## 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 $\mathbf{h}=\mathbf{- 1 6 t} \mathbf{t}^{2}+\mathbf{1 6 0 t}+\mathbf{3 0 0}$ 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.

$$
\begin{gathered}
h=-16 t^{2}+160 t+300 \\
h-300=-16\left(t^{2}-10 t\right) \\
h-300-400=-16\left(t^{2}-10 t+25\right) \\
h-700=-16(t-5)^{2}
\end{gathered}
$$

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 $\mathrm{h}=0$

$$
\begin{aligned}
& h=-16 t^{2}+160 t+300 \\
& 0=-16 t^{2}+160 t+300 \\
& 0=4 t^{2}-40 t-75 \\
& t=\frac{40 \pm \sqrt{2800}}{8} \\
& t \approx 11.6 \text { or } t \approx-1.6
\end{aligned}
$$

It will hit the ground in about 11.6 seconds.

