Home Work 2

Motion in one dimension

4 - A particle moves according to the equation $x = 10t^2$ where x is in meters and t is in seconds.

(a) Find the particle's displacement for the time interval from 2s to 3s.

(b) Find the average velocity for the time interval from 2s to 3s. (c) Find the velocity for any time t .

(d) Find the instantaneous velocity at t = 2s and at t = 3s

(e) Find the average acceleration for the time interval from 2s to 3s.

(f) Find the accelerationat t = 2s and at t = 3s

5 - A person walks first at a constant speed of 5.00 m/s along a straight line from point *A* to point *B* and then back along the line from *B* to *A* at a constant speed of 3.00 m/s. What is

(a) her average speed over the entire trip?

(b) her average velocity over the entire trip?.

15 - A particle moves along the *x*axis according to the equation $x = 2.00 + 3.00t - 1.00t^2$, where x is in meters and t is in seconds. At $t = 3.00$ s, find

(a) the position of the particle

(b) its velocity

(c) its acceleration.

20 - A truck covers 40.0 m in 8.50 s while smoothly slowing down to a final speed of 2.80 m/s.

(a) Find its original speed.

(b) Find its acceleration.

27 - A jet plane lands with a speed of 100 m/s and can accelerate at a maximum rate of -5.00 m/s^2 as it comes to rest.

(a) From the instant the plane touches the runway, what is the minimum time interval needed before it can come to rest?

(b) Can this plane land on a small tropical island airport where the runway is 0.800 km long?

37. A ball starts from rest and accelerates at 0.5m/s^2 while moving down an inclined plane 9m long. When it reaches the bottom, the ball rolls up another plane, where, after moving 15m, it comes to rest.

(a) What is the speed of the ball at the bottom of the first plane?

(b) How long does it take to roll down the first plane?

(c) What is the acceleration along the second plane?

(d) What is the ball's speed 8m along the second plane?

48. It is possible to shoot an arrow at a speed as high as 100 m/s.

(a) If friction is neglected, how high would an arrow launched at this speed rise if shot straight up?

(b) How long would the arrow be in the air?

52. A freely falling object requires 1.50 s to travel the last 30.0 m before it hits the ground. From what height above the ground did it fall?