aligned}$$

$$10x^2 - 7x - 33 = 0$$

$a = 10$
$b = -7$
$c = -33$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{7 \pm \sqrt{49 - 4 \cdot 10 \cdot -33}}{2 \cdot 10}$$

$$x = \frac{7 \pm \sqrt{1369}}{20}$$

$$x = \frac{7 \pm 37}{20}$$

$$x = \frac{7 + 37}{20}$$

$$x = \frac{7 - 37}{20}$$

$$\boxed{\begin{aligned} x &= 2.2 \\ x &= -1.5 \end{aligned}}$$

12.) Find all the zeros of: $2x^2 + 15x + 28 = 0$

Show all work! Round answers to the nearest hundredth if necessary.

$a = 2$
$b = 15$
$c = 28$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-15 \pm \sqrt{225 - 4 \cdot 2 \cdot 28}}{2 \cdot 2}$$

$$x = \frac{-15 \pm \sqrt{1}}{4}$$

$$x = \frac{-15 \pm 1}{4}$$

$$x = \frac{-15 + 1}{4}$$

$$x = \frac{-15 - 1}{4}$$

$$\boxed{\begin{aligned} x &= -3.5 \\ x &= -4 \end{aligned}}$$

13.) Find the roots of: $2x^2 - 7x - 13 = 0$ **Show all work! Round answers to nearest hundredth if necessary.**

$a = 2$
$b = -7$
$c = -13$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$$x = \frac{7 \pm \sqrt{49-4\cdot 2\cdot -13}}{2\cdot 2}$$

$$x = \frac{7 \pm \sqrt{153}}{4}$$

$$x = \frac{7 \pm \sqrt{9}\sqrt{17}}{4}$$

$$x = \frac{7 \pm 3\sqrt{17}}{4}$$

$$\boxed{\begin{array}{l} x = \frac{7+3\sqrt{17}}{4} \\ x \approx 4.84 \\ x = \frac{7-3\sqrt{17}}{4} \\ x \approx -1.34 \end{array}}$$

14.) Solve: $6x^2 + 13x + 6 = 0$ **Show all work! Round answers to nearest hundredth if necessary.**

$a = 6$
$b = 13$
$c = 6$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$$x = \frac{-13 \pm \sqrt{169-4\cdot 6\cdot 6}}{2\cdot 6}$$

$$x = \frac{-13 \pm \sqrt{25}}{12}$$

$$x = \frac{-13 \pm 5}{12}$$

$$x = \frac{-13+5}{12}$$

$$x = \frac{-13-5}{12}$$

$$\boxed{\begin{array}{l} x = -.\overline{6} \\ x = -1.5 \end{array}}$$

Score: ____________________ NAME: Key

Assessment Training Practice #4A

Directions: Find the sum, difference or product of each for #1 – 12.

