# Vectors and Kinematics

## Recap

Vector

Scalar

Kinematic Equations

## Practice

1. In 1967, New Zealander Burt Munro set the world record for an Indian motorcycle, on the Bonneville Salt Flats in Utah, with a maximum speed of 183.58 mi/h. The one-way course was 5.00 mi long. Acceleration rates are often described by the time it takes to reach 60.0 mi/h from rest. If this time was 4.00 s, and Burt accelerated at this rate until he reached his maximum speed, how long did it take Burt to complete the course?

2. Calculate the displacement and velocity at times of (a) 0.500, (b) 1.00, (c) 1.50, and (d) 2.00 s for a ball thrown straight up with an initial velocity of 15.0 m/s. Take the point of release to be yo = 0.

3. Using approximate values, calculate the slope of the curve in Figure 2.60 to verify that the velocity at 1 = 30.0 s is approximately 0.24 m/s. Assume all values are known to 2 significant Figures
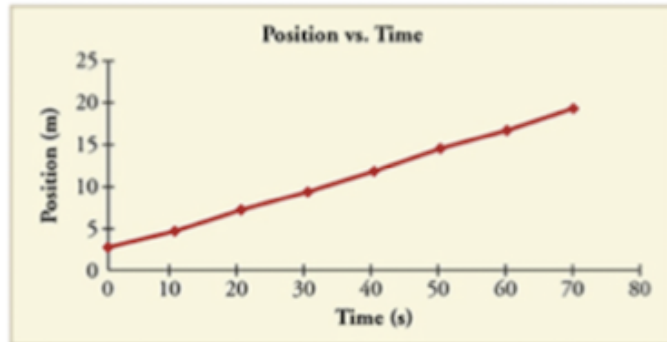


FIGURE 2.60

4. A soft tennis ball is dropped onto a hard floor from a height of 1.50 m and rebounds to a height of 1.10 m. (a) Calculate its velocity just before it strikes the floor. (b) Calculate its velocity just after it leaves the floor on its way back up. (c) Calculate its acceleration during contact with the floor if that contact lasts 3.50 ms (3.50 × 10-3 5). (d) How much did the ball compress during its collision with the floor, assuming the floor is absolutely rigid?