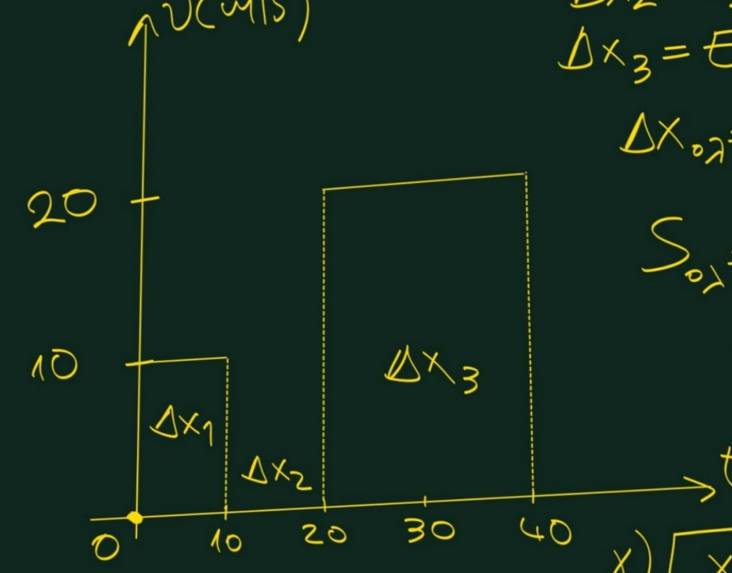
Ασκ. 3 σελ. 69)



α) $\Delta x_1 = E_1 = 10 \cdot 10 = 100\ m$

$\Delta x_2 = E_2 = 10 \cdot 0 = 0\ m$

$\Delta x_3 = E_3 = 20 \cdot 20 = 400\ m$

$\Delta x_{ολ} = \Delta x_1 + \Delta x_2 + \Delta x_3 = S_{ολ} \Rightarrow$

$S_{ολ} = 500\ m$

β) $U_μ = \frac{S_{ολ}}{t_{ολ}} = \frac{500}{40} = 12,5\ m/s.$

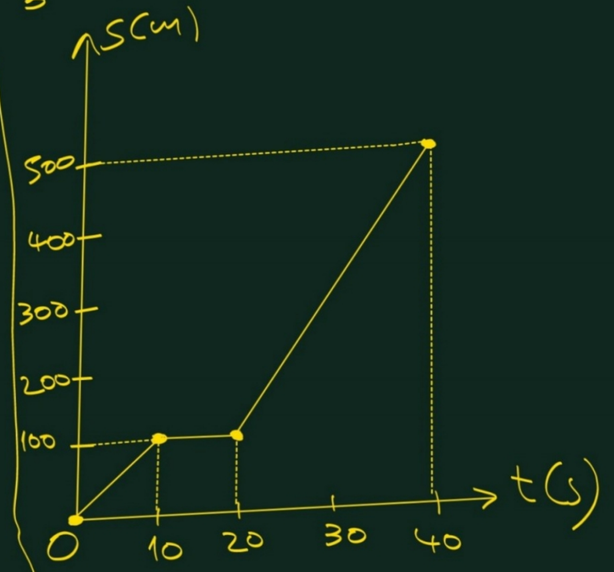
γ)

