Phys101 – Sec # 26 **Quiz # 1 (Chapter 2)**

Key

Name: _____ **ID #** _____

A racing car traveling with constant acceleration increases its speed from 10 m/s to 30 m/s over a distance of 80 m? How long does this take?

$v_i = 10 \ m/s$

$v_f = 30 \ m/s$

$\Delta x = 80 \ m$

$t = ?$

Use equation # 4

$\Delta x = \left(\frac{v_i + v_f}{2}\right) t$

$80 = \left(\frac{10+30}{2}\right) t = 20t$

$t = \frac{80}{20} = \boxed{4 \ s}$ ✓

An object starts from rest at the origin and moves along the x axis with a constant acceleration of 4 m/s^2. Find its average velocity as it goes from x=0 to x=15 m.

$\Delta x = 15 \ m$

$a = 4 \ m/s^2$

$v_0 = 0$

$t = ?$

$\Delta x = \cancel{v_0 t}^{0} + \frac{1}{2} a t^2$

$15 = \frac{1}{2}(4) t^2 \Rightarrow t = \sqrt{\frac{15}{2}} = 2.74$

$v_{avg} = \frac{\Delta x}{t} = \frac{15}{2.74} = 5.5 \ m/s$

another method

because of constant acceleration

$v_{avg} = \frac{\cancel{v_0}^{0} + v_f}{2} = \frac{\cancel{v_0}^{0} + at}{2} = \frac{4 \times 2.74}{2}$

$= 5.5 \ m/s$

A stone is thrown vertically up from the edge of the top of a 100-m high building. It reaches the ground (at the bottom of the building) after 10.0 s. What is the initial speed of the stone?

$\Delta y = -100 \ m$

$t = 10 \ s$

$a = -g$

$v_i = ?$

use equation # 2

$\Delta y = v_i t - \frac{1}{2} g t^2$

$-100 = v_i (10) - 4.9 (10)^2$

$-100 = 10 v_i - 490$

$10 v_i = 490 - 100 = 390$

$v_i = \frac{390}{10} = \boxed{39 \ m/s}$