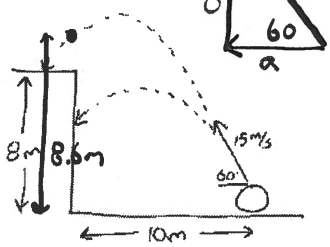
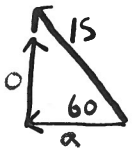
Q1:





Will the ball land on top of the ledge?

x-comp	y-comp
$v_x = 7.5$	$v_i = 12.99$
$d_x = 10m$	$v_f = ?$
$t = ?$	$a = -9.81$
	$d_y = ?$
	$t = ?$

y-comp

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

$d = (12.99)(1.3) + \frac{1}{2}(-9.81)(1.3)^2$

$d = 8.6m$

$v = \frac{d}{t}$

$7.5 = \frac{10}{t}$

$\cdot t \quad \cdot t$

$7.5t = 10$

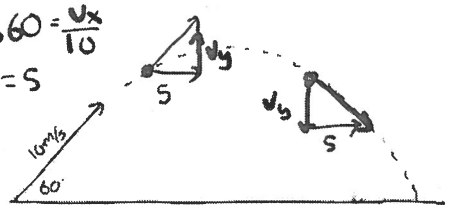
$t = 1.3s$

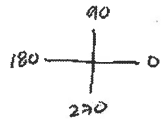
Q2:

$\cos\theta = \frac{a}{h}$

$\cos 60 = \frac{v_x}{10}$

$v_x = 5$





What is the velocity after 1.0 seconds? Write your answer as a vector.

x-comp	y-comp
$v_x = 5$	$v_{iy} = 8.66$
$d_x = ?$	$v_{fy} = ?$
$t = 1.0$	$a_y = -9.81$
	$d_y = ?$
	$t = 1.0$

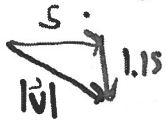
$a = \frac{\Delta v}{\Delta t}$ $\quad a = \frac{v_f - v_i}{t}$

$-9.81 = \frac{v_f - 8.66}{1.0}$

$-9.81 = v_f - 8.66$

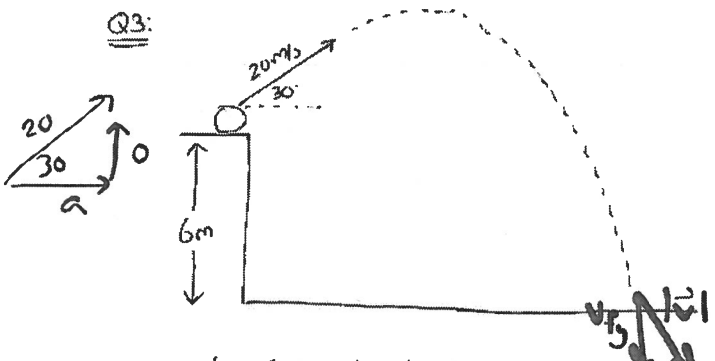
$+8.66 \quad +8.66$

$-1.15 = v_f$



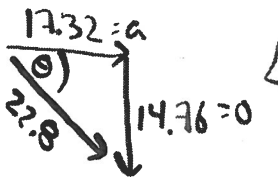
$|\vec{v}| = 5.13 m/s$

Q3:



How fast is the object moving when it hits the ground?

x-comp	y-comp
$v_x = 17.32$	$v_{iy} = 10$
$d_x = ?$	$v_{fy} = ?$
$t = ?$	$a_y = -9.81$
	$d_y = -6$
	$t = ?$



$v_f^2 = v_i^2 + 2ad$

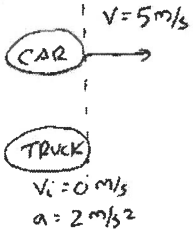
$= 10^2 + 2(-9.81)(-6)$

$= 100 + 117.72$

$v_f^2 = 217.72$

$v_f = -14.76 \text{ m/s}$

Q4:



At what time will the truck catch the car?

Car	Truck
$v = 5$ m/s	$v_i = 0$
$d = ?$	$v_f = ?$
$t = ?$	$d = ?$
	$a = 2$
	$t = ?$

$v = \frac{d}{t}$

$5 = \frac{d}{t}$

$5t = d$

$d = v_i t + \frac{1}{2}at^2$

$d = (0)t + \frac{1}{2}(2)t^2$

$d = t^2$

$5t = t^2$

$\div t \quad \div t$

$5 = t$