Planet Holloway websheet 3.3

AP Physics C - Chapter 3

You may print this out and write on it or work on your own paper.

Show all work.

1. A ball’s position is described by the equation \( x = 12t - 14t^3 \). What is the ball’s velocity at 4 seconds? What is its acceleration at 4 seconds?

2. An object moves such that \( a = 6t^2 \). What is the object’s velocity at 3 seconds, if it started with an initial velocity of -3 m/s? What is its position at 3 seconds?

3. A car has a velocity given by \( v = 2t + 5 \). What is its acceleration at 4 seconds? What is its position at 4 seconds?

4. The position of a bumblebee is given by \( x = 9t + 0.1t^2 \). If the bumblebee continues to maintain this motion, what is the velocity and acceleration of the bee at 5 seconds?

5. A car has a velocity given by \( v = 3t + 0.7t^3 \). What is the position of the car at 4 seconds? What is the car’s acceleration at 4 seconds? Is the acceleration increasing or decreasing?

6. The horizontal acceleration of an object is described by \( a = 4 + 12t \). What is the velocity and position of the object at 7 seconds if the object started from rest?

Answers:

I assumed standard SI units for all the following answers:

1. \( v = -660 \text{ m/s}, \ a = -336 \text{ m/s/s} \)

2. \( v = 51 \text{ m/s}, \ x = 31.5 \text{ m} \)

3. \( a = 2 \text{ m/s/s}, \ x = 36 \text{ m} \)

4. \( v = 10 \text{ m/s}, \ a = 0.2 \text{ m/s/s} \)

5. \( x = 68.8 \text{ m}, \ a = 36.6 \text{ m/s/s}, \ \text{increasing} \)

6. \( v = 322 \text{ m/s}, \ x = 784 \text{ m} \)