

Unit 9a

Notes, Class Work & Homework

- 9 – 1: Identifying Quadratic Functions
- 9 – 2: Characteristics of Quadratic Functions
- 9 – 3: Graphing Quadratic Functions
- 9 – 5: Solving Quadratic Equations by Graphing
- 9 – 6: Solving Quadratic Equations by Factoring
- Quadratic Real Life & World Problems

Name _____

Class _____ Date _____

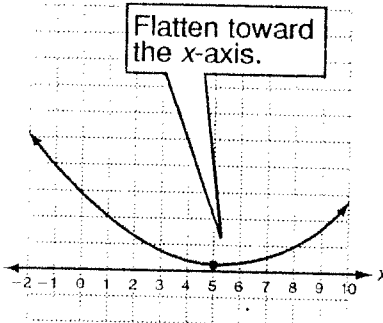
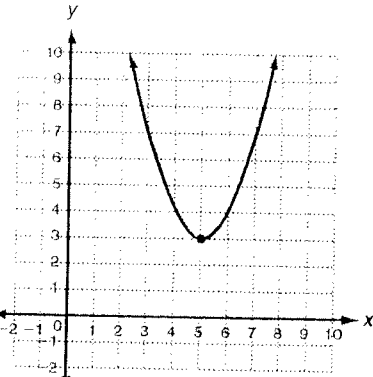
LESSON

Reteach

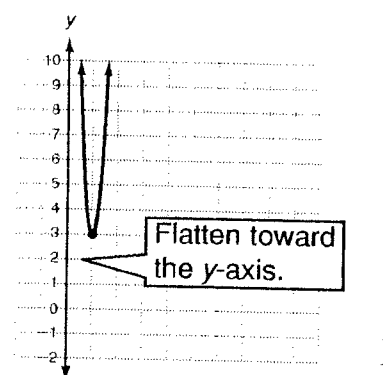
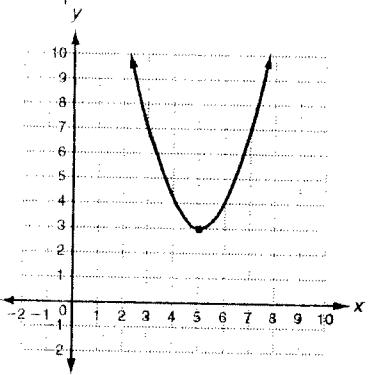
9-1 Identifying Quadratic Functions (continued)

To find the domain of a quadratic function, "flatten" the parabola toward the x-axis. To find the range, "flatten" the parabola toward the y-axis. Then read the domain and range from the inequality graphs.

Find the domain and range.



When the parabola is flat, it looks like an inequality graph that covers the entire x-axis. So, the domain is "all real numbers."

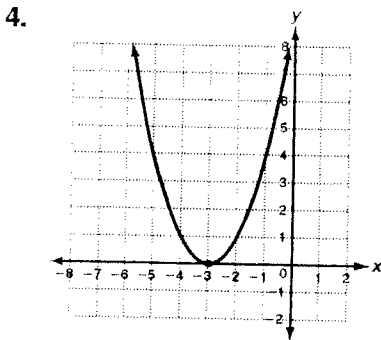


When the parabola is flat, it looks like an inequality graph with a solid point at 3, and all points above 3 are shaded. So, the range is " $y \geq 3$."

D: all real numbers

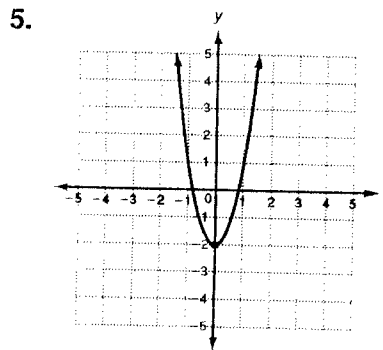
R: $y \geq 3$

Imagine "flattening" each parabola to find the domain and range.



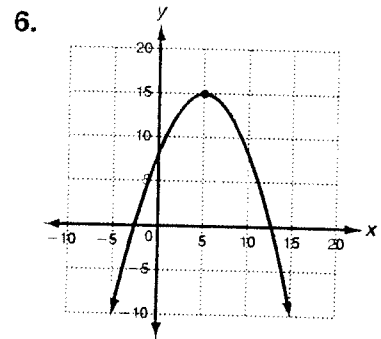
D: _____

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D: _____

R: _____



D: _____

R: _____

LESSON

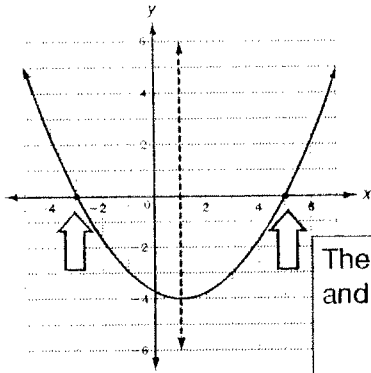
9-2

Reteach

Characteristics of Quadratic Functions

You find the **axis of symmetry** of a parabola by averaging the two zeros. If there is only one zero or no zeros, use the x-value of the vertex.

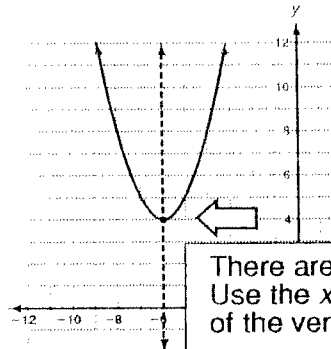
Find the axis of symmetry of each parabola.



The two zeros are -3 and 5 . Average the zeros:

$$\frac{-3 + 5}{2} = \frac{2}{2} = 1$$

The axis of symmetry is $x = 1$.



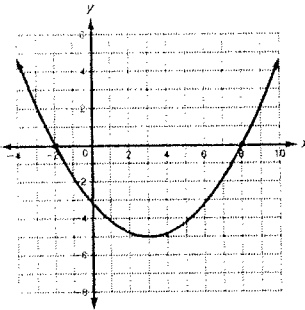
There are no zeros. Use the x-value of the vertex:

$$(-6, 4)$$

The axis of symmetry is $x = -6$.

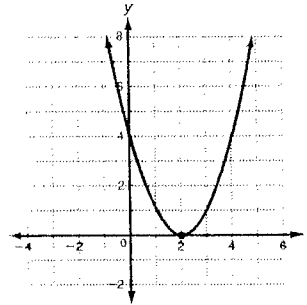
Find the axis of symmetry of each parabola.

1.



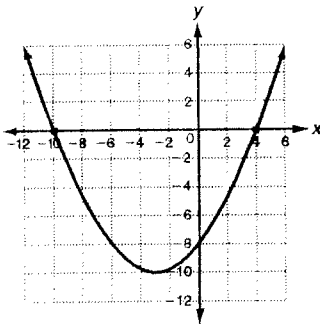
The axis of symmetry is _____.

2.

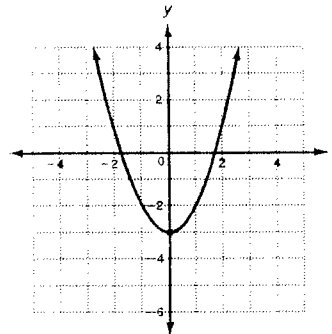


The axis of symmetry is _____.

3.

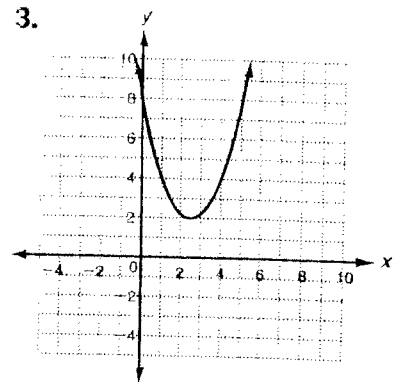
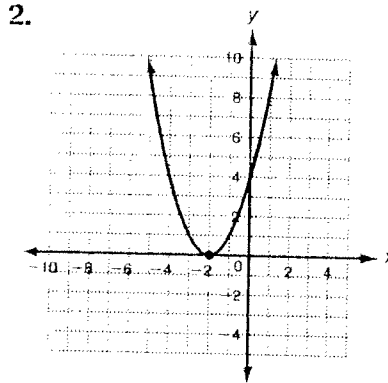
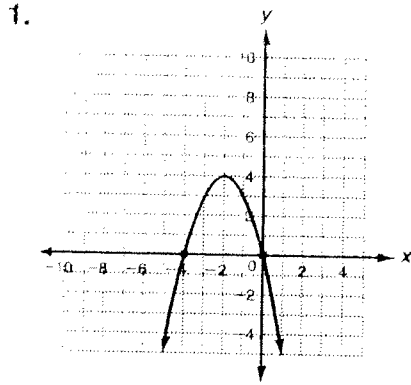


4.

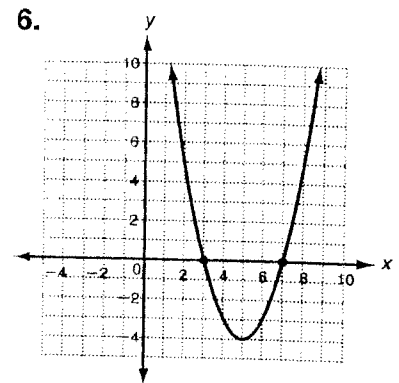
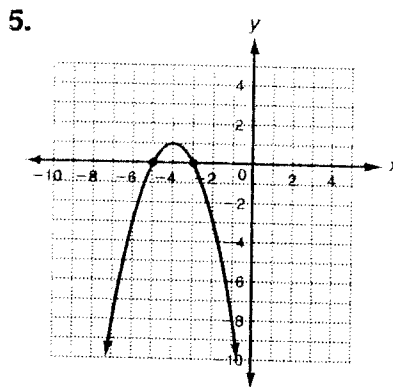
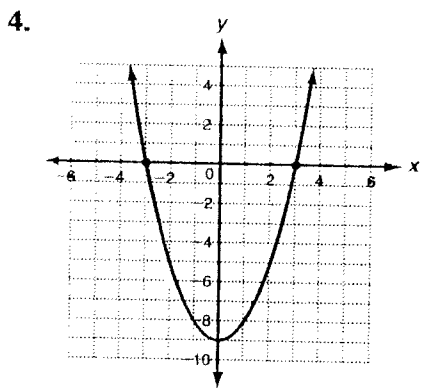


LESSON 9.2 **Practice A**
Characteristics of Quadratic Functions

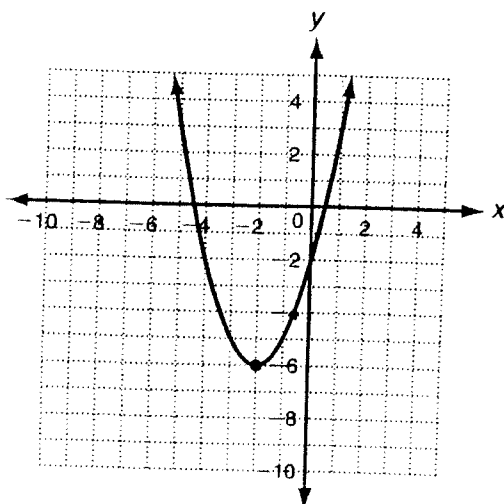
Find the zeros of each quadratic function from its graph.



Find the axis of symmetry of each parabola.



Use the graph of the quadratic function below for questions 6–8.



6. Identify the vertex of the parabola.

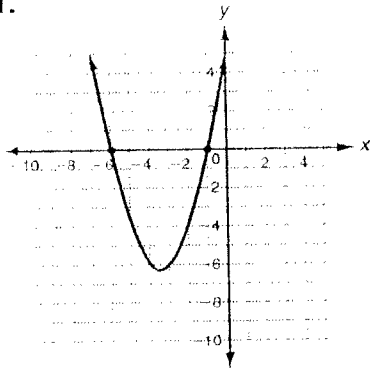
7. Give the minimum or maximum value.

8. Find the domain and range.

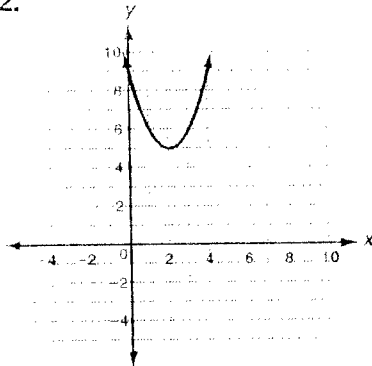
LESSON 9-2 Practice B
Characteristics of Quadratic Functions

Find the zeros of each quadratic function from its graph.

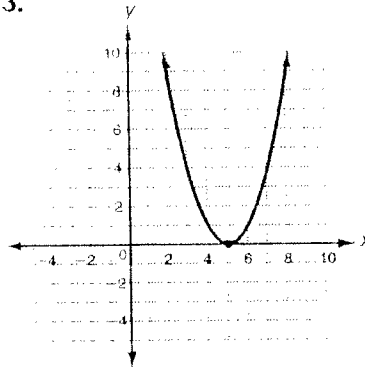
1.



2.

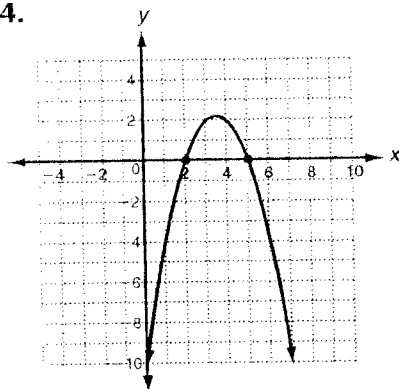


3.

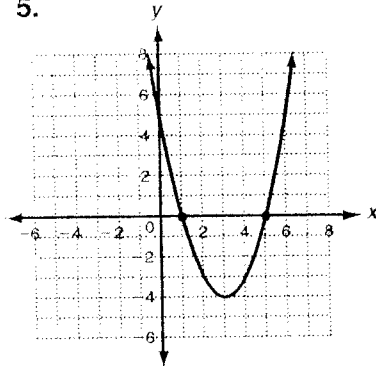


Find the axis of symmetry of each parabola.

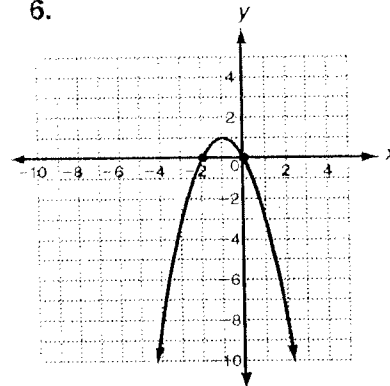
4.



5.

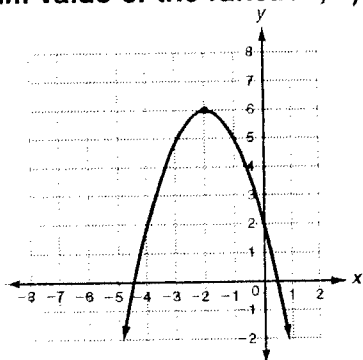


6.

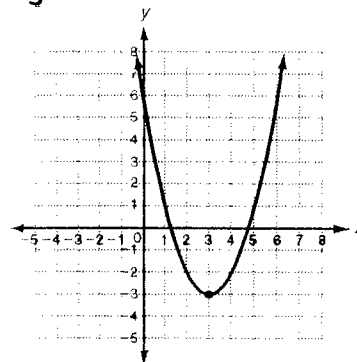


For each parabola, a) identify the vertex; b) give the minimum or maximum value of the function; c) find the domain and range.

7.



8.



a. _____

b. _____

c. _____

a. _____

b. _____

c. _____

GUIDED PRACTICE

1. **Vocabulary** The y -value of the vertex of a parabola that opens upward is the _____ value of the function. (*maximum* or *minimum*)

SEE EXAMPLE
p. 590

Tell whether each function is quadratic. Explain.

2. $y + 6x = -14$

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

4.

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

5. $\{(-10, 15), (-9, 17), (-8, 19), (-7, 21), (-6, 23)\}$

SEE EXAMPLE 2
p. 591

Use a table of values to graph each quadratic function.

6. $y = 4x^2$

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

8. $y = -x^2 + 1$

9. $y = -5x^2$

SEE EXAMPLE 3
p. 592

Tell whether the graph of each quadratic function opens upward or downward. Explain.

10. $y = -3x^2 + 4x$

11. $y = 1 - 2x + 6x^2$

12. $y + x^2 = -x - 2$

13. $y + 2 = x^2$

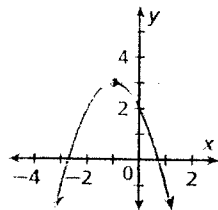
14. $y - 2x^2 = -3$

15. $y + 2 + 3x^2 = 1$

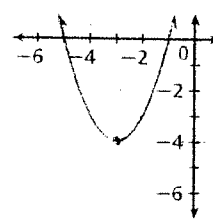
SEE EXAMPLE 4
p. 592

Identify the vertex of each parabola. Then give the minimum or maximum value of the function.

16.



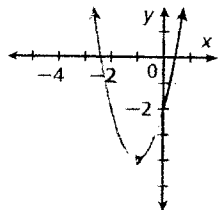
17.



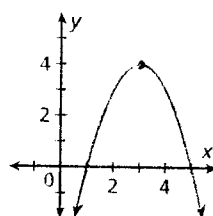
SEE EXAMPLE 5
p. 593

Find the domain and range.

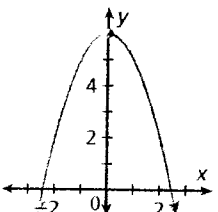
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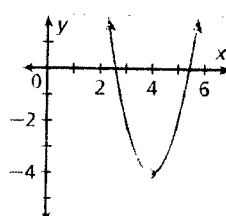
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20.



