

Position–Velocity Worksheet–Math 11

Read the following problems and answer each of the given questions:

1. Suppose a falling ball's position is given by $s(t) = 256 - 16t^2$ feet at t seconds.
 - What is the ball's initial position above the ground?
 - Find the average velocity of the ball during the initial two seconds of its drop.
 - Find the velocity at 2 seconds and 3 seconds respectively.
 - How much time passed before the ball hit the ground?
 - What was the ball's velocity when it hit the ground?
 - Finally, find the ball's acceleration at 3 seconds.

2. A ball is thrown straight upward from the ground with initial velocity $v_0 = 96$ feet per second. The height of the ball at time t is given by the position function $s(t) = -16t^2 + 96t$.
 - Find the maximum height attained.
 - Find the velocity with which the ball hits the ground upon its return.
 - How much time past before the ball returned to the ground?

3. A squirrel is running along an East-West telephone wire with position at time t (in seconds) given by $s(t) = t^2 - 6t$ feet from a fixed telephone pole, with the positive direction being to the East. (A sketch might help.)
- When is the squirrel moving East? West?
 - Where is the squirrel at time(s) when it changes direction?
 - What is the squirrel's total distance travelled from time $t = 0$ to $t = 8$?
 - What is the squirrel's displacement(net distance) travelled from time $t = 0$ to $t = 8$?
4. A stone is dropped from a bridge that is 576 feet above a river. The stone's position is given in feet at time t by $s(t) = -16t^2 + 576$.
- How long does it take for the stone to impact the water (fixed at position 0 here)?
 - What is the stone's velocity when it impacts the water?