Practice 2.10: Quadratic Modeling   **B**

1. Given the function $f(x) = 3x^2 + 8x - 3$:

   a. Does the function have a maximum or minimum?

   b. What is the axis of symmetry?

   c. What are the coordinates of the vertex?

   d. What is the y-intercept?

   e. What are the solutions?

Use the following information to complete problems 2–6:

A ball is thrown up from a rooftop. It will reach a maximum vertical height, then fall to the ground. The height of the ball from the ground at time t is modeled by the function $h(t) = -16t^2 + 64t + 80$.

2. What was the initial height of the ball?

3. In how many seconds did the ball reach its maximum height? What was the maximum height?

4. What is the height of the ball after 3 seconds?

5. When will the ball hit the ground?

6. What is the reasonable domain?

Use the following information to complete problems 7–10.

> When something is thrown into the air, gravity starts to slow it down as soon as it leaves a person's hand. At some point, it stops going up and starts coming back down. This type of situation can be modeled by the function $h(t) = -16t^2 + V_0t + h_0$, where $h(t)$ = height at the given time, t, in seconds; V_0 = initial velocity at the time of throwing the object; and h_0 = the original height.

7. A water balloon is thrown in the air at a speed of 16 feet per second. It is 2 feet in the air when it leaves the person's hand. Create an equation to model this situation.

8. How high above the person's hand will it be when it reaches its maximum height?

9. When will the balloon reach the ground?

10. What would be a reasonable domain?