Algebra 1-2 Exam Review for Chapter 6 Name Key

Multiple Choice
Identify the choice that best completes the statement or answers the question.

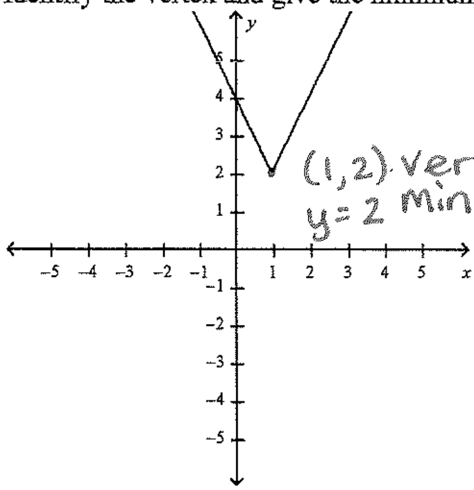
reflection

C 1. Describe the effect of the transformation from $f(x) = |x|$ to $g(x) = -|x - 4|$.

shift right

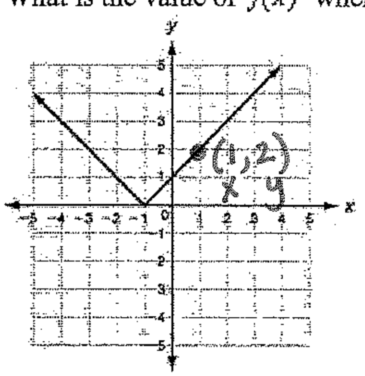
a. Shift left without reflection
b. Shift left with reflection
c. Shift right with reflection
d. Shift up with reflection

C 2. Identify the vertex and give the minimum or maximum value of the function, $f(x) = \frac{1}{2}|x-2| + 1$



a. The vertex: is (1, 2). The graph opens upward, so the function has a maximum.
b. The vertex is (1, 2). The graph does not intersect the x-axis, so the function has no minimum.
c. The vertex: is (1, 2). The graph opens upward, so the function has a minimum. The minimum is 2. The maximum is $+\infty$.
d. The vertex is (2, 1). The graph opens upward, so the function has a minimum. The minimum is 2.

C 3. What is the value of $f(x)$ when x = 1 ?



a. −4
b. −2
c. 2
d. 4

D 4. What is the value of $h(x) = \frac{|x|}{2}$ when x = -4?

$\frac{|-4|}{2} = \frac{4}{2} = 2$

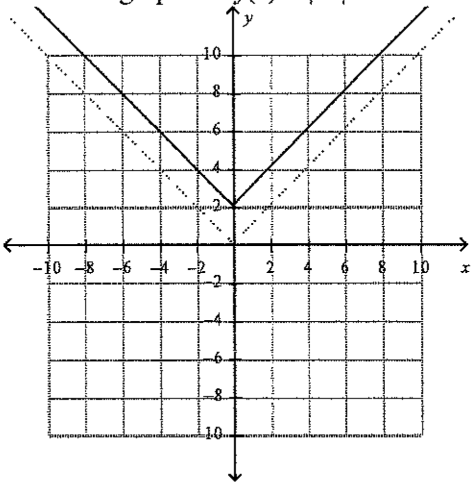
a. −2
b. −1
c. 1
d. 2

A

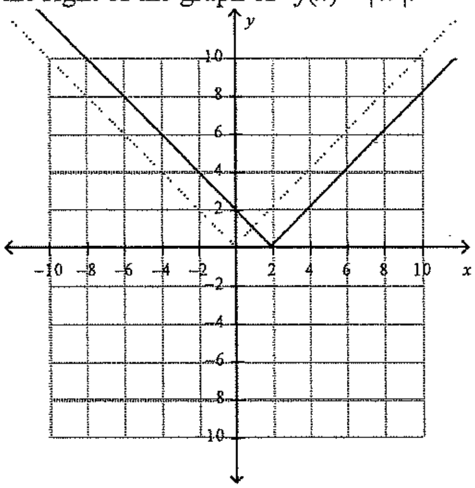
shift up 2

5. Graph $g(x) = |x| + 2$. Compare with the graph of $f(x) = |x|$.

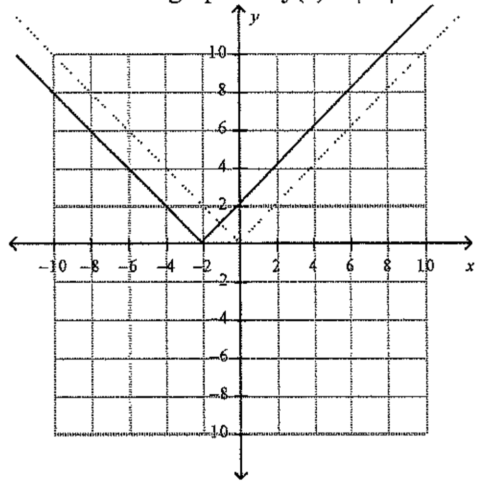
a. The graph of $g(x) = |x| + 2$ is 2 units above the graph of $f(x) = |x|$.