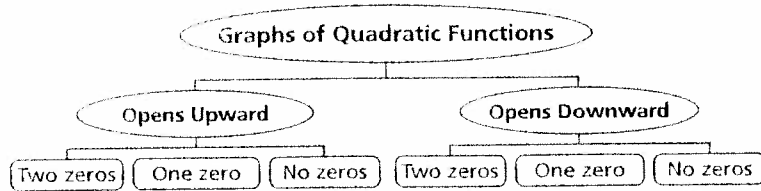
21.



THINK AND DISCUSS

- How do you find the zeros of a function from its graph?
- Describe how to find the axis of symmetry of a quadratic function if its graph does not cross the x -axis.
- GET ORGANIZED** Copy and complete the graphic organizer. In each box, sketch a graph that fits the given description.

HOW TO
1.10



9-2

Exercises

GLIMMASON

KEYWORD: MA7 9-2

KEYWORD: MA7 Parent

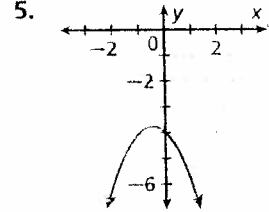
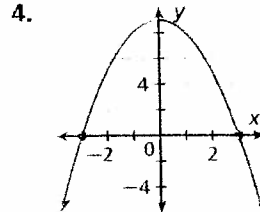
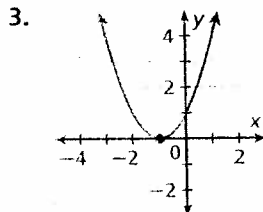
GUIDED PRACTICE

Vocabulary Apply the vocabulary from this lesson to answer each question.

- Why is the zero of a function the same as an x -intercept of a function?
- Where is the axis of symmetry of a parabola located?

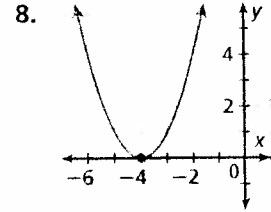
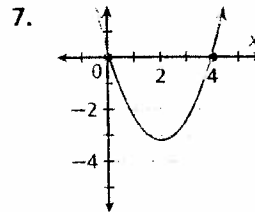
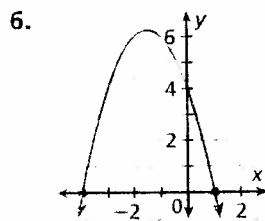
SEE EXAMPLE
p. 599

Find the zeros of each quadratic function from its graph. Check your answer.



SEE EXAMPLE
p. 600

Find the axis of symmetry of each parabola.



SEE EXAMPLE
p. 601

For each quadratic function, find the axis of symmetry of its graph.

9. $y = x^2 + 4x - 7$

10. $y = 3x^2 - 18x + 1$

11. $y = 2x^2 + 3x - 4$

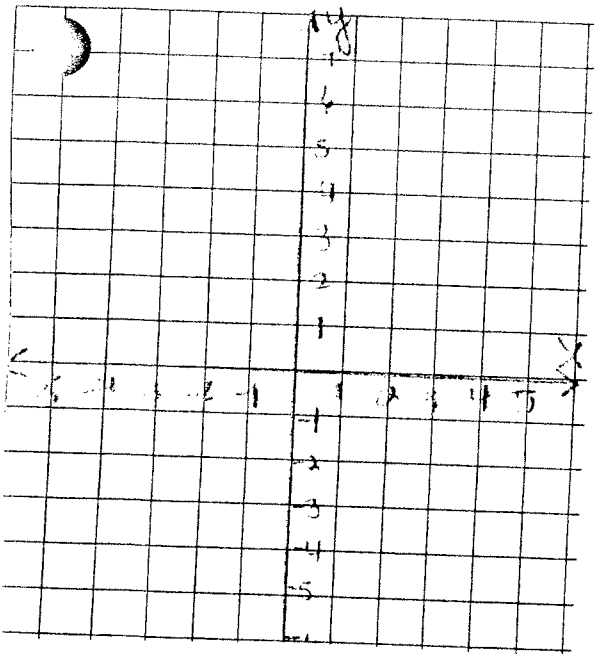
12. $y = -3x^2 + x + 5$

Quadratic Functions:

- Are any equations that can be written in the form: $y = ax^2 + bx + c$, where a, b, c are all real numbers and $a \neq 0$
- Notice that the graph is not a linear function instead the graph is a curve that will always look like the letter U in an upright position or upside down ∩
- The graph of a quadratic function is called a Parabola
- To graph a parabola :
 1. Use the interval provided to determine the values of x that will be used
 2. Type the equation into y = in your calculator to determine the corresponding values for y.
 3. Plot all of the points in the table and connect them with a smooth curve placing no arrows at the ends.
 4. Label the graph.

Directions: Graph each of the functions and answer the following questions:

#1.) a.) Draw the graph of the equation $y = -x^2 + 4$ including all values from $x = -3$ to $x = 3$ inclusive (Show your work below. Be neat!!!)



b.) What are the coordinates of the point where the graph of $y = -x^2 + 4$ turns.

b.) _____

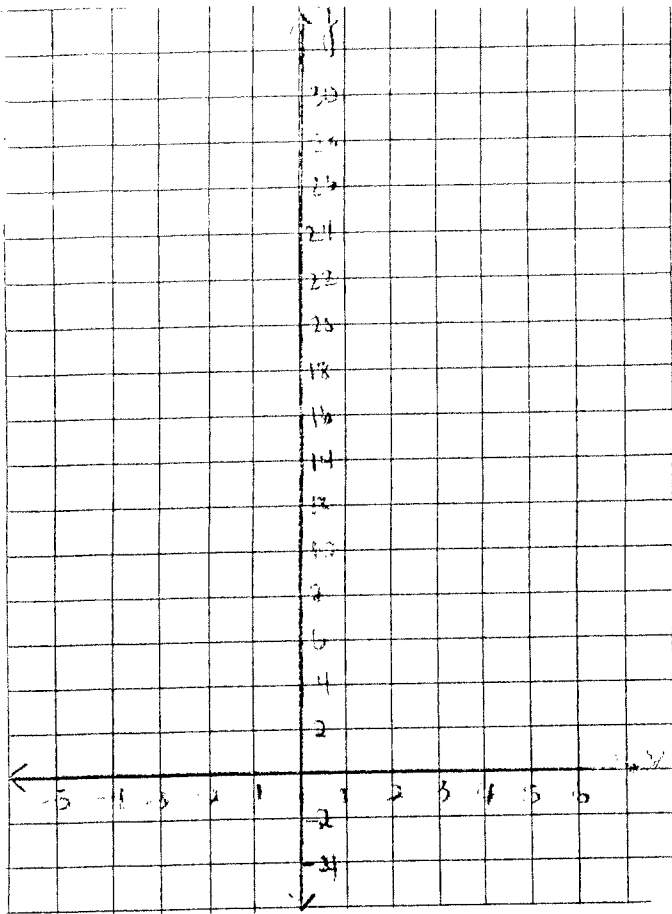
c.) Is this point a minimum or maximum?

c.) _____

d.) Find the roots of the quadratic equation $-x^2 + 4 = 0$

d.) _____

#2.) a.) Draw the graph of the equation $y = 3x^2 - 6x + 4$ including all values in the interval $-2 \leq x \leq 4$
 (Show your work below. Be neat!!!)



b.) What are the coordinates of the point where the graph of $y = 3x^2 - 6x + 4$ turns.

b.) _____

c.) Is this point a minimum or maximum?

c.) _____

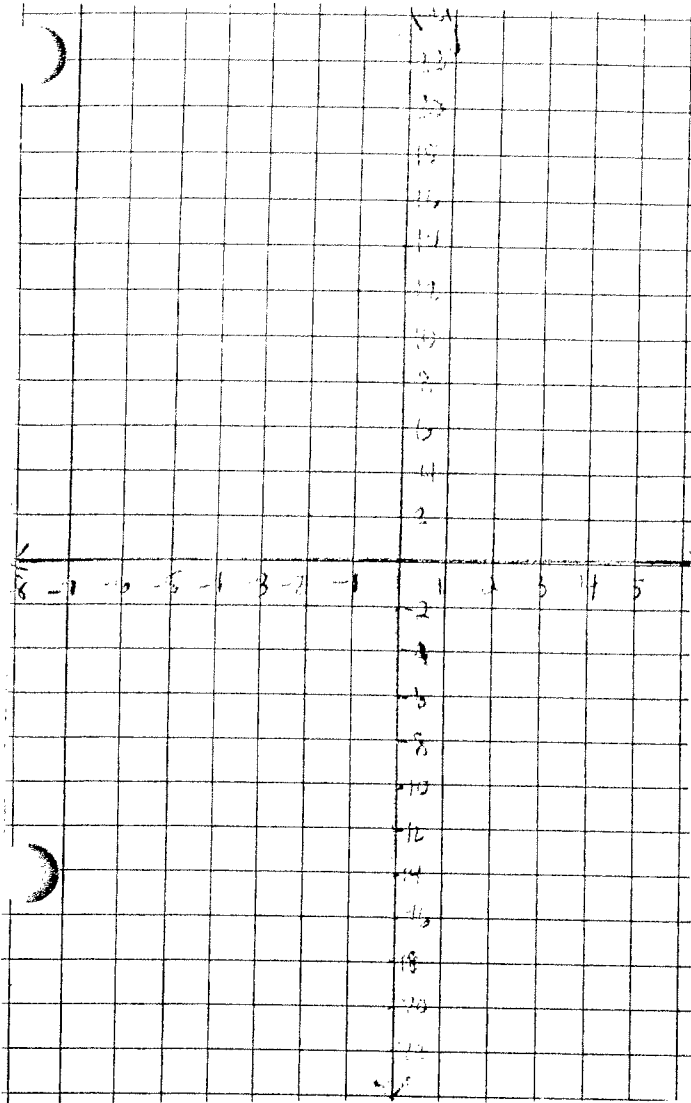
d.) Find the roots of the quadratic equation $3x^2 - 6x + 4 = 0$

d.) _____

e.) What is the equation of the axis of symmetry?

d.) _____

#3.) a.) Solve $2x^2 + 6 = -8x$ graphically in the interval $-5 \leq x \leq 1$ (Show your work below. Be neat!!!)



b.) What are the coordinates of the point where the graph of $y = 2x^2 + 8x + 6$ turns.

b.) _____

c.) Is this point a minimum or maximum?

c.) _____

d.) What is the equation of the axis of symmetry?

d.) _____

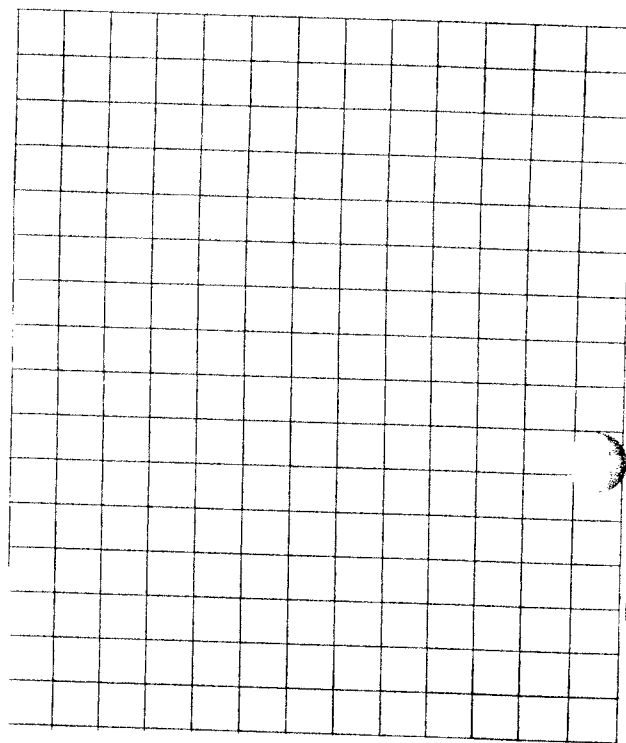
**Regents Algebra: Graphing a Parabola
Homework #6**

Name _____

Date _____

Directions: Answer all parts of each question below on your own paper. All graphs must be neatly drawn on graph paper provided. Show all of your work.

#1.) a.) On graph paper, draw the graph of the equation $y = x^2 - 2x - 8$ including all values in the interval $-2 \leq x \leq 4$ (Don't forget show your table below)



b.) Write the coordinates of the turning point where the graph of $y = x^2 - 2x - 8$ turns.

b.) _____

c.) Is this point a minimum or a maximum?

c.) _____

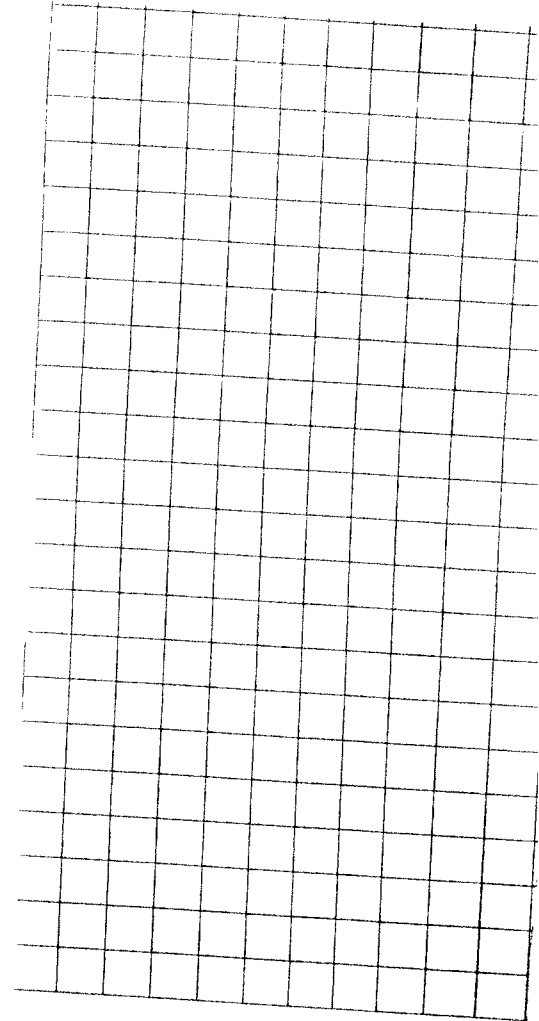
d.) Determine the solution set of $x^2 - 2x - 8 = 0$ (Find the roots)

d.) _____

e.) Write the equation of the axis of symmetry.

e.) _____

#2.) a.) On graph paper, draw the graph of the equation $y = -x^2 + 8x - 16$ including all values from $x = 2$ to $x = 6$ (Don't forget show your table below)



b.) Write the coordinates of the turning point where the graph of $y = -x^2 + 8x - 16$ turns.

b.) _____

c.) Is this point a minimum or a maximum?

c.) _____

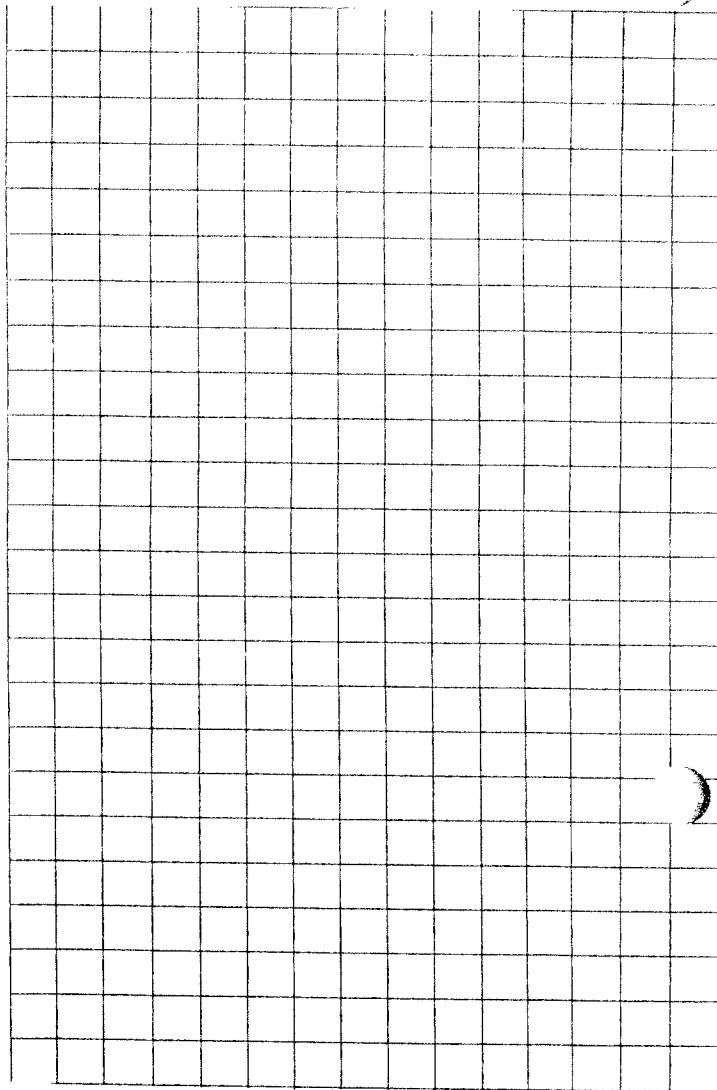
d.) Determine the solution set of $-x^2 + 8x - 16 = 0$ (Find the roots)

d.) _____

e.) Write the equation of the axis of symmetry.

e.) _____

#3.) a.) Solve graphically $-2x^2 + 8x = 1$ in the interval $-1 \leq x \leq 5$. (Remember first write the equation in Standard form, then copy the table in the space provided, be neat !!)



b.) Write the equation of the axis of symmetry.

b.) _____

c.) State the coordinates of the point where the parabola changes direction.

c.) _____

d.) Is the turning point a minimum or a maximum.

