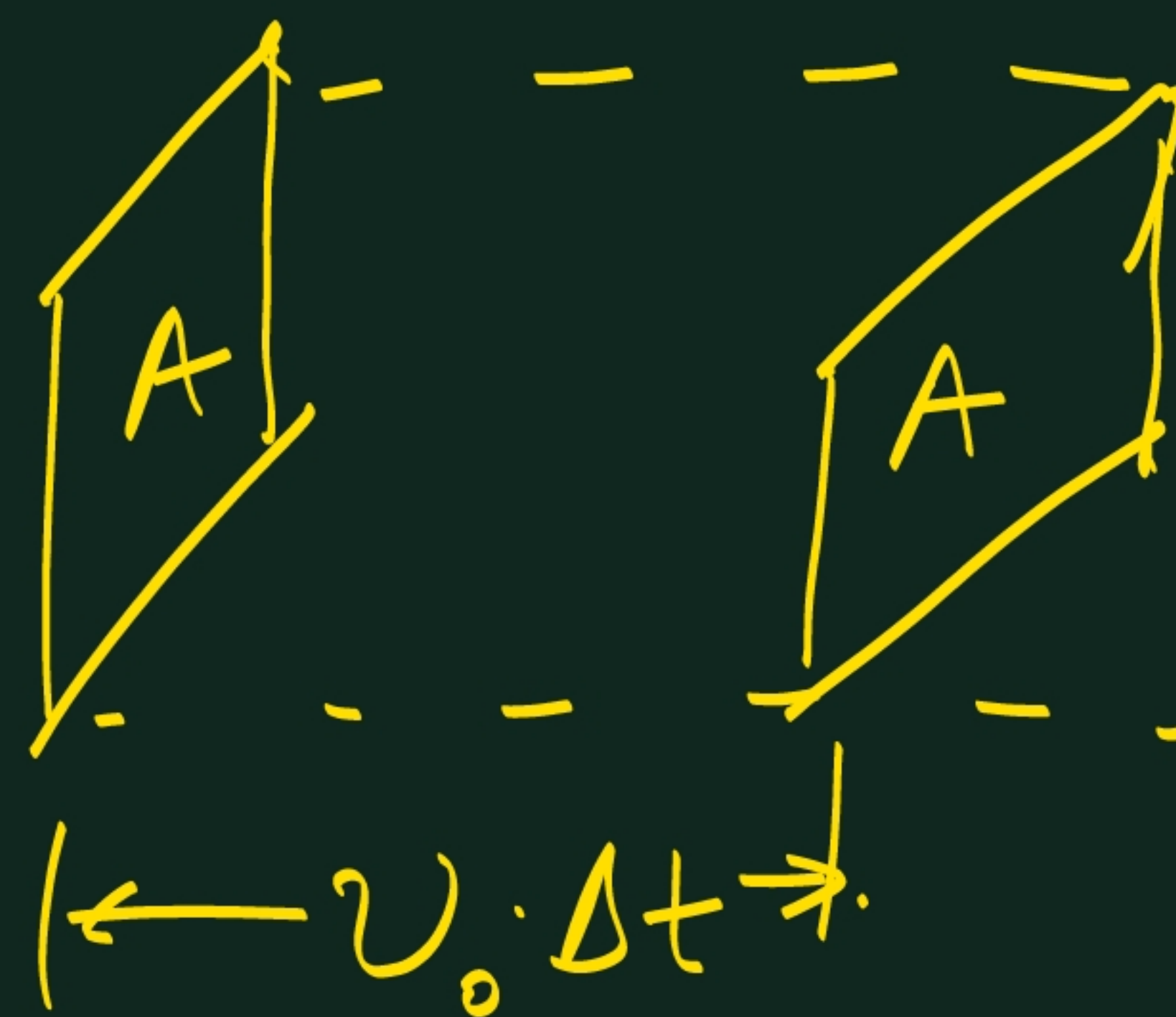