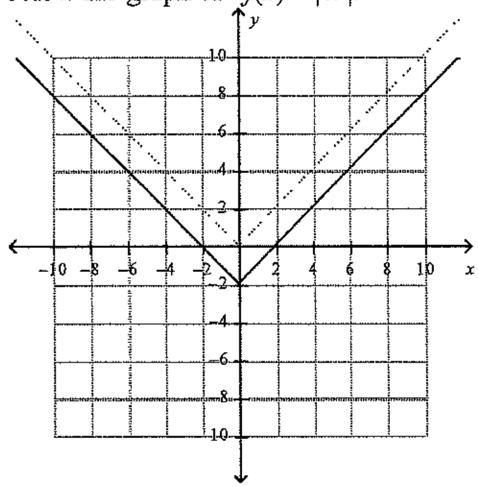
b. The graph of $g(x) = |x| + 2$ is 2 units to the right of the graph of $f(x) = |x|$.



c. The graph of $g(x) = |x| + 2$ is 2 units to the left of the graph of $f(x) = |x|$.

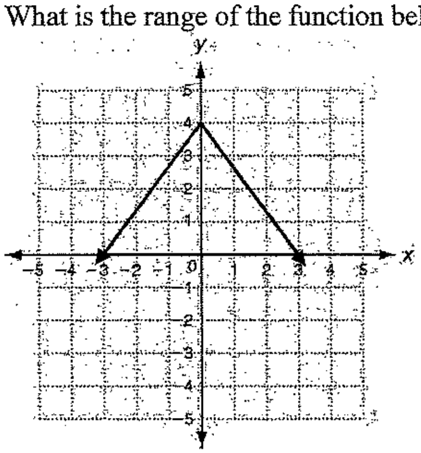


d. The graph of $g(x) = |x| + 2$ is 2 units below the graph of $f(x) = |x|$.



D

6. What is the range of the function below?



a. $y \geq 4$
b. $y > 4$
c. $y < 4$
d. $y \leq 4$

C

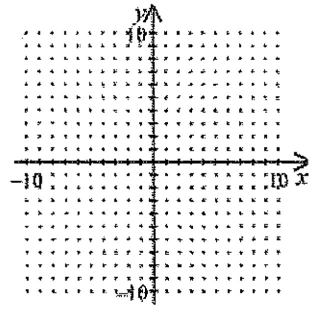
7. What is the domain of the function above?

a. $x \geq 0$
b. $x > -3$
c. All real numbers
d. $x \leq 4$

D 8. Solve $|x-2| = 4$ (Use algebra or graphing)

a. 6 and -6
b. 4 and -4
c. 4 and -2
d. 6 and -2

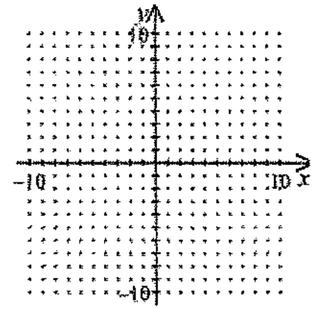
$$\begin{aligned} x-2 &= 4 \\ +2\ \ &\ \ +2 \\ \hline x &= 6 \end{aligned} \qquad \begin{aligned} x-2 &= -4 \\ +2\ \ &\ \ +2 \\ \hline x &= -2 \end{aligned}$$



B 9. Solve $\frac{2|x+1|}{2} = \frac{10}{2}$ (Use algebra or graphing)

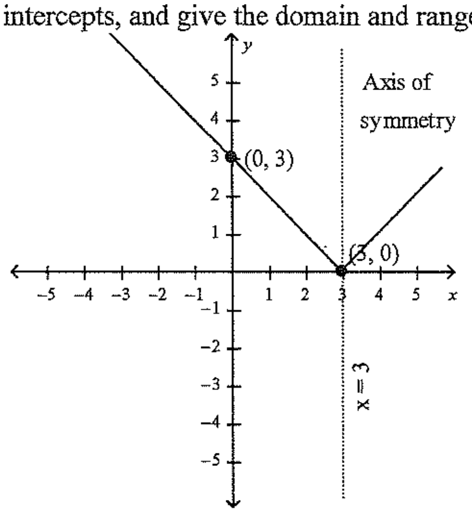
a. 6 and -6
b. 4 and -6
c. 4 and -4
d. 6 and -4

$$\begin{aligned} x+1 &= 5 \\ -1\ \ &\ \ -1 \\ \hline x &= 4 \end{aligned} \qquad \begin{aligned} x+1 &= -5 \\ -1\ \ &\ \ -1 \\ \hline x &= -6 \end{aligned}$$