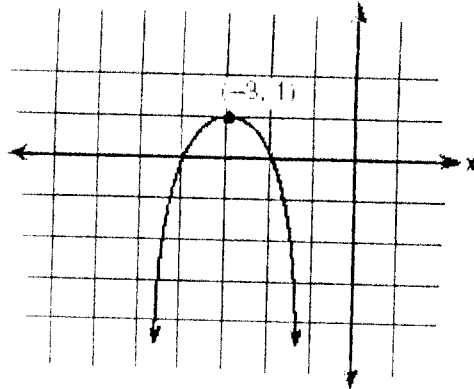
d.) _____

e.) State the roots of the equation that was written in standard form.

e.) _____

Directions: Select the choice that best answers the question.

#4.) Which equation represents the parabola shown in the accompanying graph?



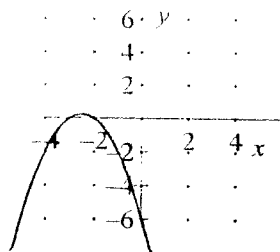
[A] $y = -(x - 3)^2 - 3$

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

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

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

#5.) Which quadratic function is graphed below?



[A] $y = -x^2 - 5x - 6$

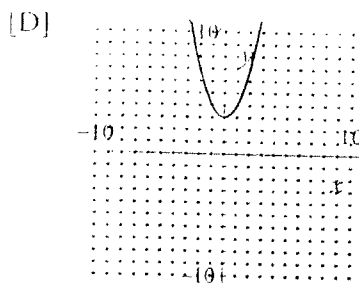
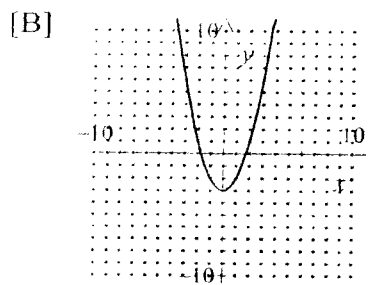
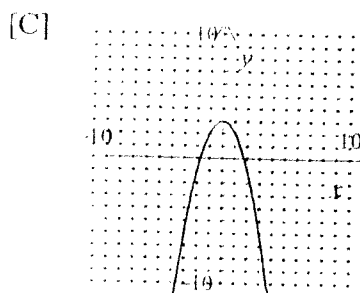
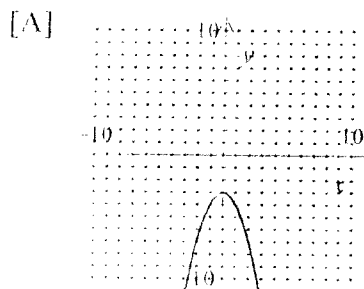
[C] $y = x^2 - 5x - 6$

[E] $y = x^2 + 5x - 6$

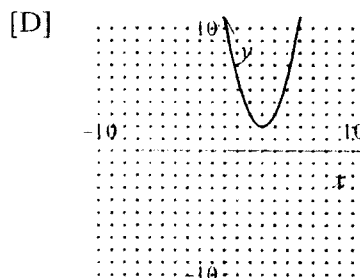
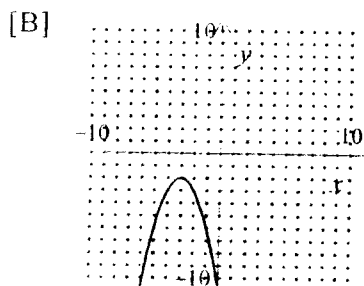
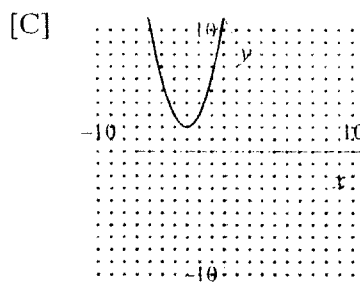
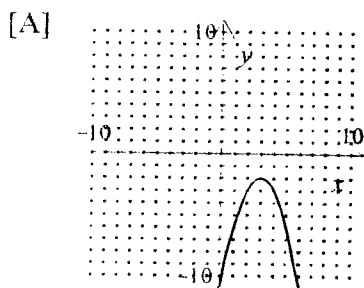
[B] $y = -x^2 + 5x + 6$

[D] $y = -x^2 - 5x + 6$

#6.) Which of the following is the graph of $y = x^2 + 3$?



#7.) Which of the following is the graph of $y = -x^2 + 6x - 11$?



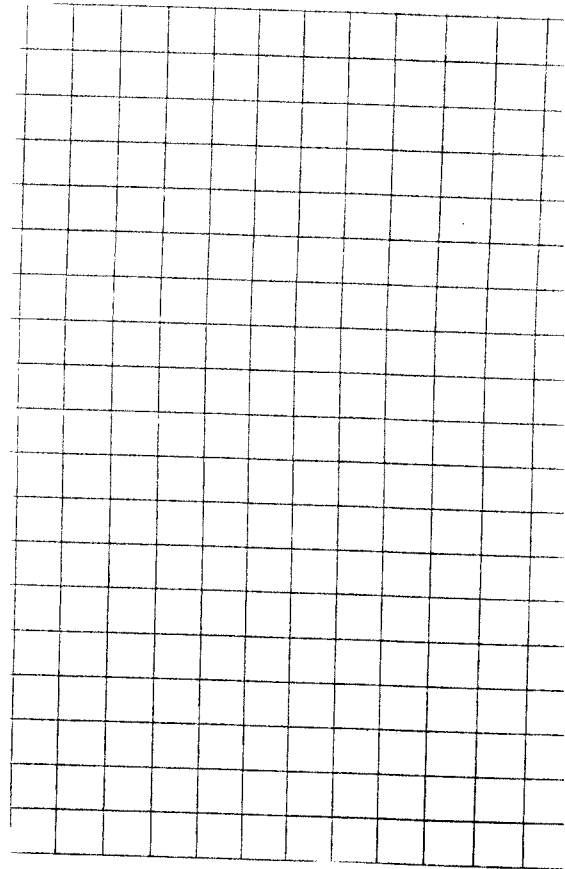
**Regents Algebra: Graphing a Parabola
Warm-up**

Name _____

Date _____

#1.) a.) Solve graphically $y = \frac{1}{2}x^2 - 8$ including all values from $x = -3$ to $x = 3$.

(Remember to copy the table in the space provided.)



b.) State the equation of the axis of symmetry.

b.) _____

c.) State the coordinates of the point where the parabola changes direction.

c.) _____

d.) Is the turning point a minimum or a maximum.

d.) _____

e.) State the roots of the equation

e.) _____

Regents Algebra: Important Facts of a Parabola
Notes (Day 2)

Name _____

Date _____

I. Axis of Symmetry:

➤ **Definition :** The axis of symmetry is a vertical line that divides the parabola, such that every point on the left of the line corresponds with a point on the right.

A.) Procedure: To determine the equation of the axis of symmetry without graphing the quadratic equation use the following formula:

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

B.) Examples: Write the equation of the axis of symmetry for the following equations:

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

2.) $y = x^2 - 4x$

II. Turning Point:

➤ **Definition:** The turning point is the point at which the parabola changes direction.
(The x- coordinate of the turning point will have the same value as the axis of symmetry, since the turning point lies on the axis of symmetry).

A.) Procedure:

- 1.) First find the axis of symmetry (this will determine the x - coordinate of the point)
- 2.) Substitute this value into the equation to find the y - coordinate.

B.) Examples: Find the coordinates of the turning point.

3.) $y = x^2 - 8x + 7$

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

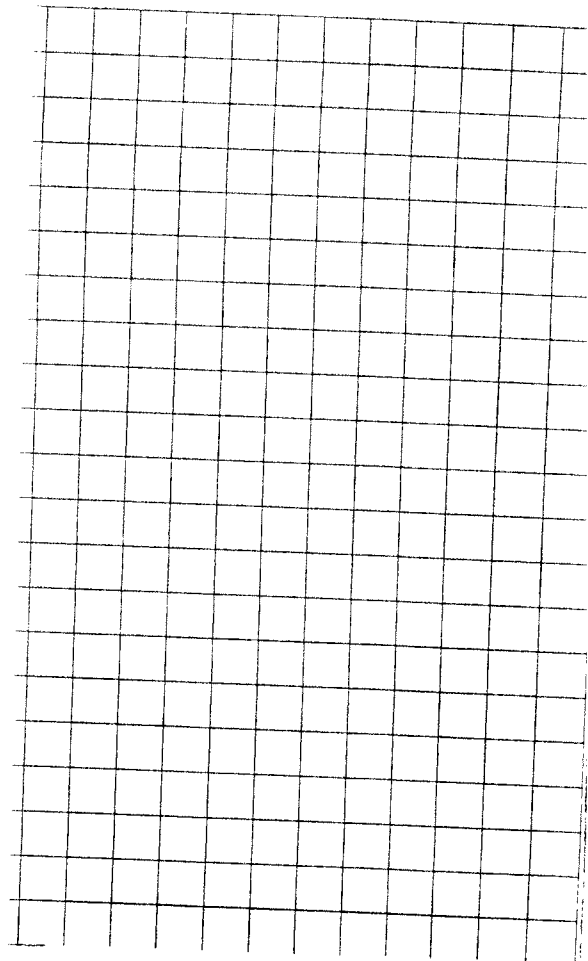
III. Graphing a parabola when an interval is not provided:
(Your table must consist of a minimum of 7 values)

A.) Procedure:

- 1) Find the axis of symmetry (This will give you the middle value for x in the interval.
- 2) Then list 3 integral values smaller than the number and 3 integral values larger than the number to complete the table.

B.) Examples:

- 5.) a.) Draw the graph of the equation $y = x^2 - 4x + 1$



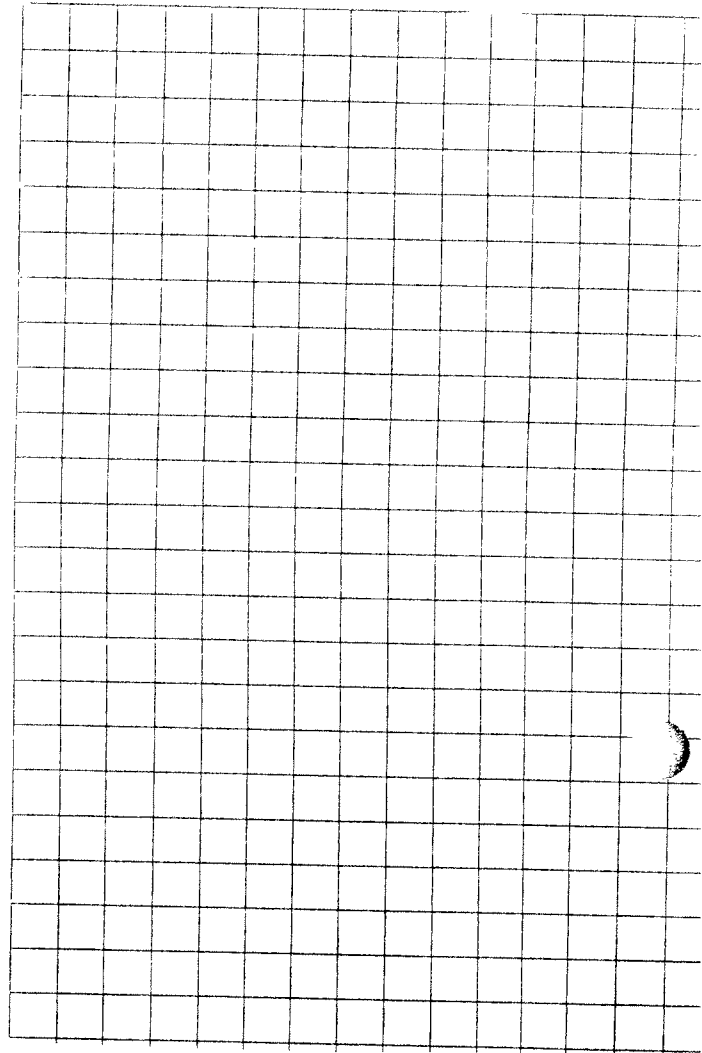
b.) Write the equation of the axis of symmetry.

b.) _____

c.) Write the coordinates of the turning point.

c.) _____

6.) a.) Draw the graph of the equation $y = -x^2 + 10x - 15$



b.) Write the equation of the axis of symmetry.

b.) _____

c.) Write the coordinates of the turning point.

c.) _____

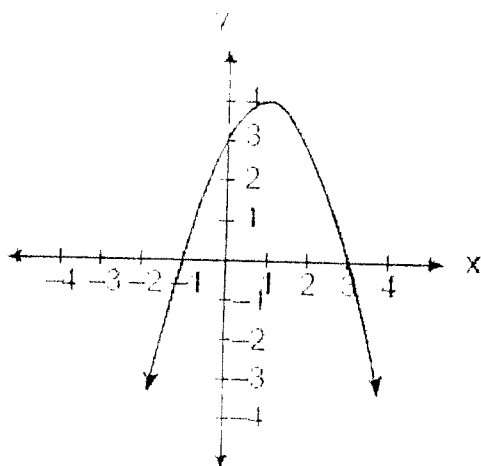
Regents Algebra: Graphing a Parabola
Notes #1 (Part 2)

Name _____

Date _____

Directions: Select the choice that best answers the question.

1.) Which is an equation of the parabola shown in the accompanying diagram?



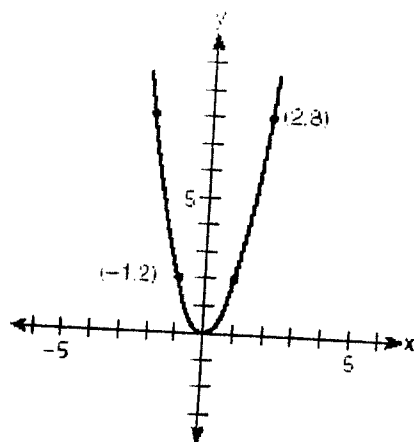
[A] $y = -x^2 - 2x - 3$

[C] $y = x^2 - 2x + 3$

[B] $y = -x^2 + 2x + 3$

[D] $y = x^2 + 2x + 3$

2.) Which quadratic function is shown in the accompanying graph?



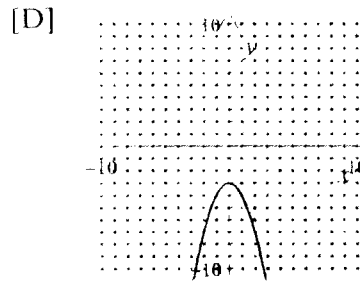
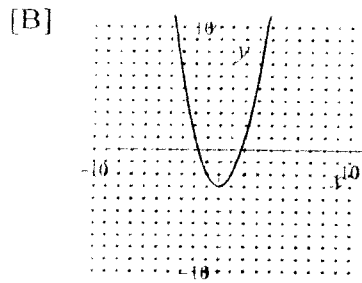
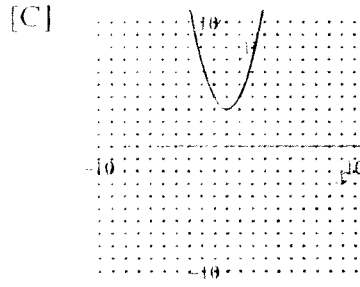
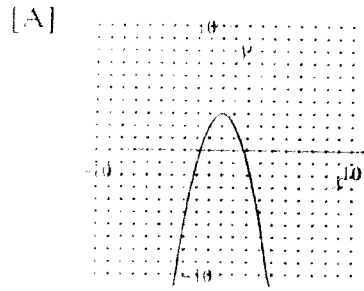
[A] $y = -2x^2$

[C] $y = -\frac{1}{2}x^2$

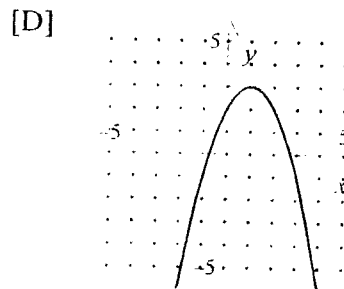
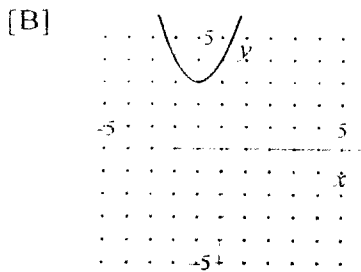
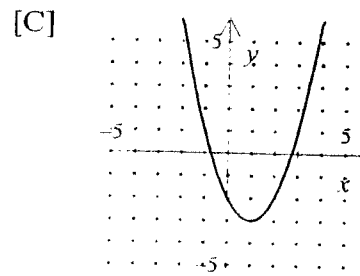
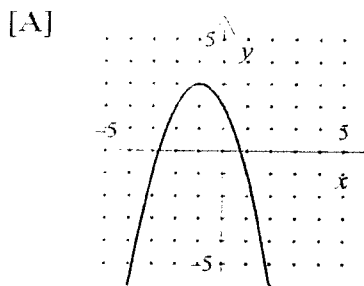
[B] $y = 2x^2$

[D] $y = \frac{1}{2}x^2$

3.) Which of the following is the graph of $y = x^2 - 3$?



4.) Which of the following is the graph of $y = -(x + 1)^2 + 3$?



