Parcial 1

Tema 1:

$d = 100m$

$a \rightarrow t_1 = 2s$

$v_0 = 0$.

a)

$v_{(2s)} = \cancel{v_0} + a(2)$ (0)

$v_f = v(2) = \boxed{2a}$ m/s

$x_f = x = \cancel{x_0} + \cancel{v_0 t} + \frac{1}{2}at^2 \rightarrow \boxed{x = 2a}$ m

(x_0: 0; $v_0 t$: 0)

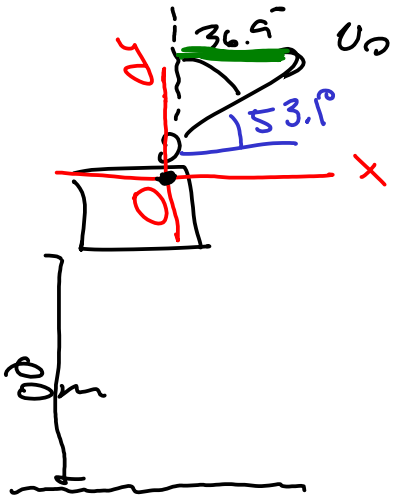
b) $t_T = 18s$

$d - x = v(2)'(8)$

$100 - 2a = 2a(8) \Rightarrow 100 = 18a$

$\therefore \boxed{a = \frac{50}{9}\ m/s^2}$

Tema 2:



a) Para x:

$$v_x(t) = v_0 \operatorname{sen}\theta = 0.6\, v_0$$

$$x(t) = v_x(t) \cdot t = 0.6\, v_0 t$$

Para y:

$$v_{y(t)} = v_0 \cos\theta - gt$$

$$= 0.8\, v_0 - 10t$$

$$y(t) = v_0 \operatorname{sen}\theta\, t - \frac{1}{2} g t^2$$

$$= 0.8 v_0 t - 5t^2$$

$\operatorname{sen}(36.9) = \cos(53.1)$

b) $t_s = 2s$.

$v_f = 0$

$v_0 = ?$

$$v_f = v_0 \cos\theta - gt \equiv v_{y(2)} = 0 = 0.8 v_0 - 20$$

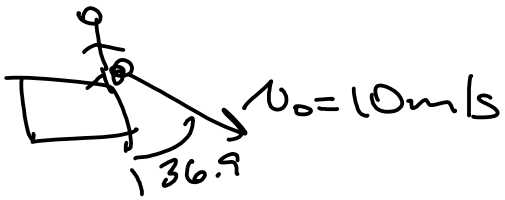
$$v_0 = \frac{gt}{\cos\theta} = 25\ m/s.$$

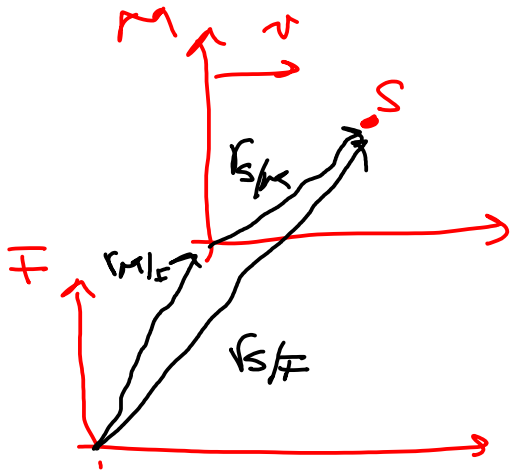
$$y(2) = 0.8(25)(2) - 5(2)^2$$

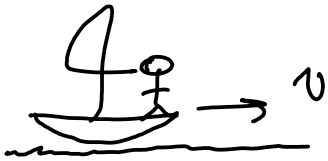
$$y(2) = 20m$$

$$H_{max} = 28m$$

Tema 3:







S → Roca

M → Barco

F → Puente

$$\vec{r}_{S/F} = \vec{r}_{S/M} + \vec{r}_{M/F}$$

$$\vec{v}_{S/F} = \vec{v}_{S/M} + \vec{v}_{M/F}$$

Transformadas Galileanas.

