Quiz 7a

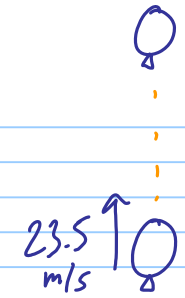
Note Title 27/09/2012

A water ballon is launched straight up in the air at 23.5 m/s.

a. What is its total hang time (total time in air)?

b. How high does it go?

c. At what velocity will it impact the ground (assuming its initial height above ground is negligible)?



a.) @ $t_{\frac{1}{2}}$

$V = 0$

$V_0 = 23.5\ m/s$

$a = -9.8\ m/s^2$

$d =$

$t_{\frac{1}{2}} =$

$V = V_0 + a t_{\frac{1}{2}}$ ✓

$-V_0 \quad -V_0$

$\frac{V - V_0}{a} = \frac{a t_{\frac{1}{2}}}{a}$

$t_{\frac{1}{2}} = \frac{V - V_0}{a} = \frac{0 - 23.5}{-9.8}$

$= 2.3980\ s$

$t_{total} = 2 t_{\frac{1}{2}}$

$= 4.7959\ s$

$= \boxed{4.80\ s}$ ✓

b.) $d = V_0 t_{\frac{1}{2}} + \frac{1}{2} a t_{\frac{1}{2}}^2$ ✓

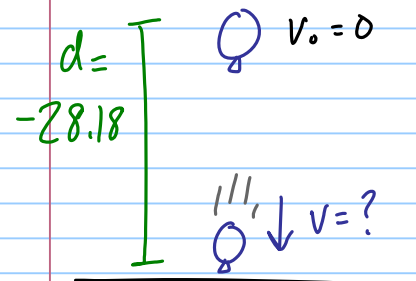
$= (23.5)(2.3980) + \frac{1}{2}(-9.8)(2.3980)^2$

$= 28.18\ m = \boxed{28.2\ m}$ ✓

c.) Since it returns to the same height: $V_{up} = -V_{down}$

$\therefore \boxed{V = -23.5\ m/s}$ ✓ *

* No math necessary... but since you LOVE math:



$V^2 = V_0^2 + 2ad$

$V = \pm\sqrt{V_0^2 + 2ad}$

$= \pm\sqrt{(0)^2 + 2(-9.8)(-28.18)}$

$= \pm 23.5\ m/s$ (reject +)

$= \boxed{-23.5\ m/s}$