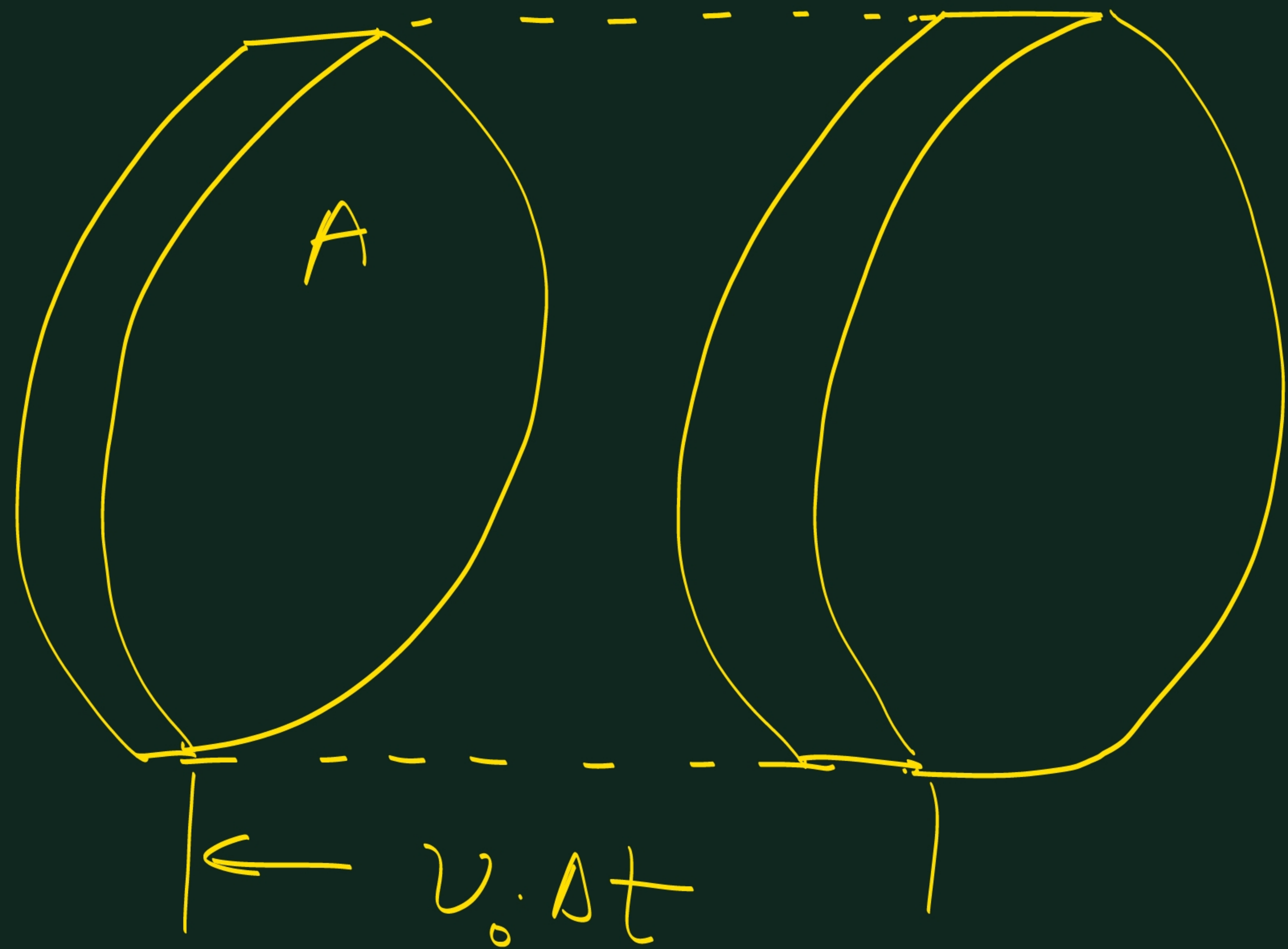


