

Name:

Key

Date:

Hour:

Algebra 1  
Unit 9 Test Review

I. Determine if the given function is quadratic.

1.  $y + 6x = -14$       2.  $2x^2 + y = 3x - 1$

no, linear

yes

3. 

x	-4	-3	-2	-1	0
y	39	18	3	-6	-9

yes

$$\begin{array}{cccc} -21 & -15 & -9 & -3 \\ \hline 6 & 6 & 6 & 6 \end{array}$$

4.  $\{(-10, 15), (-9, 17), (-8, 19), (-7, 21), (-6, 23)\}$

no, linear

5. 

x	-2	-1	0	1	2
y	-1	0	4	9	15

$$\begin{array}{cccc} +1 & +4 & +5 & +6 \\ \hline \end{array}$$

no

6.  $\{(0, -3), (1, -2), (2, 1), (3, 6), (4, 13)\}$

yes

II. Graphing

#7-9. Answer the following questions for each given function. (Show your work to the right)

7.  $y = -5x^2 + 10x + 3$        $\frac{-10}{2(-5)} = 1$

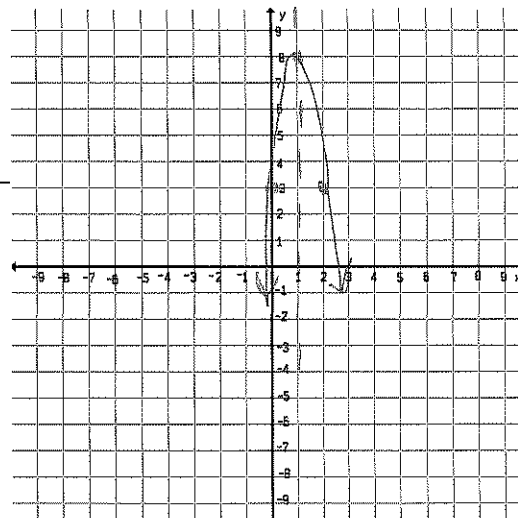
a. Find the vertex:  $-5(1)^2 + 10(1) + 3 = 8$  (1, 8)

b. Find the y-intercept (ordered pair): (0, 3)

c. Does it open up or down? down

d. Is the vertex a maximum or a minimum? max=8

e. Is the graph Normal, Narrow or wide? narrow

f. Give the domain and range:  $D: x \in \mathbb{R}$   
 $R: y \leq 8$ 

8.  $y = \frac{1}{2}x^2 + 2x$

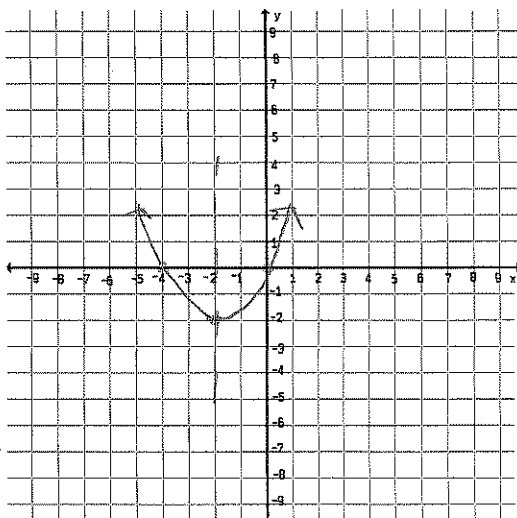
a. Find the vertex:  $\frac{-2}{2(\frac{1}{2})} = -2$   
 $\frac{1}{2}(-2)^2 + 2(-2) = -2$  (-2, -2)

b. Find the y-intercept: (0, 0)

