

Αδμ. 3.73.)

$$X = 5 + 3t \text{ (SI)}$$

Γενική εξίσωση θέσης:

$$X = x_0 + vt \quad | \quad x_0 = 5\text{m (αρχική θέση)}$$

$$X = 5 + 3t \quad | \quad \Rightarrow \quad v = 3\text{m/s (ταχύτητα)}$$

α) $0 \rightarrow 1$

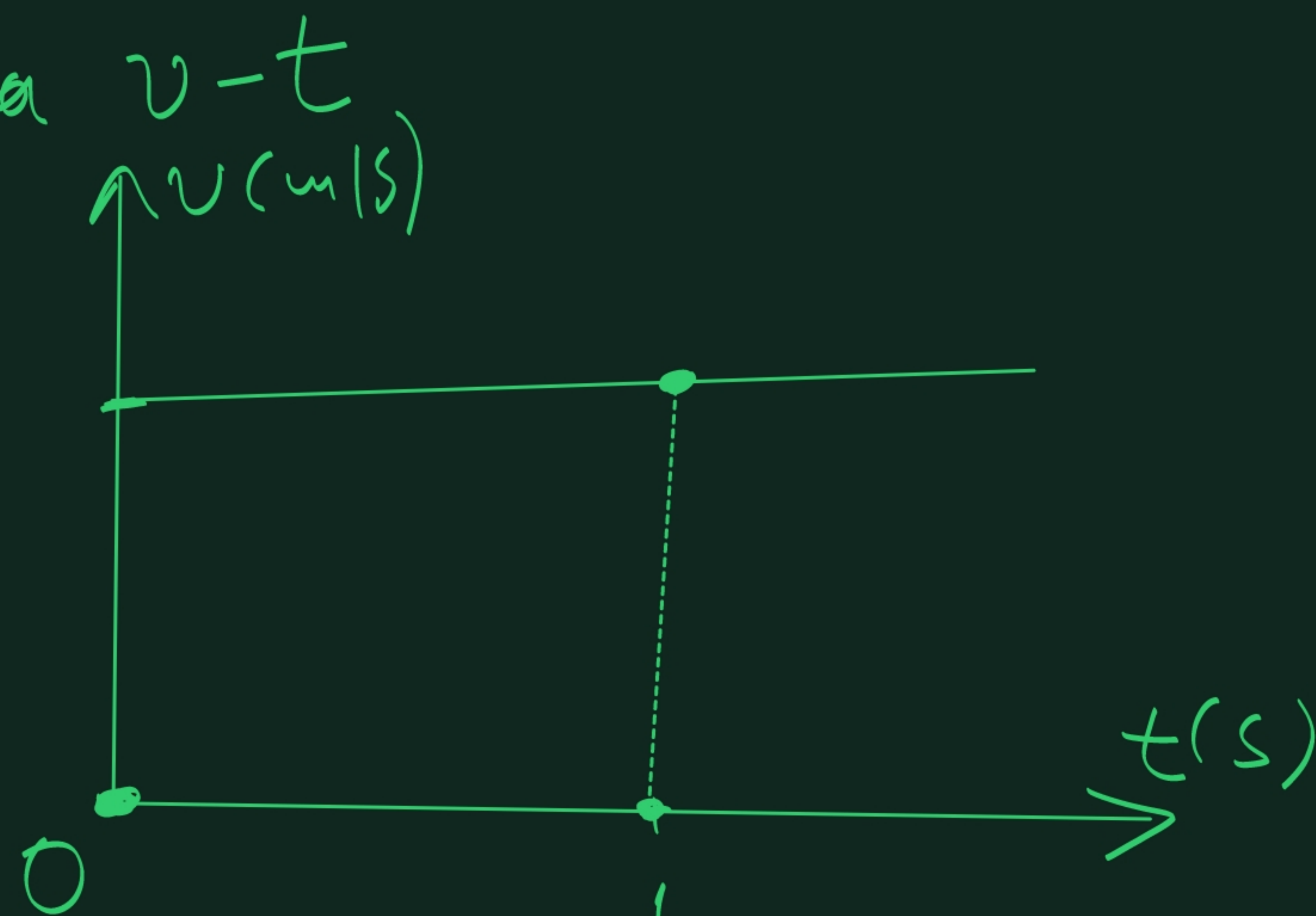
1^ο δωτερόλεπτο

$$\Delta t = 1 \text{ sec}$$

$$v = \frac{\Delta x}{\Delta t} \Rightarrow 3 = \frac{\Delta x}{1} \Rightarrow \Delta x = 3\text{m}$$

