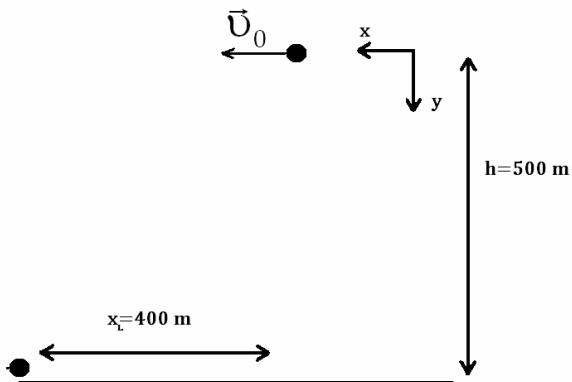


QUESTION:

The movie "the Gods Must Be crazy" begins with a pilot dropping a bottle out of an airplane. It is recovered by a surprised native below, who thinks it is a message from the gods. If the plane from which the bottle was dropped was flying at an altitude of 500.m, and the bottle lands 400.m horizontally from the initial dropping point, how fast was the plane flying when the bottle was released.? Need to know how to get the answer

SOLUTION:

In chosen coordinate system the coordinates of the bottle are:

$$x = v_0 t$$

$$y = \frac{gt^2}{2}$$

Here v_0 is initial velocity of the bottle, and v_0 is the velocity of the plane.

When bottle lands $x = x_L = 400$ m, $t = t_L$, $y = h = 500$ m, hence

$$x_L = v_0 t_L \Rightarrow t_L = \frac{x_L}{v_0} \text{ and}$$

$$h = \frac{gt_L^2}{2} = \frac{g}{2} \left(\frac{x_L}{v_0} \right)^2 \Rightarrow v_0 = \sqrt{\frac{g \cdot x_L}{2h}} = 39.6 \text{ m/s}$$

ANSWER:

$$v_0 = 39.6 \text{ m/s}$$