Math 2 Unit 10 Worksheet 1 Name:_____
Quadratic Functions Date:_____Per:_____

[1-3] Using the equations and the graphs from section B of the **NOTES**, fill out the table below.

Equation	Min or Max?	Vertex	Domain	Range
1. $y = x^2 + 3$				
2. $y = 3x^2$				
3. $y = -2x^2 - 1$				

[4-7] Fill out the table below by looking at the equations. Do NOT graph.

Equation	Min or Max?	Vertex	Domain	Range
4. $y = \frac{1}{2}x^2 - 1$				
5. $y = 4x^2 + 3$				
6. $y = -3x^2$				
7. $y = -\frac{1}{4}x^2$				

8. Which graph will be the skinniest?

9. Which graph(s) will have a maximum?

10. Which graph(s) will have a minimum?

11. Which graph will be shifted up?

12. Which graph will be shifted down?

[13-16] Sketch the graph of the quadratic function based on your work on numbers 4-7.
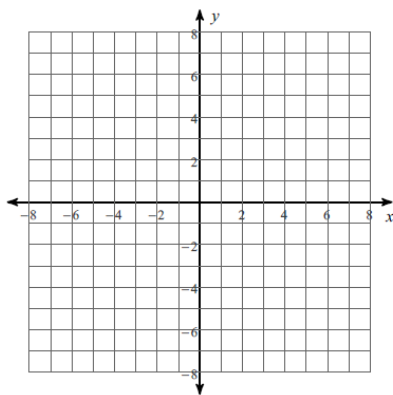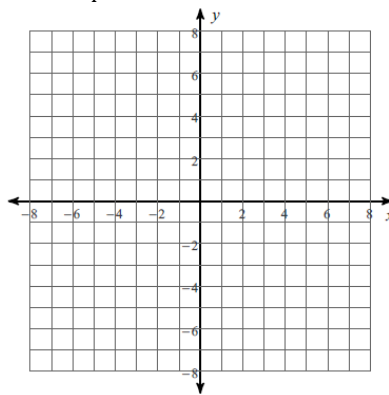
13. $y = \frac{1}{2}x^2 - 1$
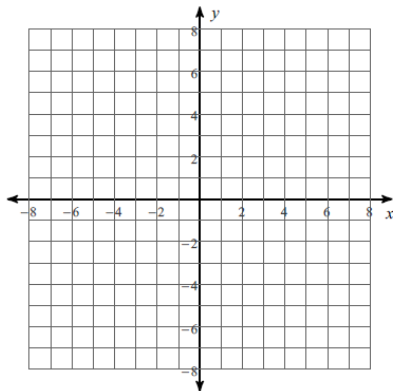
14. $y = 4x^2 + 3$
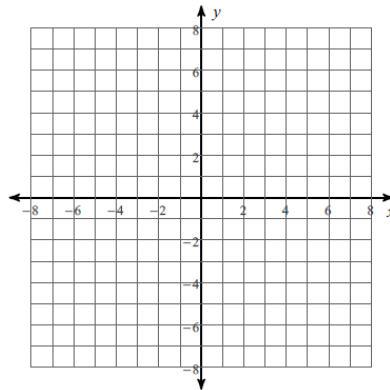
15. $y = -3x^2$

16. $y = \frac{1}{4}x^2$

[17-22] Review: Factor

17. $x^2 + 30x - 64$

18. $x^2 - 14x + 24$

19. $x^2 - 121$

20. $36x^2 - 49$

21. $2x^2 + 11x + 12$

22. $9x^2 - 30x + 25$
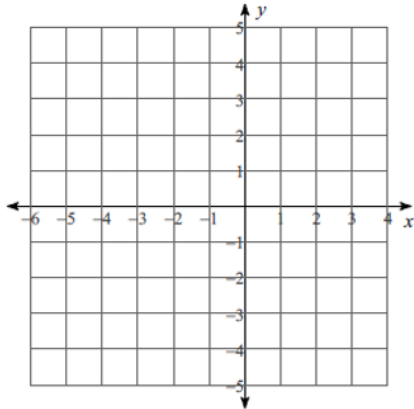
Math 2 Unit 10 Worksheet 2
Vertex Form: $y = a(x - h)^2 + k$

Name:_____
Date:_____ Per:_____

[1-4] Sketch the graph of each function and find the vertex, domain, range, width, where the axis of symmetry occurs, and what the maximum or minimum of the function is.

1. $y = 2(x + 2)^2 - 1$
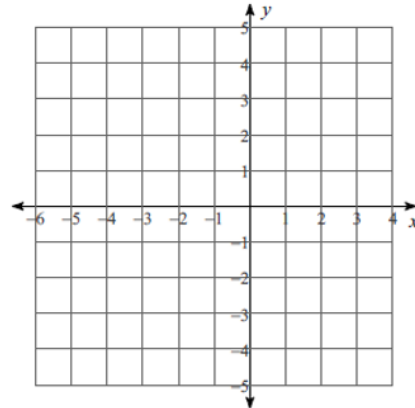
Vertex: _____

Domain: _____ Range: _____

Wide   Narrow   Normal

Axis of Symmetry (AOS): _____

Minimum value of the function is: _____

2. $y = -\frac{1}{2}(x + 4)^2 + 5$
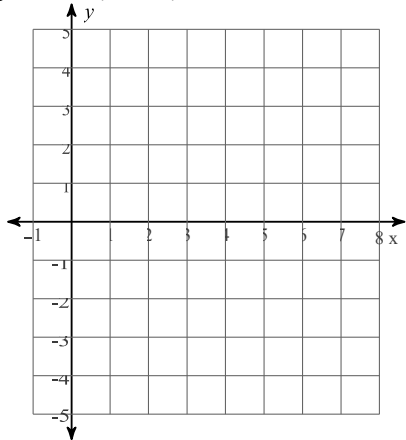
Vertex: _____

