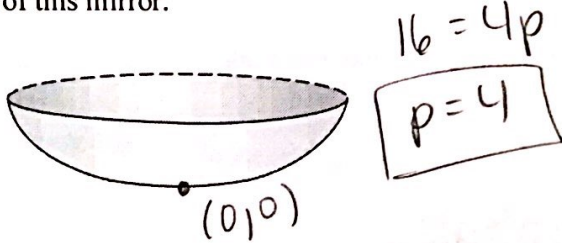


7.1-7.2 Word Problem Practice

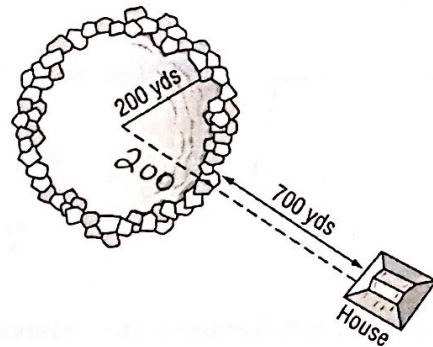
Parabolas

$$(x-h)^2 = 4p(y-k)$$

1. REFLECTOR The figure shows a parabolic reflecting mirror. A cross section of the mirror can be modeled by $x^2 = 16y$, where the values of x and y are measured in inches. Find the distance from the vertex to the focus of this mirror.



5. RETENTION POND A circular retention pond is getting larger by overflowing and flooding the nearby land at a rate that increases the radius 100 yards per day, as shown below.



2. T-SHIRTS The cheerleaders at the high school basketball game launch T-shirts into the stands after a victory. The launching device propels the shirts into the air at an initial velocity of 32 feet per second. A shirt's distance y in feet above the ground after x seconds can be modeled by $y = -16x^2 + 32x + 5$.

a. Write the equation in standard form.

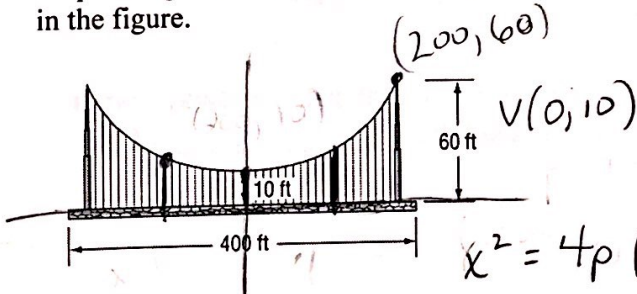
$$y - 5 = -16(x - 2)^2$$

b. What is the maximum height that a T-shirt reaches?

21 ft

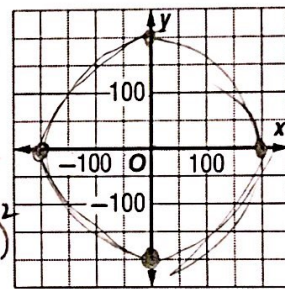
$$y - 5 = -16(x - 1)^2 - 1$$

3. BRIDGES The cable for a suspension bridge is in the shape of a parabola. The vertical supports are shown in the figure.



$$y - 21 = -16(x - 1)^2$$

$$-\frac{1}{16}(y - 21) = (x - 1)^2$$



200 + 700 = 900 yds from the house.

b. If the pond continues to overflow at the same rate, how many days will it take for the water to reach the house?

7 days

c. Write an equation for the circle of water at the current time and an equation for the circle when the water reaches the house.

$$x^2 + y^2 = 200^2$$

$$x^2 + y^2 = 900^2$$

4. WHISPERING GALLERY A whispering gallery at a museum is in the shape of an ellipse. The room is 84 feet long and 46 feet wide.

a. Write an equation modeling the shape of the room. Assume that it is centered at the origin and that the major axis is horizontal.

$$\frac{x^2}{1764} + \frac{y^2}{529} = 1$$

b. Find the location of the foci.

$$c = \sqrt{1764 - 529}$$

$$(-35, 0) (35, 0)$$

$c = 35\text{ ft}$ from the center on major axis

