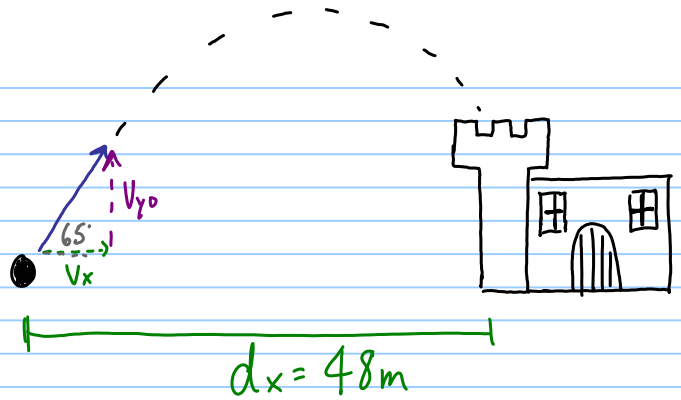
Quiz 5a

Note Title 26/09/2011

A catapult fires a rock at a castle wall which is 48 m in front of it. The rock is launched at 65° above horizontal and strikes the wall after 4.4 s.

a. At what total speed was the rock initially launched?

b. At what height does the rock hit the wall?

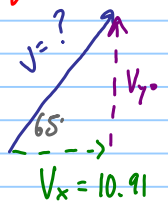


a.)

X	y
$V_x =$	$V_y =$
$d_x = 48m$	$V_{y0} =$
$t = 4.4s$	$a_y =$
	$d_y =$
	$t = 4.4s$

$V_x = \frac{d_x}{t} = \frac{48m}{4.4s}$

$= 10.91 m/s$ ✓



$\cos 65 = \frac{V_x}{V}$ ✓ $V = \frac{V_x}{\cos 65} = \frac{10.91}{\cos 65} = 25.81 m/s$

$= \boxed{26 m/s}$ ✓

b.) $\sin 65° = \frac{V_{y0}}{V}$ $V_{y0} = V \sin 65° = 25.81 \sin 65°$

$= 23.39 m/s$ ✓

X	y
	$V_y =$
	$V_{y0} = 23.39 m/s$
	$a_y = -9.8 m/s^2$
	$d_y = ?$
	$t = 4.4s$

$d = v_0 t + \frac{1}{2} a t^2$

$= (23.39)(4.4) + \frac{1}{2}(-9.8)(4.4)^2$

$= 8.05 m$

$= \boxed{8.1 m}$ ✓