Αβυ. 2.62



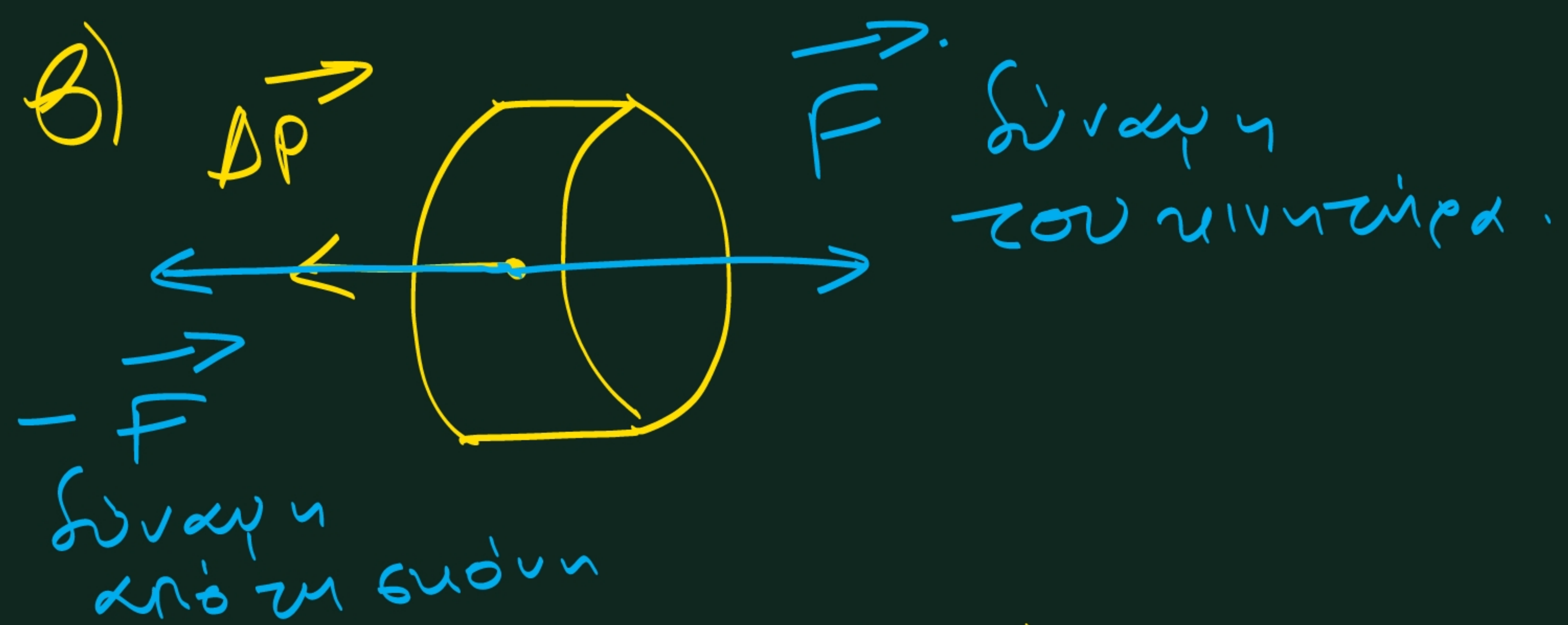
α) Σε χρόνο Δt το εμβαδό
της υστέρωνης επιφάνειας
παρνει όγκο

$$\Delta V = A \cdot v_0 \cdot \Delta t$$

Αρα η μόνη που προσολλάται
έχει γάρφα:

$$\Delta m = \rho \cdot \Delta V = \rho A v_0 \cdot \Delta t$$

$$\text{Αν } \Delta t = 2 \text{ sec τότε: } \Delta m = 10^{-3} \cdot 2 \cdot 10^4 \cdot 2 = 4 \cdot 10 = 40 \text{ kg} \quad \text{Σωστό το (ii)}$$



