Algebra II Worksheet #4 Unit 8 Selected Solutions

A canon ball is fired upward from the top of a tall building, 300 feet above the ground. The function $\mathbf{h} = -\mathbf{16t}^2 + \mathbf{160t} + \mathbf{300}$ gives the height of the ball above the ground, in feet, t seconds after it was fired.

1. What is the maximum height reached by the ball? How long did it take the ball to reach its maximum height?

Find the vertex.

 $h = -16t^{2} + 160t + 300$ $h - 300 = -16(t^{2} - 10t)$ $h - 300 - 400 = -16(t^{2} - 10t + 25)$ $h - 700 = -16(t - 5)^{2}$

The vertex is (5, 700). The maximum height is 700 feet. It will take 5 seconds to reach that height.

5. When will the ball hit the ground?

Find t when h = 0

$$h = -16t^{2} + 160t + 300$$

$$0 = -16t^{2} + 160t + 300$$

$$0 = 4t^{2} - 40t - 75$$

$$t = \frac{40 \pm \sqrt{2800}}{8}$$

t \approx 11.6 or t \approx -1.6 It will hit the ground in about 11.6 seconds.