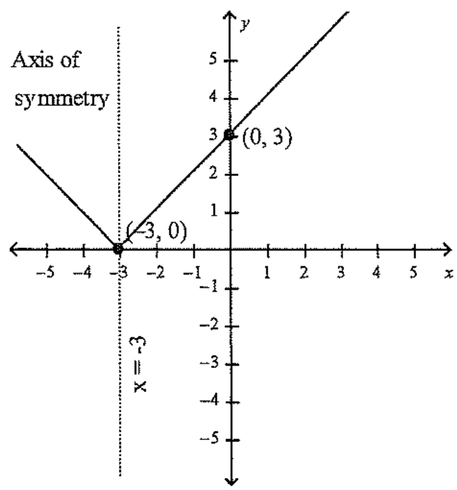
C 10. Graph the absolute-value function, $f(x) = |x+3|$. Label the axis of symmetry and the vertex. Find the intercepts, and give the domain and range.

a.



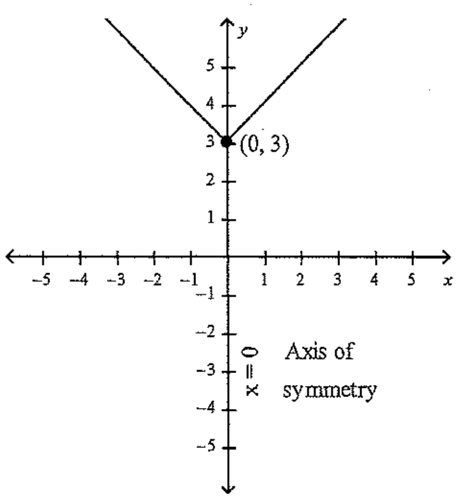
The domain is all real numbers.
The range is $y \geq 0$.

c.



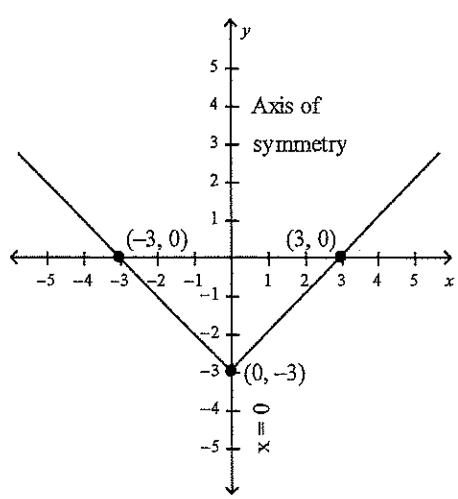
The domain is all real numbers.
The range is $y \geq 0$.

b.



The domain is all real numbers.
The range is $y \geq 3$.

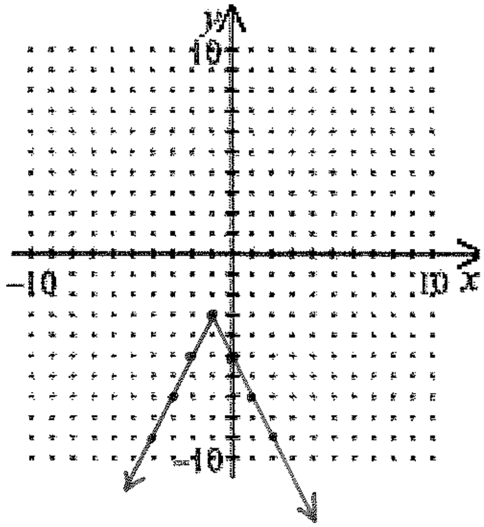
d.



The domain is all real numbers.
The range is $y \geq -3$.

Short Answer

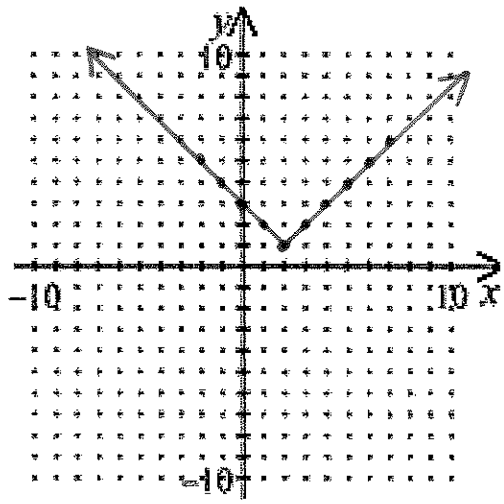
11. Graph the function $y = -2|x+1| - 3$. Identify the vertex and the slope.