Domain: _____ Range: _____

Wide   Narrow   Normal

Axis of Symmetry (AOS): _____

Maximum value of the function is: _____

3. $y = -2(x - 4)^2 + 5$
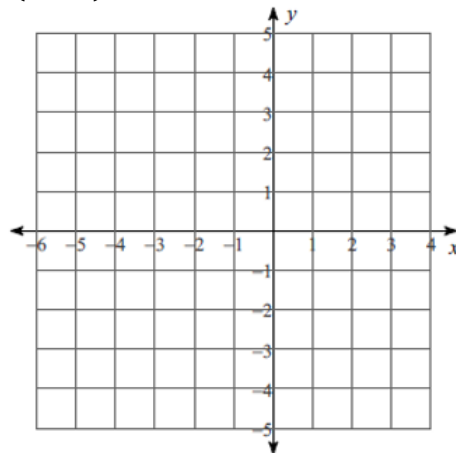
Vertex: _____

Domain: _____ Range: _____

Wide   Narrow   Normal

Axis of Symmetry (AOS): _____

Maximum value of the function is: _____

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

Vertex: _____

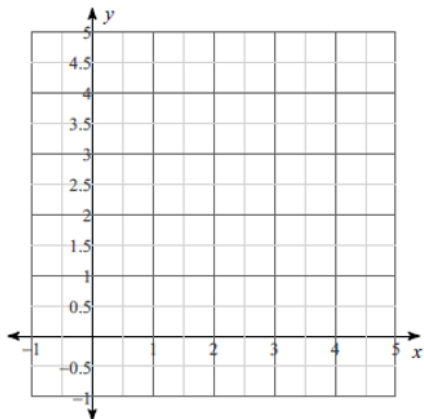Domain: _____ Range: _____

Wide   Narrow   Normal

Axis of Symmetry (AOS): _____

Minimum value of the function is: _____

[5-8] Sketch the graph of each function and answer the following questions.
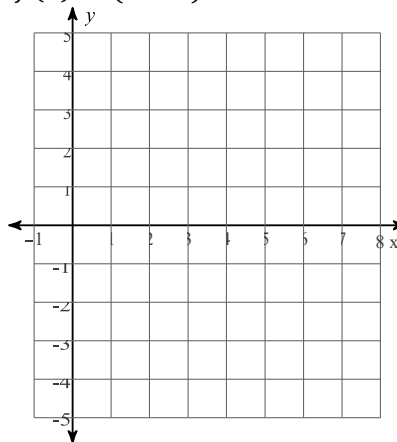
5. $y = -(x - 3)^2 + 4$

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

Does the graph have a Max or a Min? _____

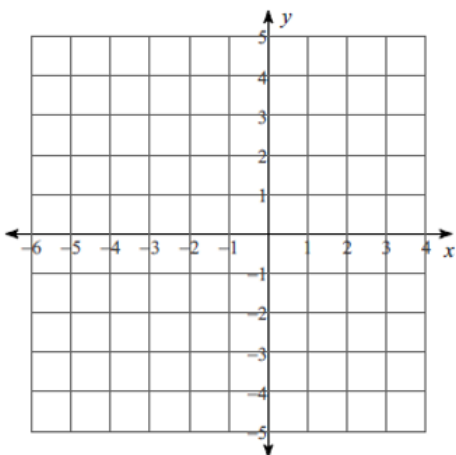The graph is increasing when _____

The graph is decreasing when _____

Does the graph have a Max or a Min? _____

The graph is increasing when _____

The graph is decreasing when _____

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

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

Does the graph have a Max or a Min? _____

The graph is increasing when _____

The graph is decreasing when _____
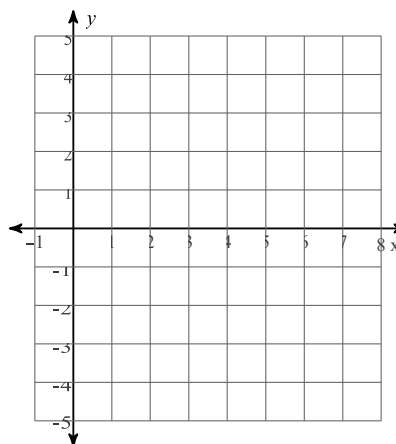
Does the graph have a Max or a Min? _____

The graph is increasing when _____

The graph is decreasing when _____

[9-10] Determine if each ordered pair is a solution to the function.

9. Function: $y = x^2 + 3$

	Work	Yes	No
$(4, 19)$			
$(-2, -1)$			
$(-6, 39)$			
$(5, 21)$			

10. Function: $y = -3x^2 + 5$

	Work	Yes	No
$(1, 8)$			
$(2, -7)$			
$(-1, 2)$			
$(4, 29)$			

11. Graph the functions $f(x) = x^2$ and $g(x) = (x - 2)^2 + 3$. If $f(x)$ is mapped on to $g(x)$, what is the transformation? Write the transformation and describe the shift.
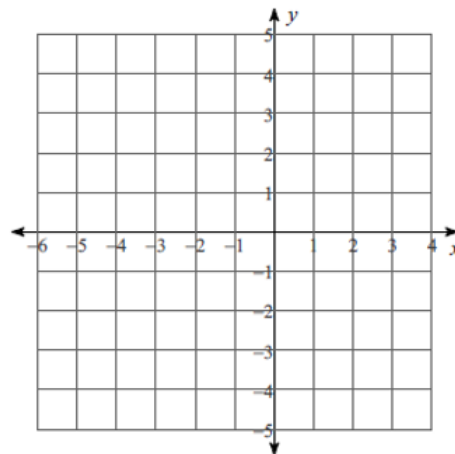
12. Graph the functions $f(x) = x^2$ and $g(x) = (x + 1)^2$. If $f(x)$ is mapped on to $g(x)$, what is the transformation? Write the transformation and describe the shift.
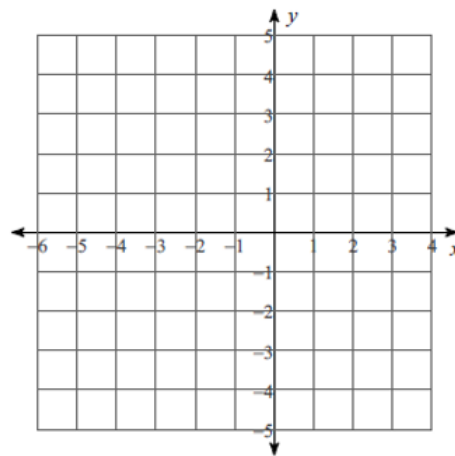
13. Graph the functions $f(x) = -x^2$ and $g(x) = -(x + 3)^2 - 1$. If $f(x)$ is mapped on to $g(x)$, what is the transformation? Write the transformation and describe the shift.

1. A golfer hits a ball from the fairway to the green. The flight of the ball is modeled by the equation
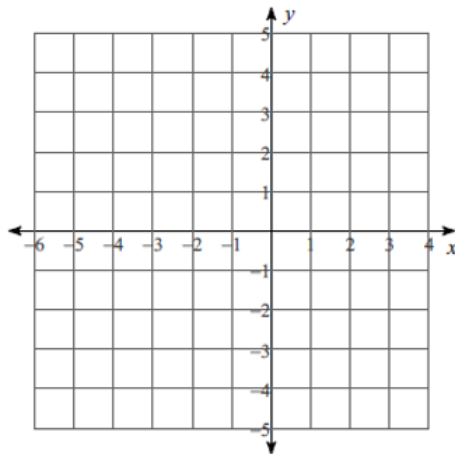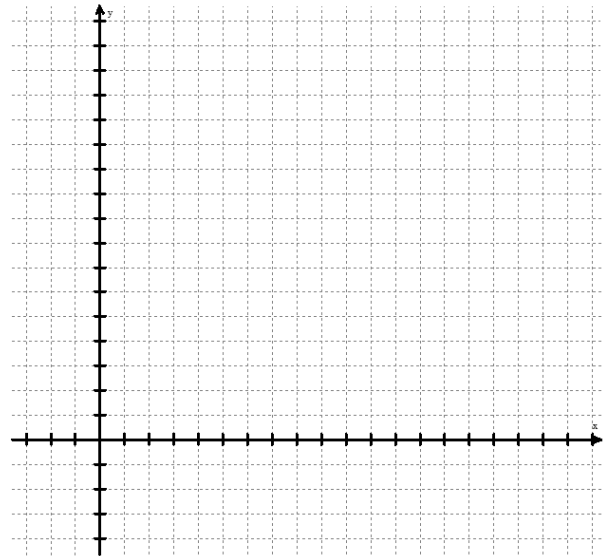 $g(x) = -2(x-4)^2 + 64$, where x is the time in seconds since the ball was hit and $g(x)$ is the height of the ball in
    feet.

