Homework Quiz Friday 10/16

- Around 15 mins.
- You can use your homework
- Quiz will be similar (in style & complexity) to a homework problem.
- Material: reviewed last week

Match motion lab report:

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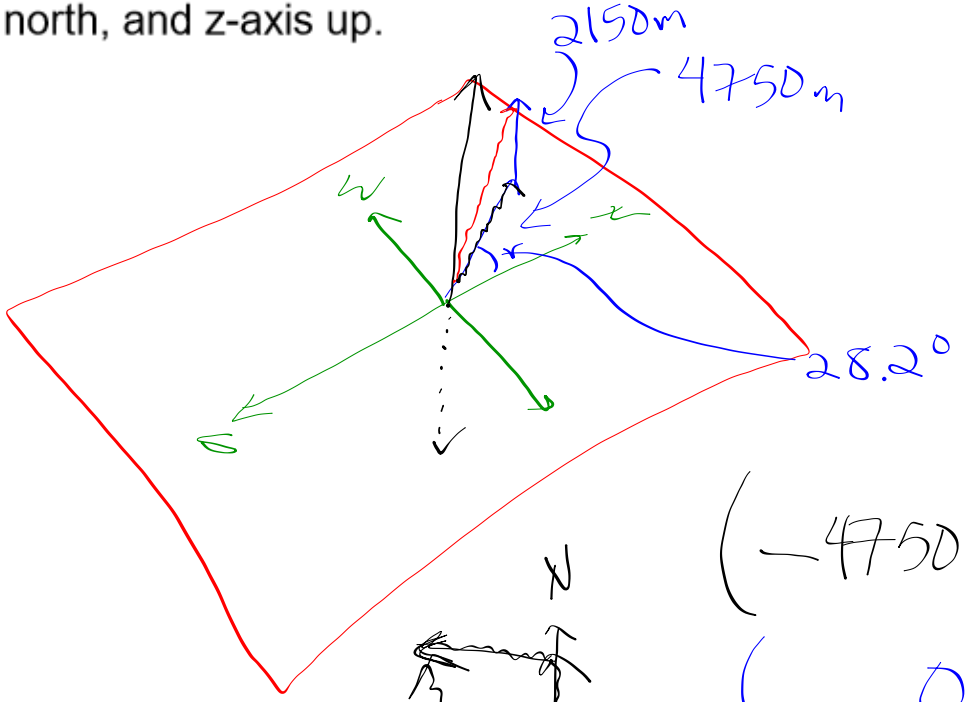
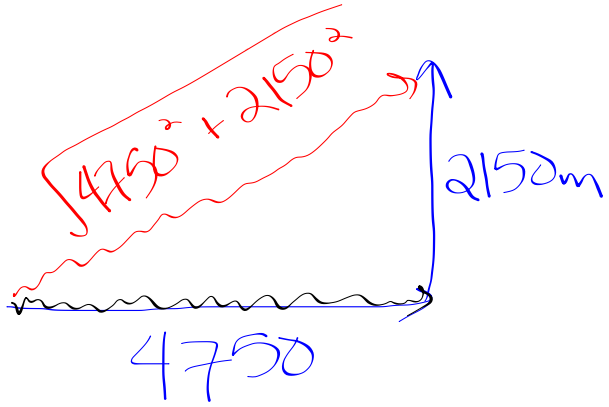
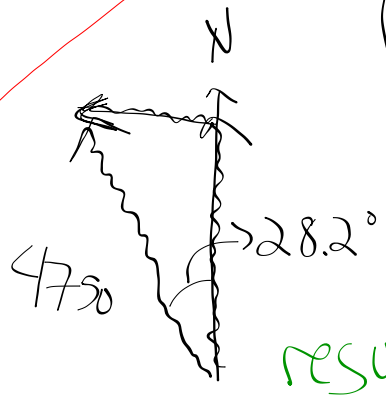
* It's OK to be brief - show me evidence of learning

* CHECK WITH ME

17. The summit of a mountain, 2150 m above a camp, is measured on a map to be 4750 m horizontally from the camp in a direction 28.2° west of due north. What are the components of the displacement vector from camp to summit? What is its length? Choose the x-axis east, y-axis north, and z-axis up.