Vertex: (-1, -3)

Slope: -2

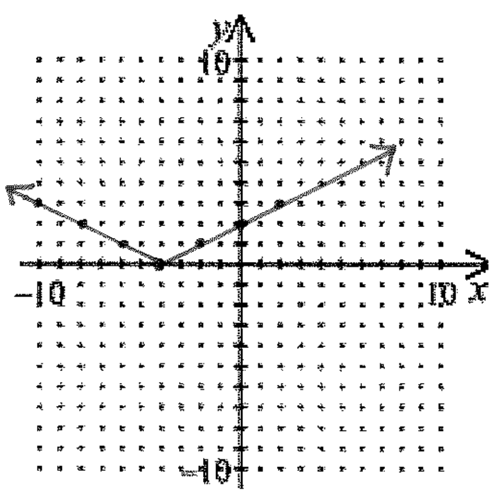
12. Graph the equation $y = |x-2| + 1$. Identify the vertex and the slope.



Vertex: (2, 1)

Slope: 1

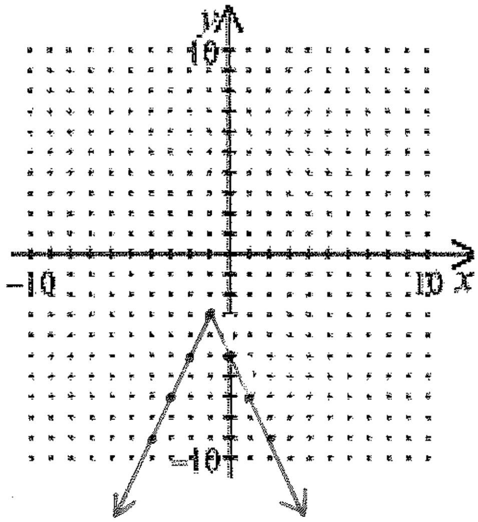
13. Graph the function $f(x) = \frac{1}{2}|x+4|$. Identify the vertex and the slope.



Vertex: (-4, 0)

Slope: 1/2

14. Graph the function $f(x) = -2|x + 1| - 3$. Describe all the transformations.



Transformations:
reflect over x-axis
vertical stretch bafo 2
shift 1 unit left
3 units down

15. Solve the equation with algebra. Show all of your work!

$3|x+1| - 2 = 9$

$+2 \quad +2$

$\frac{3|x+1|}{3} = \frac{11}{3}$

$|x+1| = \frac{11}{3}$

$x+1 = \frac{11}{3}$

$-1 \quad -1$

$x = \frac{8}{3}$

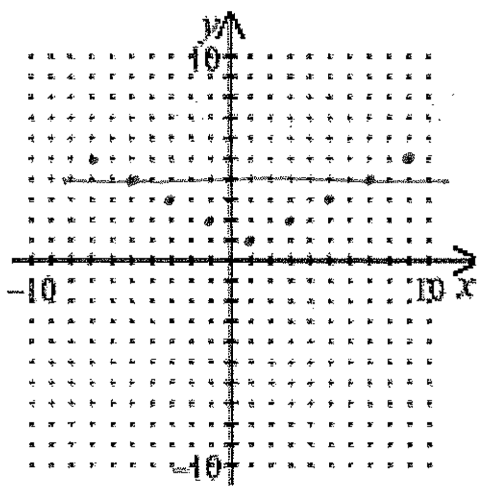
$x+1 = \frac{-11}{3}$

$-1 \quad -1$

$x = \frac{-14}{3}$

16. Solve the equation by graphing.

$\frac{1}{2}|x - 1| + 1 = 4$



$x = 7$

$x = -5$

17. Describe how to transform the graph of $f(x)= |x|$ to obtain the graph of $g(x)= \frac{2}{3}|x - 1| + 3$.

vertical shrink bafo 2/3
shift 1 unit right
3 units up

Algebra 1 Unit 7 Exam Review **Name** ______________________

1. Solve $\sqrt{x^2} = \sqrt{4}$.

$x = \pm 2$

2. Solve $144x^2 = 9$.

$\frac{144x^2}{144} = \frac{9}{144}$ $\sqrt{x^2} = \sqrt{\frac{9}{144}}$ $x = \pm \frac{3}{12}$ $x = \pm \frac{1}{4}$

3. Solve the equation. $9x^2 - 25 = 0$

$\frac{9x^2}{9} = \frac{25}{9}$

$\sqrt{x^2} = \sqrt{\frac{25}{9}}$

$x = \pm \frac{5}{3}$

4. How would the graph of the function $y = x^2 + 2$ be affected if the function were changed to $y = x^2 - 3$?

shifted down 5 units

5. How would you translate the graph of $y = -x^2$ to produce the graph of $y = -x^2 + 4$

Shifted up 4 units

6. Compare the graph of $f(x) = 5x^2$ with the graph of $f(x) = x^2$.

$5x^2$ is a vertical stretch of the graph of x^2 (it is more narrow)

7. Use this description to write the quadratic function in vertex form:
The parent function $f(x) = x^2$ is vertically stretched by a factor of 2 and translated 14 units left and 6 units up.