$X = U \cdot t$	εξίσωση κίνησης
$S = Ut$	εξίσωση διαστήματος

$S_1 = |\Delta x_1| = 100\ m$

$S_2 = 0\ m$

$S_3 = |\Delta x_3| = 400\ m$



Διάγραμμα θέσης-χρόνου

$0 \rightarrow 10$

$\Delta x_1 = 100\,m$

$x(0) = 0\,m$

$\Delta x_1 = x(10) - x(0) \Rightarrow$

$100 = x(10) - 0 \Rightarrow$

$x(10) = 100\,m$

$10 \rightarrow 20$

$\Delta x_2 = 0\,m$

$\Delta x_2 = x(20) - x(10) \Rightarrow$

$0 = x(20) - 100 \Rightarrow x(20) = 100\,m$

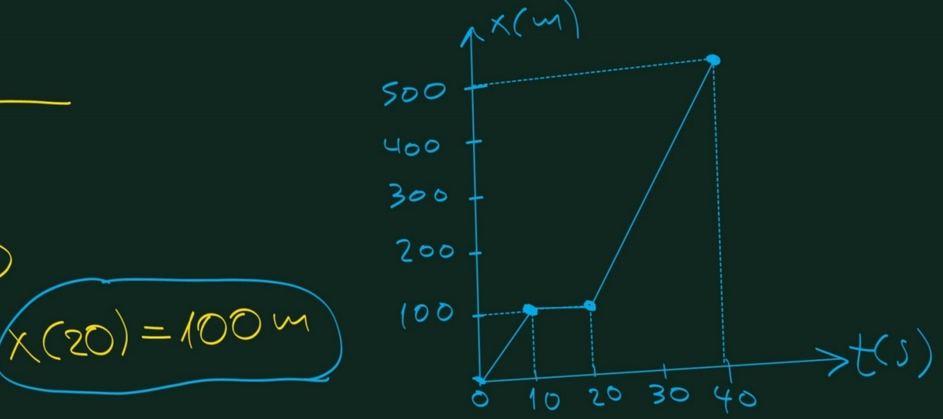
$20 \rightarrow 40\,sec$

$\Delta x_3 = 400\,m$

$\Delta x_3 = x(40) - x(20) \Rightarrow$

$400 = x(40) - 100 \Rightarrow$

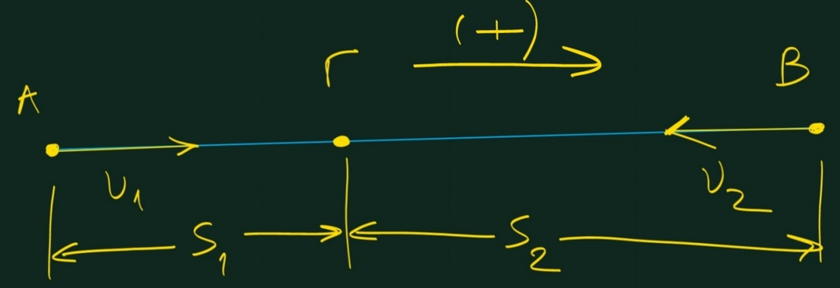
$x(40) = 500\,m$



Ασκ. 4 σελ. 69.

