PAUTA AUX #1

P1

$r_T = 6378\ km \rightarrow r_{eH} \approx 3189\ km$

$$V_{esf_H} = \frac{4}{3}\pi (r_{eH})^3 = \frac{4\pi}{3}(3189)^3 = 135847661568\ km^3 \approx 1.35 \cdot 10^{11}\ Km^3$$

$V_c = \ell_{cable}\, \pi (r_c)^2$

tomando: $r_c \approx 3\ mm$

CONDICIÓN

$V_c = V_{eH}$

Volumen del cable = Vol. de la esfera

$$\Rightarrow \frac{4\pi}{3}(3189)^3 \underbrace{(1000\ m)^3}_{(1\ Km)^3} = \ell\, \pi\, (3)^2 \underbrace{(10^{-3}\ m)^2}_{(1\ mm)^2}$$

↳ pasamos a metros

$$\Rightarrow \frac{(3189)^3 \cdot 10^9}{9 \cdot 10^{-6}} = \ell$$

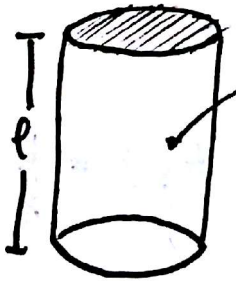
$$\Rightarrow \boxed{\frac{(3189)^3 \cdot 10^{15}}{9} = \ell}$$

OJO
TODO ESTÁ EN METROS

P2

10 Km/litro ⟷

$\ell = 10\ Km$



$V = 1$ litro $= 10^{-3}\ m^3$

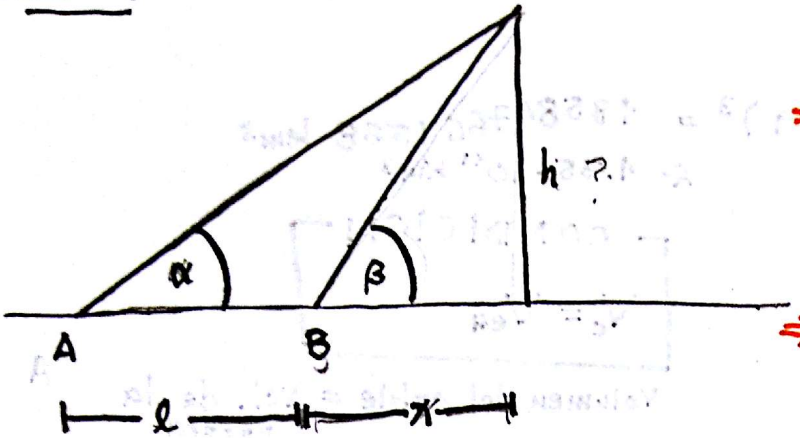
$d = 2r$

$$\ell \pi r^2 = 10^{-3}\ m^3$$

$$r^2 = \frac{10^{-3}\ m^3}{\ell \pi}$$

P3

CASO 1:



$\Rightarrow tg\,\alpha = \frac{h}{\ell + x} \Rightarrow \boxed{x + \ell = \frac{h}{tg\,\alpha} \quad (1)}$

$\Rightarrow tg\,\beta = \frac{h}{x}$

nos damos este x...
y procuramos hacerlo desaparecer :)

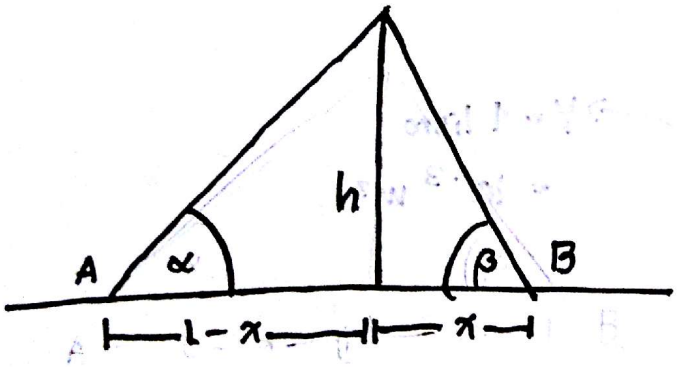
$$\boxed{x = \frac{h}{tg\,\beta} \quad (2)}$$