a) $(v_{R/B})_x = v_0 \sin\theta = 6 m/s$

$(v_{R/B})_y = -v_0 \cos\theta = -8 m/s$

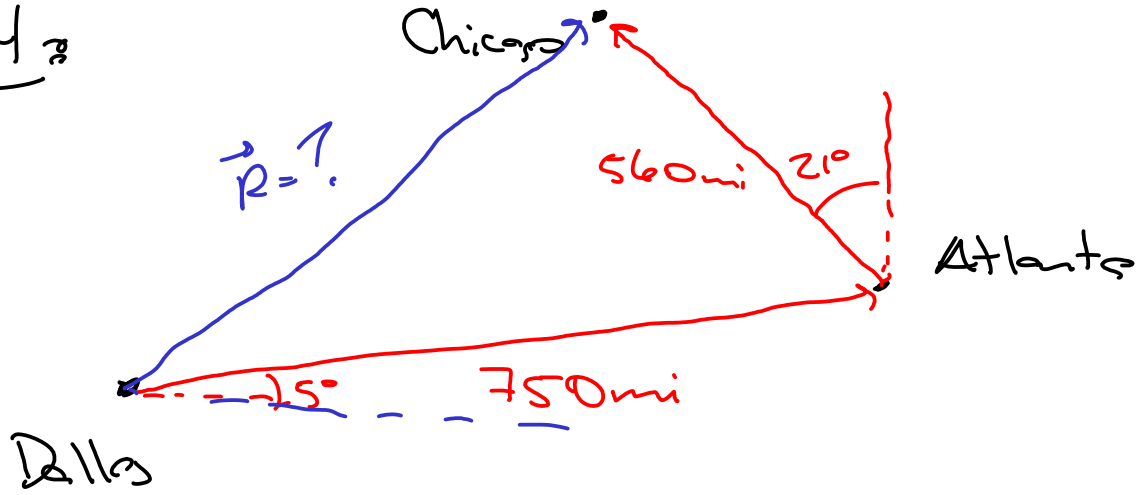
b) ~~$6\hat{i} - 8\hat{j}$~~ $= (v_{R/B})_x \hat{i} + (v_{R/B})_y \hat{j} +$ ~~$6\hat{i}$~~

$-8\hat{j} = (v_{R/B})_x \hat{i} + (v_{R/B})_y \hat{j}$

$(v_{R/B})_x = 0$

$(v_{R/B})_y = -8 m/s$

Tema 4:



$$\vec{R} = [(750\cos 25 - 560\sin 21)\hat{i} + (750\sin 25 + 560\cos 21)\hat{j}]\ mi$$

$$\vec{R} = (546.46\hat{i} + 588.17\hat{j})\ mi$$

$$(|R|, \theta) = (802.8\ mi, 47.1°)$$

↳ noreste de Dallas.

HT4

Ej 2

$$X = \frac{2v^2[\tan\alpha - \tan\beta]}{g\left(\frac{1}{\cos^2\alpha} - \frac{1}{\cos^2\beta}\right)}$$

Ej 3

$$R = \frac{2v_0^2 \operatorname{sen}\theta \cos(\theta+\phi)}{g\cos^2\phi}$$

Ej 4 Centro → (4, 6) m

Ej 5

a) 24 m/s Norte

b) 16 m/s Norte

c) 20.4 m/s

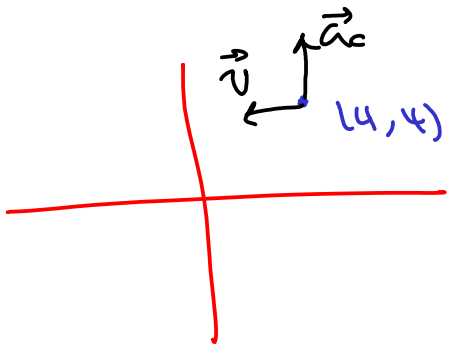
$\theta = 78.69°$ al Norte del Este.

Ej 4

$\vec{v} = -5\hat{x}\ m/s$

$\vec{a}_c = 12.5\hat{j}\ m/s^2$

$(4,4)\ m$



$$a_c = \frac{v^2}{R} \rightarrow R = \frac{v^2}{a_c} = 2m$$

$$Centro = (4,4) + (0,2) = (4,6)\ m$$