(Key)

Name: **ID #**

1- A certain car has a fuel efficiency rating of 25 miles/gallon. Convert this to kilometers/liter.
Use the following data:

     1 mile = 1.609 km   1 gallon = 3.784 Liter

$$25 \; \frac{\text{miles}}{\text{gallon}} \times \frac{1.609 \, km}{1 \, \text{mile}} \times \frac{1 \, \text{gallon}}{3.784 \, \text{Liter}} = \boxed{10.6 \; \frac{km}{\text{Liter}}}$$

2- Calculate the acceleration of a car that travels 63 m before coming to rest while moving initially with a speed of 5 m/s.

$$a = ? \qquad \Delta x = 63 \, m \qquad v_f = 0 \qquad v_o = 5 \, \frac{m}{s}$$

use

$$v_f^2 = v_o^2 + 2 a \, \Delta x$$

$$0 = (5)^2 + 2 \, (a)(63)$$

$$\Rightarrow \quad a = \frac{-25}{2(63)} \approx \boxed{-0.2 \; \frac{m}{s^2}}$$

3- A ball is thrown vertically <u>upward</u> with unknown initial velocity. It returns back to its initial point after 4 seconds. Find its initial velocity.

$$v_o = ? \qquad y_o = 0 \qquad y_f = 0 \qquad t = 4 \, s \qquad a = -9.8 \, \frac{m}{s^2}$$

use

$$\cancel{y_f}^{0} = \cancel{y_o}^{0} + v_o t + \frac{1}{2} a t^2$$

$$0 = v_o (4) - \frac{1}{2}(9.8)(4)$$

$$v_o = \frac{19.6}{4} = \boxed{4.9 \; \frac{m}{s}}$$