(2) en (1) $\quad \frac{h}{tg\,\beta} + \ell = \frac{h}{tg\,\alpha}$

$$h\left(\frac{1}{tg\,\beta} - \frac{1}{tg\,\alpha}\right) = \ell$$

$$\boxed{h = \frac{\ell}{cotg\,\alpha - cotg\,\beta}}$$

CASO 2:



$tg\,\beta = \frac{h}{x} \Rightarrow x = \frac{h}{tg\,\beta} = h\,cotg\,\beta \quad (1)$

$tg\,\alpha = \frac{h}{L - x} \Rightarrow L - x = \frac{h}{tg\,\alpha} = h\,cotg\,\alpha \quad (2)$

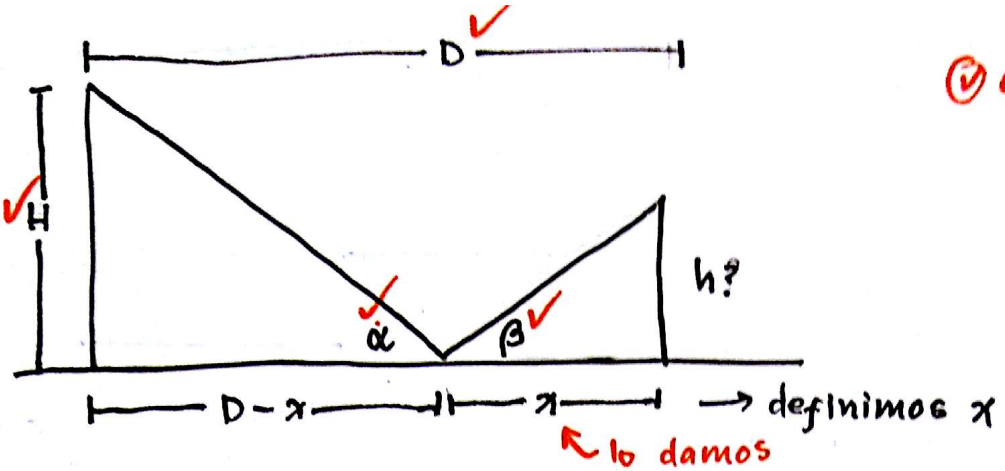
(1) en (2):

$L - h\,cotg\,\beta = h\,cotg\,\alpha$

$L = h\,(cotg\,\alpha + cotg\,\beta)$

$$\boxed{h = \frac{L}{cotg\,\alpha + cotg\,\beta}}$$

P4



✓ conocidos

$$tg\,\alpha = \frac{H}{D-x} \quad (1) \Rightarrow D - x = H\,\text{cotg}\,\alpha \quad (3)$$

$$tg\,\beta = \frac{h}{x} \quad (2) \Rightarrow x = h\,\text{cotg}\,\beta \quad (4)$$

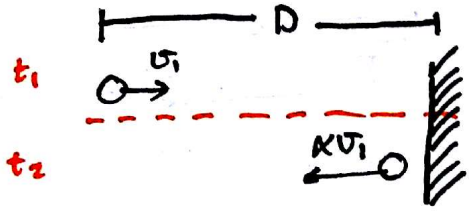
} trabajamos

(4) en (3) $\Rightarrow$ $D - h\,\text{cotg}\,\beta = H\,\text{cotg}\,\alpha$

$\Leftrightarrow$ $h\,\text{cotg}\,\beta = D - \text{cotg}\,\alpha$

$\Leftrightarrow$ $h = \dfrac{D - \text{cotg}\,\alpha}{\text{cotg}\,\beta}$

P5



$t_1 \equiv$ tiempo de ida

$t_2 \equiv$ tiempo de vuelta

$$v = \frac{d}{t} \Rightarrow v_1 = \frac{D}{t_1} \Rightarrow \boxed{t_1 = \frac{D}{v_1}}$$