Η υεταβολή ορής είναι:

$$\Delta p = \Delta m \cdot v_0 = \rho A v_0 \cdot \Delta t \cdot v_0 =$$

$$\frac{\Delta p}{\Delta t} = \rho A v_0^2 = F \Rightarrow$$

$$F = 10^{-3} \cdot 2 \cdot 10^8 = 2 \cdot 10^5 \text{ N}$$

Σωστό το (γ)

Αδ. 2.61

Το m_1 πριν την υρούση έχει ταχύτητα:

$$v_1 = \frac{\Delta x_1}{\Delta t} = \frac{8-0}{4-0} = 2 \text{ m/s}$$

Το m_2 πριν την υρούση έχει ταχύτητα:

$$v_2 = \frac{\Delta x_2}{\Delta t} = \frac{8-8}{4-0} = 0 \text{ m/s}$$

Μετά την υρούση το m_1 έχει ταχύτητα:

$$v'_1 = \frac{\Delta x'_1}{\Delta t'} = \frac{0-8}{12-4} = -1 \text{ m/s}$$

$$v_2' = \frac{\Delta x_2'}{\Delta t'} = \frac{16-8}{12-4} = 1 \text{ m/s.}$$

Αρα: $m_1 = 1 \text{ kg.}$

$$v_1 = 2 \text{ m/s.}$$

$$v_1' = -1 \text{ m/s.}$$

$$v_2' = 1 \text{ m/s.}$$

$$K_{\text{πριν}} = \frac{1}{2} m_1 v_1^2 = \frac{1}{2} \cdot 1 \cdot 4 = 2 \text{ Joule.}$$

Αρα η υρούση είναι
ελάχιστη. Σωστό το (β).

