1. Jason jumped off of a cliff into the ocean in Acapulco while vacationing with some friends. His height as a function of time could be modeled by the function $h(t) = -16t^2 + 16t + 480$, where t is the time in seconds and h is the height in feet.

    a. How long did it take for Jason to reach his maximum height?

    b. What was the highest point that Jason reached?

    c. Jason hit the water after how many seconds?

2. If a toy rocket is launched vertically upward from ground level with an initial velocity of 128 feet per second, then its height h after t seconds is given by the equation $h(t) = -16t^2 + 128t$ (if air resistance is neglected).

    a. How long will it take for the rocket to return to the ground?

    b. After how many seconds will the rocket be 112 feet above the ground?

    c. How long will it take the rocket to hit its maximum height?

    d. What is the maximum height?

3. A ball is shot out of a homemade air cannon. It flies through the air such that its height as a function of time is given by:

$$h = -16t^2 + 64t + 10$$

where h is the height of the ball in feet and t is the time since it was fired in seconds.

Max estimates that it takes 4 seconds for the ball to hit the ground and Cole estimates it takes 5 second. Algebraically determine who is closer and support your answer.

h (feet)

t
(sec)
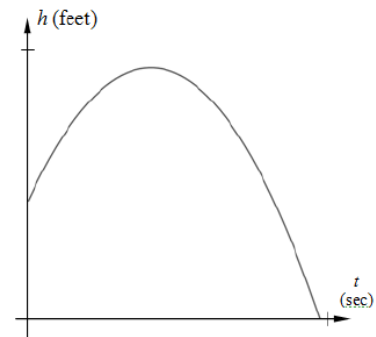
4. A soccer ball is kicked into the air. The path of the ball is modeled by the equation $h = -t^2 + 8t$, where h is the height of the ball in feet and t is the time in seconds.

Graph the function on the coordinate plane below.

height (meters)
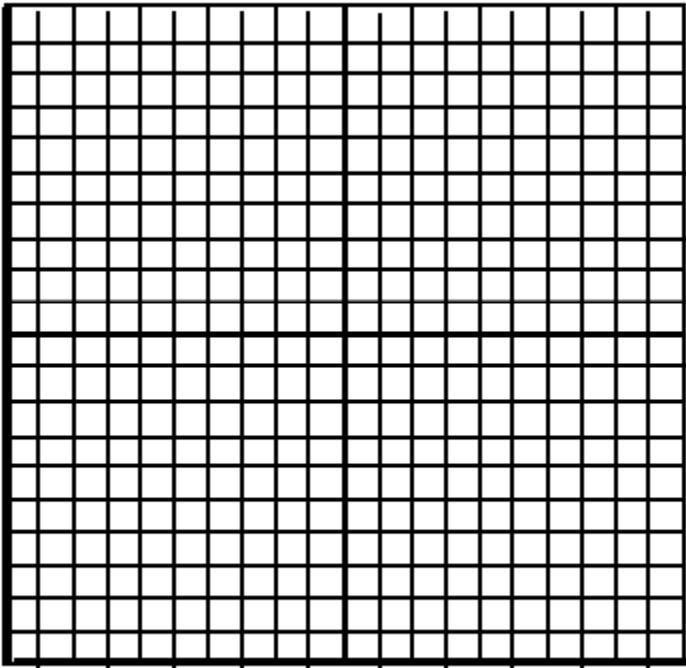
time (seconds)

a. What is the maximum height of the ball?

b. When does it hit its maximum height?

c. How long does it take for the ball to reach the ground?

d. Over what interval is the ball increasing?