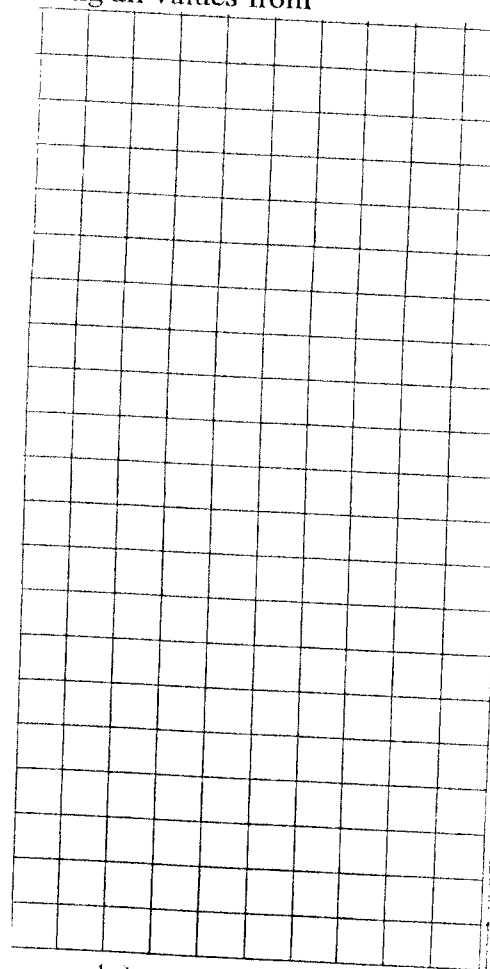
Regents Algebra: Graphing a Parabola
Homework #2

Name _____

Date _____

Directions: Answer all parts of each question below on your own paper. All graphs must be neatly drawn on graph paper provided. Show all of your work.

#1.) a.) On graph paper, draw the graph of the equation $y = 2x^2 - 8x$ including all values from



b.) Write the coordinates of the turning point.

b.) _____

c.) Is this point a minimum or a maximum?

c.) _____

d.) Determine the roots of $2x^2 - 8x = 0$

d.) _____

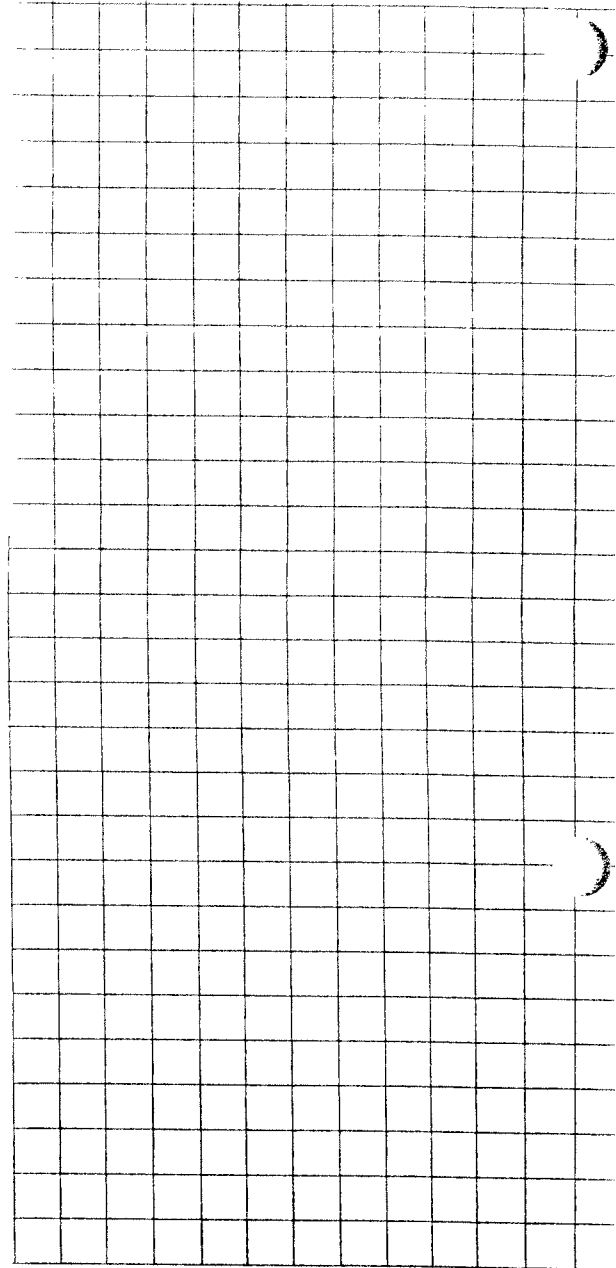
e.) Write the equation of the axis of symmetry.

e.) _____

f.) What is the minimum value of y for the equation $y = x^2 + 4x + 4$

f.) _____

#2.) a.) On graph paper, draw the graph of the equation $y = -x^2 - 2x - 5$



b.) Write the equation of the axis of symmetry.

b.) _____

c.) State the coordinates of the point where the parabola changes direction.

c.) _____

d.) Is the turning point a minimum or a maximum.

d.) _____

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Directions: Select the choice that best answers the question.

#3.) For which quadratic equation is the axis of symmetry $x = 3$?

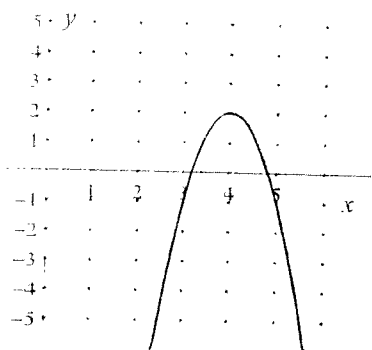
[A] $y = -x^2 + 3x + 5$

[C] $y = x^2 + x + 3$

[B] $y = x^2 + 6x + 3$

[D] $y = -x^2 + 6x + 2$

#4.) Which equation represents the parabola shown in the accompanying graph ?



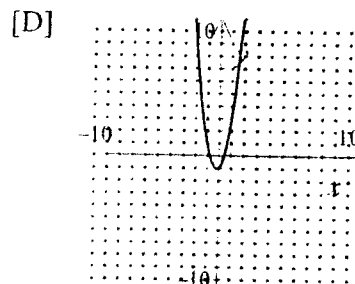
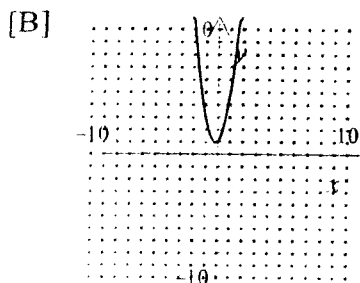
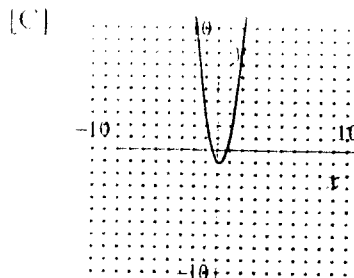
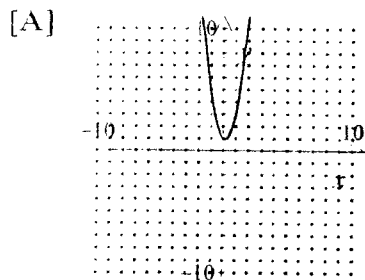
[A] $y = -3(x - 4)^2 + 2$

[C] $y = 3(x + 4)^2 + 2$

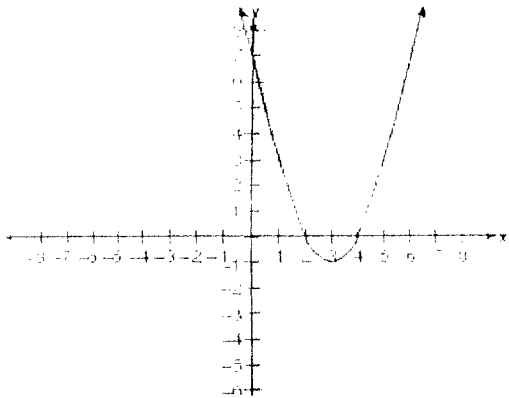
[B] $y = -3(x - 2)^2 + 4$

[D] $y = 3(x - 4)^2 + 2$

#5.) Which of the following is the graph of $y = 3x^2 + x + 1$?



#6.) Which is an equation of the line of symmetry for the parabola in the accompanying diagram?



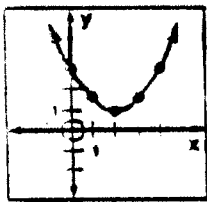
[A] $x = 2$

[C] $x = 3$

[B] $y = 3$

[D] $x = 4$

#7.) Which is not true for the parabola shown?



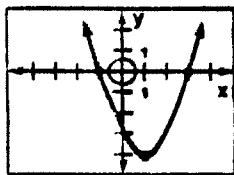
[A] There are no x-intercepts

[B] The graph intersects the y-axis at $(3, 0)$

[C] An equation of the axis of symmetry is $x = 2$

[D] There is a minimum turning point.

#8.) For the parabola shown, when $y = 0$, x can be:



[A] 1

[C] 3

[B] -3

[D] -4

- Directions:**
- a.) Write the equation of the axis of symmetry.
 - b.) Determine the coordinates of the turning point.
 - c.) Tell whether the parabola will open upward or downward.
 - d.) Tell whether the turning point is a maximum point or a minimum point.

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

#10.) $y = -x^2 + 6x$

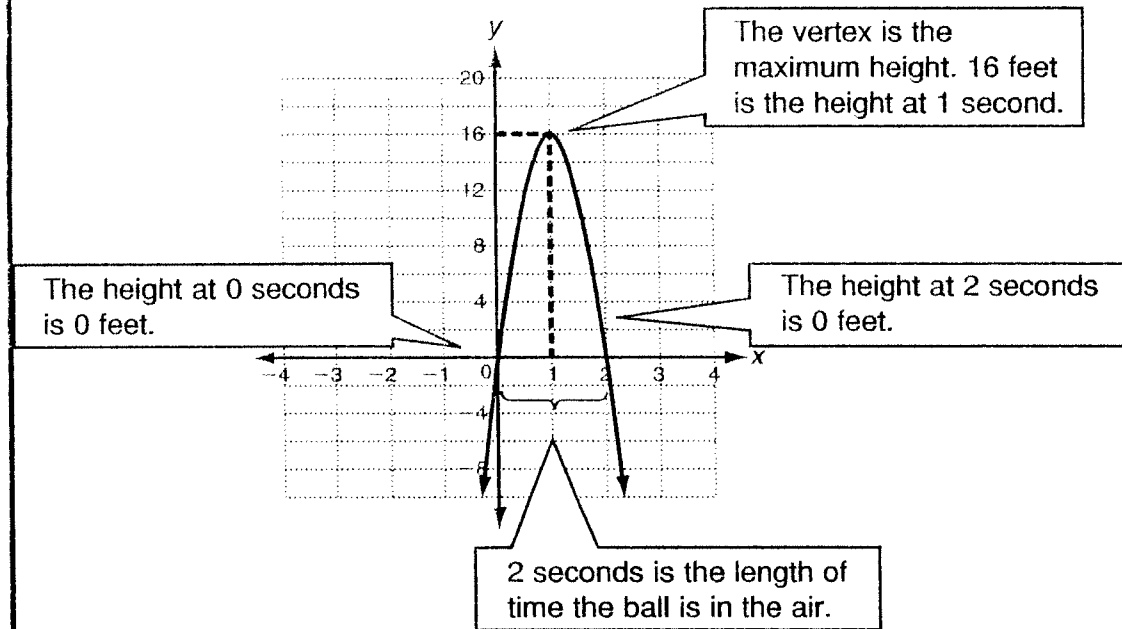
LESSON **9-3** **Reteach**
Graphing Quadratic Functions (continued)

Many real life situations involve quadratic functions. It is important to interpret the graphs correctly.

The height in feet of a soccer ball kicked in the air can be modeled by the function $f(t) = -16t^2 + 32t$. Find the ball's maximum height and the time it takes the ball to reach this height. Then find how long the ball is in the air.

The graph shows the approximate height of the soccer ball after t seconds.

The x -axis is time t in seconds. The y -axis is the height h in feet.



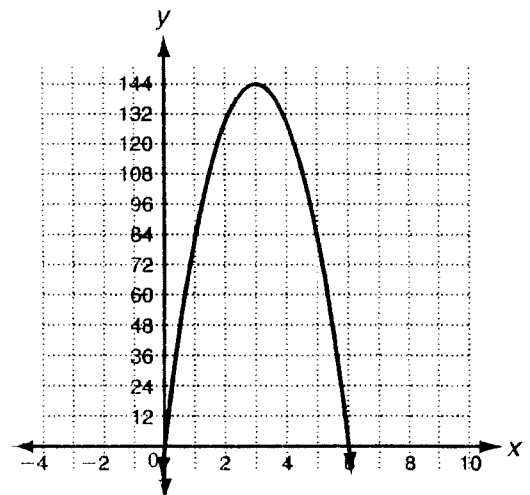
The maximum height is 16 feet. It takes the ball 1 second to reach this height. The soccer ball is in the air for 2 seconds.

The height in feet of a rocket launched straight up in the air can be modeled by the function $f(t) = -16t^2 + 96t$. The graph is shown.

6. Find the time it takes the rocket to reach the maximum height.

7. Find the rocket's maximum height.

8. Find how long the rocket was in the air.

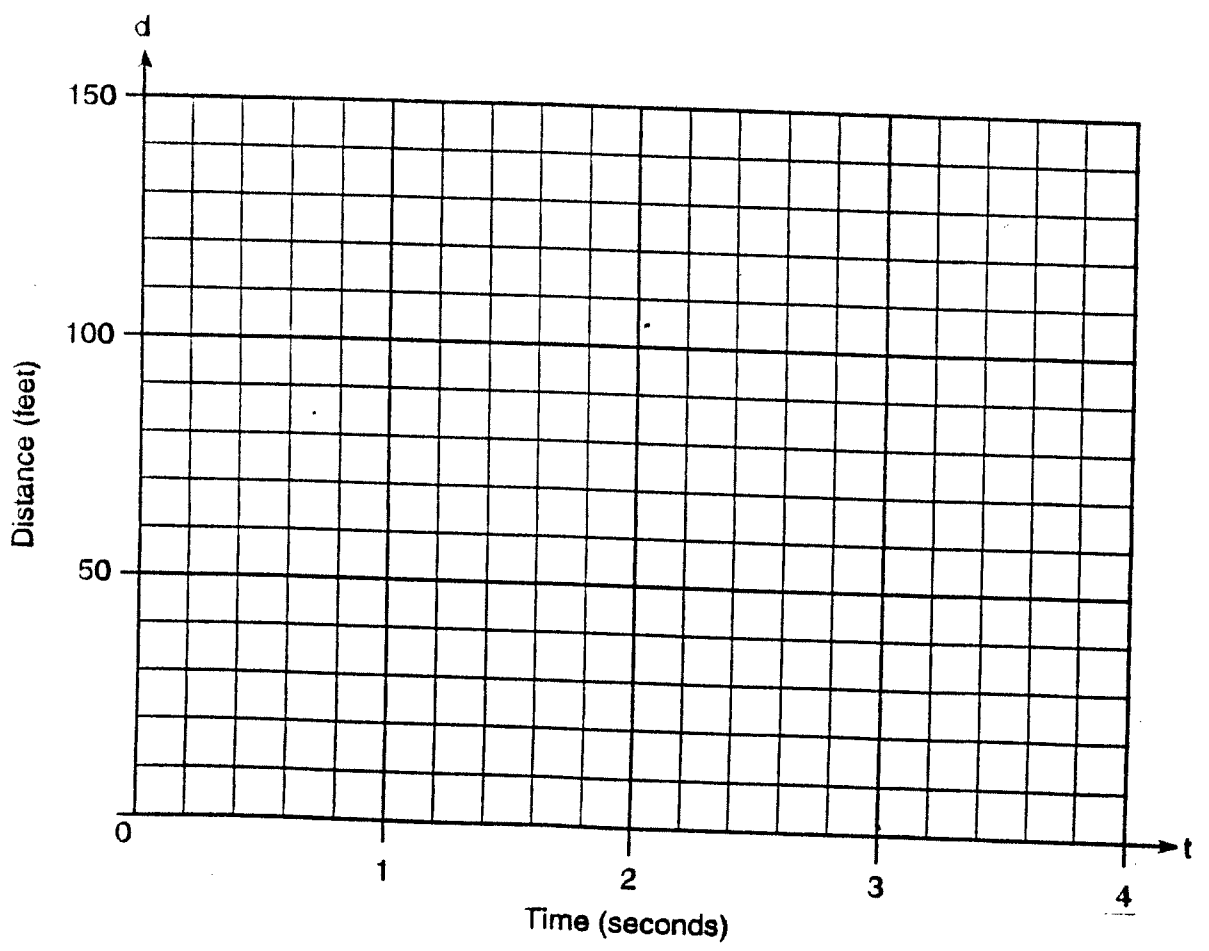


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Real – Life Problems Involving Parabolas

Directions: Use the information below to solve the problem. Show all of your work including a table of values and a graph which covers the complete interval necessary to answer the question.

- 1.) Greg is in a car at the top of a roller-coaster ride. The distance, d , of the car from the ground as the car descends is determined by the equation $d = 144 - 16t^2$, where t is the number of seconds it takes the car to travel down to each point on the ride. How many seconds will it take Greg to reach the ground?