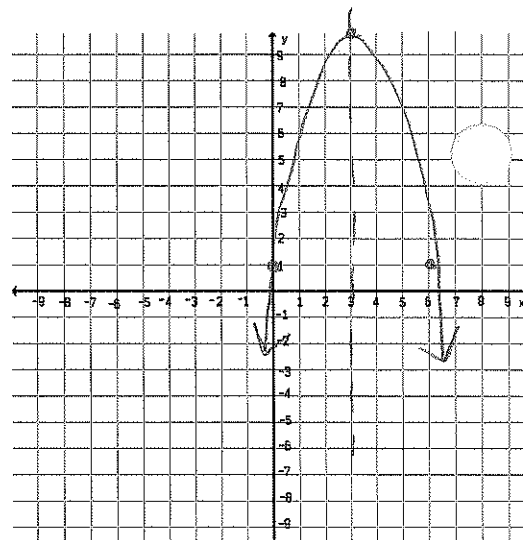
c. Does it open up or down? up

d. Is the vertex a maximum or a minimum? min=-2

e. Is the graph Normal, Narrow or wide? wide

f. Give the domain and range:  $D: x \in \mathbb{R}$   
 $R: y \geq -2$ 

9.  $y = -x^2 + 6x + 1$
- $\frac{-6}{2(-1)} = 3$   
 $-(-3)^2 + 6(3) + 1 = 10$
- Find the vertex: (3, 10)
  - Find the y-intercept: (0, 1)
  - Does it open up or down? down
  - Is the vertex a maximum or a minimum? max=10
  - Is the graph Normal, Narrow or wide? normal
  - Give the domain and range: D: x ∈ R  
R: y ≤ 10



### III. Comparing Graphs of Quadratics

Using the description of the transformation, write a quadratic equation in vertex form.

10. Shifted left 8 and down 4, opening down, vertically compressed

$$-\frac{1}{2}(x+8)^2 - 4$$

11. Opening up, vertex at (2, -5), narrow

$$2(x-2)^2 - 5$$

12. Reflected, normal, shifted right 3 and up 10

$$-(x-3)^2 + 10$$

#13-16. Describe the difference between each graph and the parent function  $y = x^2$ .

13.  $y = \frac{1}{3}(x-2)^2 + 5$

open up,  
compressed by  $\frac{1}{3}$  (wide)  
vertex (2, 5)

14.  $g(x) = x^2 + 6$

up, normal,  
vertex (0, 6)

15.  $f(x) = -2(x+1)^2 - 7$

down, stretched by  
2 (narrow),  
vertex (-1, -7)

16.  $y = -\frac{7}{4}(x+1)^2 + 6$

down, stretch by  $\frac{7}{4}$  (narrow)  
vertex (-1, 6)

17. You graphed the function  $f(x) = x^2 - 4$ , and I graphed the function  $f(x) = x^2 + 3$ . How is my graph going to look compared to yours?

mine will be 7 units lower than yours

18. Put the graphs in order from narrowest to widest.

$$f(x) = x^2, g(x) = -\frac{4}{5}x^2, h(x) = 3x^2$$

$$3x^2, x^2, -\frac{4}{5}x^2$$

$h(x), f(x), g(x)$

IV. Factoring and solving by factoring.

#19-24. Solve the equations.

19.  $5x^2 - 15 = -10x$

$$5x^2 + 10x - 15 = 0$$

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

$$5(x+3)(x-1) = 0$$

$$\boxed{x = -3, 1}$$

20.  $4x^2 = 16x$

$$4x^2 - 16x = 0$$

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

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

$$\boxed{x = 0, 4}$$

21.  $3x^2 + 9x = 12$

$$3x^2 + 9x - 12 = 0$$

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

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

$$\boxed{x = -4, 1}$$

22.  $6x^2 = 6$

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

$$x^2 = 1$$

$$\boxed{x = \pm 1}$$

23.  $6x^2 + 23x = 4$

$$6x^2 + 23x - 4 = 0$$

$$(6x^2 + 24x) - (x + 4) = 0$$

$$6x(x+4) - 1(x+4) = 0$$

$$(6x-1)(x+4) = 0$$

$$\boxed{x = \frac{1}{6}, -4}$$

24.  $-3x^2 + 27 = 0$

$$-3x^2 = -27$$

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

$$\boxed{x = \pm 3}$$

V. Application Problems

#25 - 31. Follow the directions for each question.

25. The height in feet that a football is kicked can be modeled by the function  $f(x) = -16x^2 + 64x$ . What is the maximum height the football will reach?

$$x = \frac{-b}{2a} = \frac{-64}{2(-16)} = \frac{-64}{-32} = 2$$

$$-16(2)^2 + 64(2) = 64$$

$$(2, 64) \quad \boxed{64 \text{ ft}}$$