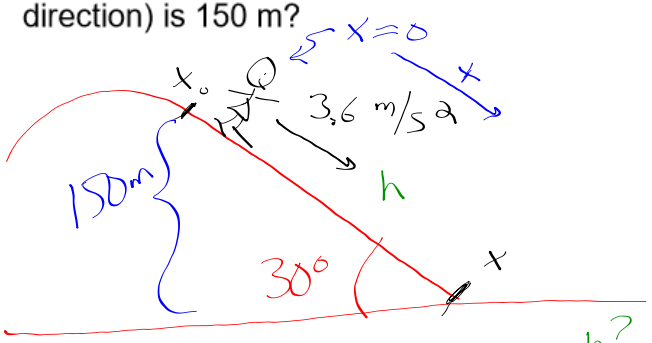
$(-4750 \sin 28.2, 4750 \cos 28.2, 0)$

$(0, 0, 2150)$

resultant:

$(-4750 \sin 28.2, 4750 \cos 28.2, 2150)$

12. A skier is accelerating down a 30.0° hill at 3.60 m/s^2.
    a) What is the vertical component of her acceleration?
    b) How long will it take her to reach the bottom of the hill, assuming she starts from rest and accelerates uniformly, if the elevation change (elevation is a measure of the vertical direction) is 150 m?



(a)

vert. acc. component:

$3.6 \sin 30° =$

$1.8 \frac{m}{s^2}$ down

(b)