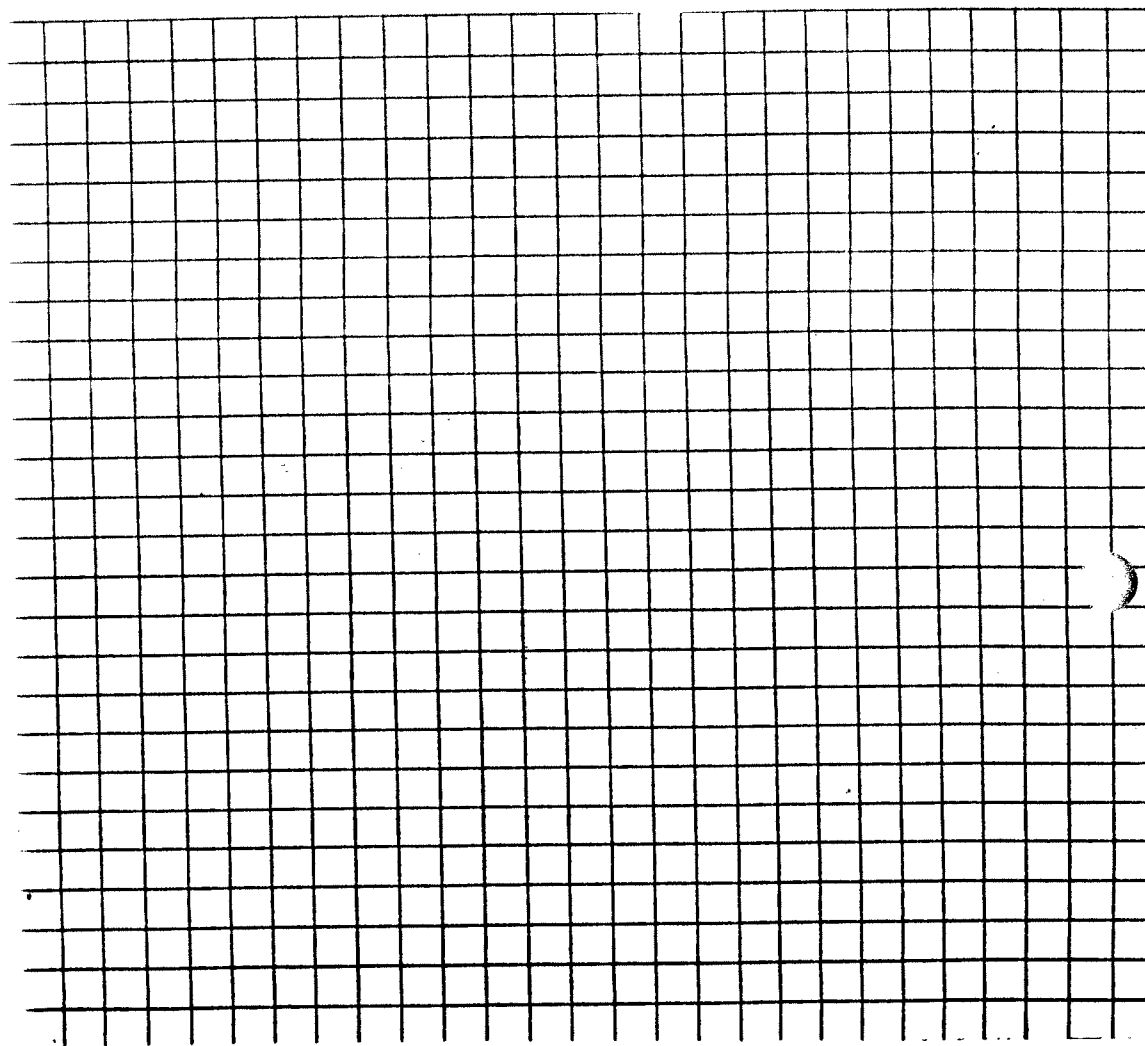


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OVER



- 2.) A bottlenose dolphin jumps out of the water. The path the dolphin travels can be modeled by $h = -0.2d^2 + 2d$, where h represents the height of the dolphin and d represents the horizontal distance.



a.) What is the maximum height the dolphin reaches?

a.) _____

b.) How far did the dolphin jump?

b.) _____

LESSON

9-3

Practice B

Graphing Quadratic Functions

Graph each quadratic function.

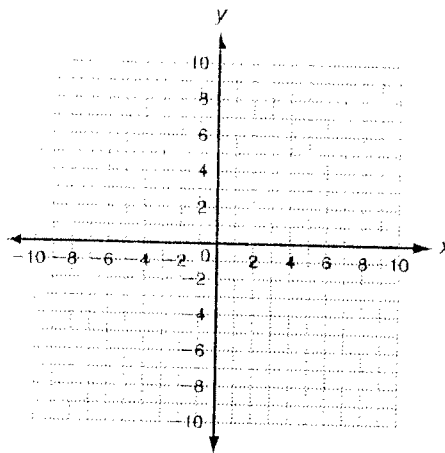
1. $y = x^2 + 4x - 4$

axis of symmetry: _____

vertex: _____

y-intercept: _____

two other points: _____



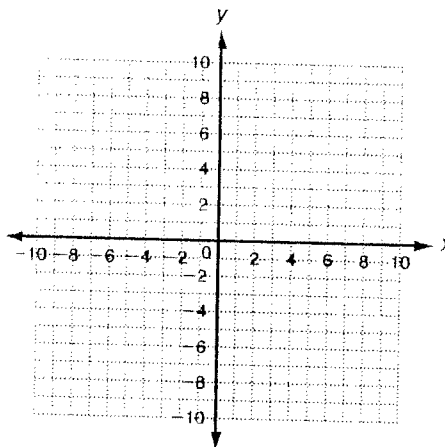
2. $y + 2x^2 - 4x - 6 = 0$

axis of symmetry: _____

vertex: _____

y-intercept: _____

two other points: _____

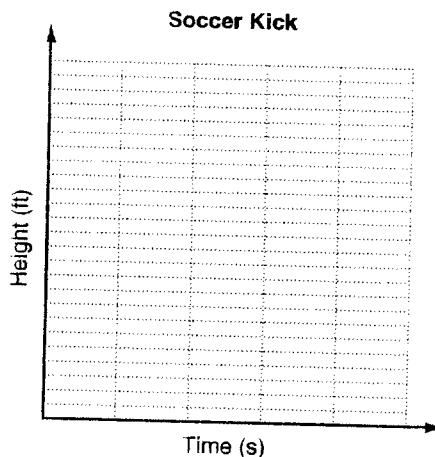


3. The height in feet of a soccer ball that is kicked can be modeled by the function $f(x) = -8x^2 + 24x$, where x is the time in seconds after it is kicked. Find the soccer ball's maximum height and the time it takes the ball to reach this height. Then find how long the soccer ball is in the air.

maximum height: _____

time to reach maximum height: _____

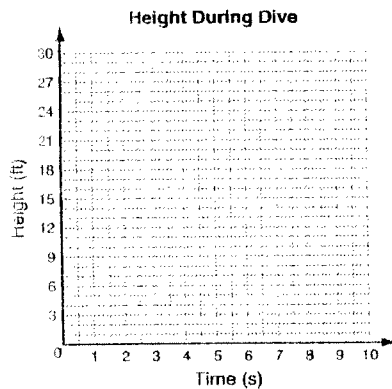
time in the air: _____



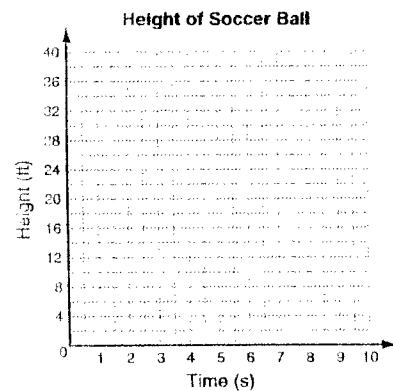
LESSON **9-3** **Problem Solving**
Graphing Quadratic Functions

Write the correct answer.

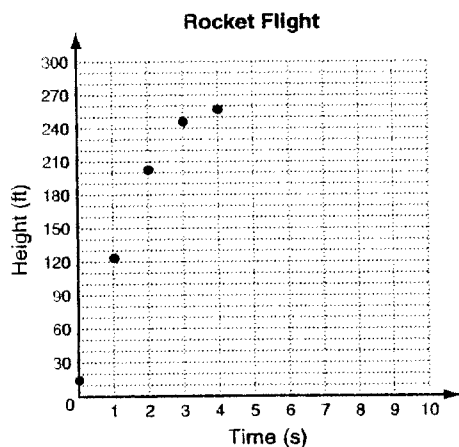
1. An Olympic diver is competing for a medal. His height in feet above the water can be modeled by the function $f(x) = -3x^2 + 6x + 24$, where x is the time in seconds after he begins the dive. Graph the function. Then find how long it takes the diver to reach the water.



2. Tanisha kicks a soccer ball during a game. The height of the ball, in feet, can be modeled by the function $f(x) = -16x^2 + 48x$, where x is the time in seconds after she kicks the ball. Graph the function. Find the maximum height of the ball and how long it takes the ball to reach that height.



A model rocket is launched from a platform into the air. Keona records its height at different times until it reaches its peak at 259 ft. Her graph of these points is shown below. Use this graph to answer questions 3-5.



4. How long will the rocket be in the air?
A 4 seconds **C** 8 seconds
B 6 seconds **D** 10 seconds

3. Keona wants to complete her graph by plotting the heights of the rocket as it descended. Which of the following points will she graph?

- F** (4, 180) **H** (6, 200)
G (5, 150) **J** (10, 0)

5. Which of the following equations models the flight of the ball where x is the time in seconds and y is the height in feet?

- A** $16x^2 + 15x + 125$
B $16x^2 + 125x + 15$
C $-16x^2 + 125x + 15$
D $-16x^2 + 15x + 125$

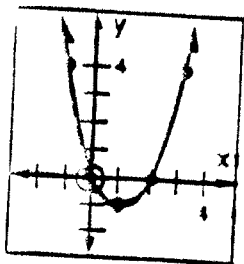
Regents Algebra: Graphing a Parabola
Homework #3

Name _____

Date _____

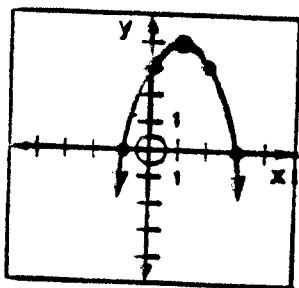
Directions: Select the choice that best answers the question. Show work where appropriate to answer the question.

1.) Which is not true for the parabola shown ?



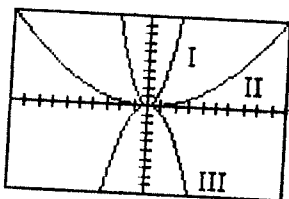
- [A] An equation of the axis of symmetry is $x = 1$.
- [B] The x-intercepts are at 0 and at 2
- [C] The equation of the parabola is $y = -x^2 + 2x$
- [D] The turning point is $(1, -1)$

2.) Which equation represents the graph shown.



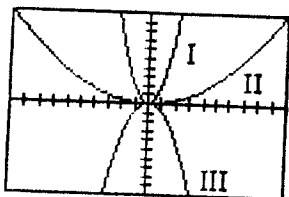
- [A] $y = x^2 - 2x + 3$
- [B] $y = x^2 - 2x - 3$
- [C] $y = -x^2 + 2x + 3$
- [D] $y = -x^2 - 2x - 3$

3) The graphs are of equations of the form $y = ax^2$. Which graph(s) shown below make the statement " $|a|$ has the least value" true?



- [A] III only
- [B] II only
- [C] I only
- [D] I and III
- [E] II and III

4) The graphs are of equations of the form $y = ax^2$. Which graph(s) shown below make the statement " $a < 0$ " true?



- [A] III only
- [B] I only
- [C] I and III
- [D] II only
- [E] II and III

5.) Which of the quadratic functions has the narrowest graph?

[A] $y = -3x^2$ [C] $y = \frac{1}{9}x^2$

[B] $y = 0.8x^2$ [D] $y = 4x^2$

6.) Which are the coordinates of the turning point of the parabola whose equation is $y = x^2 - 8x + 5$?

[A] (0, 5) [C] (8, 5)

[B] (5, 0) [D] (4, -11)

Directions: For question #7 answer all parts and show all of your work.

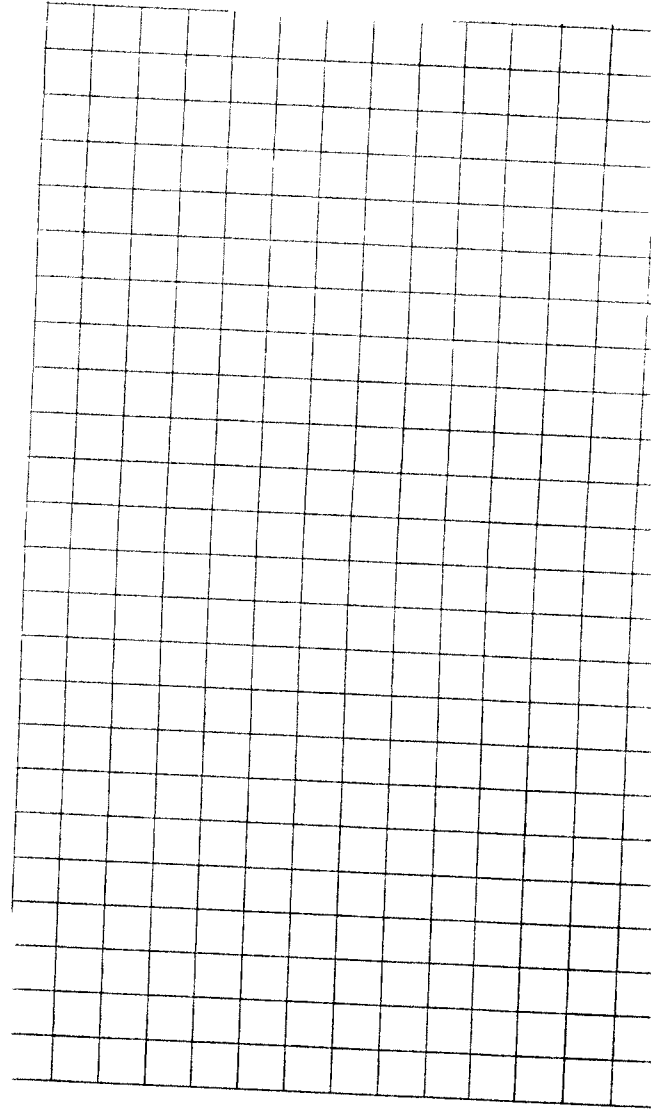
- a.) Write the equation of the axis of symmetry
- b.) Determine the coordinates of the turning point.
- c.) Tell whether the parabola will open upward or downward.
- d.) Tell whether the turning point is a maximum point or a minimum point.

7.) $y = x^2 - 3x + 2$

Directions: Answer the question below.

~~8.)~~ Without graphing, describe how the graph of $y = -5x^2$ differs from the graph of $y = x^2$

9.) a.) On graph paper, draw the graph of the equation $y = x^2 + 4x + 4$ including all values in the interval $-5 \leq x \leq 1$ (Don't forget show your table below)



b.) Write the coordinates of the turning point.

b.) _____

c.) Is this point a minimum or a maximum?

c.) _____

d.) Determine the solution set of $x^2 + 4x + 4 = 0$ (Find the roots)

d.) _____

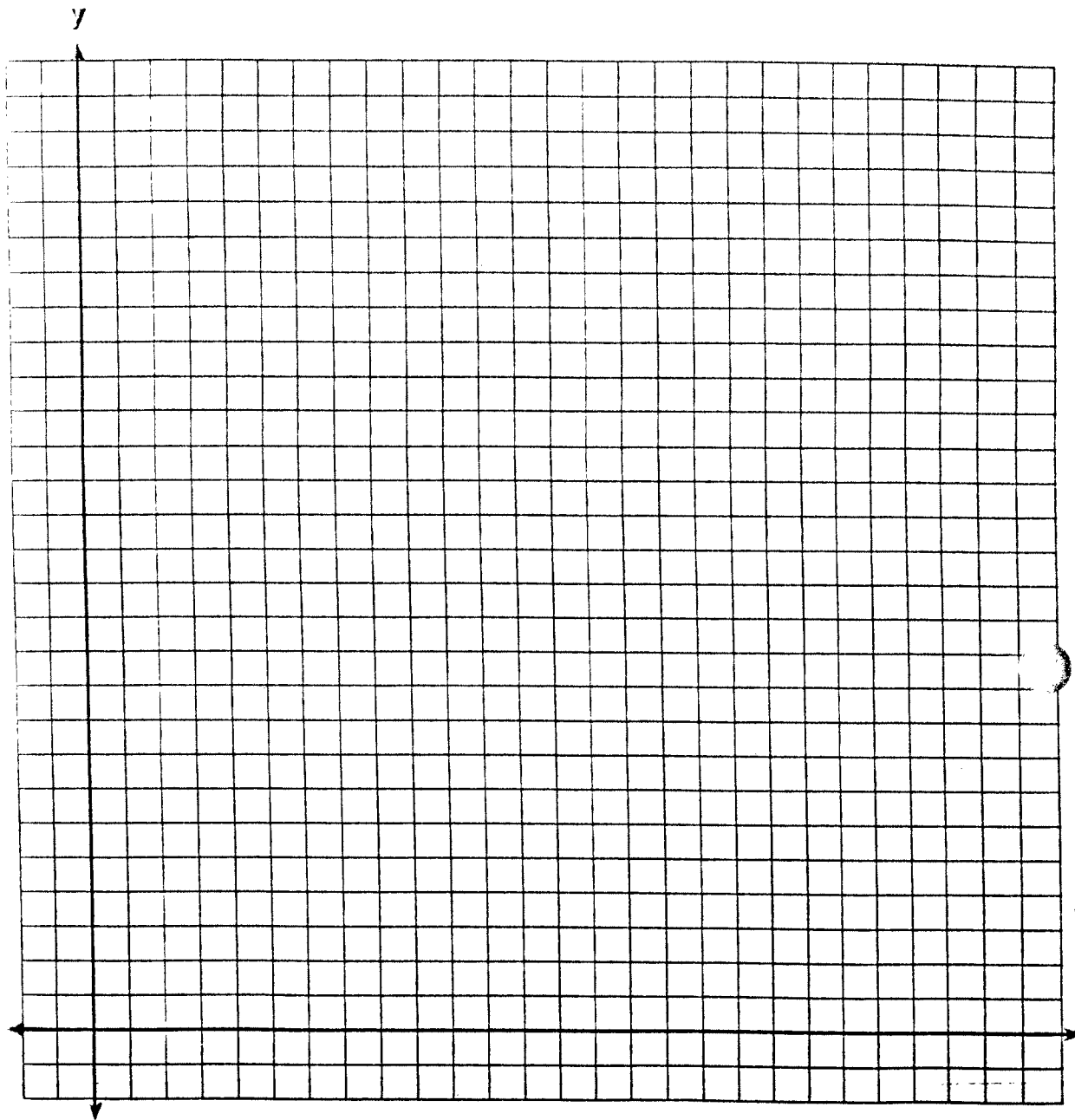
e.) Write the equation of the axis of symmetry.

e.) _____

f.) What is the minimum value of y for the equation $y = x^2 + 4x + 4$

f.) _____

- 10.) A rocket is launched from the ground and follows a parabolic path represented by the equation $y = -x^2 + 10x$. Using the accompanying set of axes, graph the equation that represents the path of the rocket, where y is the height of the rocket and x is the time in minutes.



