

For all problems, there is NO air-resistance.

- 1.) A 3kg object and a 10 kg object are dropped from the top of a building. Will they hit at the same time?

yes

- 2.) What is the acceleration due to gravity?

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

- 3.) The initial velocity of a ball thrown upward is 8 m/s. What is the final velocity?

$$V_f = 0 \text{ m/s at the top of its path}$$

- 4.) For problem number 3, how long will it take the ball to reach the top of its path?

Formula: $V_f = V_i + gt$

Plug in numbers: $0 \text{ m/s} = 8 \text{ m/s} + (-9.8 \text{ m/s}^2)t$

$$\frac{-8}{-9.8} = \frac{-9.8(t)}{-9.8}$$

Answer: $t = 0.82 \text{ s}$

Given

$$V_f = 0 \text{ m/s}$$

$$V_i = 8 \text{ m/s}$$

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

$$t = ?$$

- 5.) A ball is dropped from a tall building. What is its initial velocity?

$$V_i = 0 \text{ m/s}$$

- 6.) For problem number 5, it takes the ball 12 seconds to hit the ground. How tall is the building?

Formula: $d = v_i t + \frac{1}{2} g t^2$

Plug in numbers: $d = 0 \text{ m/s}(12 \text{ s}) + \frac{1}{2}(-9.8 \text{ m/s}^2)(12 \text{ s})^2$

$$d = -705.6 \text{ m}$$

Given

$$V_i = 0 \text{ m/s}$$

$$t = 12 \text{ s}$$

$$d = ?$$

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

Answer:

- 7.) A car is driving at an initial velocity 25 m/s and ends at a final velocity of 50 m/s in 7 seconds.

- a. What was the acceleration of the car? $V_f = V_i + at$

$$\frac{50 \text{ m/s} - 25}{7} = a \frac{7}{7}$$

$$a = 3.6 \text{ m/s}^2$$

Given

$$V_i = 25 \text{ m/s}$$

$$V_f = 50 \text{ m/s}$$

$$t = 7 \text{ s}$$

$$a = ?$$

- b. What is the distance the car travelled?

$$d = v_i t + \frac{1}{2} a t^2$$

$$d = (25 \text{ m/s})(7 \text{ s}) + \frac{1}{2}(3.6 \text{ m/s}^2)(7 \text{ s})^2$$

$$d = 263.2 \text{ m}$$