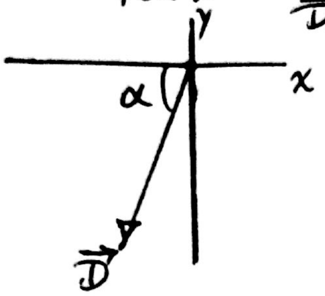
1) $\vec{A} = 100\cos(30°)N\hat{i} + 100\,\mathrm{Sen}(30°)N\hat{j} = 86{,}6N\hat{i} + 50\hat{j}$

$\vec{B} = -80\,\mathrm{Sen}(30°)N\hat{i} + 80\cos(30°)N\hat{j} = -40N\hat{i} + 69{,}28N\hat{j}$

$\vec{C} = -40\cos(53°)N\hat{i} - 40\,\mathrm{Sen}(53°)N\hat{j} = -24{,}1N\hat{i} - 31{,}9N\hat{j}$

$\vec{D} = -(\vec{A}+\vec{B}+\vec{C}) = -22{,}53N\hat{i} - 87{,}34\hat{j}$

$\Rightarrow |D| = 90{,}2N$ $\qquad \tan\alpha = \frac{D_y}{D_x} = \frac{87{,}34}{22{,}53} \Rightarrow \alpha = 75{,}54°$



5) a) $161\frac{km}{h}\left(\frac{1000m}{1km}\right)\left(\frac{1h}{60min}\right)\left(\frac{1min}{60s}\right) = 44{,}72\frac{m}{s}$

$1610\frac{km}{h}\left(\frac{1000m}{1km}\right)\left(\frac{1h}{60min}\right)\left(\frac{1min}{60s}\right) = 447{,}2\frac{m}{s}$

(i) $a = \frac{\Delta V}{\Delta t} = \frac{44{,}72\,m/s}{8s} = 5{,}59\frac{m}{s^2}$ $\qquad$ (ii) $a = \frac{447{,}2\,m/s - 44{,}72\,m/s}{60s - 8s} = 7{,}74\frac{m}{s^2}$

b) (i) $x_f - x_0 = \left(\frac{V_0 + V_f}{2}\right)\cdot t = \left(\frac{0 + 44{,}72\,m/s}{2}\right)\cdot 8s = 179m$

(ii) $x_f - x_0 = \left(\frac{44{,}72 + 447{,}2\,m/s}{2}\right)(52s) = 1{,}28\times10^4 m$

9) t: 0 − 14s $\quad x_f = \cancel{x_0}^{0} + \cancel{V_0 t}^{0} + \frac{1}{2}at^2 = \frac{1}{2}\left(1{,}6\frac{m}{s^2}\right)(14s)^2 = 157m$; $V_f = V_0 + at = \left(1{,}6\frac{m}{s^2}\right)\cdot 14s = 22{,}4\frac{m}{s}$

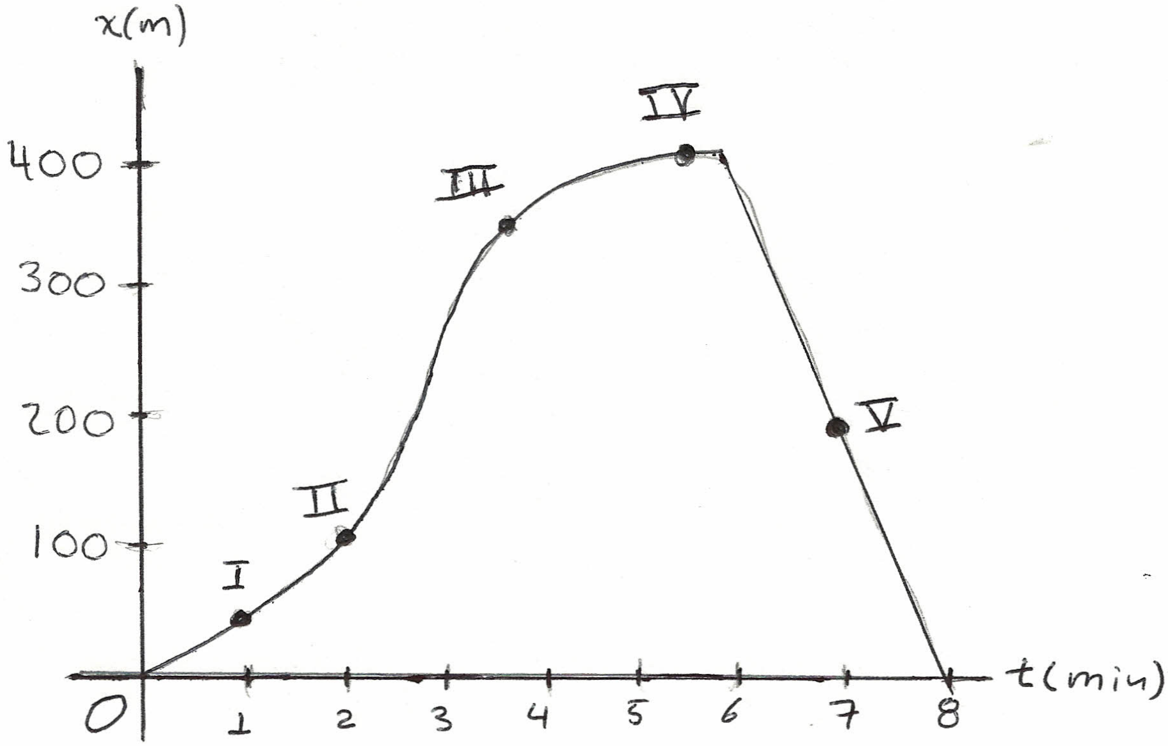
t: 14 − 70s $\quad x_f = x_0 + Vt = 157m + 22{,}4\frac{m}{s}\cdot(70s) = 1725m$

