

Horizontally Launched Projectile Example Problem

Example 2: (from power point)

A skydiver falls from an airplane with an initial ~~velocity~~ of horizontal velocity of 30 m/s. The airplane is 784 m above the ground.

Ⓐ Neglecting air resistance, what is the time of flight of the skydiver? $t = ?$

Ⓑ What is the horizontal range of the skydiver? $d_x = ?$

To solve for Ⓐ & Ⓑ

Givens: $v_x = 30 \text{ m/s}$

$$d_x = ?$$

$$t = ?$$

vertical
 $d_y = -784 \text{ m}$

$$v_{iy} = 0 \text{ m/s}$$

$$g = -9.8 \text{ m/s}^2$$

Ⓐ

$$d = \frac{1}{2} g t^2$$

$$-784 \text{ m} = \frac{1}{2} (-9.8 \text{ m/s}^2) (t)^2$$

$$\frac{-784}{-4.9} = \frac{-4.9}{-4.9} t^2$$

$$160 = t^2$$

$$\sqrt{160} = \sqrt{t^2}$$

$$\boxed{12.65 = t}$$

Ⓑ

$$v_x = \frac{d_x}{t}$$

$$30 \text{ m/s} = \frac{d_x}{12.65}$$

$$\times 12.6 \quad \times 12.6$$

$$\boxed{378 \text{ m} = d_x}$$

★ Use vertical formula to find time!

→ plug time into horizontal formula!