    [a-e] Preparing to sketch.

    a) Add labels to the axes including:
        variable, description in words, and units.

    b) Focus on the equation used to model the balls flight.
        What will the graph look like? Be as specific as possible.

    c) Scale each axis so all the important features of the
        graph will show. Graph the parabola.

    d) Why does it make sense that this graph is only in the first quadrant?

    e) Use your graph to identify the domain and range that make sense for this problem.

        Domain: _____

        Range: _____

    [f-h] Answer the following questions based on the flight of the ball.

    f) What is the maximum height of the ball?   g) How do you know?

   h) How high is the ball after 3 seconds?

    [i-j] Challenge.

    i) How long is the ball in the air?   j) How do you know?

2. A peach tree produces 275 peaches per tree when 25 trees are planted per acre. For each additional tree planted per acre, the number of peaches a tree produces decreases by 5 peaches. This function is represented by $p(x) = -5(x - 40)^2 + 8000$, where x represents the number of trees per acre and $p(x)$ represents the total number of peaches per acre.

[a-e] Preparing to sketch.

a) Add labels to the axes including:
   variable, description in words, and units.

b) Focus on the equation used to model the total number of peaches. What will the graph look like? Be as specific as possible.
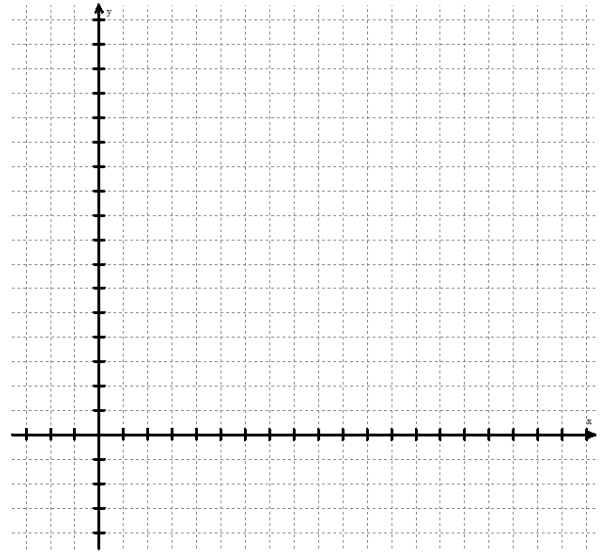
c) Scale each axis so all the important features of the graph will show. Graph the parabola.

d) Why does it make sense that this graph is only in the first quadrant?

e) Use your graph to identify the domain and range that make sense for this problem.

   Domain: _____

   Range: _____

[f-g] Answer the following questions based on the situation and the equation.

f) How many peaches do you expect if zero trees are planted?

g) What does the function predict when the number of trees per acre (x) is zero? Show algebraic to support your answer.

[h-j] Answer questions about the total number of peaches per acre.

h) How many peaches per acre can be expected if 30 trees are planted per acre? Justify your answer algebraically and using a complete sentence.

i) How many trees should be planted per acre to maximize the number of peaches?

j) What is the expected maximum number of peaches per acre?

3. A stomp rocket is shot vertically upward with an initial speed of 64 ft/sec. Its height, measured in feet, after t seconds is given by: $h(t) = -16(t-3)^2 + 144$

   a) Draw a sketch, including well labeled, appropriately scaled axes.

   b) How high does the rocket go?

   c) How high is the rocket at 4 seconds? (show work)
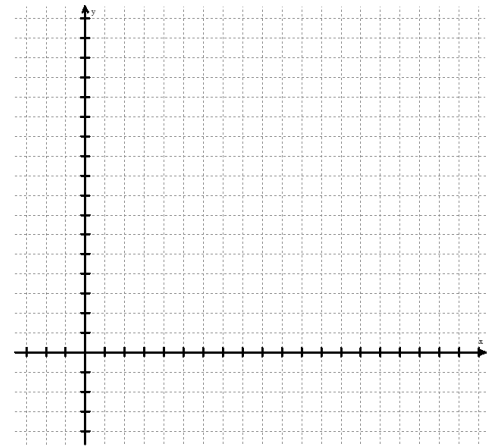
4. The Sunshine Manufacturing Company produces 10 solar water heaters per day. If they were to increase their production, income from sales would increase, but so would their expenses. If they were to decrease their production, both their income and their expenses would also decrease. Since they want to maximize their profit, they asked a business analyst to determine a profit function. The analyst estimated that the profit 'y' from producing 'x' units per day is given by $y = -(x-14)^2 + 64$. How many units should they produce to maximize profits? Justify your answer using complete sentences.

5. The yearly profit function $P(x)$ for a company selling x items is given by $P(x) = -3(x-16)^2 + 400$, where $P(x)$ is in thousands of dollars. What is the maximum profit that this company can expect in one year? Justify your answer using complete sentences.

6. The profit, $P(x)$, made selling phones at price, x, can be modeled by $P(x) = -\frac{1}{5}(x-400)^2 + 18000$

   a) What <u>price</u> will maximize the company's revenue?

   b) What is the maximum <u>revenue</u>?

   c) What profit could the company expect if they changed the price to $500 dollars per phone? Why do you think their profit is decreasing at this price?
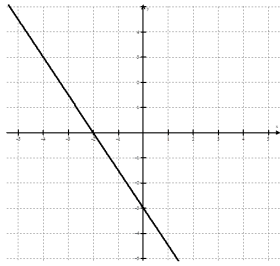
   d) What profit does the function predict if the price is $800 per phone? Explain what this means in the situation using complete sentences.

