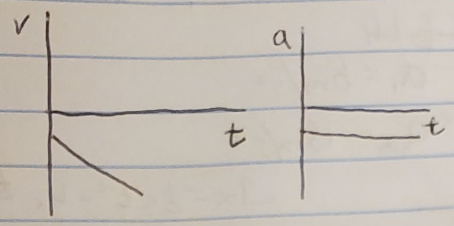
PHYS 401

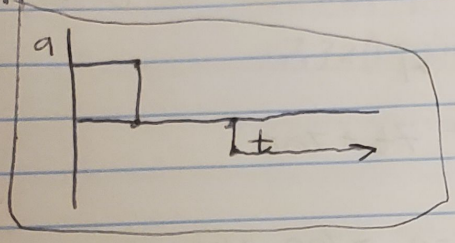
Exam #1

1.



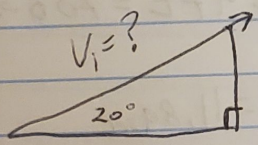
yes, the object is speeding up. It's like a car in reverse, it is speeding up, but backwards

2.



$30 \cdot 60/2 = 900$
$50 \cdot 60 = 3000$
$60 \cdot 60/2 = 1800$
→ 5,700 m

3.



$y_i = 0.5\,m$, $y_f = 0\,m$
$x_f = 5\,m$, $x_i = 0\,m$

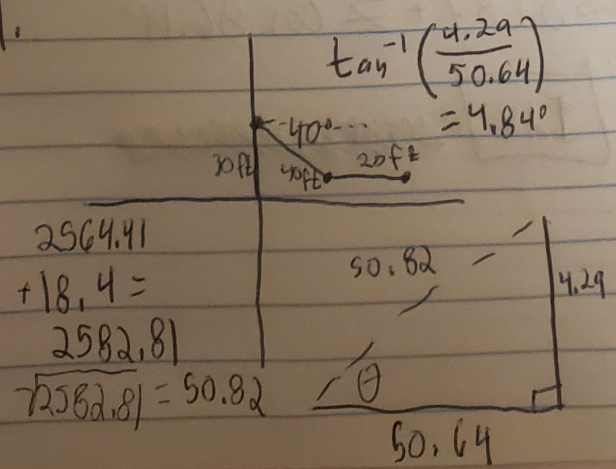
$0 = -4.9t^2 + V_i \sin 20° t + 0.5$ $\quad 5 = V_i \cos 20° t \rightarrow \frac{5}{\cos 20° t} = V_i$

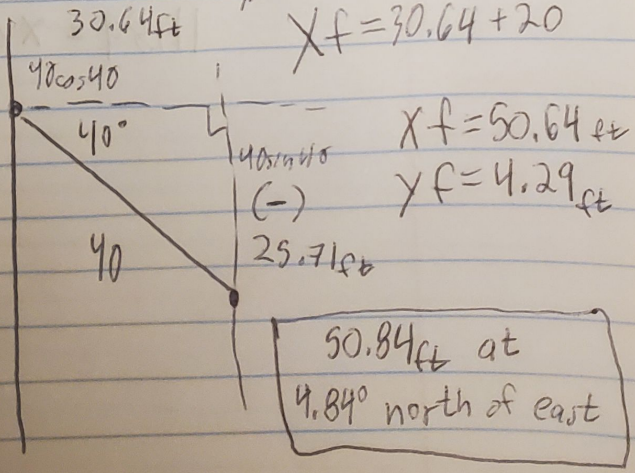
$0 = -4.9t^2 + \frac{5}{\cos 20° t} t \sin 20° + 0.5 \rightarrow 0 = -4.9t^2 + \frac{5}{\cos 20°} \sin 20° + 0.5$

$t = \pm 0.69$ seconds $\quad \frac{5}{0.69 \cos 20°} = V_i = 7.71\,m/s$

at least 7.71 m/s

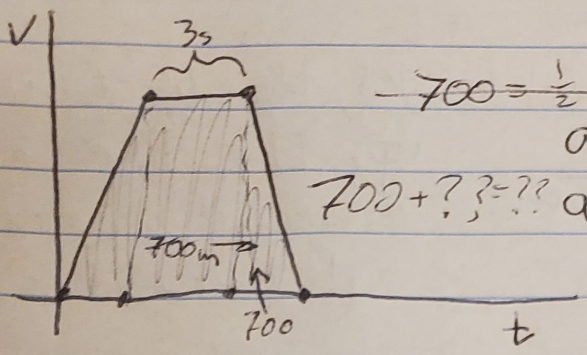
4.





50.84 ft at 4.84° north of east

Exam #1

5. 

