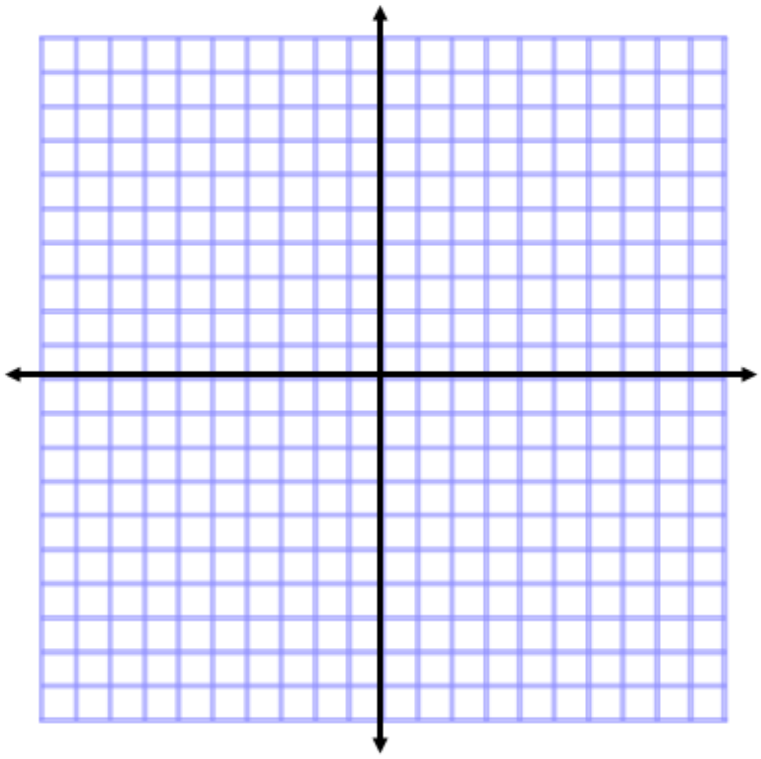
Name_____ HW#_____ Date_____

Unit 9-Quadratics Review

1. Given: $f(x) = x^2 - 2x - 8$

a) Find the roots of the given equation ***algebraically***

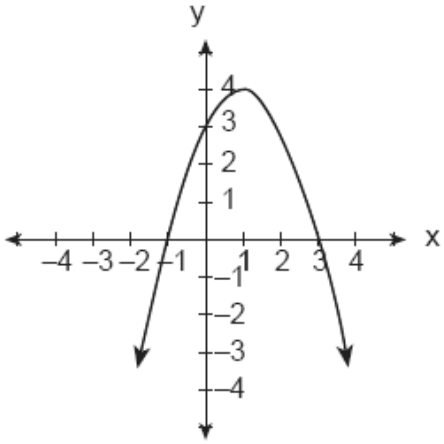


b) Graph of the equation.

c) Find:

- Turning Point_____
- Roots_____
- Axis of Symmetry_____
- y – intercept_____
- Domain_____
- Range_____
- Vertex form_____
- State the increasing interval graphed_____
- State the decreasing interval graphed_____

2. Directions: Answer the following questions based on this graph of a parabola:



a) Write the equation for the axis of symmetry.

b) Identify the x-intercepts.

c) Identify the y-intercept.

c) Write the quadratic equation of this graph:

In standard form:_____ In vertex form: _____

3. Find the vertex of $f(x) = -x^2 - 4x + 9$ ***ALGEBRAICALLY***.

4. Describe how you know by looking at the equation of a quadratic function whether the graph will open upward or downward?

5. American astronauts working on a space station on the moon toss a ball into the air. The height of the ball is represented by the equation $y = -2.7x^2 + 13.5x + 14$ where *x* represents the number of seconds since the ball was thrown and *y* represents the height of the ball in feet. Determine the height of the ball after 2 seconds. Show how you arrived at your answer.

6. Given the quadratic equation: $x^2 - kx - 16 = 0$, where -2 is one solution.
   a) Find the value of k
   b) Find the missing root

7. Write the quadratic equation in vertex form by completing the square. Then, identify the quadratic equation's turning point. $f(x) = x^2 - 2x + 8$

8. Write the quadratic equation in vertex form by completing the square. Then, identify the quadratic equation's turning point. $f(x) = 2x^2 + 36x + 170$

9. The populations of two different villages are modeled by the equations shown below. The population (in thousands) is represented by *y* and the number of years since 1975 is represented by *x*. Lewiston village is represent by $f(x) = x^2 - 30x + 540$ Lockport village is represent by $g(x) = 20x + 15$

   a. Algebraically, determine which year did the villages have the same population?

