

Ball Rolls Off Cliff

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1 Problem

Imagine that a golf ball traveling horizontally at 1.0 meter/second is about to hurtle off a 5.0-meter cliff, as Figure 4-11 shows. The question: Where will the ball hit the ground, and what will be its total speed immediately before landing? First you must find the amount of time the golf ball will be flying through the air before it lands.

Holzner, Steven. Physics I For Dummies (For Dummies (Math & Science)) (p. 70). Wiley. Kindle Edition.

2 Solution

$$a = \frac{\Delta v}{\Delta t}$$

$$s = \bar{v}t$$

$$9.8 = \frac{v_f - v_i}{\Delta t}$$

$$s = 5m$$

$$\bar{v} = \frac{v_i + v_f}{2}$$

$$\bar{v} = \frac{0 + v_f}{2}$$

$$s = \frac{v_f * t}{2}$$

$$v_f = \frac{2s}{t}$$

$$9.8 = \frac{2s}{t^2}$$

$$9.8 = \frac{10}{t^2}$$

$$\sqrt{\frac{10}{9.8}}$$

Rounding because of SI precision

$$t = 1 \text{ second}$$

$$s = 1 * 1 = 1 \text{ meter}$$

The ball would travel one meter horizontally before hitting the ground.