- a.) What is the maximum height of the rocket? a.) _____
- b.) How long did it take for the rocket to reach its maximum height? b.) _____
- c.) How long did it take for the rocket to reach the ground after being launched? c.) _____

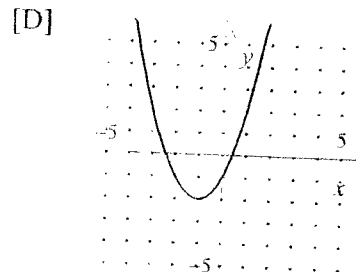
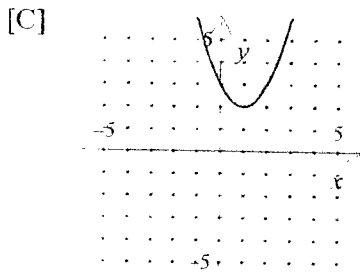
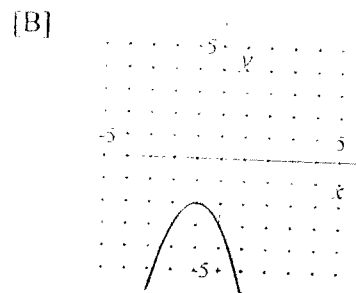
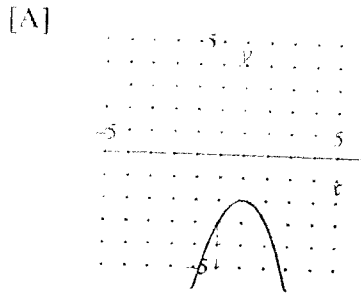
Regents Algebra: Graphing a Parabola
Homework #4

Name _____

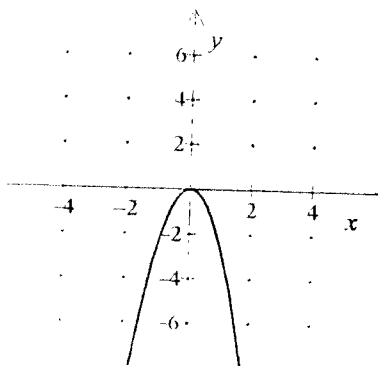
Date _____

Directions: Select the choice that best answers the question. Show work where appropriate to answer the question.

1.) Graph the parabola: $y = -(x + 1)^2 - 2$?



2.) Which quadratic function is graphed below.



[A] $y = 0.5x^2$

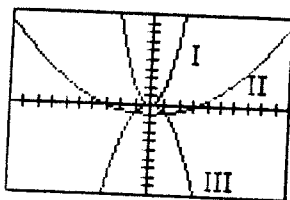
[C] $y = -2.5x^2$

[B] $y = 2.5x^2$

[D] $y = -0.5x^2$

[E] $y = -x^2$

3.) The graphs are of equations of the form $y = ax^2 + c$. Which graph(s) shown below make the statement " $c < 0$ " true?



[A] I and III

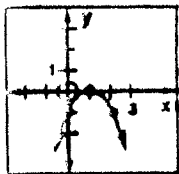
[C] I and II

[E] III only

[B] I only

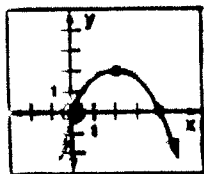
[D] II only

4.) Which is not true for the parabola shown ?



- [A] The y-intercept is -1
- [B] The x-intercept is 1
- [C] The equation of the axis of symmetry $y = 1$
- [D] The graph represents $y = -x^2 + 2x - 1$

5.) Select the equation for the parabola shown.



- [A] $y = -\frac{1}{2}x^2 + 2x$
- [B] $y = -\frac{1}{2}x^2 - 2x$
- [C] $y = \frac{1}{2}x^2 + 2x$
- [D] $y = \frac{1}{2}x^2 - 2x$

Directions: For question #7 answer all parts and show all of your work.

- a.) Write the equation of the axis of symmetry
- b.) Determine the coordinates of the turning point.
- c.) Tell whether the parabola will open upward or downward.
- d.) Tell whether the turning point is a maximum point or a minimum point.

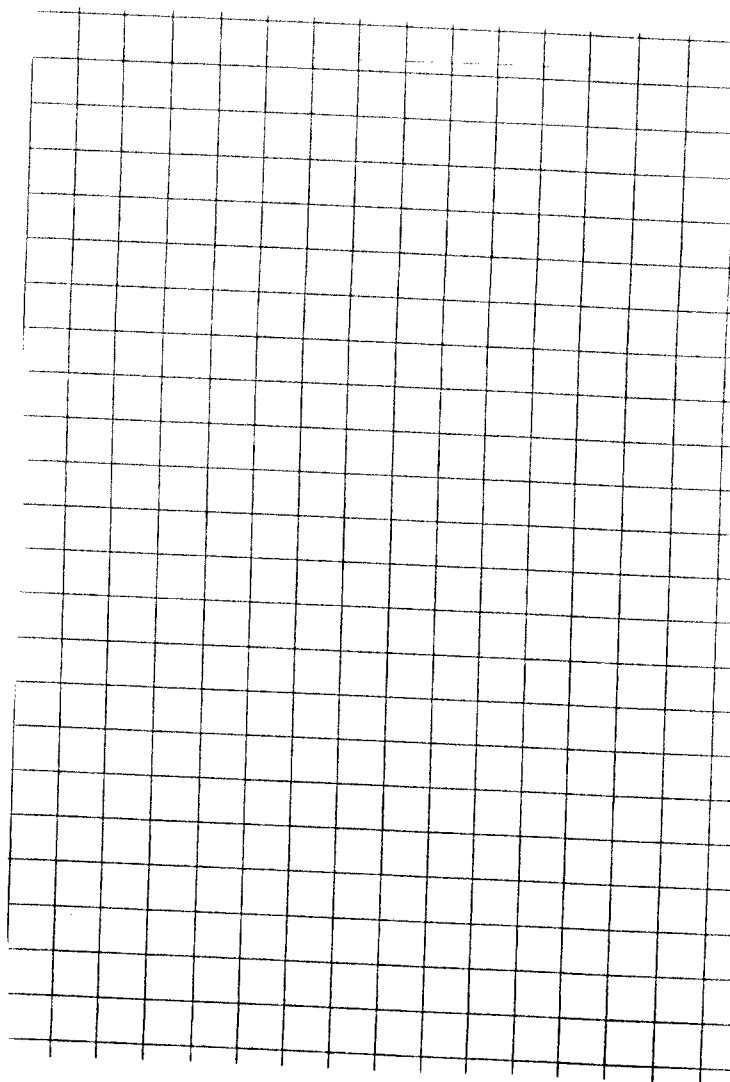
6.) $y = x^2 + 14x - 1$

Directions: Answer the question below.

~~X~~ Give an example of a quadratic function whose graph opens upward and is wider than the graph $y = x^2$

8) Give an example of a quadratic function whose graph opens downward and is wider than the graph of $y = 4x^2$

9.) a.) On graph paper, draw the graph of the equation $y = x^2 + 4x - 12$ including all values from $x = -6$ to $x = 2$ inclusive (Don't forget show your table below)



b.) Write the coordinates of the turning point.

b.) _____

c.) Is this point a minimum or a maximum?

c.) _____

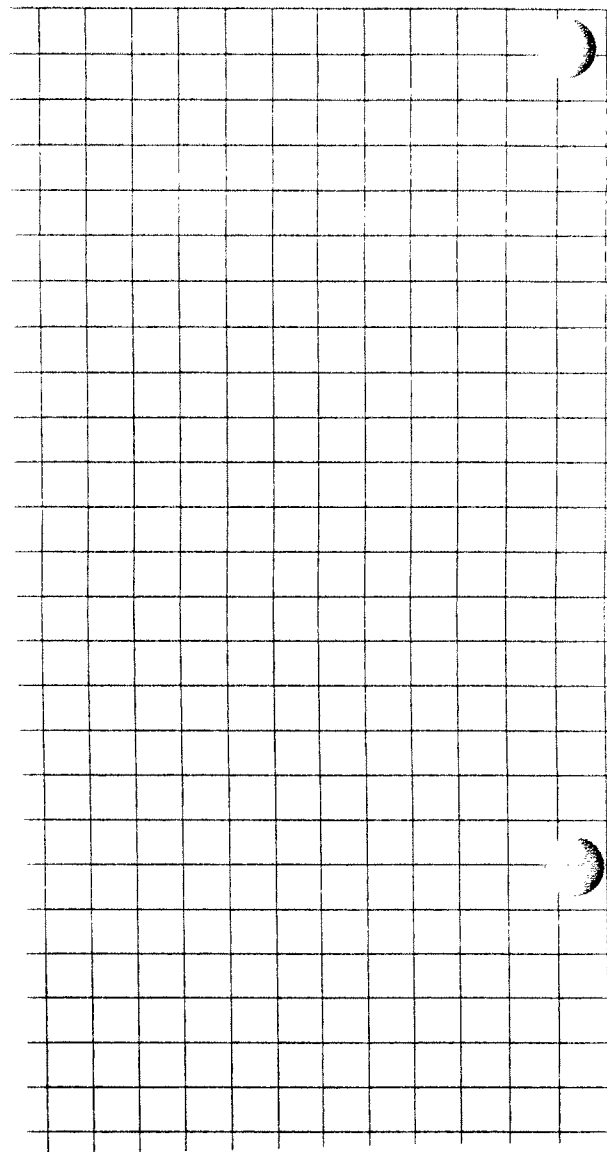
d.) Determine the solution set of $x^2 + 4x - 12 = 0$ (Find the roots)

d.) _____

e.) Write the equation of the axis of symmetry.

e.) _____

- 10.) a.) On graph paper, draw the graph of the equation $y = -x^2 + 6x - 5$
(Don't forget show your table below)



b.) Write the coordinates of the turning point.

b.) _____

c.) Is this point a minimum or a maximum?

c.) _____

d.) Determine the solution set of $-x^2 + 6x - 5 = 0$ (Find the roots)

d.) _____

e.) Write the equation of the axis of symmetry.

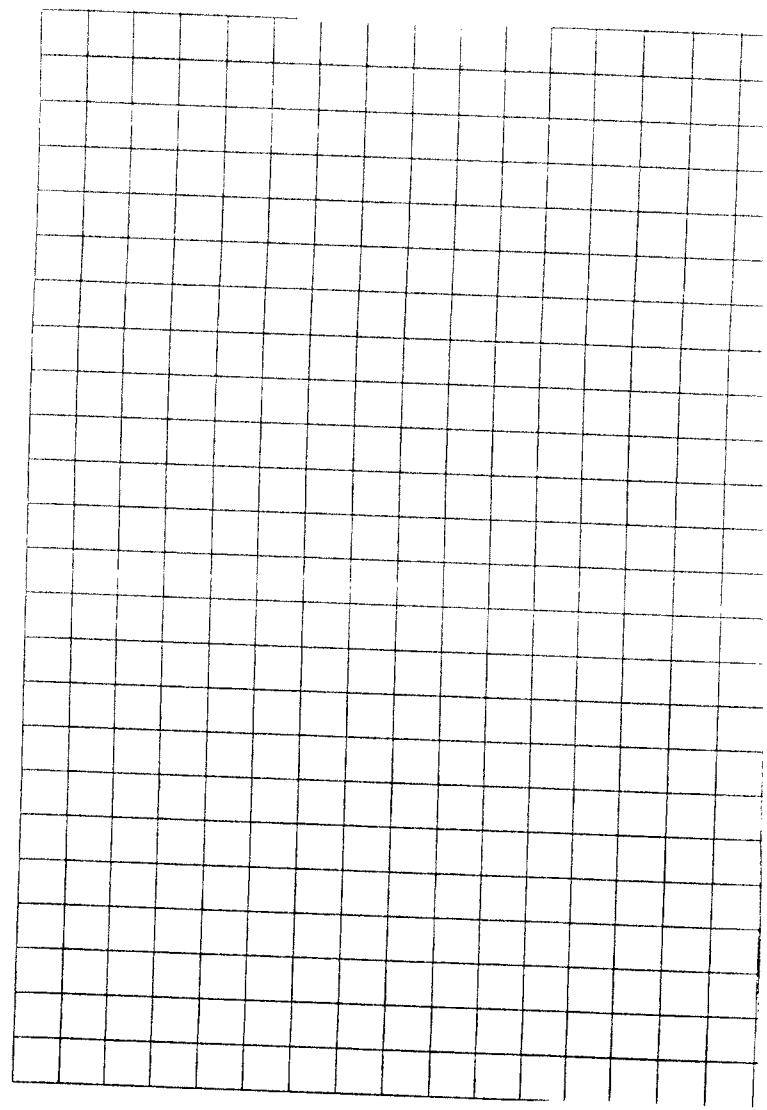
e.) _____

f.) What is the maximum value of y for the equation $y = -x^2 + 6x - 5$

f.) _____

11.) The height in feet of a soccer ball that is kicked can be modeled by the function $y = -8x^2 + 24x$, where x is the time in seconds after it is kicked. Using the accompanying set of axes, graph the equation that represents the path of the soccer ball.

(To build your table change the table so the values for x increase by .5 instead of 1. Go to 2nd, window to get to the table setup menu and change $\Delta Tbl = .5$)



- a.) What is the maximum height of the soccer ball? a.) _____
- b.) How long did it take for the soccer ball to reach its maximum height? b.) _____
- c.) How long was the ball in the air? c.) _____

LESSON **9-5** **Reteach**
Solving Quadratic Equations by Graphing (continued)

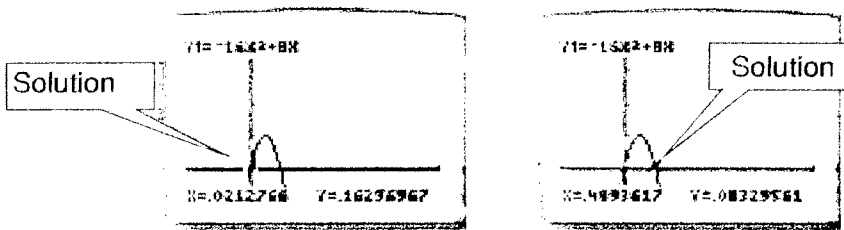
It is possible to use a graphing calculator to find the solutions of a quadratic equation. Remember that using the trace key gives an estimate of the solutions.

A dancer leaps straight into the air. The quadratic function $y = -16x^2 + 8x$ models the dancer's height above the ground after x seconds. About how long is the dancer in the air?

Step 1: Write the related function.

$$y = -16x^2 + 8x$$

Step 2: Graph the function by using a graphing calculator.



Step 3: Use trace to estimate the zeros.

The solutions appear to be 0 and 0.5.

The dancer is in the air for about 0.5 seconds.

Use your graphing calculator to estimate each answer. Check your answer by plugging it back into the quadratic equation.

4. A rocket is launched from the ground. The quadratic function $y = -16x^2 + 56x$ models the rocket's height (in feet) above the ground after x seconds. About how long is the rocket in the air? _____

5. A firework is launched from the ground. The quadratic function $y = -4.9x^2 + 120x$ models the firework's height (in meters) above the ground after x seconds. About how long is the firework in the air? _____

6. A football is kicked from the ground. The quadratic function $y = -16x^2 + 90x$ models the football's height above the ground after x seconds. About how long is the football in the air? _____

LESSON
9-6

Reteach

Solving Quadratic Equations by Factoring (continued)

Sometimes you need to factor before using the Zero Product Property.

Solve $x^2 + 4x - 5 = 0$ by factoring.

$$x^2 + 4x - 5 = 0$$

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

$$x + 5 = 0 \quad \text{or} \quad x - 1 = 0$$

$$\underline{-5} \quad \underline{-5} \qquad \qquad \underline{+1} \quad \underline{+1}$$

$$x = -5 \qquad \qquad \qquad x = 1$$

Check:

$x = -5$

$$\begin{array}{r|l} x^2 + 4x - 5 = 0 & \\ \hline (-5)^2 + 4(-5) - 5 & 0 \\ 25 - 20 - 5 & 0 \\ 0 & 0\checkmark \end{array}$$

$x = 1$

$$\begin{array}{r|l} x^2 + 4x - 5 = 0 & \\ \hline (1)^2 + 4(1) - 5 & 0 \\ 1 + 4 - 5 & 0 \\ 0 & 0\checkmark \end{array}$$

Solve $3x^2 - 12x + 12 = 0$ by factoring.

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

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

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

$$3 \neq 0 \quad \text{or} \quad x - 2 = 0$$

$$\underline{+2} \quad \underline{+2}$$

$$x = 2$$

Check:

$x = 2$

$$\begin{array}{r|l} 3x^2 - 12x + 12 = 0 & \\ \hline 3(2)^2 - 12(2) + 12 & 0 \\ 3(4) - 24 + 12 & 0 \\ 12 - 24 + 12 & 0 \\ 0 & 0\checkmark \end{array}$$

Solve each quadratic equation by factoring.

