Projectile Motion I

A.C. Norman

anorman@bishopheber.cheshire.sch.uk

March 8, 2011

Take $g = 10$ m s^{-2}, and ignore air resistance.

1. A ball is kicked horizontally with a velocity of 6.0 m s^{-1} from the top of a building which is 96 m high. Calculate:

   (a) the time taken to reach the ground,

   (b) the horizontal distance travelled by the ball,

   (c) the horizontal and vertical components of the ball velocity as it hits the ground.

2. A pencil is knocked off the edge of a horizontal desk which is 64.8 cm high. The pencil hits the floor 32.4 cm from the edge of the desk. What was the speed of the pencil as it left the desk?

3. An aeroplane moving horizontally at 150 m s^{-1} releases a bomb at a height of 500 m. The bomb hits the intended target. What was the horizontal distance of the aeroplane from the target when the bomb was released?

4. A stone is projected horizontally witha velocity of 3.0 m s^{-1} from the top of a cliff 200 m high. Calculate:

   (a) how long it takes to reach the ground,

   (b) the distance it lands from the foot of the cliff,

   (c) the vertical and horizontal components of velocity as it hits the ground.

5. Water emerges from a hosepipe as shown.
   Calculate the distance PS.