~~$700 = \frac{1}{2} bh$~~

$a_1 = 8 m/s^2$

$700 + ? = ??$ $a_2 = -15 m/s^2$

$V_f^2 - V_i^2 = 2a\Delta x$

$\Delta x = \frac{1}{2} a t^2 + V_{ix} t$

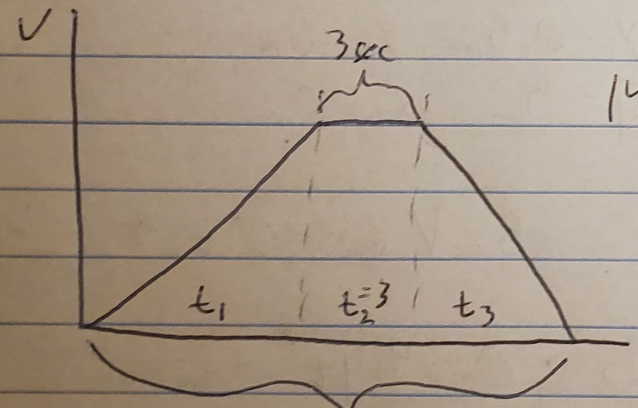
~~$? = \frac{1}{2} \cdot 8t^2 + 0t + 0 \rightarrow 4t^2 = X_f$~~

$\uparrow 8 \rightarrow 1$ $\quad \downarrow 15 \rightarrow 1$

$700 - 8t - 15t = 7t + 700$

$700 - 3(8t) - 15t = 0 \rightarrow 700 - 24t - 15t = 0$

$+8t + 24t + 15t = +700 \rightarrow 47t = 700 \rightarrow t = 14.89$ seconds

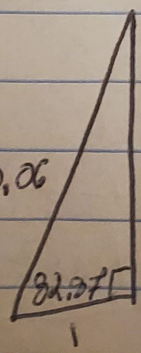


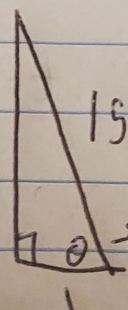
$14.89 - 3 = 11.89$ sec

$t_1 + t_3 = 11.89_{sec}$

~~$t_1 = a_1 \tan 8$, $t_3 = a_2 \tan 15$~~

$t_t = 14.89_{secs}$





$t_1 = 8 \cos 82.87°$

$t_3 = 15 \cos 86.19°$

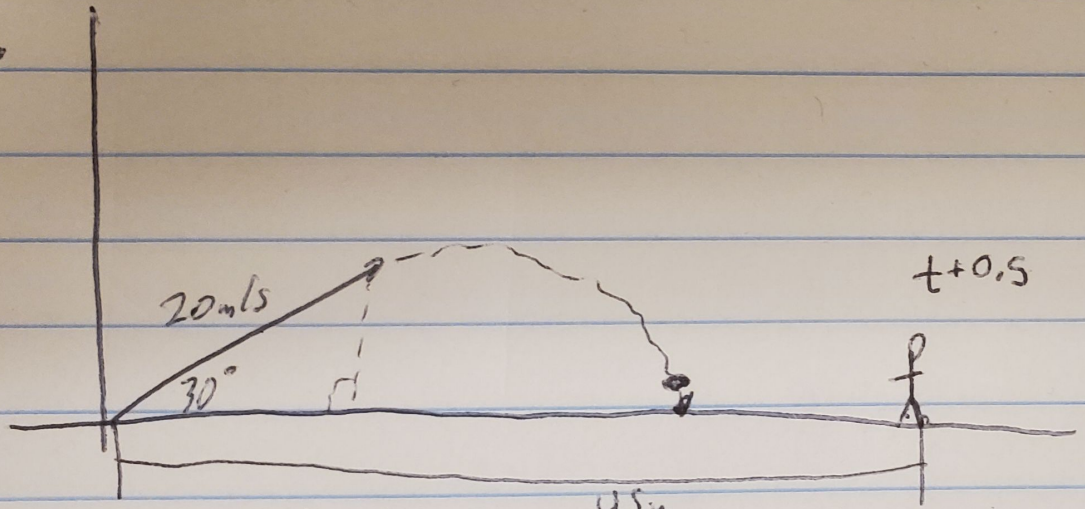
$11.89 = X \cos 82.87° + Z \cos 86.19°$

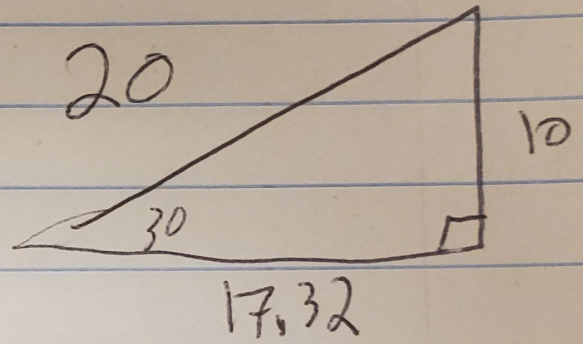
Idk

PHYS 407

Exam #1

6.





$0 = -4.9t^2 + 10t - 1$ $t = 1.94$ seconds

$17.32(1.94) = 33.6$ m

$45 - 33.6 = 11.4$ m

$V = 11.4\text{m} / 2.44\text{s} = \boxed{4.67\text{ m/s}}$