β) Διάγραμμα $v-t$

3



γ) $x_0 = 0\text{m}$

$$v = 2 \cdot 3 = 6\text{m/s}$$

$$\text{Αρα: } X = x_0 + vt \Rightarrow X = 0 + 6t = 6t \text{ (SI)}$$

β' τρόπο

$$X(t) = x_0 + vt$$

Αρα:

$$X(t) = 5 + 3t$$

$$X(0) = 5\text{m}$$

$$X(1) = 5 + 3 \cdot 1 = 8\text{m}$$

$$\Rightarrow \Delta x = X(1) - X(0) \Rightarrow \Delta x = 8 - 5 = 3\text{m}$$

Ex. 3.74)

$$x = 12 - t \quad (\text{SI})$$

$$x = x_0 + vt$$

$$x = 12 + (-1) \cdot t$$

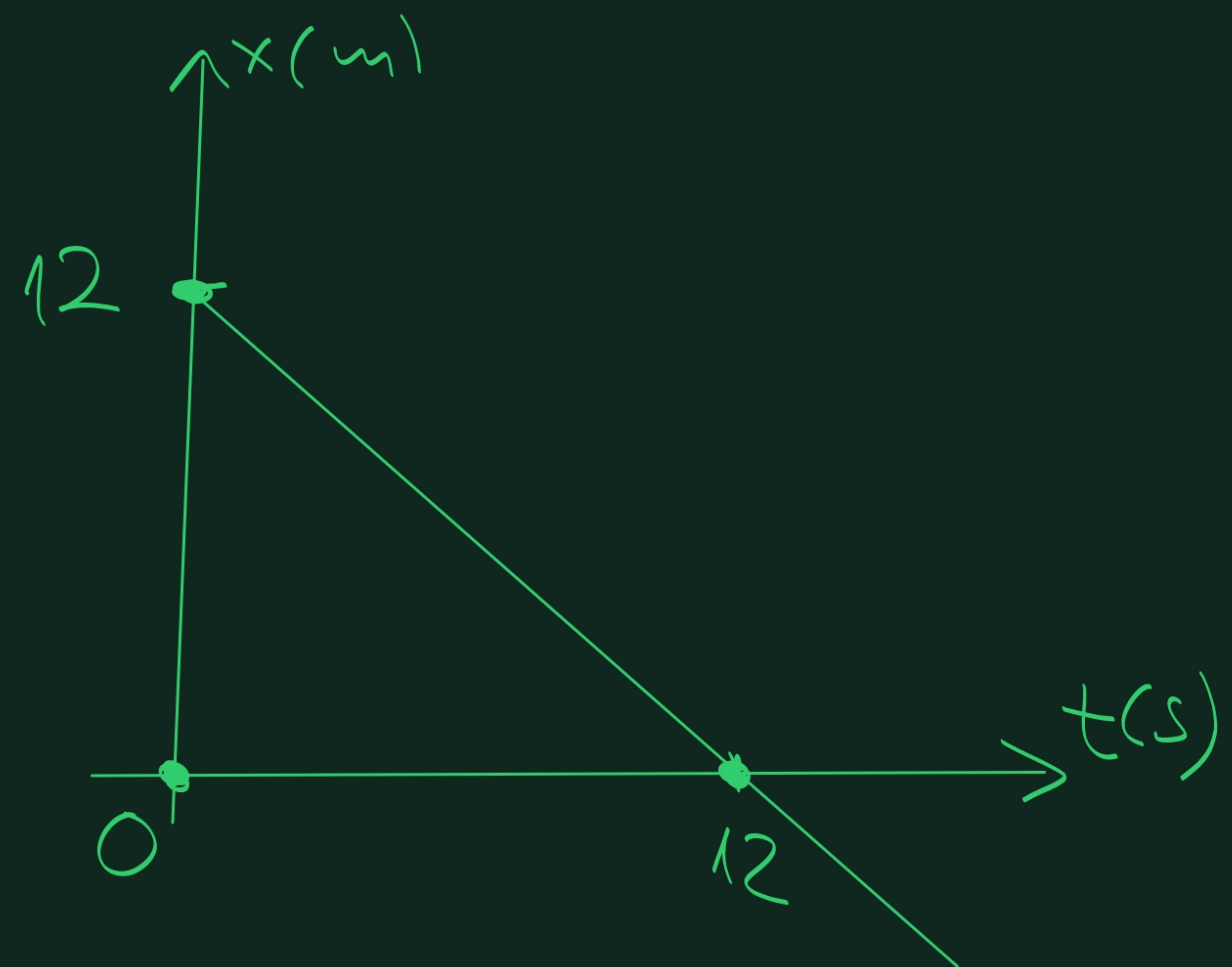
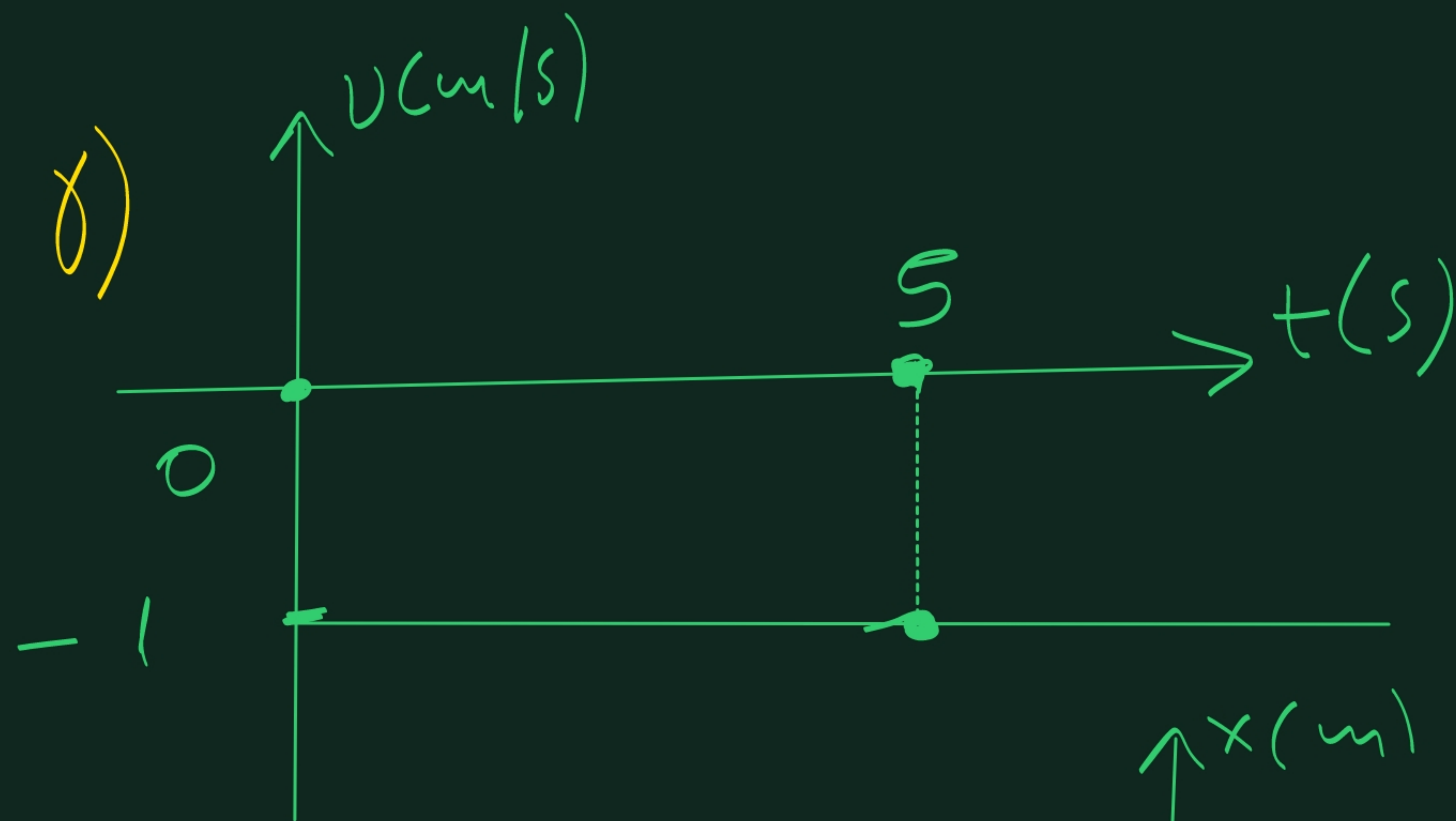
Apex: $x_0 = 12 \text{ m}$ (apex 0 s)