Math 2 Unit 10 Worksheet 4

Intercepts

Name:_____

Date:_____Per:_____

[1-12] Identifying Intercepts: Based on the graphs, name the x and y intercepts as ordered pairs. If a graph does not intersect an axis, write *none*.
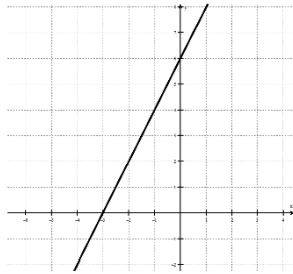
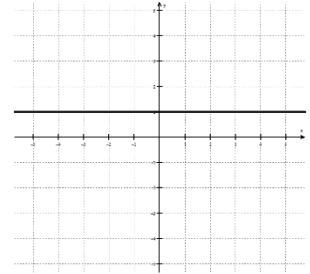1. $y = -\frac{3}{2}x - 3$

x-intercept_____

y-intercept_____

2. $y = 2x + 6$
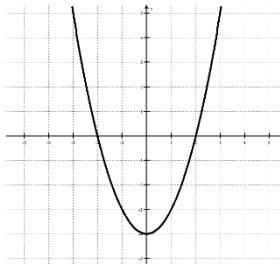
x-intercept_____

y-intercept_____

3. $y = -1$

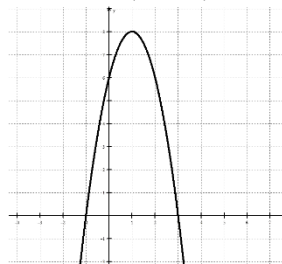x-intercept_____

y-intercept_____

4. $y = x^2 - 4$

x-intercepts_____

y-intercept_____

5. $y = -2(x - 1)^2 + 8$

x-intercepts_____

y-intercept_____

6. $x = 4$

x-intercept_____

y-intercept_____

7. $y = (x + 1)^2 + 2$

x-intercept_____

y-intercept_____

8. $y = 2^x$
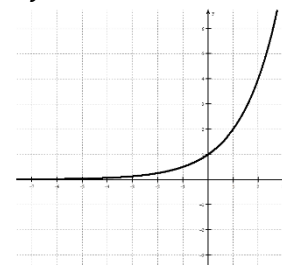
x-intercept_____

y-intercept_____

9. $y = 2(x - 1)^2$

x-intercept_____

y-intercept_____

10. $y = 3^x + 1$

x-intercept_____

y-intercept_____

11. $y = -x + 3$

x-intercept_____

y-intercept_____

12. $y = x^2$

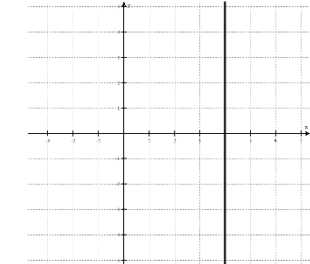x-intercept_____

y-intercept_____

Math 2 Unit 10   Worksheet 4

[13-23] State whether each statement is sometimes, always, or never true. If sometimes, give an example of each.

13. The graph of a line has a y-intercept.

19. A quadratic function has two y-intercepts.

14. A linear function has a y-intercept.

20. When written as a point, one of the coordinates of an intercept is always zero.

15. A linear function has an x-intercept.

21. When written as a point, x-intercepts have an x-coordinate of zero.

16. A quadratic function has two x-intercepts.

22. When written as a point, y-intercepts have an x-coordinate of zero.

17. A quadratic function has at least one x-intercept.

23. When written as a point, x-intercepts have a y-coordinate of zero.

18. A quadratic function has at least one y-intercept.

[24-29] Calculating Intercepts: Without graphing, calculate the intercepts for each function.

24. $y = \frac{2}{3}x - 8$ x-intercept_____

y-intercept_____

25. $y = 2x + 5$ x-intercept _____

y-intercept _____

26. $y = x^2 - 9$ x-intercepts_____

y-intercept_____

27. $y = -3x^2 + 12$ x-intercepts _____
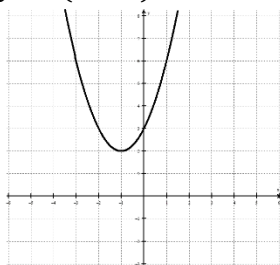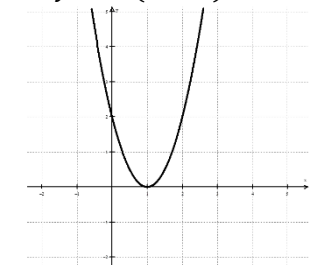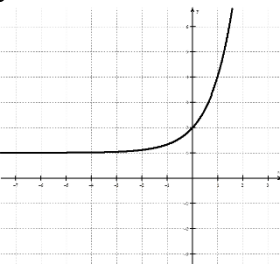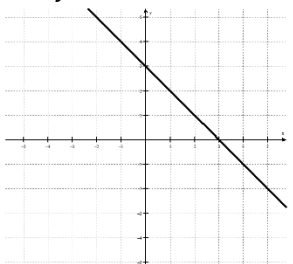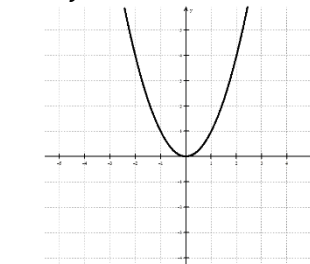
y-intercept _____

[28-29] Challenge:

28. $y = (x - 2)^2 - 1$ x-intercepts_____

y-intercept_____

29. $y = (x - 2)^2 + 1$ x-intercepts _____

y-intercept_____

Math 2 Unit 10 Worksheet 5

Solving Quadratic Equations using Square Roots

Name:_____

Date:_____Per:_____

1. a) Solve the equation for x
$$0 = (x+3)^2 - 4$$

    b) Graph the function $y = (x+3)^2 - 4$
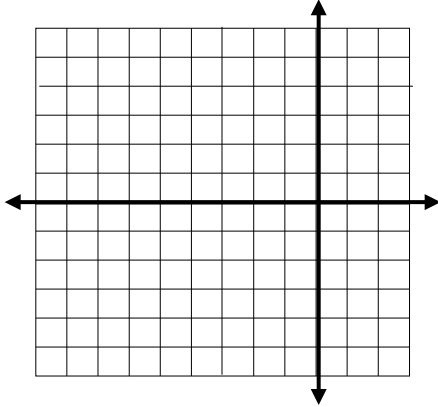
    c) Where can you see the answers from part a in your graph?

2. a) Solve equation for x
$$0 = (x-5)^2 + 4$$

    b) Graph the function $y = (x-5)^2 + 4$
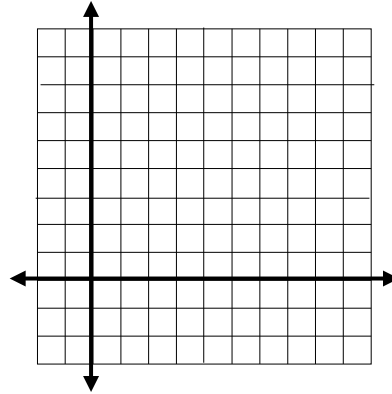
    c) Where can you see the answers from part a in your graph?

3. a) Solve the equation for x
$$0 = -2(x-3)^2 + 8$$

    b) Graph the function $y = -2(x-3)^2 + 8$
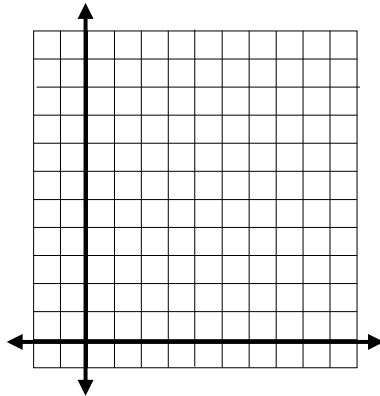
    c) Where can you see the answers from part a in your graph?