$y = 2(x+14)^2 + 6$

8. Solve the equation using algebra $\frac{2(x+3)^2}{2} = \frac{72}{2}$

$\sqrt{(x+3)^2} = \sqrt{36}$

$x + 3 = \pm 6$

$-3 \quad -3$

$x = -3 \pm 6$

$x = -3 + 6 = 3$

$x = -3 - 6 = -9$

9. Use the following description to write a quadratic function in vertex form:
The parent function $f(x) = x^2$ is vertically compressed by a factor of $\frac{2}{5}$ and translated 8 units left and 3 units down.

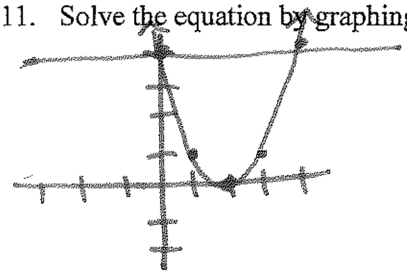
$y = \frac{2}{5}(x+8)^2 - 3$

10. Describe how the graph of the function $y = x^2$ compares to the graph of $y = -\frac{7}{3}x^2$.

$y=x^2$ opens up and $y=-\frac{7}{3}x^2$ opens down

$y=-\frac{7}{3}x^2$ is a vertical stretch of $y=x^2$ (or more narrow)