t: frenado. $\cancel{V_f^2}^{0} = V_0^2 + 2a(x_f - x_0) \Rightarrow x_f - x_0 = \frac{-V_0^2}{2a} = -\frac{(22{,}4\,m/s)^2}{2(-3{,}5\,m/s^2)} = 72m$

$\Rightarrow X_{Total} = 1725m + 72m = 1797m$

Scanned by CamScanner

Solución Ejercicio 4 (2,10)



a) ¿Velocidad igual a cero?

IV pendiente = 0

b) ¿Velocidad constante y positiva?

I pendiente constante y positiva.

c) ¿Velocidad constante y negativa?

V pendiente constante y negativa.

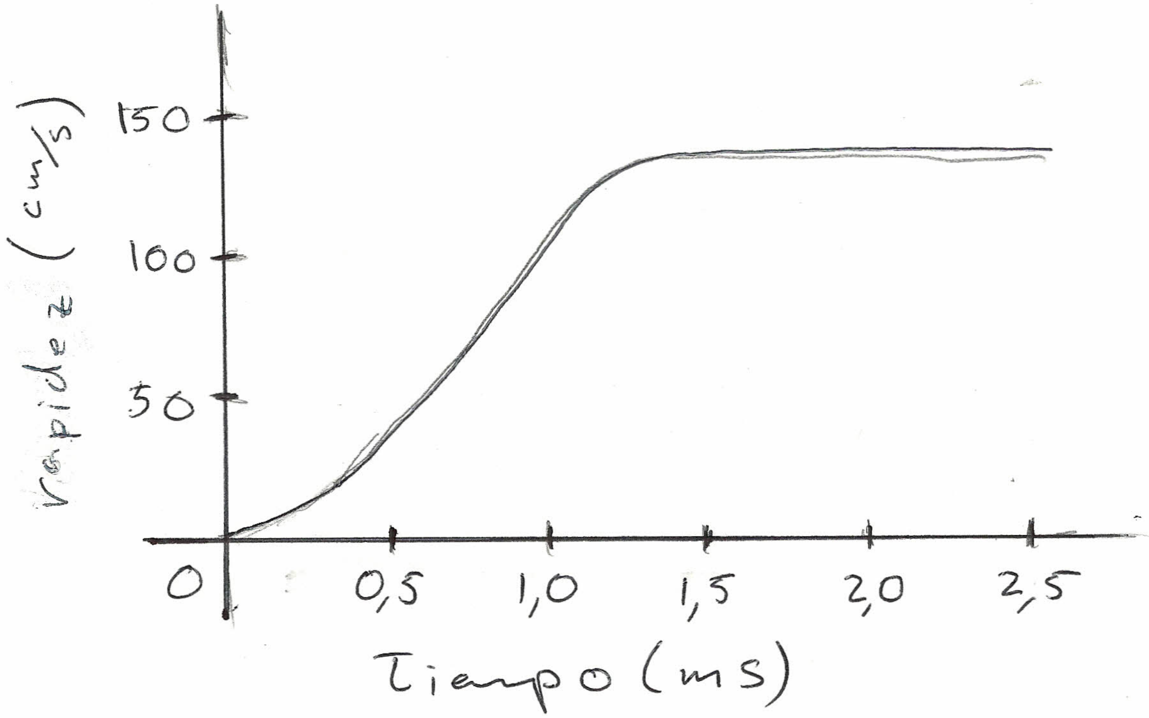
d) ¿Velocidad aumentando en magnitud?