4. a) Solve the equation for x
$$0 = 5(x+4)^2$$

    b) Graph the function $y = 5(x+4)^2$
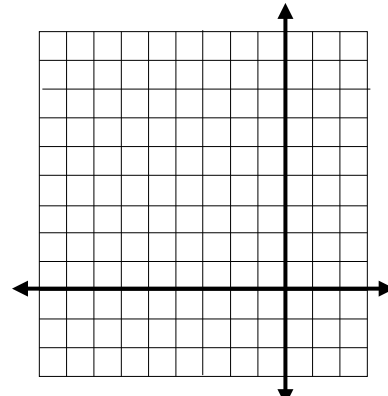
    c) Where can you see the answers from part a in your graph?

5. Look carefully at the equations in part a and the function in part b for problems 1-4. Why does plugging in zero for y and solving for x find the x value of the point where the function crosses the x-axis?

[6-17] Solve the following equations. State the number of x-intercepts for the related quadratic function.

6. $4x^2 - 100 = 0$

7. $0 = 3x^2 - 27$

8. $5x^2 - 7 = 0$

9. $0 = 11x^2 - 6$

10. $\frac{2}{3}x^2 - 5 = 0$

11. $0 = 5x^2 + 100$

12. $(x - 3)^2 - 10 = 0$

13. $0 = (x - 7)^2 - 21$

14. $(x - 15)^2 = 0$

15. $0 = (x + 1)^2 + 12$

16. $0 = 2(x - 7)^2 - 20$

17. $-4(x + 7)^2 + 20 = 0$

18. A ball is thrown vertically upward with an initial speed of 96 ft/sec. Its height after t seconds is given by $h = -16(t - 3)^2 + 144$. After how many seconds will the ball hit the ground?

19. A basketball is thrown upward with an initial speed of 64 ft/sec. Its height after t seconds is given by $h = -16(t - 2)^2 + 64$. After how many seconds will the ball hit the ground?

20. The profit, P, made selling phones at price, x, can be modeled by $P = -\frac{1}{5}(x - 400)^2 + 18000$. What prices could the company sell each phone for if the profit is exactly zero dollars (break-even point)?

[1-2] Identify equivalent functions.

1. Which of the following are equivalent to $y = x^2 - 16$?

   a) $y = (x - 0)^2 - 16$

   b) $y = (x - 4)^2$

   c) $y = (x + 0)^2 - 16$

   d) $y = 1x^2 + 0x + 16$

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

   f) $y = 4(x^2 - 4)$

2. Which of the following are equivalent to $y = (x - 3)^2 - 4$?

   a) $y = x^2 - 9$

   b) $y = x^2 - 6x + 5$

   c) $y = x^2 - 6x - 14$

   d) $y = (x - 5)(x - 1)$

   e) $y = (x - 2)(x - 3)$

   f) $y = (x - 3)(x - 3) - 4$

[3-6] Rewrite the quadratic equation written in vertex form as an equivalent equation written in standard form.

Vertex Form	Standard Form
$y = a(x - h)^2 + k$	$y = ax^2 + bx + c$

3. $y = (x - 6)^2 - 12$

4. $y = 3(x + 2)^2 + 1$

5. $y = \frac{1}{2}(x + 4)^2 + 2$

6. $y = -2(x - 3)^2 + 4$

7. Pablo and Amanda were finding the x-intercepts for the quadratic function $y = (x - 1)^2 - 9$. They agreed to put zero in for y and solve for x. Pablo says they need to solve by square rooting. Amanda says they can solve by factoring.

Pablo's Work:

$0 = (x - 1)^2 - 9$

$9 = (x - 1)^2$

$\pm 3 = x - 1$

$x = 3 + 1 = 4$

$x = -3 + 1 = -2$

Amanda's Work:

$0 = (x - 1)^2 - 9$

$0 = (x - 1)(x - 1) - 9$

$0 = x^2 - 2x + 1 - 9$

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

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

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

$x = 4$ $x = -2$

a) What are the x-intercepts Pablo found?

(___ , ___) and (___ , ___)

b) What are the x-intercepts Amanda found?

(___ , ___) and (___ , ___)

[8-13] Use the zero-product property to solve the equations.

8. $(y + 6)(y - 4) = 0$ 9. $(3f + 2)(f - 5) = 0$ 10. $(2x - 7)(4x + 10) = 0$

11. $(8t - 7)(3t + 5) = 0$ 12. $d(d - 8) = 0$ 13. $3m(2m + 9) = 0$

[14-25] Solve by factoring.

14. $n^2 + 2n - 15 = 0$ 15. $a^2 - 15a + 56 = 0$ 16. $z^2 - 10z + 24 = 0$

17. $8x^2 + 10x + 3 = 0$ 18. $3b^2 + 7b - 6 = 0$ 19. $5p^2 - 9p - 2 = 0$

20. $w^2 + w = 12$ 21. $s^2 + 12s = -32$ 22. $d^2 = 5d$

23. $3j^2 = 21j$ 24. $y^2 = -8y$ 25. $r^2 = 2r + 35$

Math 2 Unit 10 Worksheet 7

Intercept Form

Name:_____

Date:_____Per:_____

Vertex Form	Standard Form	Intercept Form
$y = a(x - h)^2 + k$	$y = ax^2 + bx + c$	$y = a(x - p)(x - q)$

[1-6] The following quadratic functions are written in intercept form. Find the x-intercepts for each. Write your answers as ordered pairs.

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

2. $y = 3(x + 6)(x + 2)$

3. $y = -\frac{1}{2}(x - 3)(x - 6)$

4. $y = 2(x - 5)(x - 5)$

5. $y = -6(x + 2)(x - 9)$

6. $y = \frac{2}{5}(x + 7)(x - 5)$

[7-12] For the same set of quadratic functions, find the y-intercept. Write you answer as an ordered pair.

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

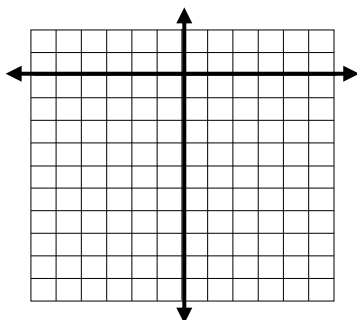8. $y = 3(x + 6)(x + 2)$

9. $y = -\frac{1}{2}(x - 3)(x - 6)$

10. $y = 2(x - 5)(x - 5)$

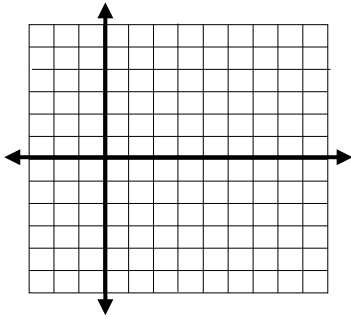11. $y = -6(x + 2)(x - 9)$

12. $y = \frac{2}{5}(x + 7)(x - 5)$

[13-15] For each question, factor, sketch, state the x-intercept, axis of symmetry, vertex, and the y-intercept.

