Unit Problem

The Jones varsity soccer team has just won the championship. To celebrate this triumph, the school will be putting on a fireworks display, and the team members are helping with the planning.

The fireworks will use rockets launched from the top of a tower near the school. The top of the tower is 160 feet off the ground. The mechanism will launch the rockets so that they are initially rising at 92 feet per second.

The team members want the fireworks from each rocket to explode when the rocket is at the top of its trajectory. They need to know how long it will take for the rocket to reach the top, so that they can set the timing mechanism. Also, in order to inform spectators of the best place to stand to see the display, they need to know how high the rockets will go.

The rockets will be aimed toward an empty field and shot at an angle of 65 degrees above the horizon. The team members want to know how far the rockets will land from the base of the tower so they can fence off the area in advance. The field where the rockets will land is the same level as the base of the tower.

Some Formulas you will use for this problem:

There is a function h(t) that will give the rocket's height off the ground in terms of the time ,t, elapsed since the launch. Specifically, if t is in seconds and h(t) is in feet, then H**(t)= 160 + 92t – 16t^2**

(You should be able to see where the 160 and the 92 come from. The -16 is from force of gravity)

The Horizontal distance the rocket travels can be modeled with the following:
D(t) = 92t/ (tan 65)