$$K_{\text{μετά}} = \frac{1}{2} m_1 v_1'^2 + \frac{1}{2} m_2 v_2'^2 =$$

$$= \frac{1}{2} \cdot 1 \cdot 1 + \frac{1}{2} \cdot m_2 \cdot 1 =$$

$$= \frac{1+m_2}{2}$$

$$P_{\text{πριν}} = P_{\text{μετά}} =$$

$$m_1 v_1 + m_2 v_2 = m_1 v_1' + m_2 v_2' \Rightarrow$$

$$1 \cdot 2 = 1 \cdot (-1) + m_2 \cdot 1 \Rightarrow$$

$$2 = -1 + m_2 \Rightarrow m_2 = 3 \text{ kg.}$$

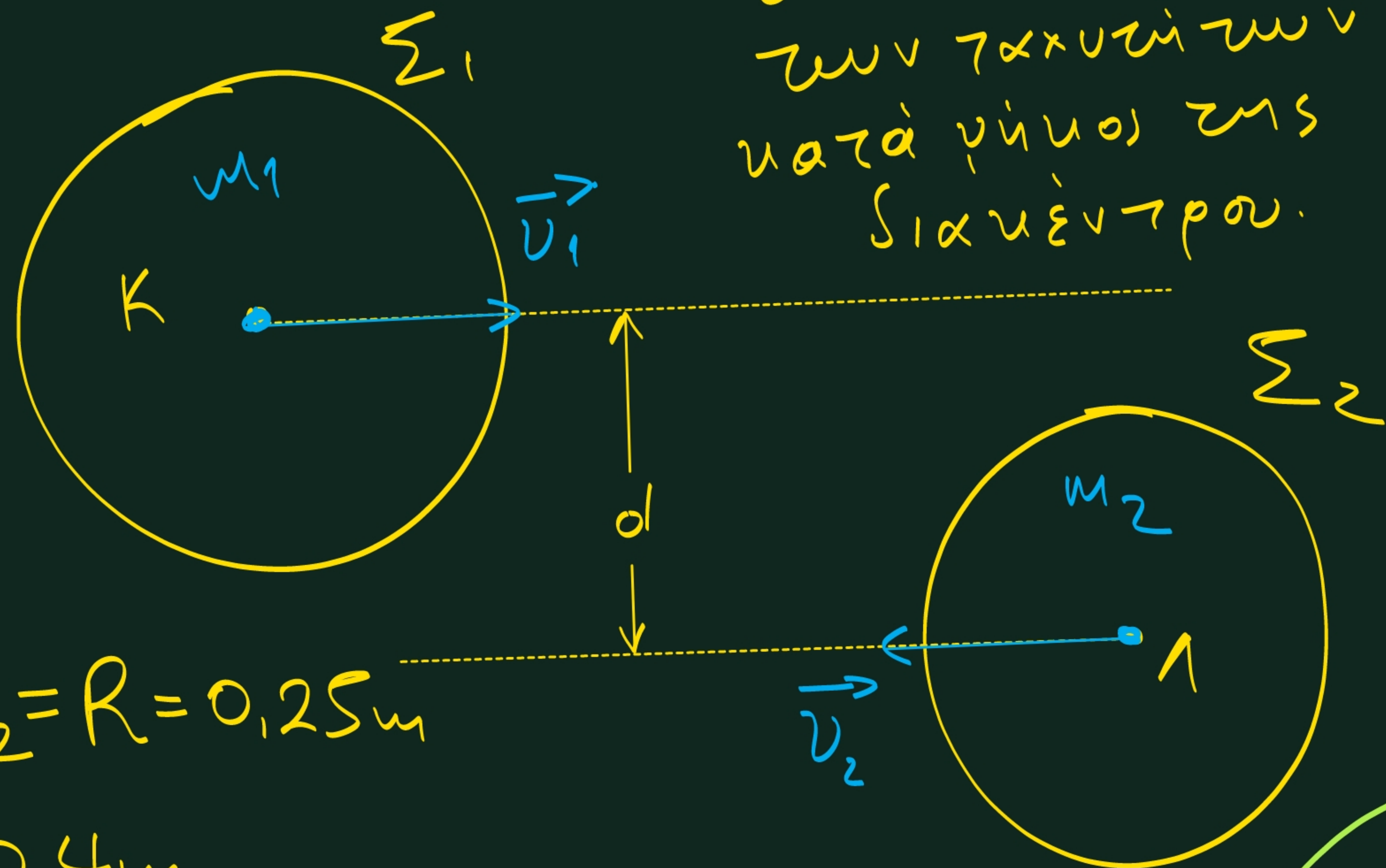
$$\text{Αρα: } K_{\text{μετά}} = \frac{1+3}{2} = 2 \text{ Joule}$$

Α6υ. 2.179.)

Μας ενδιαφέρουν
οι συνιστώσες
των ταχυτήτων
κατά μήκος της
διαμέτρου.

$$\omega\theta = \frac{d}{2R} = \frac{0,4}{0,5} = 0,8$$

$$\cos\theta = 0,6$$



$$R_1 = R_2 = R = 0,25\text{m}$$

$$d = 0,4\text{m}$$

$$m_1 = 1\text{kg}$$

$$m_2 = 2\text{kg}$$

$$v_1 = 5\text{m/s} \quad v_2 = 10\text{m/s}$$



$$v_{1x} = v_1 \cos\theta = 5 \cdot 0,6 = 3\text{m/s}$$

$$|v_{2x}| = v_2 \cos\theta = 10 \cdot 0,6 = 6\text{m/s}$$

$$v_{1y} = v_1 \omega\theta = 5 \cdot 0,8 = 4\text{m/s}$$

$$v_{2y} = v_2 \omega\theta = 10 \cdot 0,8 = 8\text{m/s}$$

$$\vec{F}_1 = -\vec{F}_2$$

Οι συνιστώσες v_{1y} και v_{2y} των
ταχυτήτων δεν αλλάζουν, επειδή η υπόθεση είναι κεντρική.