II pendiente aumentando.

e) ¿Velocidad disminuyendo en magnitud?

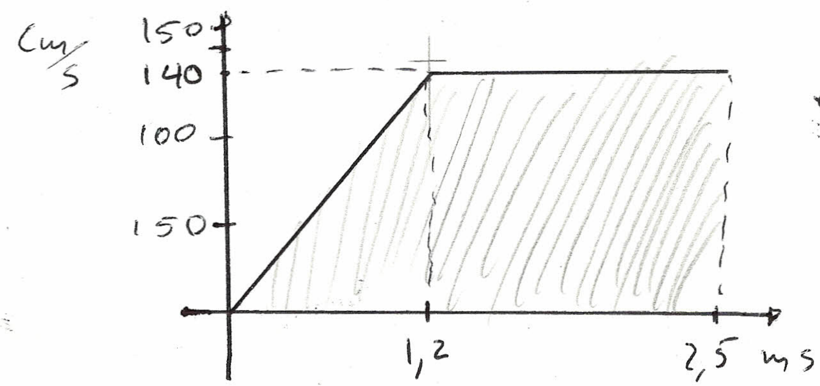
III pendiente disminuyendo.

Solución Ejercicio 8
(2,54)



a) Sí, después de los 1,2 ms la rapidez es cte $\Rightarrow a = 0$

b) Usando una aproximación:

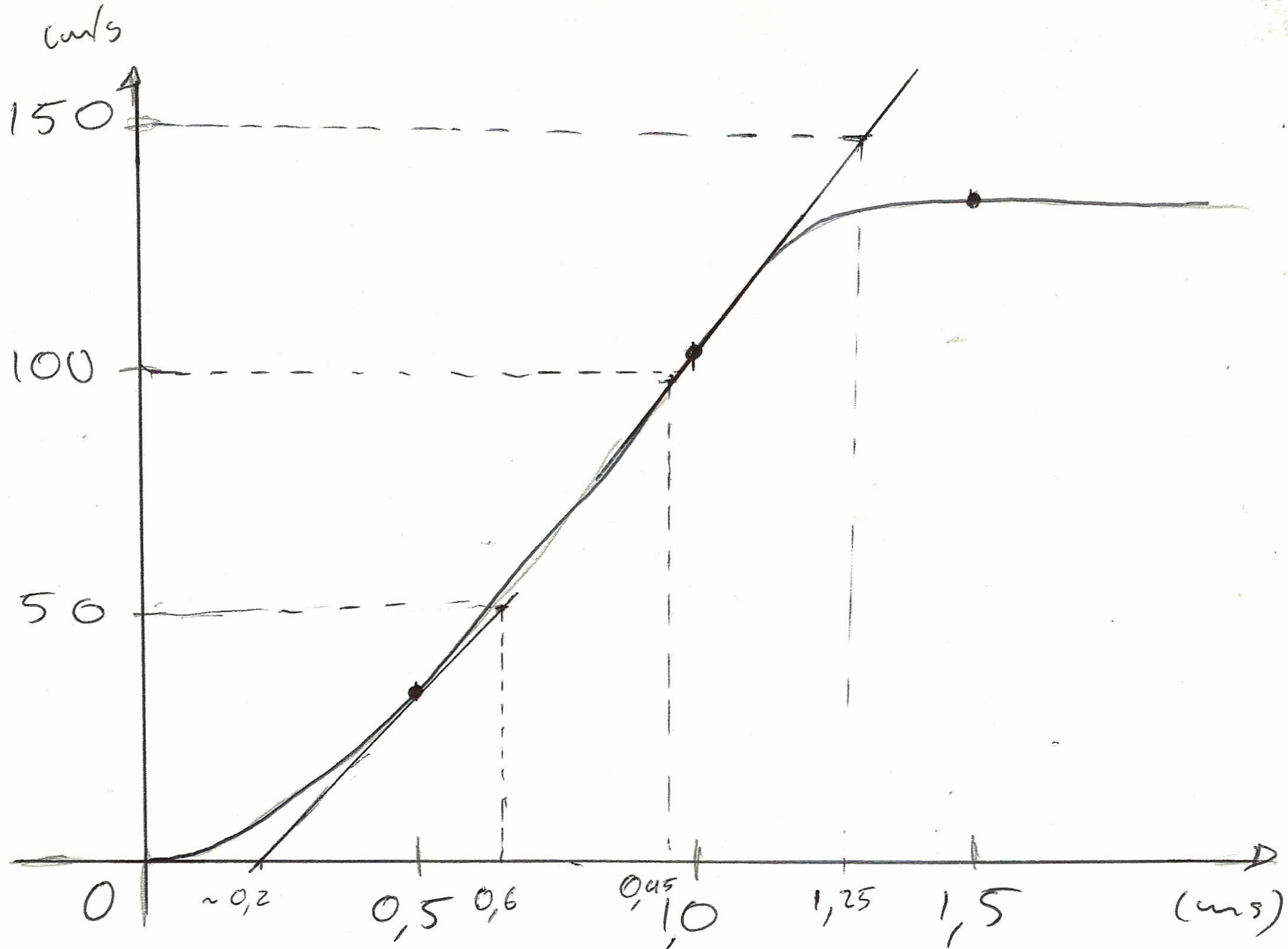


Calculando el área bajo la curva

$$\triangle = \frac{1{,}2\,\text{ms} \times 0{,}14 \frac{\text{cm}}{\text{ms}}}{2} = 0{,}084\,\text{cm}$$

$$\boxed{} = (2{,}5-1{,}2)\,\text{ms} \times 0{,}14 \frac{\text{cm}}{\text{ms}} = 0{,}182\,\text{cm}$$

$$\triangle + \boxed{} = 0{,}266\,\text{cm}$$



c) pendiente en 0,5 ms

$$m(0{,}5\,ms) = \frac{0{,}050\,\frac{cm}{ms} - 0\,\frac{cm}{ms}}{0{,}6\,ms - 0{,}2\,ms} = 0{,}125\,\frac{cm}{ms^2}$$

$$\Rightarrow a(t = 0{,}5\,ms) = 0{,}125\,\frac{cm}{ms^2}$$

$$m(1{,}0\,ms) = \frac{0{,}140\,\frac{cm}{ms} - 0{,}100\,\frac{cm}{ms}}{1{,}25\,ms - 0{,}95\,ms} = 0{,}13\,\frac{cm}{ms^2}$$

$$\Rightarrow a(t = 1{,}0\,ms) = 0{,}13\,\frac{cm}{ms^2}$$

$$m(1{,}5\,ms) = 0$$

$$\Rightarrow a(t = 1{,}5\,ms) = 0$$

d) Calculando areas de manera similar al numeral b

$$d(0{,}5ms) = \frac{0{,}5ms \times 0{,}035 \frac{cm}{ms}}{2} = 0{,}008cm$$

$$d(1{,}0ms) = \frac{1{,}0ms \times 0{,}105 \frac{cm}{ms}}{2} = 0{,}052cm$$

$$d(1{,}5ms) = \frac{1{,}2ms \times 0{,}140 \frac{cm}{ms}}{2} + 0{,}3ms \times 0{,}140 \frac{cm}{ms}$$

$$= 0{,}084\,cm + 0{,}042cm$$

$$= 0{,}126\,cm$$

(2.8) $v = \frac{dx}{dt}$

$x(t) = 28.0m + (12.4\frac{m}{s})t - (0.0450\frac{m}{s^2})t^3 \ldots$

$\Rightarrow v(t) = 12.4\frac{m}{s} - 3(0.0450\frac{m}{s^2})t^2$

$= 12.4\frac{m}{s} - 0{,}135\frac{m}{s^2}t^2$

$\therefore v(t = 8.00s) = 12.4\frac{m}{s} - 0.135\frac{m}{s^2}(8.00s)^2 = \boxed{3.76\frac{m}{s}}$

(2.42) $\Delta\vec{y} = \vec{v}_{0y}\Delta t + \vec{a}\frac{\Delta t^2}{2}$

(a) Supongamos que el movimiento del ladrillo está en $\hat{j}$.

$\cancel{y_f}^{0}\hat{j} - y_0\hat{j} = \cancel{v_{0y}\Delta t}^{0} + \frac{\Delta t^2}{2}(-g\hat{j})$

$\therefore -y_0\hat{j} = -g\frac{\Delta t^2}{2}\hat{j}$ $\quad\therefore y_0 = +9.8\frac{m}{s^2}\frac{(2.50s)^2}{2} = \boxed{30.6\ m}$

(b) $a = \frac{|v_f^2 - v_0^2|}{2|\Delta y|}$ ó $\vec{a} = \frac{\vec{v}_f - \vec{v}_0}{\Delta t}$

Usemos la segunda: $\vec{v}_f = \vec{a}\Delta t + \cancel{\vec{v}_0}^{0}$

$\therefore \vec{v}_f = (2.50s)(9.8\frac{m}{s^2})(-\hat{j}) = \boxed{24.5\frac{m}{s^{\cancel{2}}}(-\hat{j})}$

(c)