

A ball is thrown straight up from the top of a 150m building. Calculate its velocity when the ball is 50m above the ground. $v_0 = 18 \text{ m/s}$ $a = -9.81 \text{ m/s}^2$

$$v_f^2 = v_0^2 + 2 \vec{a} \vec{d}$$

$$\vec{d} = \vec{d}_f - \vec{d}_0$$

$$v_f^2 = v_0^2 + 2 \vec{a} (\vec{d}_f - \vec{d}_0) \quad *$$

$$v_f^2 = (18)^2 + 2(-9.81)(50 - 150)$$

$$v_f^2 = 324 + 1962$$

$$v_f^2 = 2286$$

$$v_f = \sqrt{2286} = \pm 48$$

$$v_f = 48 \text{ m/s [down]}$$

or

$$v_f = -48 \text{ m/s}$$

Pre-Quiz Answers

1. a) $4s, 13s$

b) $-2m/s^2$ or $-1.8m/s^2$

c) $v_{sp} = 3.25m/s$; $v_{avg} = 0m/s$

2. a) $a = 0.76m/s^2$

b) $\vec{d}_f = 488m [E]$

3. a) $t = 3.7s$

b) $\vec{d}_f = 316m$

c) $\vec{v}_f = -72m/s$