$$v = -1 \text{ m/s} \quad (\text{negative})$$

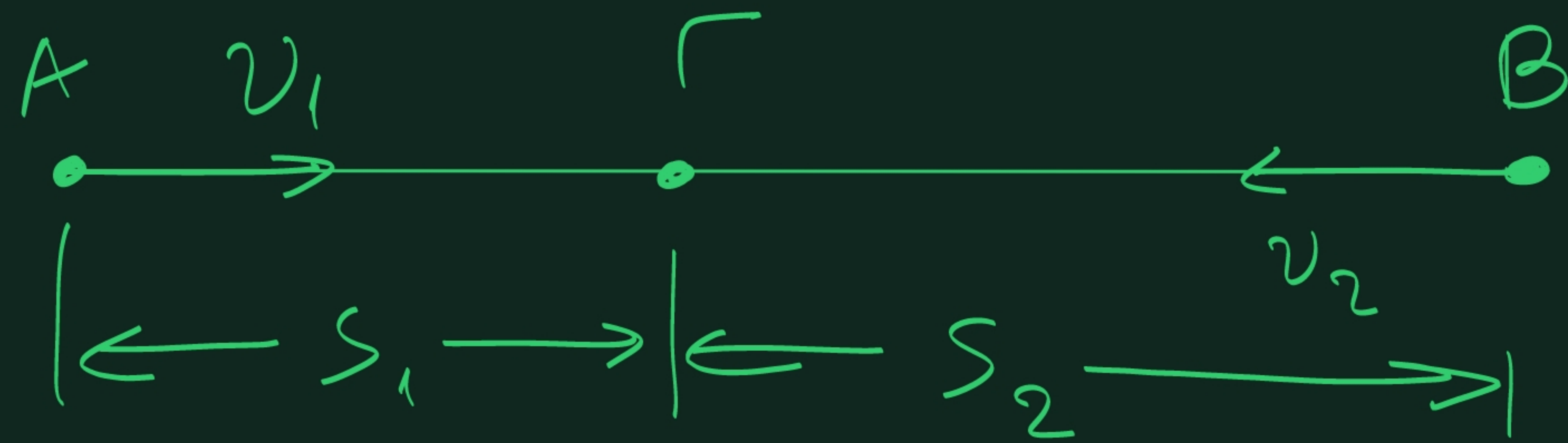
a) $x = 0 \Rightarrow$
 $12 - t_1 = 0 \Rightarrow$
 $t_1 = 12 \text{ sec}$

b) $0 \rightarrow 1 \rightarrow 2 \rightarrow 3 \rightarrow 4 \rightarrow 5$
 $1^{\circ} \quad 2^{\circ} \quad 3^{\circ} \quad 4^{\circ} \quad 5^{\circ}$
 $\Delta t = 5 \text{ sec}$

$$v = \frac{\Delta x}{\Delta t} \Rightarrow -1 = \frac{\Delta x}{5} \Rightarrow \Delta x = -5 \text{ m}$$



Αβλ. 3.44 (Ποδυνάμεις)



$$AB = 60 \text{ km}$$

$$s_1 = v_1 t = v_1 \cdot 1 = v_1 \text{ km}$$

$$s_2 = v_2 t = v_2 \cdot 1 = v_2 \text{ km}$$

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

$$\Delta = 400 + 4 \cdot 2400 = 10.000$$

$$t_1 = \frac{60}{v_1} \quad (\text{o A})$$

$$t_2 = \frac{60}{v_2} = t_1 + 1,5 \quad (\text{o B})$$

Αρα: $v_1 = 40 \text{ km/h}$
και $v_2 = 20 \text{ km/h}$.

$$\text{Αρα: } t_2 = t_1 + 1,5 \Rightarrow \frac{60}{v_2} = \frac{60}{v_1} + 1,5 \Rightarrow$$

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

$$40v_1 = 40v_2 + v_1 v_2 \Rightarrow$$

$$40v_1 = 40(60 - v_1) + v_1(60 - v_1) \Rightarrow$$

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

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

$$v_1 = \frac{-20 \pm 100}{2} \rightarrow \frac{80}{2} = 40 \text{ km/h δευτή}$$

$$\rightarrow \frac{-120}{2} = -60 \text{ km/h (απορρ)}$$