Purpose: In this problem set, you will be utilizing your quadratic function skill set to answer application questions.

1. A ball is thrown in the air from the top of a building. Its height, in meters above the ground, as a functions of time, in seconds, is given by $h(t) = -4.9t^2 + 24t + 8$.

   (a) From what height was the ball thrown?

   (b) How high above ground does the ball reach its peak?

   (c) When does the ball hit the ground?

2. A box with a square base and no top is to be made from a square piece of cardboard by cutting 6 inch squares out of each corner and folding up the sides. The box needs to hold 1000 cubic inches. How big of a piece of cardboard is needed?

3. You have a wire that is 56 centimeters long. You wish to cut it into two pieces. One piece will be bent into the shape of a square. The other piece will be bent into the shape of a circle. Let A represent the total area enclosed by the square and the circle. What is the circumference of the circle when A is a minimum?

4. A small independent motion picture company determines the profit P, in thousands of dollars, for producing n DVD copies (measured in thousands) of a recent release is $P = -0.02n^2 + 3.40n - 16$. What is the maximum profit? How many DVDs should they sell to earn the maximum profit?