$\sin = \frac{o}{h}$

$h = \frac{o}{\sin\theta} = \frac{150}{\sin 30°} = 300m$

$x_0 = 0$

$x = 300m$

$v_0 = 0 \, m/s$

$v =$

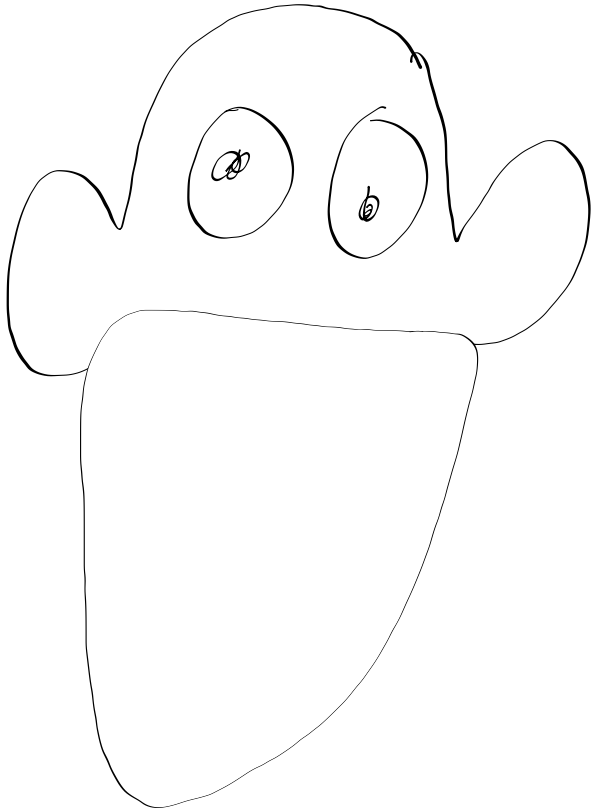
$a = 3.6 \, m/s^2$

$t =$

$x = x_0 + v_0 t + \frac{1}{2} a t^2$

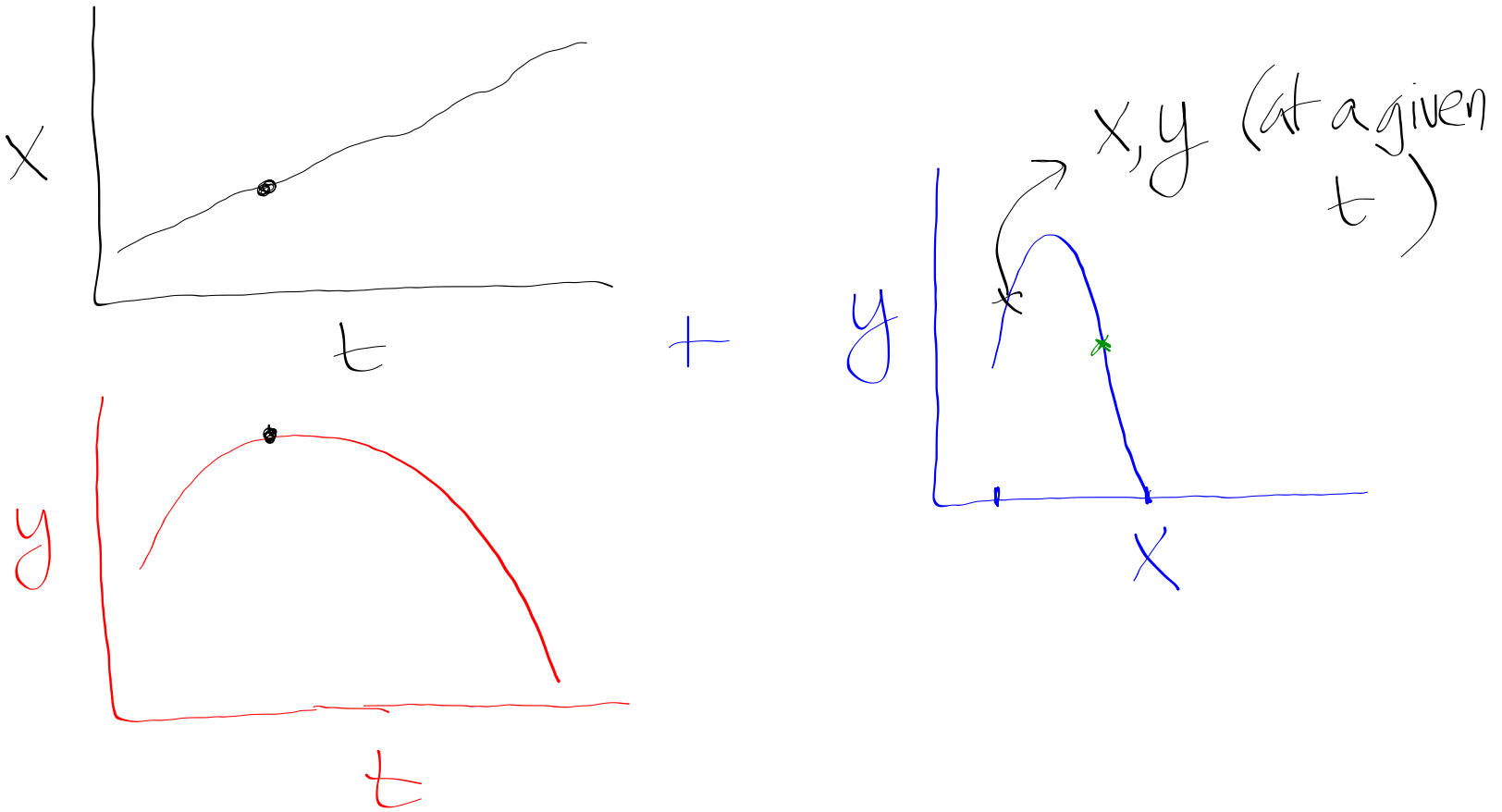
$300 = \frac{1}{2}(3.6) t^2$

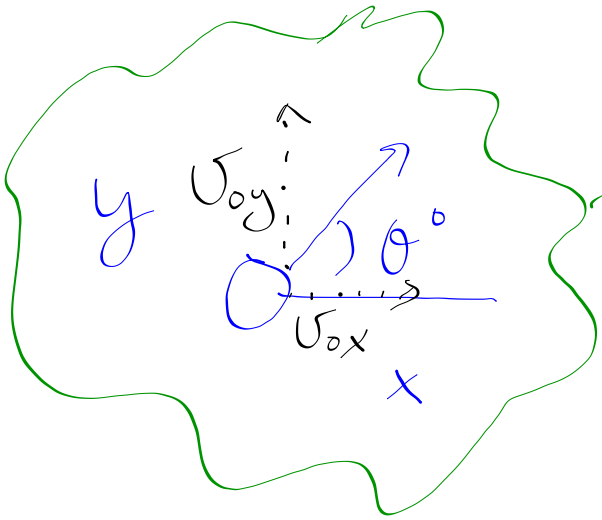
$t = \sqrt{\frac{2(300)}{3.6}} = 12.9 s$



Preliminary Lab:

- We can look at the motion of objects as independent, perpendicular components → We can use the big 4 completely separately for x- and y-variables (linked by t)


x
t
y
t
+
y
x
x, y (at a given t)
x



① toss a ball — capture the motion

② find a_x and a_y

③ toss it again

④ use initial v_x v_y values to predict...