

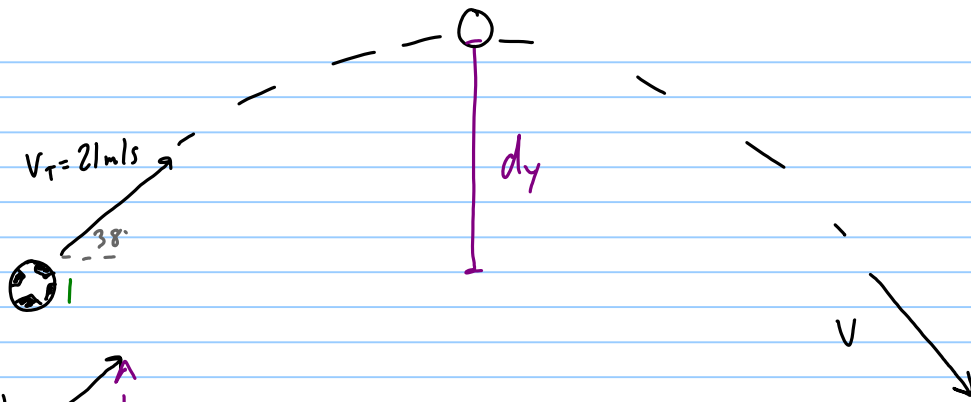
## Quiz 5b

Note Title

27/09/2012

A soccer ball is kicked at  $21 \text{ m/s}$   $38^\circ$  above the horizontal. Assuming the ball travels over level ground, find:

- a. The time of flight of the ball.
- b. The maximum height reached by the ball.
- c. The total final velocity when the ball hits the ground  
(HINT: No Math Required!!!)



$$V_T = 21 \text{ m/s}$$

$$V_{y0} = 21 \sin 38^\circ = 12.93 \text{ m/s} \quad \checkmark$$

$$V_x = 21 \cos 38^\circ = 16.55 \text{ m/s} \quad \checkmark$$

x	y @ $t_{\frac{1}{2}}$
$V_x = 16.55 \text{ m/s}$	$V_y = 0$
$dx$	$V_{y0} = 12.93 \text{ m/s}$
$t =$	$a_y = -9.8 \text{ m/s}^2$
	$dy =$
	$t_{\frac{1}{2}} =$

a)  $v = v_0 + at$

$$t = \frac{v - v_0}{a} = \frac{0 - 12.93 \text{ m/s}}{-9.8 \text{ m/s}^2}$$

$$= 1.319 \text{ s} \times 2$$

$$t_{\text{total}} = 2.639 \text{ s} \quad \checkmark$$

$$= \boxed{2.6 \text{ s}} \quad \checkmark$$

b)  $v^2 = v_0^2 + 2ad$  (or  $d = v_0 t + \frac{1}{2} a t^2$ )

$$d = \frac{v^2 - v_0^2}{2a} = \frac{0^2 - (12.93)^2}{2(-9.8)}$$

$$= \boxed{8.5 \text{ m}} \quad \checkmark$$

c.) Since it is level ground:

$$V_x = 16.55 \text{ m/s} \quad \leftarrow \text{always constant}$$

$$V_y = -12.93 \text{ m/s} \quad \leftarrow \text{same as } V_{y0} \text{ except downwards so "-"}$$

$$\boxed{V = 21 \text{ m/s } 38^\circ \text{ below horizontal}} \quad \checkmark$$