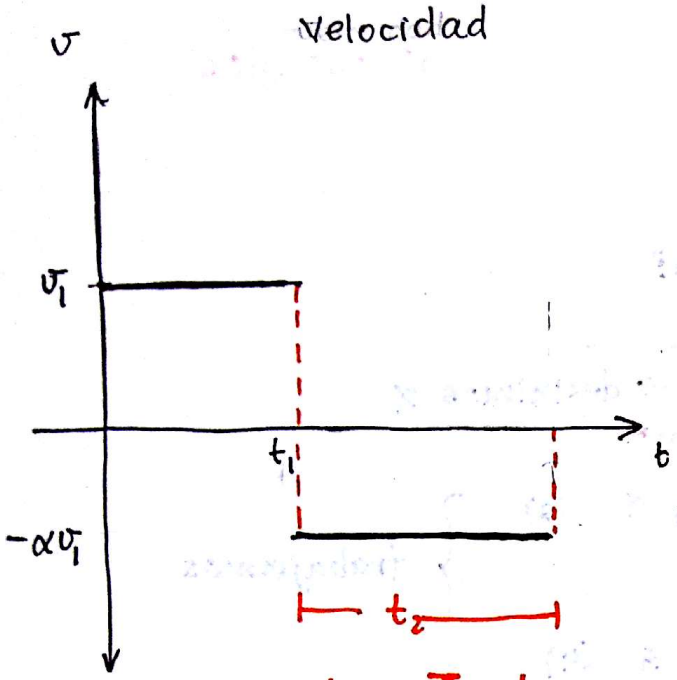
$$\Rightarrow v_2 = \frac{D}{t_2} \Rightarrow t_2 = \frac{D}{v_2} = \frac{D}{\alpha v_1} = \boxed{\frac{1}{\alpha}\,t_1}$$

$$\boxed{t_1 + t_2 = T} \Rightarrow \frac{1}{\alpha}\,t_1 + t_1 = T$$

TIEMPO TOTAL

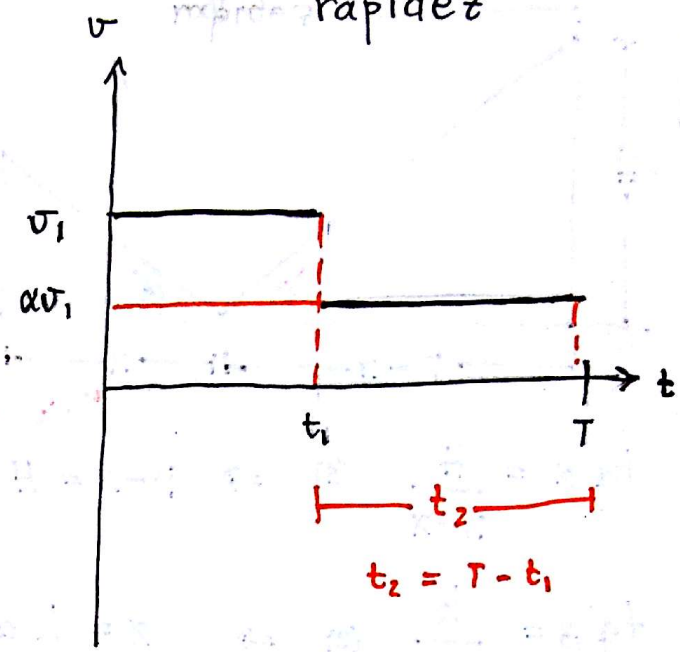
$$\Rightarrow T = t_1\left(\frac{1}{\alpha} + 1\right) \Rightarrow \boxed{\frac{D}{v_1}\left(\frac{\alpha+1}{\alpha}\right) = T}$$

velocidad



$t_2 = T - t_1$

rapidez



$t_2 = T - t_1$