

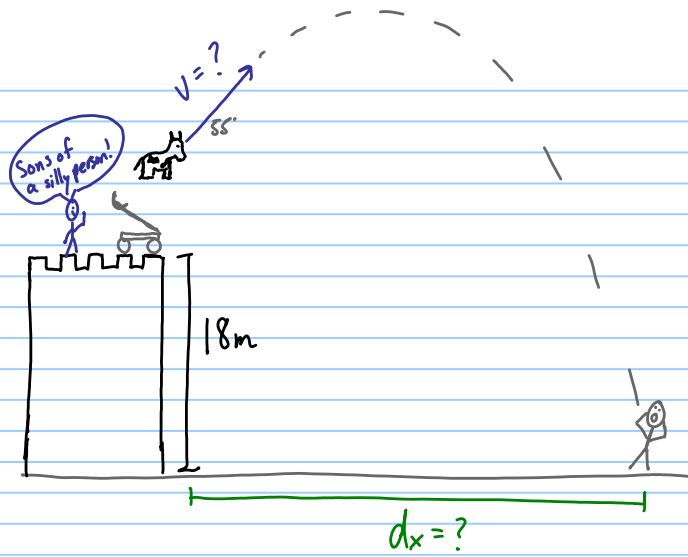
Quiz 5c

Note Title

03/10/2011

A catapult is mounted on the top of a castle wall, 18 m above the ground. It launches a cow at a 55° angle above the horizontal. The cow lands on Sir Arthur's squire 4.56 s later.

- a) At what initial speed was the cow launched?
- b) What horizontal distance did the cow travel?



a.)

x	y
$V_x =$	$V_y =$
$dx =$	$V_{y0} = ?$
$t = 4.56s$	$a_y = -9.8 \text{ m/s}^2$
	$d_y = -18 \text{ m}$
	$t = 4.56s$

a) $d = V_0 t + \frac{1}{2} a t^2$

$$V_0 = \frac{d - \frac{1}{2} a t^2}{t} = \frac{-18 - \frac{1}{2}(-9.8)(4.56)^2}{4.56}$$

$$= 18.90 \text{ m/s} \checkmark$$

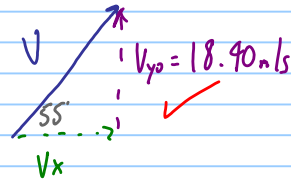
b) $\tan 55 = \frac{V_{y0}}{V_x}$

$$V_x = \frac{V_{y0}}{\tan 55} = 12.88 \text{ m/s} \checkmark$$

$$dx = V_x \cdot t$$

$$= (12.88 \text{ m/s})(4.56 \text{ s})$$

$$= \boxed{58.8 \text{ m}} \checkmark$$



$$\sin 55 = \frac{V_{y0}}{V}$$

$$V = \frac{V_{y0}}{\sin 55} = \frac{18.90}{\sin 55}$$

$$= \boxed{22.5 \text{ m/s}} \checkmark$$