

## Calculus Worksheet #8 Unit 1 Selected Solutions

An object is propelled upward in such a way that its distance above the ground,  $s$ , (measured in feet) after  $t$  seconds is given by the function

$$s = f(t) = 192 + 64t - 16t^2, \text{ where } 0 \leq t \leq 6.$$

Answer the following questions.

1. Write a function for the velocity of the object in terms of  $t$ .

$$v = f'(t) = 64 - 32t$$

2. What is the maximum height that the object will reach above the ground?

$$v = f'(t) = 64 - 32t$$

The maximum height is  $f(2) = 156$  feet.

$$64 - 32t = 0$$

$$t = 2$$

3. How long will it take the object to reach its maximum height?

It will take 2 seconds to reach its maximum height.

4. Describe the position and the velocity of the object when  $t = 0$  s.

$$\text{position} = f(0) = 192.$$

$$\text{velocity} = f'(0) = +64$$

The object is 192 feet above the ground moving upward at 64 feet per second.