11. Solve the equation by graphing. $\sqrt{(x-2)^2} = \sqrt{4}$

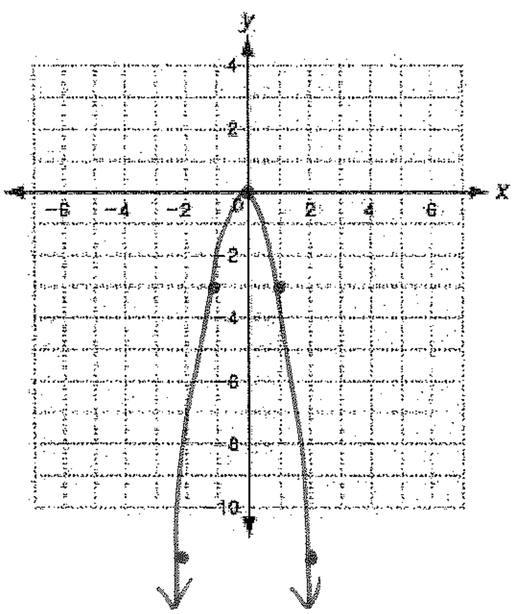


$$x-2 = \pm 2$$
$$+2 \quad +2$$
$$x = 2 \pm 2$$

$x = 4$ and 0

12. Use a table of values to graph $y = -3x^2$.

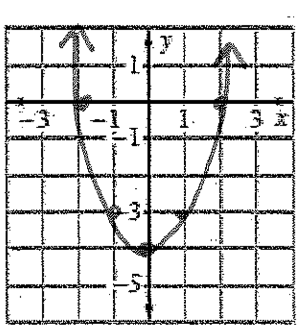
x	−2	−1	0	1	2
y	−12	−3	0	−3	−12



Domain: $x \in \mathbb{R}$

Range: $y \leq 0$

13. Graph the function $y = x^2 - 4$. Label the vertex, domain, range and axis of symmetry.



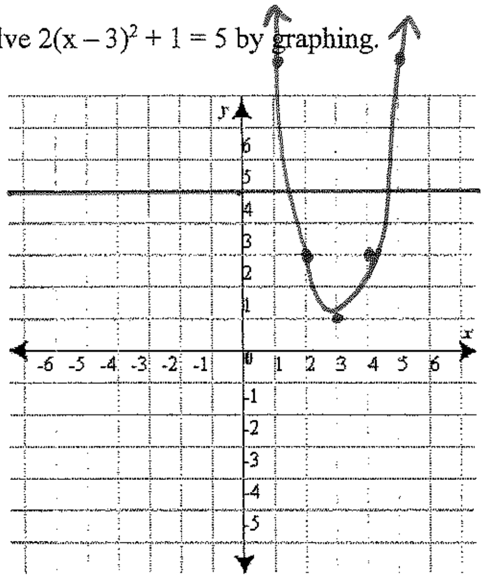
Vertex: $(0,-4)$

Line of Symmetry: $x=0$

Domain: $x \in \mathbb{R}$

Range: $y \geq -4$

14. Solve $2(x-3)^2 + 1 = 5$ by graphing.



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

$x \approx 1.5$ and 4.5

$2(2-3)^2+1$
$2(-1)^2+1$
$2+1$
3

$2(1-3)^2+1$
$2(-2)^2+1$
$2(4)+1$
$8+1$
9

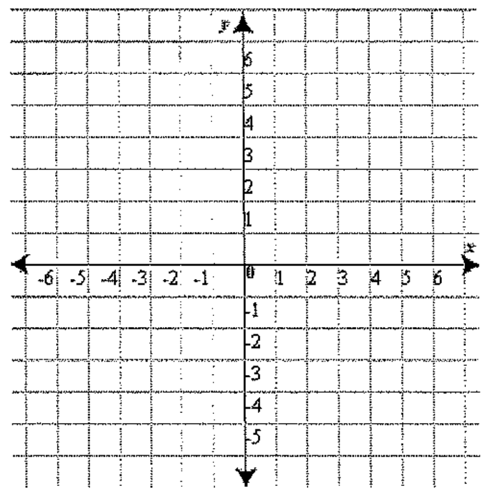
15. Solve the quadratic equation.

$3x^2 + 5 = 26$
$\quad -5 \quad -5$

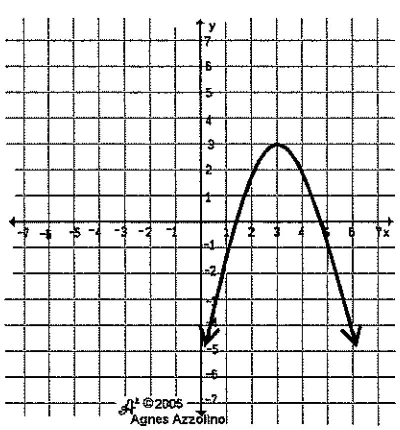
$\frac{3x^2}{3} = \frac{21}{3}$

$\sqrt{x^2} = \sqrt{7}$

$x = \pm\sqrt{7}$



16. Write the quadratic function for the graph shown.



shifted 3 units right
3 units up

reflection over x-axis

$\boxed{y = -(x-3)^2 + 3}$

Essay

17. A particular year, make, and model of a car's speed and fuel economy is given by the table.

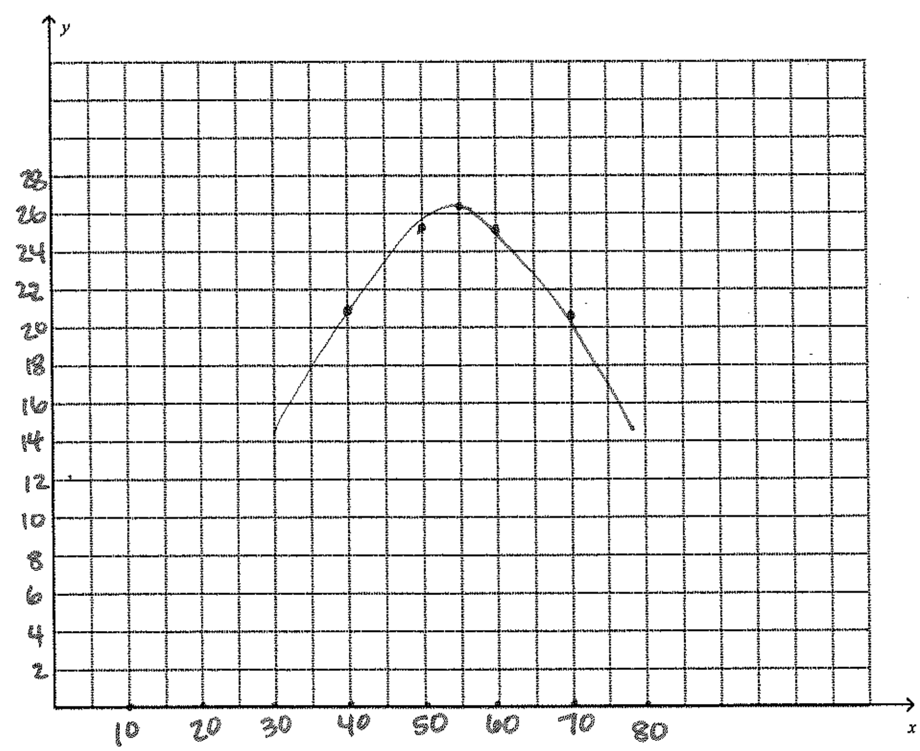
Speed (mph)	Gas Mileage (mpg)
40	21
50	25.4
55	26.1
60	25.2
70	20.8

a. Identify the independent and dependent variables in this situation. State the units associated with each variable.