$$a) v'_{1x} = \frac{m_1 - m_2}{m_1 + m_2} v_{1x} + \frac{2m_2}{m_1 + m_2} v_{2x}$$

$$v'_{2x} = \frac{2m_1}{m_1 + m_2} v_{1x} + \frac{m_2 - m_1}{m_1 + m_2} v_{2x}$$

$$m_1 = 1 \text{ kg}$$

$$m_2 = 2 \text{ kg}$$

$$v_{1x} = 3 \text{ m/s}$$

$$v_{2x} = -6 \text{ m/s (α 2 δεβρινα)}$$

$$v'_{1x} = \frac{1-2}{1+2} \cdot 3 + \frac{4}{1+2} \cdot (-6) \Rightarrow$$

$$\Rightarrow v'_{1x} = -1 - \frac{24}{3} = -\frac{27}{3} = -9 \text{ m/s}$$

$$v'_{2x} = \frac{2}{1+2} \cdot 3 + \frac{2-1}{1+2} (-6) =$$

$$= 2 - 2 = 0$$

$$\text{Αρα: } v'_2 = \sqrt{v'^2_{2x} + v'^2_{2y}} = \sqrt{0^2 + 8^2} \Rightarrow$$

$$v'_2 = 8 \text{ m/s}$$

$$v'_{2y} = v_{2y} =$$

$$= 8 \text{ m/s}$$

επειδι

δεν

αλλάζει

$$b) v_2' = 8 \text{ m/s.}$$

$$v_2 = 10 \text{ m/s.}$$

$$K_{2, \text{npiv}} = \frac{1}{2} m_2 v_2^2 = \frac{1}{2} \cdot 2 \cdot 100 = 100 \text{ J.}$$

$$K_{2, \text{yeyx}} = \frac{1}{2} m_2 v_2'^2 = \frac{1}{2} \cdot 2 \cdot 64 = 64 \text{ J.}$$

$$\eta\% = \frac{\Delta K_2}{K_{2, \text{npiv}}} \cdot 100 = \frac{K_{2, \text{yeyx}} - K_{2, \text{npiv}}}{K_{2, \text{npiv}}} \cdot 100 =$$

$$= \frac{64 - 100}{100} \cdot 100 = -36\%$$

$$8) \vec{p}_1 + \vec{p}_2 = 67 \alpha \theta \Rightarrow$$

$$\Delta \vec{p}_1 + \Delta \vec{p}_2 = \vec{0} \Rightarrow \Delta \vec{p}_1 = -\Delta \vec{p}_2 \Rightarrow$$

