

## 7.3 Modeling with Quadratic Equations

M. Goodroe - Quantitative Skills and Reasoning

### Key Terms:

Quadratic Equation

Quadratic Formula

Discriminant

Vertex

Parabola

Name: \_\_\_\_\_

**SHORT ANSWER.** Write the word or phrase that best completes each statement or answers the question.

Solve the quadratic equation.

1)  $x^2 + 12x + 36 = 0$

2)  $9y^2 + 12y + 4 = 0$

3)  $5x^2 - 9x - 2 = 0$

Find the vertex of the quadratic equation's graph and determine whether the graph opens up or down.

4)  $y = x^2 + 3x + 6$

5)  $y = -x^2 + 4x - 12$

6)  $y = -2x^2 + 3x - 12$

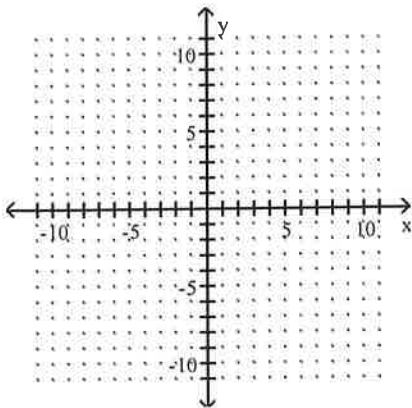
Find the x-intercepts and y-intercept of the graph of the given quadratic equation.

7)  $y = x^2 + 7x + 10$

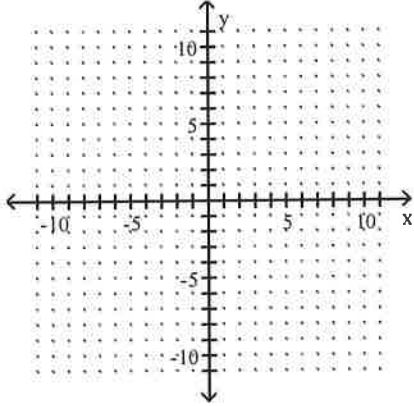
8)  $y = -x^2 + 15x - 56$

Graph.

9)  $y = x^2 + 2x - 6$



10)  $y = -x^2 + 2x + 2$



**Solve the problem.**

- 11) A projectile is thrown upward so that its distance, in feet, above the ground after  $t$  seconds is  $h = -16t^2 + 608t$ . What is its maximum height?
  
- 12) A projectile is thrown upward so that its distance above the ground after  $t$  seconds is  $h = -16t^2 + 608t$ . After how many seconds does it reach its maximum height?
  
- 13) Bob owns a watch repair shop. He has found that the cost of operating his shop is given by  $c = 2x^2 - 116x + 63$ , where  $c$  is the cost in dollars, and  $x$  is the number of watches repaired. How many watches must he repair to have the lowest cost?
  
- 14) John owns a hotdog stand. His profit is represented by the equation  $P = -x^2 + 10x + 31$ , with  $P$  being profits and  $x$  the number of hotdogs. What is the most he can earn?