

Section 3.3: Rates of Change in the Natural and Social Sciences

*EXAMPLE 1:* A particle moves according to the equation of motion  $s(t) = 4t^3 - 9t^2 + 6t + 2$ , where  $s(t)$  is measured in meters and  $t$  in seconds.

(a) Find the velocity at time  $t$ .

(b) When is the particle at rest?

(c) When is the particle moving in the positive direction?

(d) Draw a diagram that represents the motion of the particle.

(e) Find the distance traveled in the first 3 seconds.

*EXAMPLE 2:* A ball is thrown vertically upward with a velocity of 80 feet per second. The height after  $t$  seconds is given by  $h(t) = 80t - 16t^2$ . What is the maximum height of the ball?