7. $x^2 + x - 12 = 0$

8. $x^2 + 10x + 25 = 0$

9. $x^2 + 7x - 8 = 0$

10. $x^2 - 49 = 0$

11. $4x^2 + 25x = 0$

12. $5x^2 - 15x - 50 = 0$

13. $x^2 + 10x + 21 = 0$

14. $4 - x^2 = 0$

15. $3x^2 - 6x - 9 = 0$

Solving Quadratic Equations by Factoring:

A. Procedure:

1. Rewrite the equation in standard form: $ax^2 + bx + c = 0$
 - Equation is set equal to zero
 - All terms are arranged in order based on their exponents (largest \rightarrow smallest)
2. Factor the polynomial using the methods of factoring:
 - Greatest Common Factor
 - Difference of Two Perfect Squares
 - Quadratic Trinomial
3. Set each factor equal to zero and solve the equations

B. Examples: Solve the following equations. Show all of your work.

#1.) $x^2 + 5x - 24 = 0$

#2.) $x^2 - 2x = 8$

#3.) $x(x + 2) = 7x$

#4.) $(x + 4)(x - 7) = -3(x + 4)$

LESSON

Practice B

9-6

Solving Quadratic Equations by Factoring

Use the Zero Product Property to solve each equation. Check your answers.

~~$(x-1)(x-5) = 0$~~
 ~~$x-1 = 0$~~ or ~~$x-5 = 0$~~
 ~~$x = 1$~~ or ~~$x = 5$~~

~~$(2x+1)(x-9) = 0$~~
 ~~$2x+1 = 0$~~ or ~~$x-9 = 0$~~
 ~~$x = -\frac{1}{2}$~~ or ~~$x = 9$~~

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

4. $(2x+1)(x-6) = 0$

Solve each quadratic equation by factoring.

5. $x^2 - 3x = 0$

6. $x^2 + 4x + 3 = 0$

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

11. $x^2 - 4x - 12 = 0$

12. $x^2 + 11x + 10 = 0$

13. $x^2 + 12x + 35 = 0$

17. $x^2 - 14 = 5x$

18. $x^2 + 10x = -21$

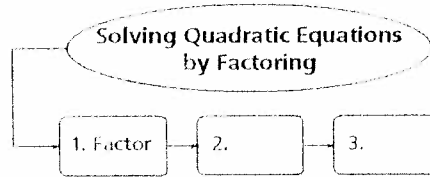
19. $x^2 = 5x$

23. The height of a flare fired from the deck of a ship in distress can be modeled by $h = -16t^2 + 104t + 56$, where h is the height of the flare above water and t is the time in seconds. Find the time it takes the flare to hit the water.

THINK AND DISCUSS

1. Explain two ways to solve $x^2 + x - 6 = 0$. How are these two methods similar?
2. For the quadratic equation $0 = (x + 2)(x - 6)$, what are the x -intercepts of the related function?
3. **GET ORGANIZED** Copy and complete the graphic organizer. In each box, write a step used to solve a quadratic equation by factoring.

Now!
Note



9-6

Exercises

go.hrw.com

Homework Help Online

KEYWORD: MA7 9-6

Parent Resources Online

KEYWORD: MA7 Parent

GUIDED PRACTICE

- SEE EXAMPLE 1 Use the Zero Product Property to solve each equation. Check your answer.
p. 630
1. $(x + 2)(x - 8) = 0$
 2. $(x - 6)(x - 5) = 0$
 3. $(x + 7)(x + 9) = 0$
 4. $(x)(x - 1) = 0$
 5. $(x)(x + 11) = 0$
 6. $(3x + 2)(4x - 1) = 0$
- SEE EXAMPLE 2 Solve each quadratic equation by factoring. Check your answer.
p. 631
7. $x^2 + 4x - 12 = 0$
 8. $x^2 - 8x - 9 = 0$
 9. $x^2 - 5x + 6 = 0$
 10. $x^2 - 3x = 10$
 11. $x^2 + 10x = -16$
 12. $x^2 + 2x = 15$
 13. $x^2 - 8x + 16 = 0$
 14. $-3x^2 = 18x + 27$
 15. $x^2 + 36 = 12x$
 16. $x^2 + 14x + 49 = 0$
 17. $x^2 - 16x + 64 = 0$
 18. $2x^2 + 6x = -18$
- SEE EXAMPLE 3 **19. Games** A group of friends tries to keep a beanbag from touching the ground without using their hands. Once the beanbag has been kicked, its height can be modeled by $h = -16t^2 + 14t + 2$, where h is the height in feet above the ground and t is the time in seconds. Find the time it takes the beanbag to reach the ground.

PRACTICE AND PROBLEM SOLVING

Independent Practice

For Exercises	See Example
20–25	1
26–31	2
32	3

Use the Zero Product Property to solve each equation. Check your answer.

20. $(x - 8)(x + 6) = 0$
21. $(x + 4)(x + 7) = 0$
22. $(x - 2)(x - 5) = 0$
23. $(x - 9)(x) = 0$
24. $(x)(x + 25) = 0$
25. $(2x + 1)(3x - 1) = 0$

Solve each quadratic equation by factoring. Check your answer.

26. $x^2 + 8x + 15 = 0$
27. $x^2 - 2x - 8 = 0$
28. $x^2 - 4x + 3 = 0$
29. $x^2 + 10x + 25 = 0$
30. $x^2 - x = 12$
31. $-x^2 = 4x + 4$

Extra Practice

Skills Practice p. S21

Application Practice p. S36

Regents Algebra: Assignment
Solving Quadratic Equations #1

Name _____

Date _____

Directions: Solve each of the following equations by factoring:

1.) $m^2 - 3m = 0$

2.) $9x^2 - 25 = 0$

3.) $y^2 + y - 20 = 0$

4.) $x^2 - 4x = 60$

5.) $x^2 + 5x = 40 - x$

6.) $x(x + 3) = 40$

$$7.) x(2x + 7) = 3x$$

$$8.) (2x + 7)(x - 3) = x(x - 3)$$

$$9.) (x + 2)(x - 5) = 2(2x - 1)$$

$$10.) (x + 4)^2 = 10(x + 2) - 2(x - 6)$$

Regents Algebra: Assignment
Solving Quadratic Equations #3

Name _____

Date _____

Directions: Solve each of the following equations by factoring:

1.) $n^2 - 7n + 12 = 0$

2.) $16w^2 - 9 = 0$

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

4.) $x^2 + 14 = -9x$

5.) $k(k - 5) = -6$

6.) $2x^2 + 10x - 12 = 0$

7.) $2y(y - 3) = y^2 + 27$

8.) $(c + 5)(c - 2) = c(-c - 7) + 18$

Regents Algebra: Notes
Solving Verbal Problems Involving
Quadratic Equations

Name _____

Date _____

Procedure:

- Using one variable and the relationships stated in the problem, represent all quantities to be found with “let” statements.
- Write an equation by translating from the words in the problem to mathematical symbols.
- Solve the resulting equation.
- Answer in a sentence.

Exercises: Solve each problem algebraically.

1.) Twenty less than the square of a positive number is the number.

2.) Find three consecutive positive integers such that the square of the largest decreased by four times the second equals the first integer.

3.) The length of a rectangle is 2 more than the width. If the area of the rectangle is 24, find the dimensions of the rectangle.

4.) If the length of one side of a square is doubled and the length of an adjacent side is decreased by 3, the area of the resulting rectangle exceeds the area of the original square by 16. Find the length of a side of the original square.

Regents Algebra: Assignment #1
Solving Verbal Problems
Involving Quadratics

Name _____

Date _____

Directions: On your own paper, solve each problem algebraically. Show all work.

- 1.) The square of a positive integer is increased by $\frac{1}{4}$ the result is 15 times the number. Find the number.
- 2.) The product of two positive numbers is 48. The larger number is 13 more than the smaller. Find both numbers.
- 3.) Find two consecutive integers such that the square of the larger diminished by five times the smaller is equal to 71.
- 4.) Find three consecutive positive odd integers such that the product of the two smaller exceeds the largest by 8.
- 5.) One orchard has 160 trees planted in rows, the same number of trees in each row. If the number of rows is 6 less than the number of trees in a row, find the number of rows.
- 6.) The length of a rectangle is 6 more than the width. If the area of the rectangle is 55, find the dimensions of the rectangle.
- 7.) The side of a certain square is 3 feet longer than that of another square. The sum of their areas is 117 square feet. Find the length of a side of the smaller square.

Projectile Motion Comparison

Name _____

Grab your graphing calculator!

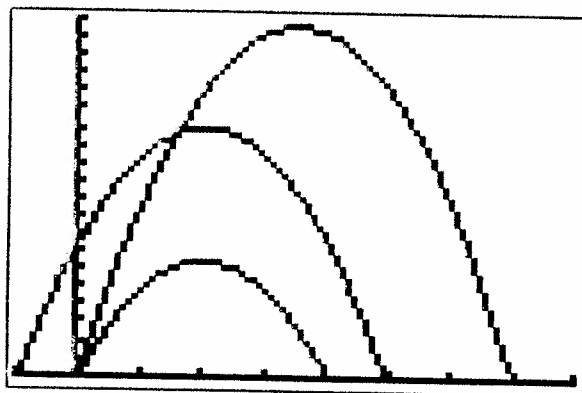
Projectile motion (in feet) is modeled by the equation: $h = -16t^2 + v_0t + h_0$
 where h = height of the projectile, t = time, v_0 = initial velocity, h_0 = initial height

Graph the following functions on your graphing calculator. Adjust the WINDOW so you clearly see all three graphs.

$$h = -16t^2 + 112t$$

$$h = -16t^2 + 64t$$

$$h = -16t^2 + 64t + 75$$



These three graphs depict projectile motion created by a football player, a little league baseball player, and a tennis pro. The units being used are feet and seconds. Based upon the descriptions below, and your observations of the graphs, match each graph with the athlete that created it. Draw lines showing the connections.

1. Match:

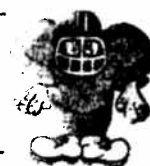
$$h = -16t^2 + 112t$$

A little league baseball player throws a baseball straight upward.



$$h = -16t^2 + 64t$$

A football player, standing atop the school building, throws a football straight upward.



$$h = -16t^2 + 64t + 75$$

A tennis pro fires a shot straight upward.



2. On each graph, what does the x -axis represent? _____

What does the y -axis represent? _____

In the following questions, if necessary, round answers to the nearest tenth.

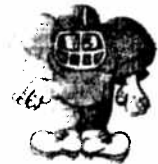
3. Regarding the little league baseball player:

- a. What was the initial velocity with which he threw the baseball? _____
- b. What was the initial height of the baseball? _____
- c. What was the maximum height reached by the baseball? _____
- d. For what length of time was the baseball in the air? _____
- e. After 3 seconds, what was the height of the baseball? _____



4. Regarding the football player:

- a. How tall was the school building upon which the football player was standing? _____
- b. What was the initial velocity of the football? _____
- c. What was the initial height of the football? _____
- d. What was the maximum height reached by the football? _____
- e. After how many seconds did the football reach its maximum height? _____
- f. After how many seconds did the football hit the ground? _____



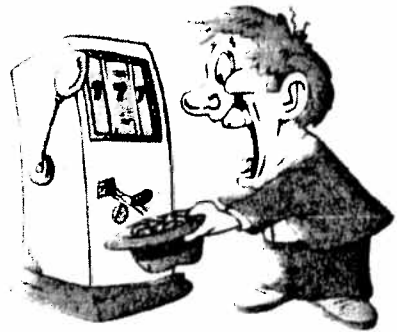
5. Regarding the tennis pro:

- a. What was the initial velocity with which he fired the tennis ball? _____
- b. What was the initial height of the tennis ball? _____
- c. What was the maximum height reached by the tennis ball? _____
- d. After how many seconds did the tennis ball reach its maximum height? _____
- e. For what length of time was the tennis ball in the air? _____



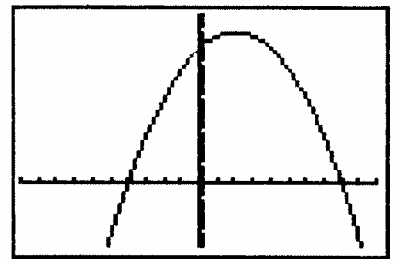
QuadSlot Game

"Let Go of that Eggo" Game Series



Place the chips in ascending numerical order in the ice cube tray "slots" starting with slot number 1.

1. The roots of the equation $x^2 - 12x + 27 = 0$ are _____.
If the answer is 9 and 3, switch Slot[12] with Slot[2].
If the answer is -9 and -3, switch Slot[12] with Slot[4].
2. Graphically, the roots of the equation $x^2 - x - 6 = 0$ can be found on the _____.
If the answer is x -axis, switch Slot[3] with Slot[8].
If the answer is y -axis, switch Slot[3] with Slot[9].
3. The roots of the equation $x^2 = 16$ are _____.
If the answer is ± 4 , switch Slot[4] with Slot[6].
If the answer is ± 8 , switch Slot[6] with Slot[13].
4. The equation $x^2 + 9 = 0$ has _____.
If the answer is 2 real roots, switch Slot[8] with Slot[10].
If the answer is no real roots, switch Slot[8] with Slot[6].
5. The parabola shown at the right has an axis of symmetry of $x = 0$ _____.
If this statement is true, switch Slot[10] with Slot[1].
If this statement is false, switch Slot[7] with Slot[5].
6. The formula for finding the axis of symmetry in a parabola is _____.
If the answer is $\frac{b}{2a}$, switch Slot[14] with Slot[8].
If the answer is $-\frac{b}{2a}$, switch Slot[9] with Slot[10].



□ 7. The coordinates of the vertex of $y = 5x^2 + 10x + 7$ are _____.

If the answer is $(1, 22)$, switch Slot[12] with Slot[2].

If the answer is $(-1, 2)$, switch Slot[3] with Slot[12].

□ 8. The height that a baby kangaroo can jump is modeled by the equation

$h = -0.4d^2 + 2d$, where h is height (in feet) and d is horizontal distance (in feet). _____.

What is the maximum height this baby kangaroo can jump?

If the answer is 4.5 feet, switch Slot[1] with Slot[11].

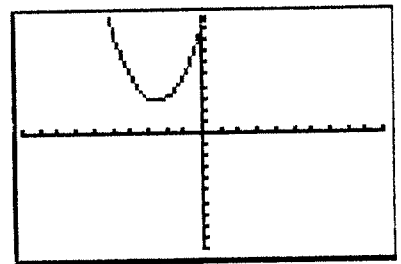
If the answer is 2.5 feet, switch Slot[1] with Slot[9].

□ 9. By examining the graph at the right, we know that there

is/are _____ for this parabola.

If the answer is 1 root, switch Slot[14] with Slot[5].

If the answer is no roots, switch Slot[6] with Slot[5].



□ 10. The roots of the equation $x^2 - 6x + 9 = 0$ are _____.

If the answer is -3 and 3, switch Slot[7] with Slot[3].

If the answer is 3 repeated, switch Slot[7] with Slot[10];

□ 11. The graph $y = x^2 + 2$ intercepts the y-axis at the point _____.

If the answer is $(0, 0)$, switch Slot[12] with Slot[6].

If the answer is $(0, 2)$, switch Slot[12] with Slot[1].

□ 12. The roots of the equation $25x^2 - 36 = 0$ are _____.

If the answer is $\frac{\pm 6}{5}$, switch Slot[2] with Slot[3].

If the answer is $\frac{\pm 36}{25}$, switch Slot[9] with Slot[2].

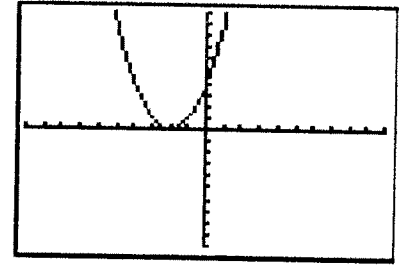
□ 13. The solution to the equation $2x^2 = 8$ is _____.

If the answer is ± 2 , switch Slot[7] with Slot[10].

If the answer is ± 4 , switch Slot[4] with Slot[8].

- 14. By examining the graph at the right, we know that there is/are _____ for this parabola

If the answer is 1 root, switch Slot[12] with Slot[1].
 If the answer is no roots, switch Slot[12] with Slot[10].



- 15. What is the missing value in the following table representing a parabola? _____

x	-3	-2	-1	0	1	2	3
y	10	5	2	1	2		10

If the answer is 2, switch Slot[6] with Slot[11].
 If the answer is 5, switch Slot[7] with Slot[2].

- 16. The quadratic equation $x^2 - 19x - 20 = 0$ can be factored as _____.

If the answer is $(x - 20)(x + 1) = 0$, switch Slot[9] with Slot[5].

If the answer is $(x - 5)(x + 4) = 0$, switch Slot[4] with Slot[8].

- 17. The equation $2x(x + 1) = 7x - 2$ written in standard quadratic form is _____.

If the answer is $2x^2 + 9x - 2 = 0$, switch Slot[10] with Slot[7].

If the answer is $2x^2 - 5x + 2 = 0$, switch Slot[8] with Slot[1].

- 18. The roots of the equation $x(x - 2) = 3(x + 8)$ are _____.

If the answer is 2 and -8, switch Slot[6] with Slot[2].

If the answer is -3 and 8, switch Slot[9] with Slot[12].

- 19. The ^{axis of} symmetry of the graph $y = -x^2 - 2x - 5$ is _____.