Α. $v_1 = 36\ km/h = \frac{36.000\ m}{3.600\ sec} = 10\ m/s.$

$v_2 = 54\ km/h = \frac{54.000\ m}{3.600\ sec} = 15\ m/s.$



$S_1 + S_2 = 1000\ m.$

$S_1 = v_1 t$

$S_2 = v_2 t$

$\Rightarrow S_1 + S_2 = 1000 \Rightarrow$

$v_1 t + v_2 t = 1.000 \Rightarrow$

$10t + 15t = 1000 \Rightarrow$

$\frac{25t}{25} = \frac{1000}{25} \Rightarrow t = 40\ sec$

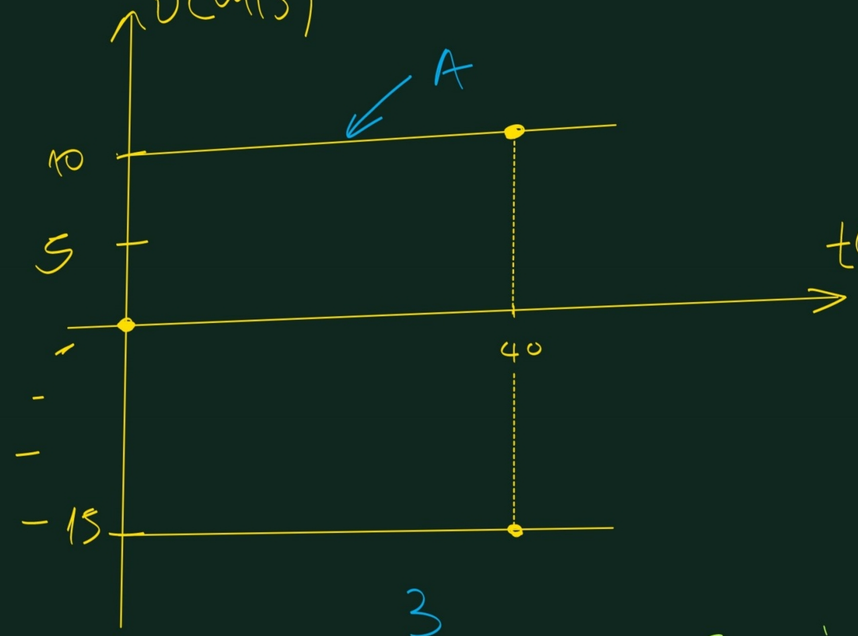
Χρόνος συνάντησης

Σημείο συνάντησης

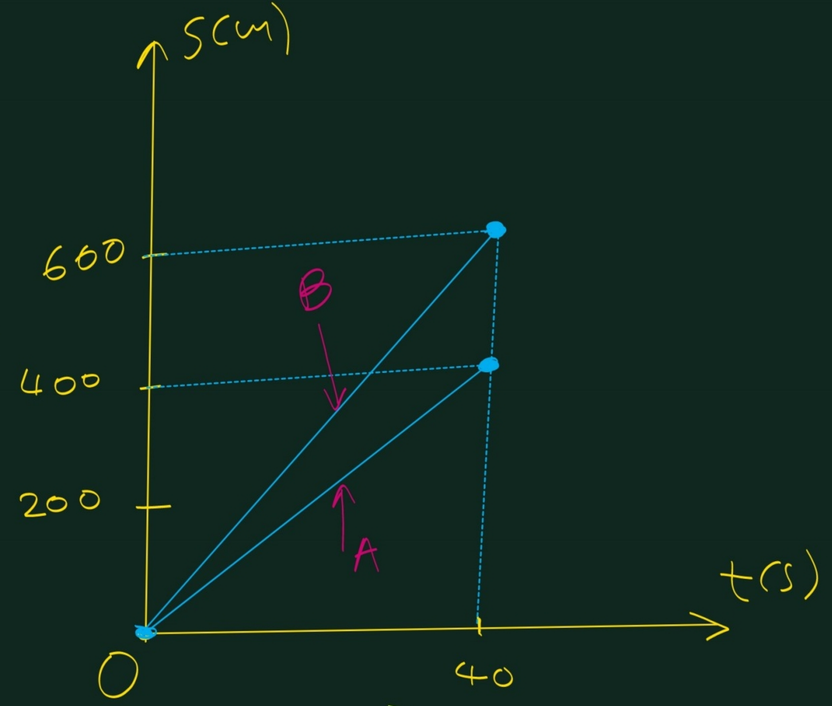
$S_1 = v_1 t = 10 \cdot 40 = 400\ m$

$S_2 = v_2 t = 15 \cdot 40 = 600\ m$

Β. Διάγραμμα υ-t (αλγεβρικά)