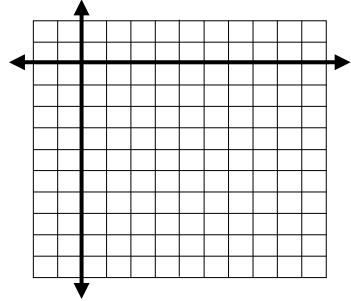13. Factor and sketch the graph of $y = x^2 + 2x - 8$, and state:

a. x-intercepts (____ , ____) and (____ , ____)

b. Axis of Symmetry _____

c. Vertex (____ , ____)

d. y-intercept _____

Math 2 Unit 10

Worksheet 7

14. Factor and sketch the graph of $y = x^2 - 6x + 5$, and state:

a. x-intercepts (____ , ____) and (____ , ____)

b. Axis of Symmetry _____

c. Vertex (____ , ____)

d. y-intercept _____

15. Factor and sketch the graph of $y = x^2 - 8x + 7$, and state:

a. x-intercepts (____ , ____) and (____ , ____)

b. Axis of Symmetry _____

c. Vertex (____ , ____)

d. y-intercept _____

[16-18] Given the quadratic equation $y = 2(x + 1)^2 - 8$ in vertex form, complete the table below.

Vertex Form	Standard Form	Intercept Form
$y = a(x - h)^2 + k$	$y = ax^2 + bx + c$	$y = a(x - p)(x - q)$

Vertex Form:	Standard Form:	Intercept Form:
16. Find an equivalent version of the equation in standard form and intercept form. Show work for each.		
$y = 2(x + 1)^2 - 8$		
17. Find the x-intercepts for each form. Show work for each.		
18. Find the y-intercepts for each form. Show work for each.		

19. Which form would you rather use to find:

a. x-intercepts? _____

b. y-intercept? _____

c. vertex?   _____

[1-7] Answer the following based on the average rate of change (Hint make an input/output table).

1. Given $f(x) = x^2$ find the average rate of change from 2 to 5.

2. Given $g(x) = 2x^2$ find the average rate of change from 2 to 5.

3. The average rate of change of $f(x)$ is different than $g(x)$. What does that mean in relationship to the graph?

4. Given $h(x) = 3^x$ find the average rate of change from 1 to 4.

5. Given $k(x) = 2^x$ find the average rate of change from 1 to 4.

6. The average rate of change of $h(x)$ is different than $k(x)$. What does this mean in relationship to the graph?

7. Find the average rate of change of $f(x)$ from 1 to 4. Which function has a greater average rate of change, $f(x)$ or $k(x)$?

[8-11] Graph the parabola and determine key features.
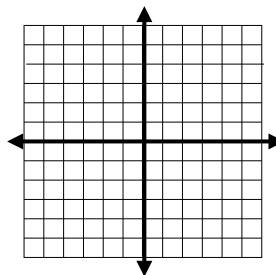
8. $y = -\frac{1}{2}x^2$
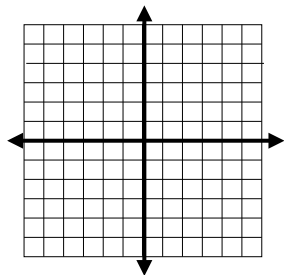
Vertex: _____

Axis of Symmetry: _____

Domain: _____

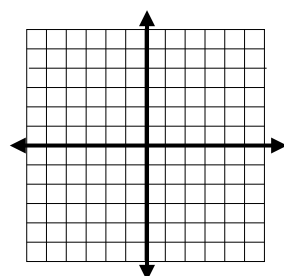Range: _____

9. $y = 3x^2 - 4$

Vertex: _____

Increasing: _____

Decreasing: _____

Max or Min? _____

Max/Min Value: _____
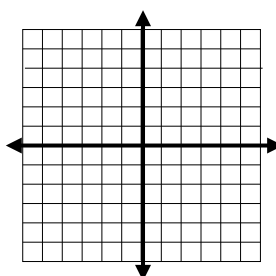
10. $y = -(x + 1)^2 + 4$

Vertex: _____

Axis of Symmetry: _____

x-ints: _____

Domain: _____

Range: _____

11. $y = \frac{1}{4}(x - 3)(x + 5)$
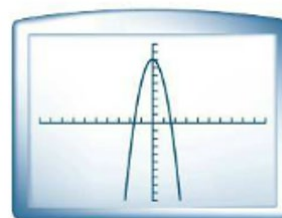
x-ints: _____

Axis of Symmetry: _____

Vertex: _____

y-int: _____

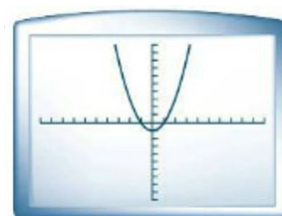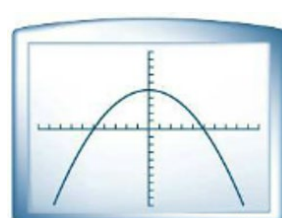[12-14] Given the functions, match them to the correct graph.

12. $y = x^2 - 1$

A.

13. $f(x) = -3x^2 + 8$
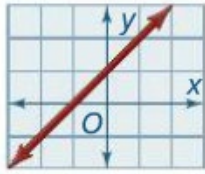
B.

14. $f(x) = -0.2x^2 + 5$
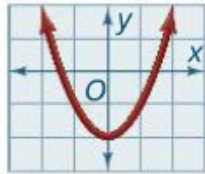
C.

Math 2 Unit 10

Worksheet 8

Math 2 Unit 10 Worksheet 9
Linear, Quadratic, and Exponential Functions

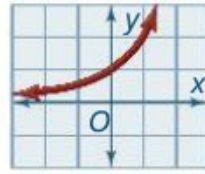Name:_____
Date:_____Per:_____

Linear: $y = mx + b$ Quadratic: $y = ax^2 + bx + c$ Exponential: $y = a \cdot b^x$

[1-3] Graph each set of points. Which model is most appropriate for each set? Choose from linear, quadratic, or exponential.

