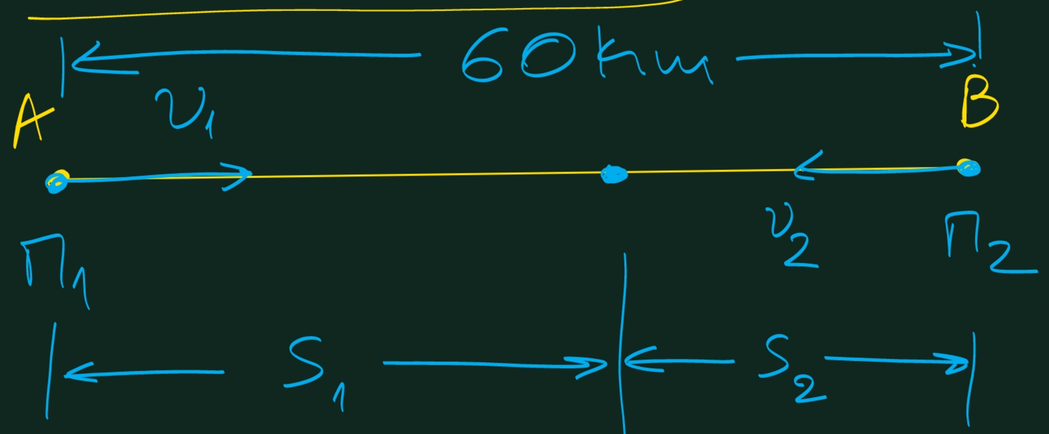
## Ασκ. 3.74 (Ποδηλάτες)




Έστω ότι συναντώνται μετά από χρόνο $t = 1h$.

$s_1 = v_1 t = v_1 \cdot 1 = v_1$ km

$s_2 = v_2 t = v_2 \cdot 1 = v_2$ km

$s_1 + s_2 = 60$ km $\Rightarrow$ $\boxed{v_1 + v_2 = 60}$

Αν ο $\Pi_1$ χρειαστεί χρόνο $t_1$ για να πάει από την Α στη Β, ο $\Pi_2$ θα χρειαστεί χρόνο

$$t_2 = t_1 + 1,5 \ (h)$$

για να πάει από τη Β στην Α.

Γενικά: $v = \frac{s}{t} \Rightarrow s = vt \Rightarrow t = \frac{s}{v}$

$$t_2 = t_1 + 1,5 \Rightarrow \frac{s}{v_2} = \frac{s}{v_1} + 1,5 \Rightarrow$$

$$\frac{60}{v_2} = \frac{60}{v_1} + 1,5 \Rightarrow \frac{40}{v_2} = \frac{40}{v_1} + 1$$

$$\frac{v_1}{40} \cdot \frac{v_2}{v_2} = \frac{40}{v_1} + \frac{1}{1} \Rightarrow \frac{40v_1}{v_1 v_2} = \frac{40v_2}{v_1 v_2} + \frac{v_1 v_2}{v_1 v_2} \Rightarrow$$

$$\boxed{40v_1 = 40v_2 + v_1 v_2}$$

$$40v_1 = 40v_2 + v_1 v_2 \quad \Big| \Rightarrow \quad 40v_1 = 40(60 - v_1) + v_1(60 - v_1) \Rightarrow$$
$$v_1 + v_2 = 60$$

$$40v_1 = 2400 - 40v_1 + 60v_1 - v_1^2 \Rightarrow$$

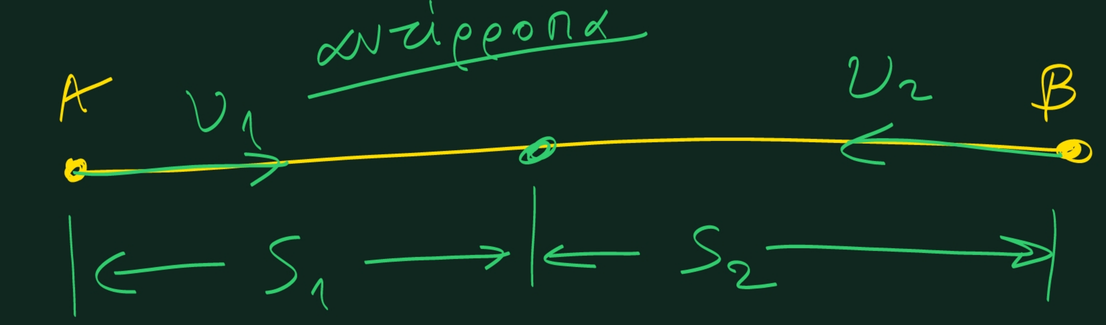
$$v_1^2 - 60v_1 + 40v_1 + 40v_1 - 2400 = 0 \Rightarrow$$

$$v_1^2 + 20v_1 - 2400 = 0$$

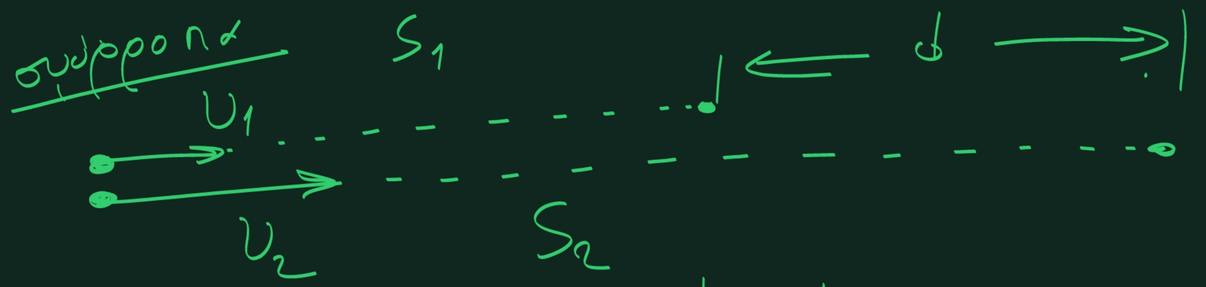
$$\Delta = 20^2 + 4 \cdot 2400 = 400 + 9600 = 10.000$$

$$v_{1,2} = \frac{-20 \pm 100}{2} \begin{cases} \nearrow 40 \text{ Km/h δεκτή} \\ \searrow -60 \text{ Km/h απορρ.} \end{cases}$$

Άρα: $v_1 = 40$ Km/h και $v_2 = 60$ Km/h.




$s_1 + s_2 = d \Rightarrow v_1 t + v_2 t = d$




$s_2 - s_1 = d \Rightarrow v_2 t - v_1 t = d$

Εξίσωση κίνησης.

$x = x_0 + v \cdot t$

$x_0$ = αρχική θέση

$v$ = ταχύτητα.

$10 m/s = 36 km/h$