1.) $(4x^2 - 5x) - 2x(2x^2 - 3x + 3)$

$(4x^2 - 5x) + -2x(2x^2 - 3x + 3)$

$4x^2 - 5x + -4x^3 + 6x^2 - 6x$

$-4x^3 + 10x^2 - 11x$

2.) $(3p - 7)(3p + 4)$

	$3p$	-7
$3p$	$9p^2$	$-21p$
4	$12p$	-28

$9p^2 - 9p - 28$

3.) $(6 - 3x^2) + (x^2 - x + 5)$

$6 - 3x^2 + x^2 - x + 5$

$-2x^2 - x + 11$

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

	n^2	$-3n$	4
$-2n^3$	$-2n^5$	$6n^4$	$-8n^3$

$-2n^5 + 6n^4 - 8n^3$

5.) $(2a^2 + 4c^3)^2$

	$2a^2$	$4c^3$
$2a^2$	$4a^4$	$8a^2c^3$
$4c^3$	$8a^2c^3$	$16c^6$

$4a^4 + 16a^2c^3 + 16c^6$

6.) $(n^4 + 2n - 1) + (5n - n^4 - 4)$

$n^4 + 2n - 1 + 5n - n^4 - 4$

$7n - 5$

7.) $(4x + 3)(2x + 1)$

	$4x$	3
$2x$	$8x^2$	$6x$
1	$4x$	3

$8x^2 + 10x + 3$

8.) $(4h^2 - 5)(5h^2 - 6)$

	$4h^2$	-5
$5h^2$	$20h^4$	$-25h^2$
-6	$-24h^2$	30

$20h^4 - 49h^2 + 30$

9.) $(2x^3 + 4x^2 + 1)(x - 4)$

	$2x^3$	$4x^2$	1
x	$2x^4$	$4x^3$	x
-4	$-8x^3$	$-16x^2$	-4

$2x^4 - 4x^3 - 16x^2 + x - 4$

10.) $(-4x^2 + 5x - 8) + (-x^2 + 3x + 6)$

$-4x^2 + 5x - 8 + -x^2 + 3x + 6$

$-5x^2 + 8x - 2$

11.) $(2x^2 - 3x - 3) - (-6x^2 + 3x + 8)$

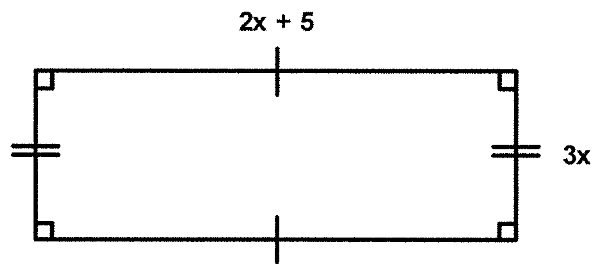
$2x^2 - 3x - 3 + -1(-6x^2 + 3x + 8)$

$2x^2 - 3x - 3 + 6x^2 - 3x - 8 = 8x^2 - 6x - 11$

12.) $(3x^2 + 5x + 6)(x - 7)$

	$3x^2$	$5x$	6
x	$3x^3$	$5x^2$	$6x$
-7	$-21x^2$	$-35x$	-42

$3x^3 - 16x^2 - 29x - 42$



$2(2x+5)+2(3x)$

$4x+10+6x$

$10x+10$

13a.) Write an expression for the perimeter of the figure above.

$P = 2l + 2w \quad 2(2x+5) + 2(3x) = 10x+10$

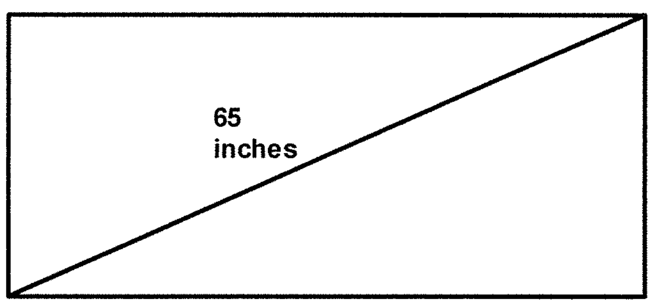
13b.) Write an expression for the area of the figure above.

$(2x+5)(3x)$

$A = l \cdot w \quad (2x+5)(3x) = 6x^2 + 15x$

$6x^2 + 15x$

14.) A 65 inch television is named by the length of the diagonal of the television.



Since the angles of the television are right angles, the Pythagorean Theorem can be used to compare the dimensions to the diagonal: $a^2 + b^2 = c^2$. You want to know if your new television will fit in your existing cabinet. Rearrange the formula to solve for height (a).

$a^2 + b^2 = c^2$

$a^2 = c^2 - b^2$

$\sqrt{a^2} = \sqrt{c^2 - b^2}$

$a = \pm\sqrt{c^2 - b^2}$ reject $-\sqrt{c^2 - b^2}$

$\boxed{a = \sqrt{c^2 - b^2}}$

15.) In accounting, a company's gross profit rate measures how well the company controls cost of goods sold to maximize gross profit. The gross profit rate, P, is calculated using the formula: $P = \frac{S-C}{S}$, where S is the net sales and C is the cost of goods sold. Rearrange the formula to solve for the cost of goods sold (C).

$$P = \frac{S-C}{S}$$

$$S \cdot P = \frac{S-C}{S} \cdot S$$

$$PS = S - C$$

$$PS = S - C$$
$$-S \quad -S$$

$$\frac{PS - S}{-1} = \frac{-C}{-1}$$

$$-PS + S = C$$

$$S - PS = C$$

16.) The surface area, S, of a right circular cylinder is calculated using the formula: $S = 2\pi r^2 + 2\pi rh$, where r is the radius of the cylinder and h is the height of the cylinder. Rearrange the formula to solve for height (h).

$$S = 2\pi r^2 + 2\pi rh$$
$$-2\pi r^2 \quad -2\pi r^2$$

$$\frac{S - 2\pi r^2}{2\pi r} = \frac{2\pi rh}{2\pi r}$$

$$\frac{S - 2\pi r^2}{2\pi r} = h$$

$$h = \frac{S - 2\pi r^2}{2\pi r}$$

17.) If F denotes a temperature in degrees Fahrenheit and C is the same temperature measured in degrees Celsius, then F and C are related by the equation: $F = \frac{9}{5}C + 32$. Rewrite this equation to solve for C in terms of F.

$$F = \frac{9}{5}C + 32$$
$$-32 \quad -32$$

$$\frac{5}{9}(F - 32) = \frac{9}{5}C\left(\frac{5}{9}\right)$$

$$\boxed{\frac{5}{9}(F - 32) = C}$$