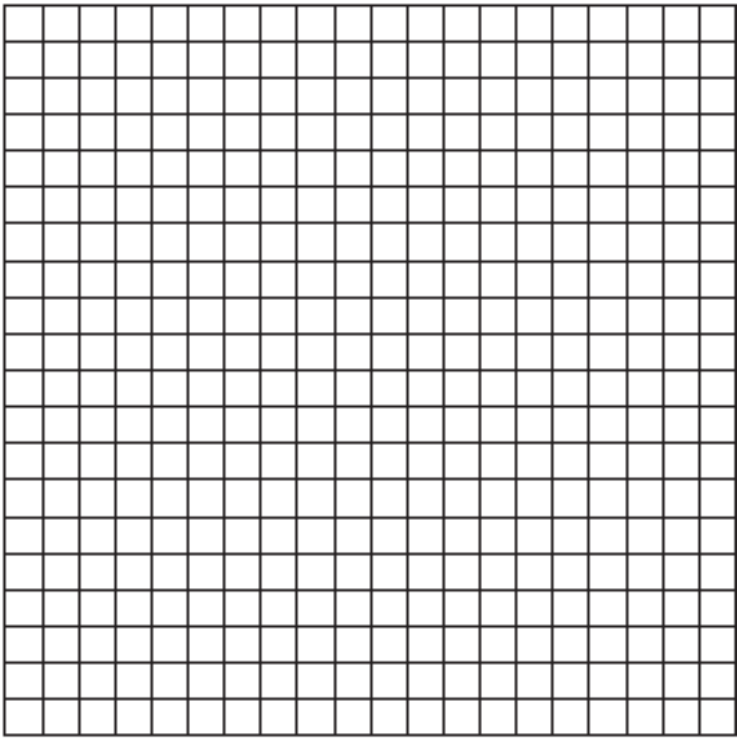
   b. Algebraically, determine what was the population of both cities during the year of equal population?

10. If (x - 7) is a factor of $2x^2 - 11x + k$, what is the value of k?

(1) -21 (2) -7 (3) 7 (4) 28

11. The height, h, of a golf ball hit into the air can be represented by the equation $h = -16t^2 + 48t$, where t is the elapsed time.

a) Graph $h = -16t^2 + 48t$



b) At what time is the ball at its highest point?

c) Write the equation of the axis of symmetry.

d) Domain_____

e) Range_____

f) State the increasing interval graphed_____

g) State the decreasing interval graphed_____

12. What is the solution of the system of equations shown below?

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

$$g(x) = x^2 - 8x + 6$$

(1) (-1,-3) and (-8,-10) (2) (2,0) and (-8,-10) (3) (0,-2) and (5,3 (4) (1,-1) and (8,6)

13. Which of the following equations is equivalent to $x^2 + 14x - 14 = 0$

(1) $(x+7)^2 = 14$ (2) $(x+7)^2 = 63$ (3) $(x+14)^2 = 14$ (4) $(x+14)^2 = 63$

14. What are the vertex and axis of symmetry of the parabola $y = x^2 - 16x + 63$?

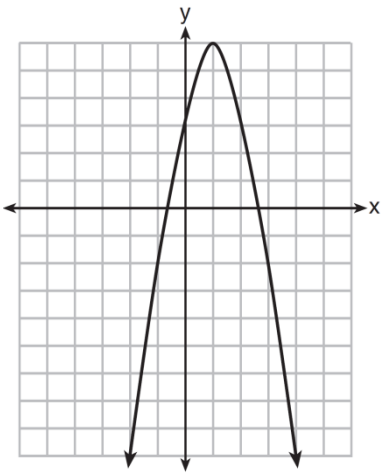
(1) vertex: $(8,-1)$; axis of symmetry: $x = 8$