1. $(-1, 0.5), (0, 1), (2, 4), (3, 8)$ 2. $(-3, 8), (-1, 6), (0, 5), (2, 3), (3, 2)$ 3. $(-2, 11), (-1, 5), (0, 3), (1, 5)$

Model: _____   Model: _____   Model: _____
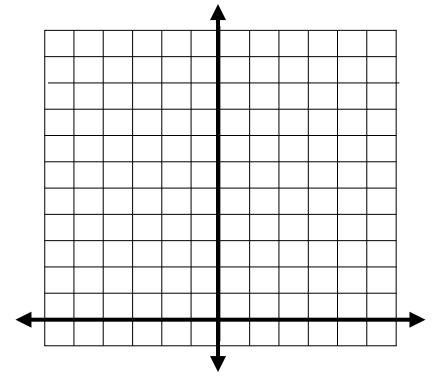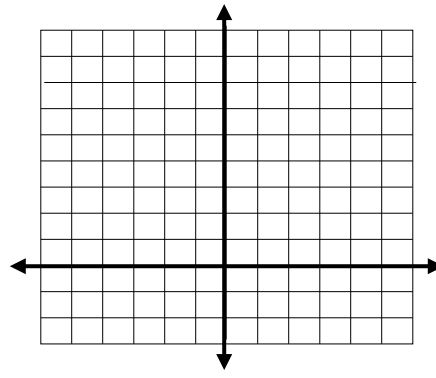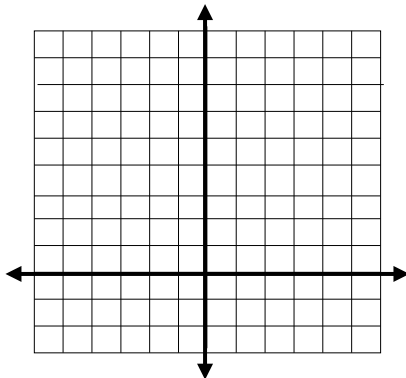
[4-11] Which type of function best models the data in each table? Choose from linear, quadratic, exponential or neither.
Hint: Use differences or ratios.

4. Model: _____

x	$f(x)$
-2	9
-1	6
0	5
1	6
2	9

5. Model: _____

x	$f(x)$
-3	3
-2	6
-1	12
0	24
1	48

6. Model: _____

x	$f(x)$
-2	3
-1	9
0	19
1	33
2	51

7. Model: _____

x	$f(x)$
-1	8
0	-1
1	0
2	1
3	8

8. Model: _____

x	$f(x)$
-2	-7
-1	-3
0	1
1	5
2	9

9. Model: _____

x	$f(x)$
-3	-1
-2	1
-1	3
0	5
1	7

10. Model: _____

x	$f(x)$
-2	1
-1	4
0	16
1	64
2	256

11. Model: _____

x	$f(x)$
-1	-1
0	-4
1	-2
2	0
3	2

Name:_____

Date:_____Per:_____

1. The graph of $f(x)$ is shown below. State whether each statement is True or False.
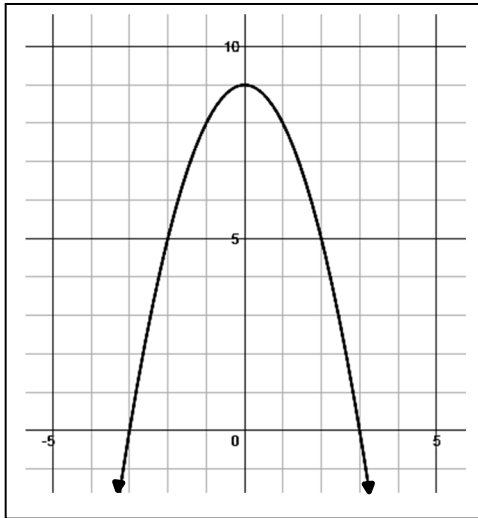
   a. $f(x)$ is decreasing when $x > 0$ a._____

   b. The axis of symmetry is $y = 0$ b._____

   c. The maximum value of $f(x)$ is 9   c._____

   d. (2, 5) is a solution of $f(x)$ d._____

   e. (-1, 3) is a solution of $f(x)$ e._____

   f. (3, 0) is an x intercept of $f(x)$ f._____

   g. (0, 9) is an x intercept of $f(x)$ g._____

   h. The axis of symmetry is $x = 0$ h._____

   i. The vertex is (0, 9)   i._____

   j. The value of x when $f(x)$ reaches its maximum is 0   j._____

2. Using $f(x)$ in #1 above, determine:

   a. The domain of $f(x)$: _____   b. The range of $f(x)$: _____

   c. Determine the rule for translating $g(x) = -x^2$ to $f(x)$: $(x, y) \rightarrow ($___ , ___$)$
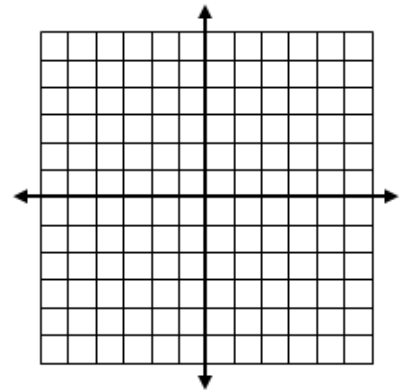
3. Selected values of the quadratic function, $k(x)$, are shown in the table. Sketch $k(x)$, and determine:

x	-6	-5	-4	-3	-2	-1	0	1	2
$k(x)$	-7	0	5	8	9	8	5	0	-7

   a. The x-intercept(s) of $k(x)$ _____

   b. The y-intercept(s) of $k(x)$ _____

   c. The value of x when $k(x)$ is at its maximum _____

   d. The maximum value of $k(x)$ _____

   e. $k(x)$ is increasing when x _____

   f. $k(x)$ is decreasing when x _____

4. Match the equation to the number that reveals the characteristics of the equation without changing the form of the equation.

   a. $m(x) = -3(x + 1)(x - 5)$ 1. Reveals the maximum value of $m(x)$ a._____

   b. $m(x) = -3x^2 + 12x + 15$ 2. Reveals the zeros (x-intercepts) of $m(x)$ b._____

   c. $m(x) = -3(x - 2)^2 + 27$ 3. Reveals the value of $m(x)$ when $x = 0$ c._____

5. In order to factor the left side of the equation, choose from the number box to fill in the blanks in the expression below.

-10	-5	-3	-2	-1	$+1$	$+2$	$+3$	$+5$	$+10$

   a. $2x^2 + 7x - 15 = 0$ b. $5x^2 - 51x + 10 = 0$

   (___$x +$ ___)(___$x +$ ___$) = 0$ (___$x +$ ___)(___$x +$ ___$) = 0$

6. For each of the following, state the vertex, and determine whether it has a maximum or minimum.

   a. $f(x) = -(x-5)^2 + 2$ b. $f(x) = (x-5)^2 + 2$ c. $f(x) = (x+5)^2 + 2$

   Vertex: _____   Vertex: _____   Vertex: _____

          Max or Min   Max or Min   Max or Min

7. For each of the following, state the axis of symmetry.

   a. $f(x) = -(x+1)^2 - 3$ b. $f(x) = (x+5)^2 + 7$ c. $f(x) = (x+4)^2 - 9$
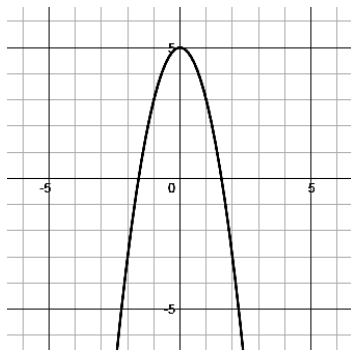
   AOS: _____   AOS: _____   AOS: _____

