Normally the coordinates of the vertex are (x,y) but we don't always use these variables in an equation.

A ball is shot into the air from the top of a 20 foot building with an initial velocity of 112 ft/sec. The following equation models the height of the ball as a function of time:

$$h(t) = -16t^2 + 112t + 20$$

What letters would represent the coordinates of the vertex?

$$t \quad \underline{(?,?)} \quad h \to \text{height depends on time}$$

The vertex of a parabola is either the Maximum or the Minimum of the function.

A ball is shot into the air from the top of a 20 foot building with an initial velocity of 112 ft/sec. The following equation models the height of the ball as a fu

$$h(t) = -16t^2 + 112t + 20$$

Is the vertex of this Quadratic a (Maximum) or a Minimum?

a is neg

$$h(t) = -16t^2 + 112t + 20$$

This is the key word. It tells us we are looking for the VERTEX

Find the time it takes to get to the maximum height.

3.5 sec

$$\frac{-b}{2a} = \frac{-112}{-32} = 3.5$$

Find the ball's maximum height.

216 ft

$$h(3.5) = -16(3.5)^2 + 112(3.5) + 20$$

Vertex

$$(t, h)$$
$$(3.5, 216)$$

A company wants to minimize its costs. The following equation gives the company's costs as a function of the number of employees:

$$C(e) = 12e^2 - 360e + 2850$$

vertex !

1. How many employees should the company have in order to (minimize) its costs?

15 employees

vertex !

$$(e, C)$$

2. What are the minimum costs?

$$12(15)^2 - 360(15) + 2850$$
$$= \$150$$

$$\frac{-b}{2a} = \frac{360}{24} = 15$$
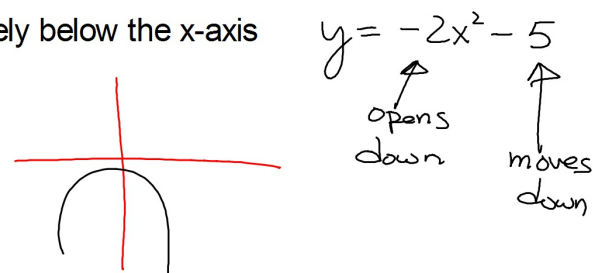
You can now finish Hwk #26   Sec 10-2

Pages 520-521

Problems 1-3, 11-13, 16, 32-34, 37

Use the paper I'll provide for this homework

Write the equation of a quadratic that meets the following condition:

The graph lies entirely below the x-axis

$$y = -2x^2 - 5$$

opens down

moves down

Simplify each square root.

1. $\sqrt{320}$

$\sqrt{64 \cdot 5} = \sqrt{64} \cdot \sqrt{5}$
$= 8\sqrt{5}$

2. $\sqrt{243}$

$\sqrt{81}\sqrt{3} = 9\sqrt{3}$

3. $\sqrt{450}$

$= \sqrt{25 \cdot 18}$

$= 5\sqrt{18} = 5\sqrt{9} \cdot \sqrt{2}$
$= 15\sqrt{2}$

4.