Quick Review of Quadratic Functions (cont.)

5. Do NOT use a graphing calculator to answer the questions below. Explain how you got your answers.

A ball is shot from a cannon into the air with an upward velocity of 40 ft/sec. The equation that gives the height \( h \) of the ball at any time \( t \) is: \( h(t) = -16t^2 + 40t + 1.5 \).

  a. Find the maximum height attained by the ball.  
  b. How long did it take for the ball to reach its maximum height?  
  c. How long did it take for the ball to reach the ground?

6. Do NOT use a graphing calculator to answer the question 6 below. Explain how you got your answers.

Big Bertha, a cannon used in World War I, could fire shells incredibly long distances. The path of a shell could be modeled by \( f(x) = -0.02x(x - 68.5) \) where \( x \) was the horizontal distance traveled (in miles) and \( y \) was the height (in miles). (Do not change the form of the function in order to answer the questions.)

  a. How far could Big Bertha fire a shell?  
  b. What was the shell’s maximum height?

7. Do NOT use a graphing calculator to answer the question 7 below.

The shape of a bridge support can be modeled by \( f(x) = -\frac{1}{600}(x - 300)^2 + 150 \), where \( x \) is the horizontal distance in feet from the left end of the bridge and \( f(x) \) is the height in feet above the bridge deck.

  a. Sketch a graph of the support. Use the graph shown.
  
  b. Then determine the maximum height of the support above the bridge deck.  
  c. Determine the width of the support at the level of the bridge deck.
8. USE only a graphing calculator to answer the question below. Explain how you got your answer.

The profit a company makes is given by the model \( P(x) = -0.4x^2 + 30x + 220 \), where \( P \) is the profit the company earns and \( x \) is the amount spent on advertisement in hundreds of dollars. What amount should the company spend on advertising in order to maximize profits.

Do NOT use a graphing calculator.

9. a. The function below is in _________________________ form.

Without changing its form nor changing the scale of the provided graph, graph the function by first finding its vertex and then using a H-chart.

\[ f(x) = -15(x + 4)^2 + 10 \]

b. CRITICAL THINKING: Think about using transformations for graphing the function above. Why would that method be difficult to use in order to get an accurate graph on the grid provided?