8. Determine if each ordered pair is a solution to the function $y = -3x^2 + 1$.

	Work	Yes	No
$(0,1)$			
$(2,37)$			
$(2,11)$			
$(1,8)$			

9. Given the graph below, answer the following questions:
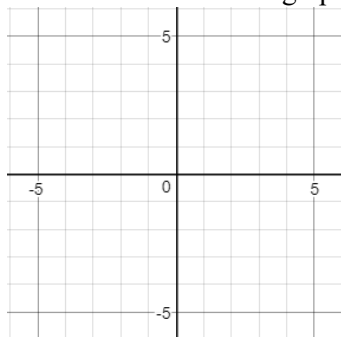

   a. Vertex: _____
   b. Max/Min Value: _____
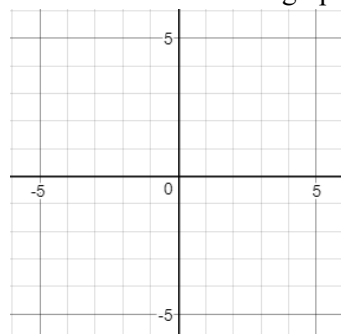   c. Axis of symmetry: _____
   d. Graph is increasing: _____
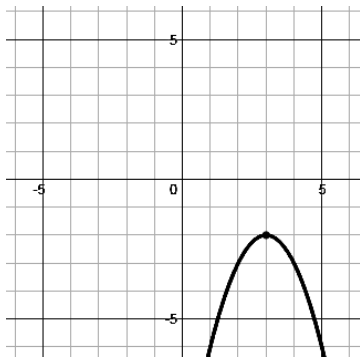   e. Graph is decreasing: _____

10. What is the transformation of the graph of $f(x)$ to $g(x)$ when $f(x) = x^2$ and $g(x) = (x+4)^2 - 2$

11. What is the transformation of the graph of $f(x)$ to $g(x)$ when $f(x) = x^2$ and $g(x) = (x-3)^2 + 1$

12. The graph of $f(x)$ is shown below, the table represent some values for $g(x)$.

x	-1	0	1	2	3	4	5	6	7
$g(x)$	-6	-2.5	0	1.5	2	1.5	0	-2.5	-6

a. Which graph has the greater maximum value? _____

b. The value of x when $g(x)$ is at its maximum, is greater than the value of x when $f(x)$ is at its maximum.   Yes   or   No
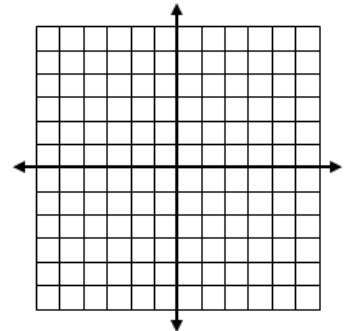
c. State the x intercept(s) of $g(x)$: _____

13. State the zeros for $h(x) = x^2 - 5x - 14$

14. A ball is thrown into the air and is represented by the equation $h(t) = -3(t-3)^2 + 23$, where $h(t)$ is the height of the ball and t is the time in seconds. Find the time it takes for the ball to reach the maximum height.

a. Time it takes to reach Maximum height: _____

b. What is the domain: _____

c. What is the range: _____

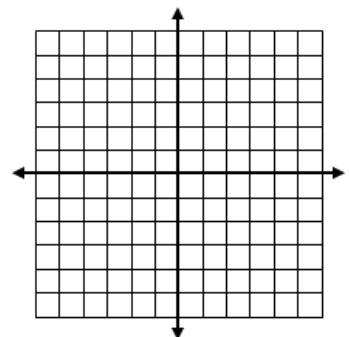15. Graph: $y = -2(x+1)^2 - 2$

a. Vertex: _____

b. Domain: _____

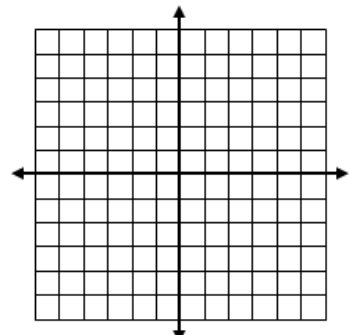c. Range: _____

d. Axis of symmetry: _____

16. Graph $y = -x^2 - 4x - 3$

a. x-intercepts: _____ and _____

b. Vertex: _____

c. Axis of symmetry: _____

17. Graph $y = x^2 - 4x - 5$

a. x-intercepts: _____ and _____

b. Vertex: _____

c. Axis of symmetry: _____

Math 2 Unit 10   Review Worksheet

18. Given $f(x) = x^2$ and $g(x) = 3^x$ evaluate:

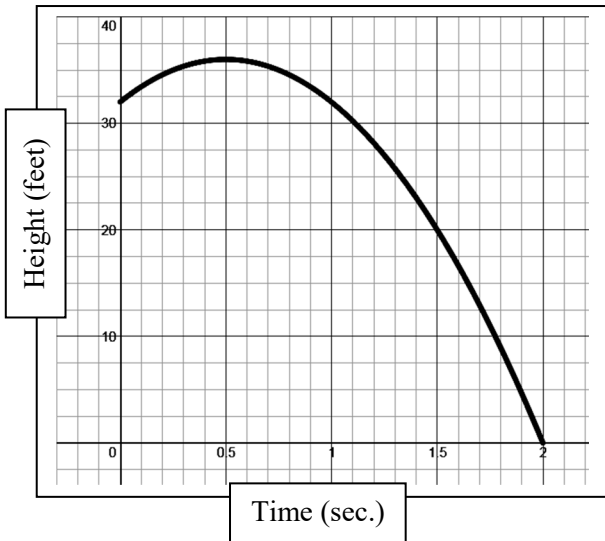   a.   Average rate of change of $f(x)$ from $x = 0$ to $x = 3$ 18a. _____

    b.   Average rate of change of $g(x)$ from $x = 0$ to $x = 3$ 18b. _____

    c.   What do these average rates of change tell you about functions $f(x)$ and $g(x)$?

    _____

    _____

    d.   How are the average rate of changes different? Why?

    _____

    _____

19. The graph of $h(t) = -16(t - \frac{1}{2})^2 + 36$ models the path of a rocket's height, h, with respect to time, t.

Time (sec.)

Choose True or False:

Statement	True	False
19a. The maximum height of the rocket is at 36 feet.		
19b. The maximum height is 2 feet.		
19c. It took 2 seconds for the rocket to hit the ground.		
19d. The rocket started at an initial height of 30 feet.		
19e. The rocket was increasing in height between time 0 and time 0.5 sec.		

[20-23] Find the zeros by the method of your choice. If there is no solution, write *none*.

20. $2x^2 - 32 = 0$ 21. $(x - 1)^2 - 49 = 0$

22. $-2(x + 3)^2 + 50 = 0$ 23. $x^2 - 6x - 40 = 0$

24. Which model is most appropriate for each set? Choose from linear, quadratic, or exponential.

    a.

x	y
0	1
1	3
2	9
3	27

    b.

x	y
0	0
1	3
2	6
3	9

    c.

x	y
0	0
1	3
2	12
3	27

    Model: _____   Model: _____   Model: _____