(2) vertex: $(8,1)$; axis of symmetry: $x = 8$

(3) vertex: $(-8,-1)$; axis of symmetry: $x = -8$

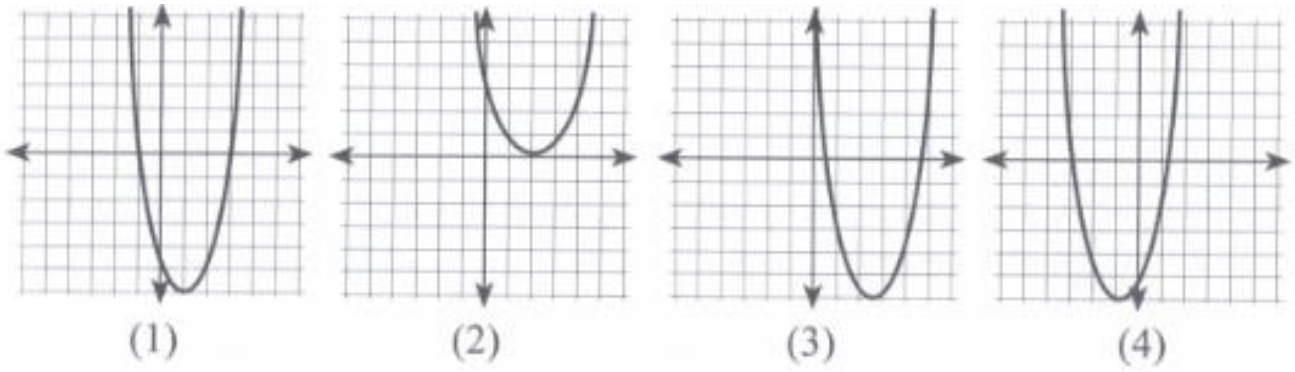
(4) vertex: $(-8,1)$; axis of symmetry: $x = -8$

15. Let f be the function represented by the graph below.



Let g be a function such that $g(x) = -\frac{1}{2}x^2 + 4x + 3$. Determine which function has the larger maximum value. Justify your answer. (*hint: find the maximum for g(x) algebraically)*

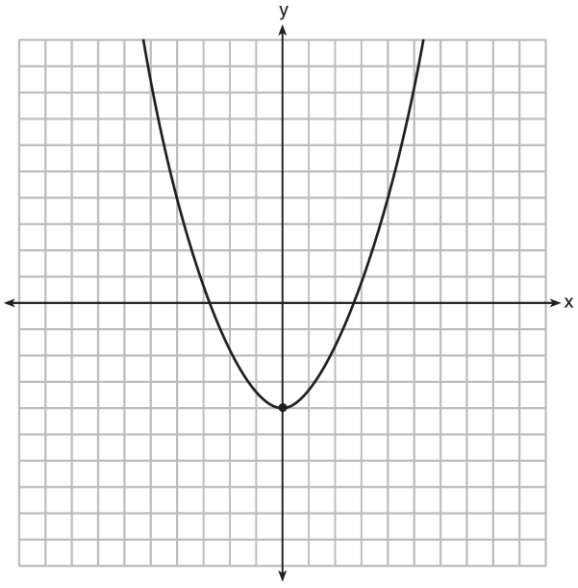
16. Which sketch is the correct graph for the function $y = x^2 - 5x - 6$?



17. Each time Juanita bowls, her score increases by 5% of her previous score. If her initial score is represented by a, which equations shows this relationship?

a) $y = a(1.5)^x$ b) $y = a(1.05)^x$ c) $y = 0.05^x$ d) $y = a(0.5)^x$

18. Ryan is given the graph of the function $y = \frac{1}{2}x^2 - 4$. He wants to find the zeros of the function, but is unable to read them exactly from the graph.



a) Find the zeros in simplest radical form.
(*hint: use a specific formula)*

19. What is the slope and y intercept of: $x-3y=-15$?

20. What is the order, from narrowest to widest graph, of the quadratic function $f(x)=-10x^2, f(x)=2x^2, and\ f(x)=0.5x^2$?

(1) $f(x) = -10x^2, f(x) = 2x^2$, and $f(x) = 0.5x^2$

(2) $f(x) = 2x^2, f(x) = -10x^2$, and $f(x) = 0.5x^2$

(3) $f(x) = 0.5x^2, f(x) = 2x^2$, and $f(x) = -10x^2$

(4) $f(x) = 0.5x^2, f(x) = -10x^2$, and $f(x) = 2x^2$

21. Joey's math class is studying the basic quadratic function, $f(x)=x^2$. Each student is supposed to make two new functions by adding or subtracting a constant to the function. Joey chooses the functions $g(x)=x^2-5$ and $h(x)=x^2+2$. What transformations would map $f(x)$ to $g(x)$ and $f(x)$ to $h(x)$?

(1) shift left 5, shift right 2

(2) shift right 5, shift left 2

(3) shift up 5, shift down 2

(4) shift down 5, shift up 2

22. What is the difference when $2x^3+x-5$ is subtracted from $6x^3-x^2+4x+8$?