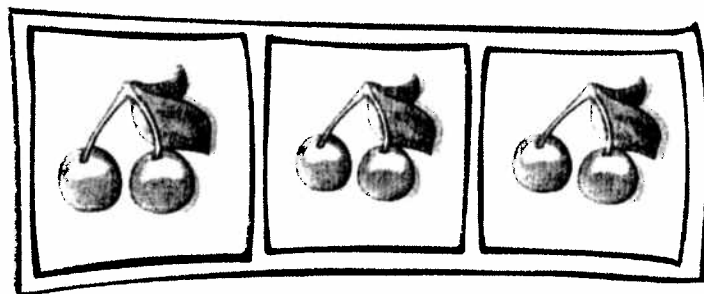
If the answer is 1, switch Slot[12] with Slot[4].

If the answer is -1, switch Slot[12] with Slot[3].

- 20. The **sum** of the roots of the equation $2x^2 + 6x = -4$ is _____.

If the answer is -1, switch Slot[3] with Slot[9].

If the answer is -3, switch Slot[3] with Slot[8].



SUBMIT your QuadSlot answers

Copy the entries from your QuadSlot tray into the boxes below. Tear off the second copy and hand it in as your submission for class credit and possible BONUS credit.

1	2	3	4	5	6	7
14	13	12	11	10	9	8

Be sure to keep a copy of your answers so that you can see if you are a winner!!!!

Names _____

1	2	3	4	5	6	7
14	13	12	11	10	9	8

Name: _____ Class: _____ Date: _____

REVIEW - Chapter 9: Skills Practice

Tell whether each function is quadratic. Explain.

1. $y + 4x^2 = 2x - 3$

2. $4x - y = 3$

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

Tell whether the graph of each quadratic function opens upward or downward, and if the vertex is a maximum or minimum point.

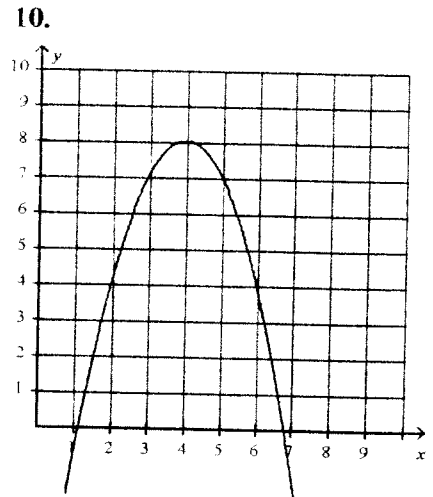
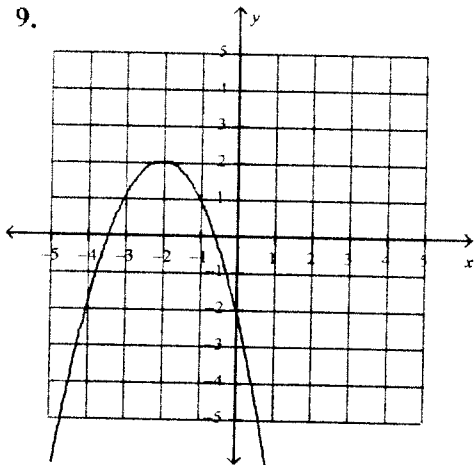
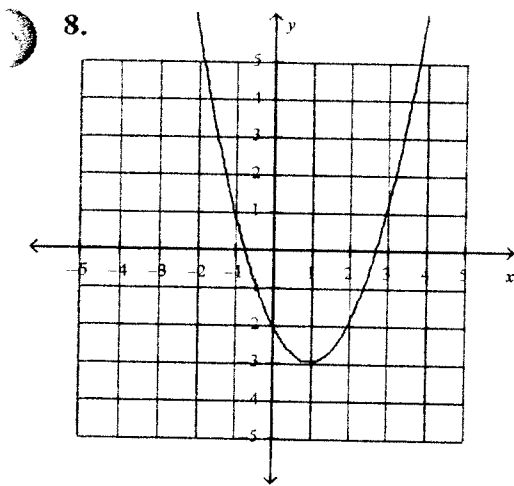
4. $y = -3x^2$ _____ / _____

6. $y = x^2 + 2$ _____ / _____

5. $y = .5x^2$ _____ / _____

7. $y = -4x^2 + 2x$ _____ / _____

Identify the vertex of each parabola. Then find the Domain and Range.



Vertex: _____

Vertex: _____

Vertex: _____

D: _____

D: _____

D: _____

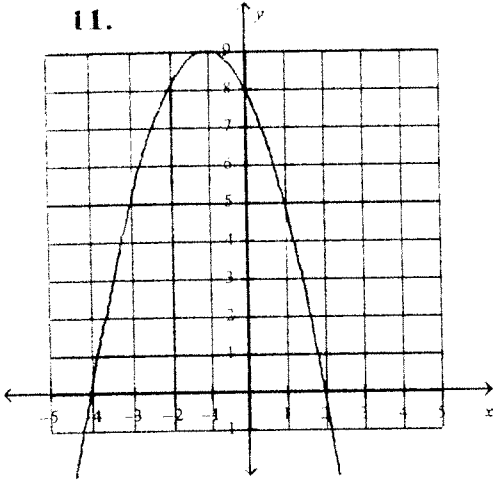
R: _____

R: _____

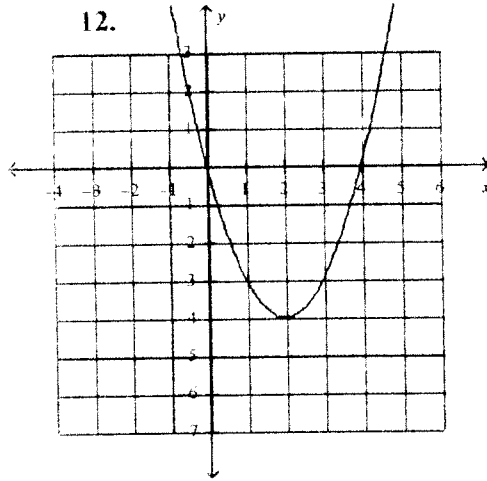
R: _____

Find the zeros of each quadratic function and the axis of symmetry of each parabola from the graph.

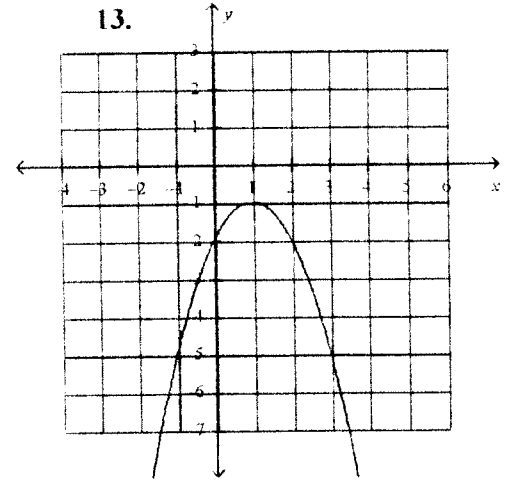
11.



12.



13.



For each quadratic function, find the vertex of its graph.

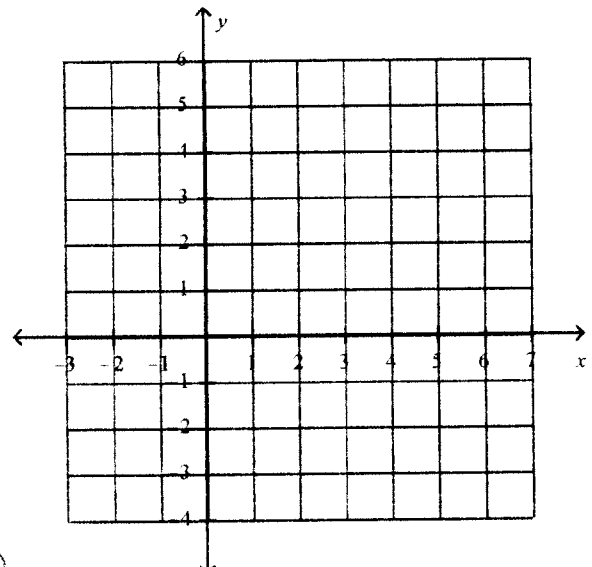
14. $y = 3x^2 - 6x + 2$

15. $y = -2x^2 + 8x - 3$

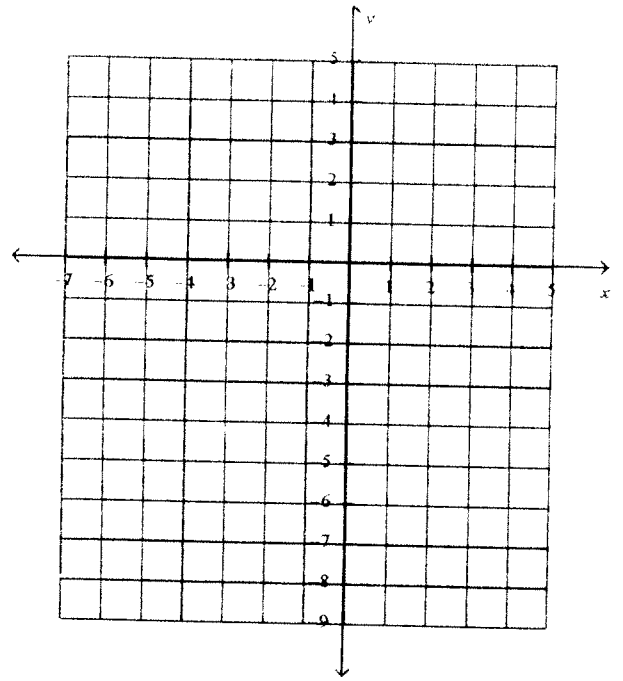
16. $y = x^2 + 2x - 4$

Graph each quadratic function.

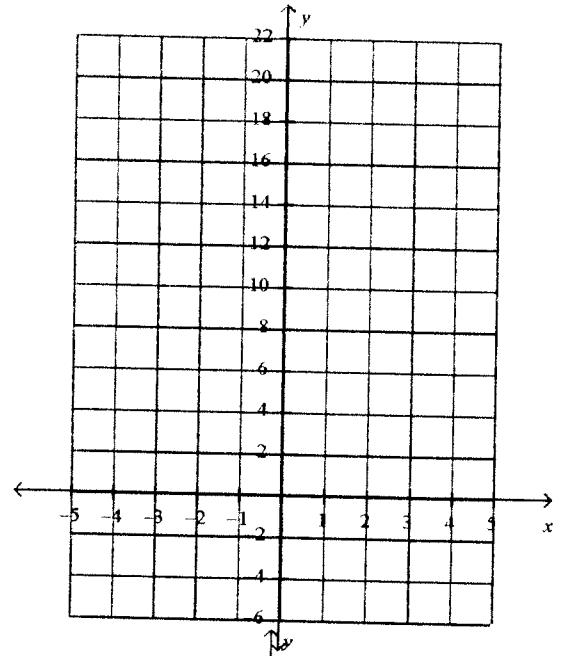
17. $y = x^2 - 4x + 1; -1 \leq x \leq 5$



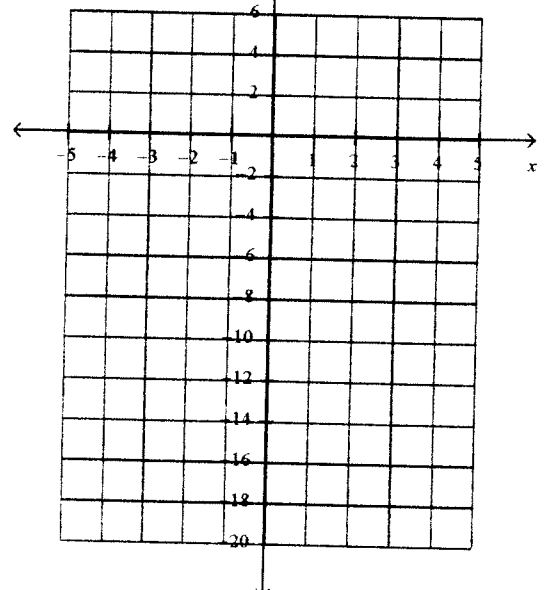
18. $y = -x^2 + 2x + 2$



19. $y - 2 = 2x^2$



20. $y + 3x^2 = 3x - 1$



Order the functions from narrowest to widest.

21. $f(x) = 2x^2$, $g(x) = -4x^2$, $h(x) = .25x^2$

22. $f(x) = 3x^2$, $g(x) = .5x^2$, $h(x) = -2x^2$

Solve each quadratic equation by using your calculator to find the solutions. [2nd TRACE; 2]

23. $y = x^2 - x - 2$

25. $y = x^2 - 4$

24. $y = 2x^2 + 9x + 4$

26. $y = -3x^2 - 2$

Use the zero product property to solve each equation.

27. $(x + 3)(x - 2) = 0$

28. $(2x + 6)(x - 2) = 0$

Solve each quadratic equation by factoring.

29. $x^2 + 5x + 6 = 0$

30. $x^2 - 169 = 0$

31. $x^2 + 4x - 12 = 0$

32. $4x^2 - 121 = 0$

33. $x^2 = 6x - 9$

34. $x^2 + 2x = -1$

35. $3x^2 = 3x + 6$

36. $4x^2 = 196$

37. One number is 10 more than another. If the product of the two numbers is -21, find the numbers.

38. The area of a rectangular playground enclosure is 500 square meters. The length of the playground is 5 meters longer than the width. Find the dimensions of the playground in meters.

Name _____

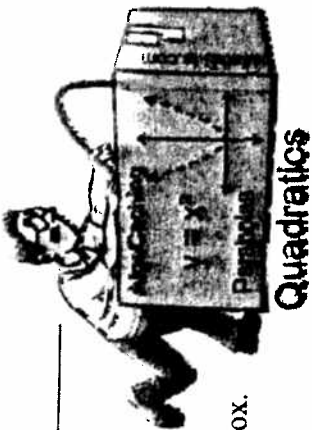
AlgeCaching Topic Series

ANSWER Sheet – Quadratics

Show all work on this paper.

There is a printable "Certificate"

available when you find the last box.



Quadratics

Box 1:

1. Which equations are quadratic equations?

I. $x^2 + 4 = 7x$

II. $3x - 1 = 0$

III. $4x^2 - 5x = 0$

1) I only

2) I and II only

3) I and III only

4) none of above

2.

Which numbered choice describes the roots of the equation

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

1) no positive roots

2) one positive & one negative root

3) two positive roots

4) impossible to tell

3.

Which numbered choice is the solution set to the equation

$$x^2 + 2x - 35 = 0?$$

1) $\{-35, 2\}$

2) $\{-5, 7\}$

3) $\{-7, 5\}$

4) $\{-2, 35\}$

Box 2:

1.

2.

3.

4.

Box 3:

1.

2.

3.

65

Box 4:

- 1.
- 2.
- 3.
- 4.

Box 5:

- 1.
- 2.
- 3.
- 4.

Box 6:

- 1.
- 2.
- 3.
- 4.

Box 7: Complete this URL of the winning box!

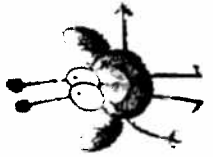
http://AlgebraBits.com/Games/Q_____ .html

Remember that there is a printable "Certificate".

Techno Quadratics

Find the answer to each clue. The clues are listed in alphabetic order. Then find your answer in the word search puzzle.

1. A polynomial with two unlike terms. (8)
2. A number in front of a variable. (11)
3. The equation $x^3 - 2x^2 - 8x = 0$ is called a _____ equation. (5)
4. A quadratic equation has a _____ of two. (6)
5. The parabola $y = -x^2$ opens _____. (4)
6. $x^2 + 5x + 6$ is an expression but $x^2 + 5x + 6 = 0$ is an _____. (8)
7. $(x + 3)$ is a _____ of $x^2 + 5x + 6$. (6)
8. A number from $\{ \dots, -2, -1, 0, 1, 2, \dots \}$ is called an _____. (7)
9. Each real root of a quadratic equation will be an x -_____. (9)
10. In $x^2 + 2x + 3x + 6$, you should combine the (2 words) _____. (9)
11. The largest y -value reached by a parabola. (7)
12. The smallest y -value reached by a parabola. (7)
13. The graph of $y = x^2 - x - 6$. (8)
14. An equation which has a degree of two. (9)
15. The solutions to a quadratic equation are called its _____. (5)
16. Another name for the answers to a quadratic equation. (9)
17. $x^2 + 5x + 6 = 0$ is written in _____ form. (8)
18. A line of symmetry in a parabola is its axis of _____. (8)
19. A polynomial with three unlike terms is called a _____. (9)
20. The maximum/minimum values of a parabola are also called its _____ points. (7)
21. A symbol, usually a letter, representing an unknown value. (8)
22. The turning point of a parabola is also known as its _____. (6)



The number at the end of each clue is the number of letters in the answer.

The word search grid contains the following words highlighted in red:

- Vertical: C O O E F F I C I E N T
- Vertical: Y X W E D A Y F B R E M E R V
- Vertical: M U M I N I X M E U S J Y M
- Vertical: V E R Q V E R C C R O R D A N S W O U M J N O P E R S A
- Vertical: A G J C C R S E A N S U N G Y T U L
- Vertical: F A C T O R S E A N S U N G Y T U L
- Vertical: F M B C C R O M I A L W Q N M W I
- Vertical: I T R I N G J N W E Z H O U M W I
- Vertical: C N D B E J N O M I A L P S D N
- Vertical: I V S U N G J V U M I A L P S D N
- Vertical: E L F C B I N O P E R S E E A
- Vertical: N T T F T C F X P T V T V
- Vertical: C T T F T C F X P T V T V
- Vertical: K T V H E W Q R I A L O B A R A P A R R K A
- Vertical: G E B U K J E A C Z K I C G C G I O B S Q F
- Vertical: F Y F R A R T B C C I T A R D A U Q L O J F M T
- Vertical: R A Z G G N L J N N S T A N D A R D G T G H W C
- Vertical: I G J I E Q U A T I O N F F F W Z Y S S K C