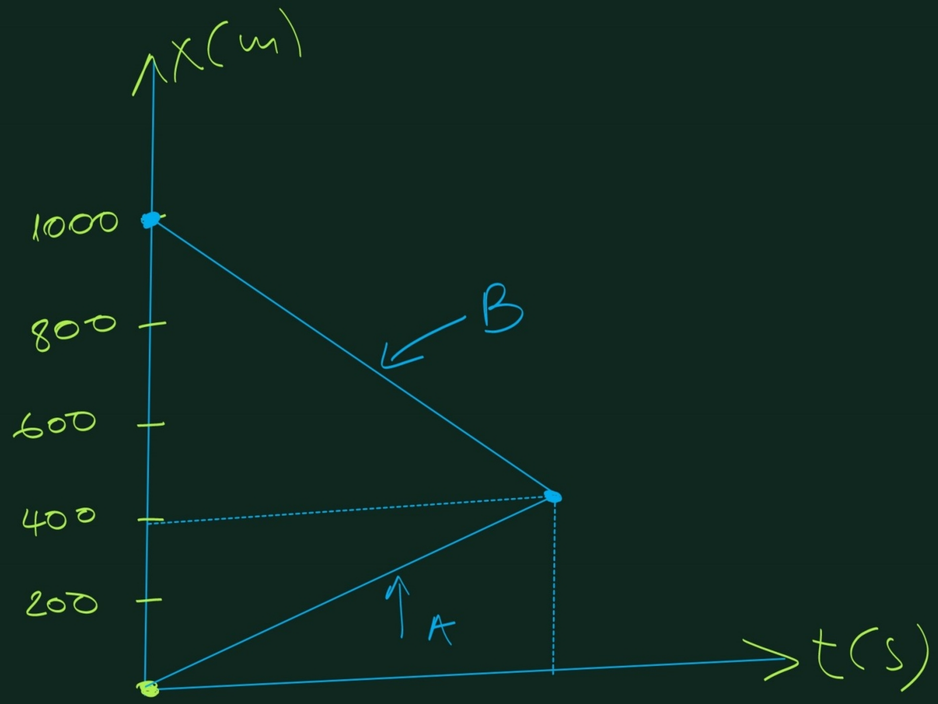


3



Το Α ξεκινά από τη θέση $X=0$

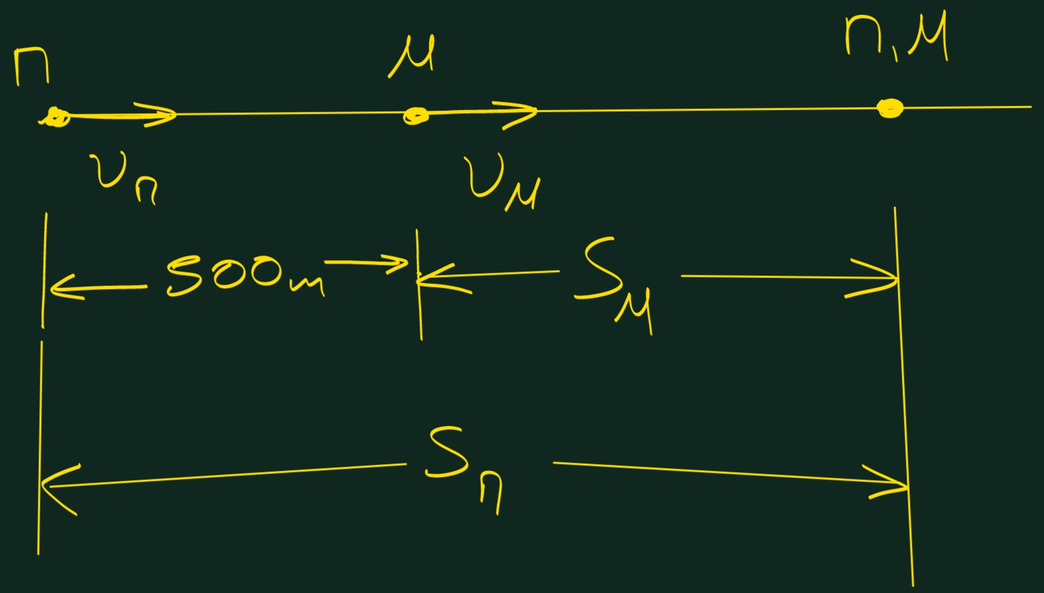
Το Β " " " " $X=1000\,m$


x(m)
1000
800
600
400
200
B
A
t(s)

Ασκ. 5 σελ. 69.)

$v_n = 30\ m/s$.

$v_M = 20\ m/s$.



$S_n = v_n \cdot t = 30t$

$S_M = v_M \cdot t = 20t$

$S_n - S_M = 500 \Rightarrow$

$30t - 20t = 500 \Rightarrow$

$10t = 500 \Rightarrow$

$t = 50\ sec.$

$S_n = v_n \cdot t = 30 \cdot 50 \Rightarrow$

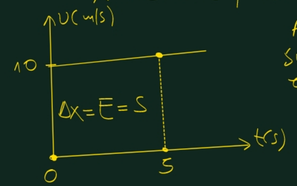
$S_n = 1500\ m$

Ασκ. 6 σελ 69

$x = 10t$ (SI)

Γενικά: $x = x_0 + \upsilon t$ $\Rightarrow$ $x_0 = 0m$ (αρχική θέση), $\upsilon = 10 m/s$ (ταχύτητα)

$x = 0 + 10t$



Από το εμβαδόν στο διάγραμμα υ-t, βρίσκουμε τη μετατόπιση

$\Delta x = S = 10 = 50 m$.

Ασκ. 3.73

$x = 5 + 3t$ (SI)

α) $x = x_0 + \upsilon t$

Άρα: $x_0 = 5m$ (αρχική θ) και $\upsilon = 3 m/s$

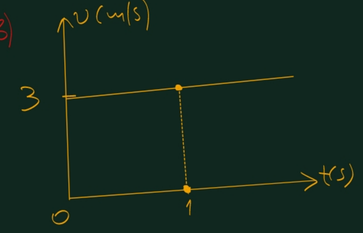
1ο δευτερόλεπτο (0→1)

$\upsilon = \frac{\Delta x}{\Delta t} \Rightarrow 3 = \frac{\Delta x}{1} \Rightarrow \Delta x = 3m$.

2ος τρόπος $x(t) = 5 + 3t$ $\Rightarrow$ $x(0) = 5 + 3 \cdot 0 = 5 = x_0$, $x(1) = 5 + 3 \cdot 1 = 8m$

$\Delta x = x(1) - x(0) = 8 - 5 = 3m$

β)



γ) $x_0 = 0 = x(0)$

$\upsilon' = 6 m/s$

$x = x_0 + \upsilon' t \Rightarrow$

$x = 0 + 6t \Rightarrow$

$x = 6t$ (SI)

Ασκ. 3.74

$x = 12 - t$ (SI)

α) $x = 12 - t \Rightarrow$

$0 = 12 - t_1 \Rightarrow$

$t_1 = 12 sec$

β) 5 πρώτα δευτερόλεπτα (0→5)

$\upsilon = \frac{\Delta x}{\Delta t} \Rightarrow -1 = \frac{\Delta x}{5} \Rightarrow \Delta x = -5m$.