$$|\Delta \vec{p}_1| = |\Delta \vec{p}_2|$$

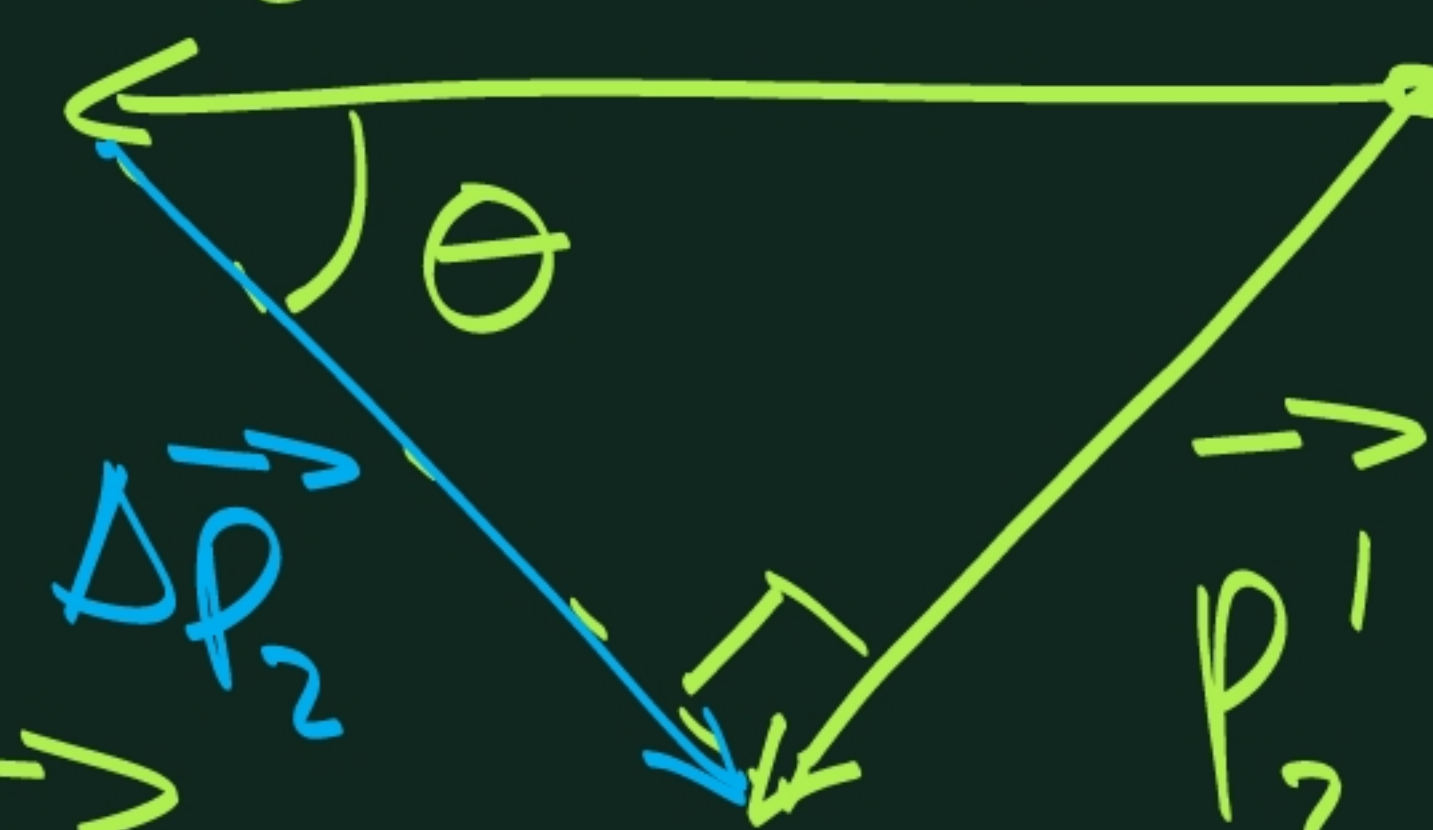
$$p_{2, \text{npiv}} = m_2 v_2 = 20 \text{ kg} \cdot \text{m/s}$$

$$p_{2, \text{yeyx}} = m_2 v_2' = 16 \text{ kg} \cdot \text{m/s.}$$

$$\vec{p}_2 = \vec{p}_{2, \text{npiv}}$$

$$|\Delta \vec{p}_2|^2 = |\vec{p}_2|^2 -$$

$$|\vec{p}_2'|^2 =$$



$$p_2 = p_{2, \text{yeyx}} = 20^2 - 16^2 = 400 - 256$$

$$\Rightarrow |\Delta \vec{p}_2|^2 = 144 \Rightarrow |\Delta \vec{p}_2| = 12 \text{ kg} \cdot \text{m/s.}$$

$$\vec{p}_{2, \text{yeyx}} = \vec{p}_{2, \text{npiv}} + \Delta \vec{p}_2$$

А60. 3. 57 ($\Sigma \times BB$) 632.124)

$$m = 2 \text{ kg}.$$

$$v_1 = 40 \text{ m/s}.$$

$$\varphi = \pi/6.$$

$$M = 10 \text{ kg}.$$

$$v_2 = 2 \text{ m/s}.$$

$$v_1' = 10\sqrt{3} \text{ m/s}.$$

$$\Theta = \frac{\pi}{3} \text{ rad}$$