speed (mph) gas mileage (mpg)

b. On the scatter plot provided, label the axes with the quantities they represent and indicate the axis scales by showing numbers for select grid lines. Then plot the ordered pairs of data from the table.

c. Sketch a parabola that you think best fits the plotted points. (you will not be able to make it pass through all the points)



d. Does your parabola open up or down? What are the coordinates of your parabola's vertex?

(55, 26)

Algebra 1 Exam Review– Unit 8 Sections 1-5 **Name** ______________________

1. Simplify. $(5x^2 - 3x + 7) + (3x^2 + 8x + 6)$

$8x^2 + 5x + 13$

2. Multiply $(2x - 5)(2x + 5)$.

$4x^2 + 10x - 10x - 25 = \quad 4x^2 - 25$

3. Which product results in $x^2 - 49$? (Factor it!)

$(x + 7)(x - 7)$

4. What is the product $(x^2 - 5x + 4)(2x - 3)$?

$2x^3 - 10x^2 + 8x - 3x^2 + 15x - 12$

$2x^3 - 13x^2 + 23x - 12$

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

$3x^2 - 5x + 1$
$-2x^2 - 5x - 1$

$x^2 - 10x$

6. Solve by factoring. $3x^2 - 2x = 8$

$3x^2 - 2x - 8 = 0$

-24; 4, -6; -2 $\quad \frac{4}{3x} \quad \frac{-6}{3} = \frac{-2}{1x}$

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

$3x + 4 = 0 \quad x - 2 = 0$

$x = -\frac{4}{3} \quad x = 2$

7. Find the zeros of the function $f(x) = x^2 - 13x + 36$ by factoring.

36; -9, -4; -13

$(x-9)(x-4) = 0$

$x - 9 = 0 \quad x - 4 = 0$

$x = 9$ and 4

8. Solve the equation $x^2 = 5 - 4x$ by completing the square.

$x^2 + 4x + \underline{4} = 5 + \underline{4}$

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

$\sqrt{(x+2)^2} = \sqrt{9}$

$x + 2 = \pm 3$
$-2 \quad -2$

$x = -2 \pm 3$

$x = 1$ and -5

9. Complete the square for the expression $x^2 - 12x + \underline{36}$. Write the resulting expression as a binomial squared.

$\left(\frac{-12}{2}\right)^2 = (-6)^2 = 36$

$(x - 6)^2$

10. Solve by completing the square: $x^2 - 2x - 7 = 0$

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

$x^2 - 2x + \underline{1} = 7 + \underline{1}$

$\sqrt{(x-1)^2} = \sqrt{8}$

$x - 1 = \pm\sqrt{8}$
$+1 \quad +1$

$x = 1 \pm \sqrt{8}$

11. The height of an arrow that is shot upward at an initial velocity of 40 meters per second can be modeled by $h = 40t - 5t^2$, where h is the height in meters and t is the time in seconds. Find the time it takes for the arrow to reach the ground.

$h=0$

$0 = 40t - 5t^2$

$0 = 5t(8-t)$

$\frac{5t}{5} = \frac{0}{5}$

$t = 0$

$8 - t = 0$
$+t \quad +t$

$8 = t$ seconds

Short Answer

12. Factor. $\sqrt{9x^2} - 24x + \sqrt{16}$

$3x \quad \uparrow \quad 4$
$2(3x)4$

$(3x-4)^2$

13. Factor. $\sqrt{36x^2} - \sqrt{25}$

$6x \quad 5$

$(6x+5)(6x-5)$

14. Factor. $x^2 + 8x - 48$

-48; 12, -4; 8

$(x-4)(x+12)$

15. Multiply $(3x-7)^2$

$(3x-7)(3x-7)$ $9x^2 - 28x + 49$

16. Solve $x^2 - 7x - 18 = 0$ by factoring.

-18; -9, 2; -7

$(x-9)(x+2) = 0$

$x = 9$ and -2

18. Factor. $4x^2 + 20x - 11$

-44; -2, 22; 20

$\frac{-2}{4}$ $\frac{22}{4}$

$\frac{-1}{2x}$ $\frac{11}{2x}$

$(2x+11)(2x-1)$

19. Walt threw a basketball from the basketball court toward the hoop. The quadratic function that models the height, in feet, of the ball after t seconds is $h(t) = -16t^2 + 12t + 6$. If the hoop is 8 feet high, how long is the ball in the air before the ball goes through the hoop?

$h=8$

$8 = -16t^2 + 12t + 6$
$-8 \qquad\qquad\qquad -8$

$0 = -16t^2 + 12t - 2$

$a = -16$
$b = 12$
$c = -2$

$\frac{-12 \pm \sqrt{12^2 - 4(-16)(-2)}}{2(-16)} = \frac{-12 \pm \sqrt{144 - 128}}{-32}$

$\frac{-12 \pm 4}{-32} = \frac{-8}{-32}$ and $\frac{-16}{-32}$

$x = \frac{1}{4}$ and $\frac{1}{2}$ second

$6 = \frac{24}{4} + \frac{1}{4}$

Algebra Unit 8.6-8.10 Exam Review Name: ______________________

1. Solve $r^2 - r - 6 = 0$ by completing the square.

$r^2 - r + \frac{1}{4} = 6 + \frac{1}{4}$

$\left(\frac{1}{2}\right)^2 = \frac{1}{4}$ $\sqrt{\left(r+\frac{1}{2}\right)^2} = \sqrt{\frac{25}{4}}$

$r + \cancel{\frac{1}{2}} = \pm \frac{5}{2}$

$-\cancel{\frac{1}{2}} \quad -\frac{1}{2}$

$r = -\frac{1}{2} \pm \frac{5}{2}$

r = 2 and -3

2. Solve $5x = x^2 + 6$ using the Quadratic Formula.

$x^2 - 5x + 6 = 0$

$a = 1$
$b = -5$
$c = 6$

$\frac{5 \pm \sqrt{(-5)^2 - 4(1)(6)}}{2(1)} = \frac{5 \pm \sqrt{25-24}}{2} = \frac{5 \pm 1}{2} =$ x=3 and 2

3. Henry throws a tennis ball over his house. The ball is 7 feet above the ground when he lets it go. The quadratic function that models the height, in feet, of the ball after *t* seconds is $p(x) = -16t^2 + 46t + 7$. How long does it take for the ball to hit the ground?

$0 = -16t^2 + 46t + 7$
$h = 0$

$\frac{-46 \pm \sqrt{46^2 - 4(-16)(7)}}{2(-16)}$

$a = -16$
$b = 46$
$c = 7$

$t \approx 3.01$ seconds

6. What is the minimum or maximum of $g(x) = 9x^2 - 6x + 1$?

minimum is 1

7. What are the zeros of $y = 6x^2 - 7x + 1$?

6, -6, -1, -7

$\frac{-6}{6} = \frac{-1}{1x}$ $\quad \frac{-1}{6x}$

$(x-1)(6x-1) = 0$

x = 1 and 1/6

8. Solve the equation by using the quadratic formula.
$x^2 + 7x - 18 = 0$

$a = 1$
$b = 7$
$c = -18$

$\frac{-7 \pm \sqrt{7^2 - 4(1)(-18)}}{2(1)} = \frac{-7 \pm \sqrt{121}}{2} = \frac{-7 \pm 11}{2}$

x = 2 and -9

9. Solve $4x + 1 = 3x^2$ using the Quadratic Formula.

$3x^2 - 4x - 1 = 0$

$a = 3$
$b = -4$
$c = -1$

$\frac{4 \pm \sqrt{(-4)^2 - 4(3)(-1)}}{2(3)} = \frac{4 \pm \sqrt{16+12}}{6} = \frac{4 \pm \sqrt{28}}{6}$

$\frac{4 \pm 2\sqrt{7}}{6} = \frac{2 \pm \sqrt{7}}{3}$

10. A rocket is launched from atop a 92 foot cliff with an initial vertical velocity of 112 feet per second. The height of the rocket *t* seconds after launch is given by the equation $h = -16t^2 + 112t + 92$. Graph the equation to find out how long after the rocket is launched it will hit the ground. Estimate your answer to the nearest tenth of a second.

$0 = -16t^2 + 112t + 92$

$a = -16$ $\quad c = 92$
$b = 112$

$\frac{-112 \pm \sqrt{112^2 - 4(-16)(92)}}{2(-16)}$

$t \approx 7.7$ seconds

11. Solve $x^2 - 4x - 12 = 0$ by using the quadratic formula.

$a = 1$
$b = -4$
$c = -12$

$\frac{4 \pm \sqrt{(-4)^2 - 4(1)(-12)}}{2(1)} = \frac{4 \pm \sqrt{16+48}}{2} = \frac{4 \pm \sqrt{64}}{2} = \frac{4 \pm 8}{2}$

$\boxed{x = 6 \text{ and } -2}$