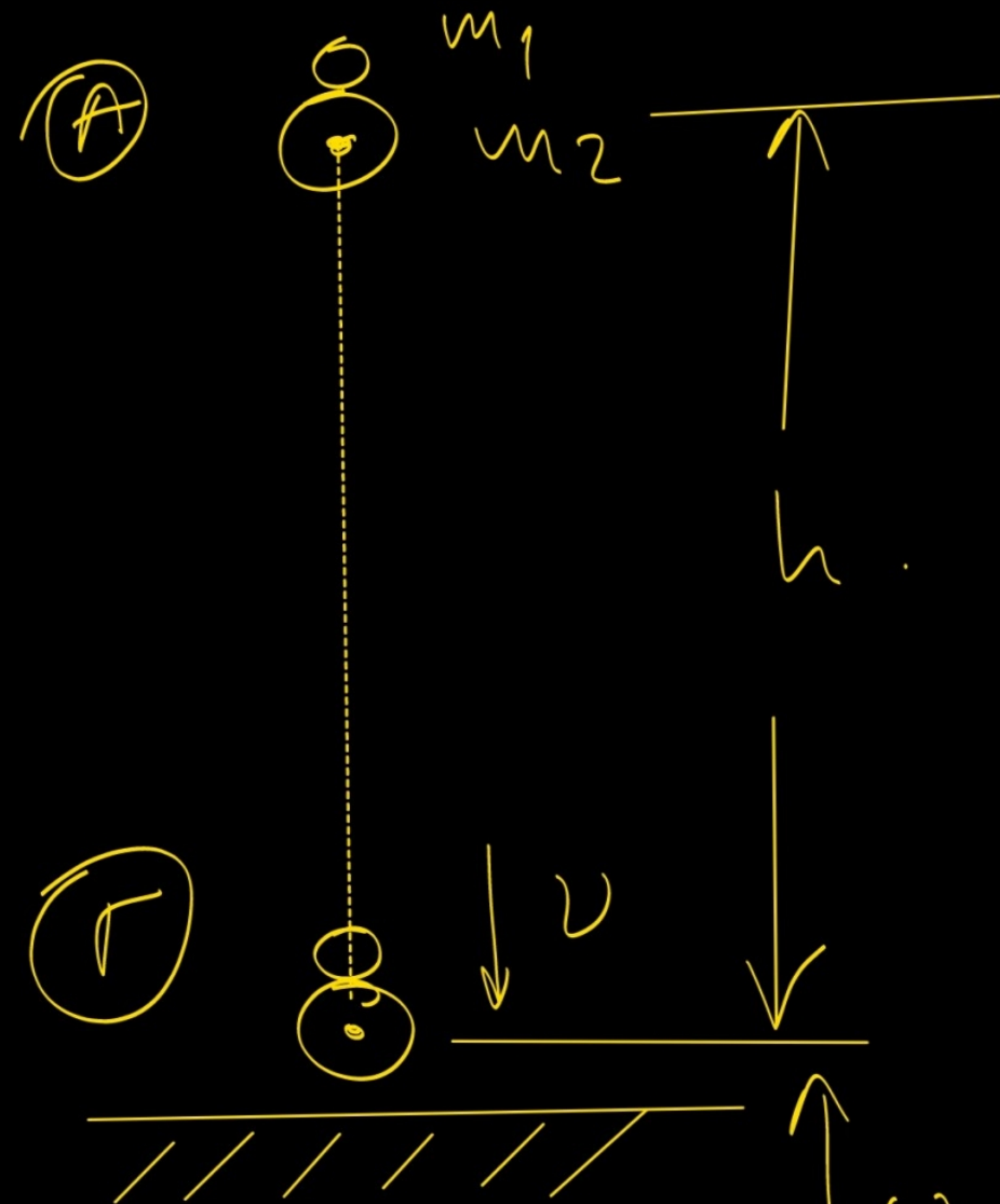
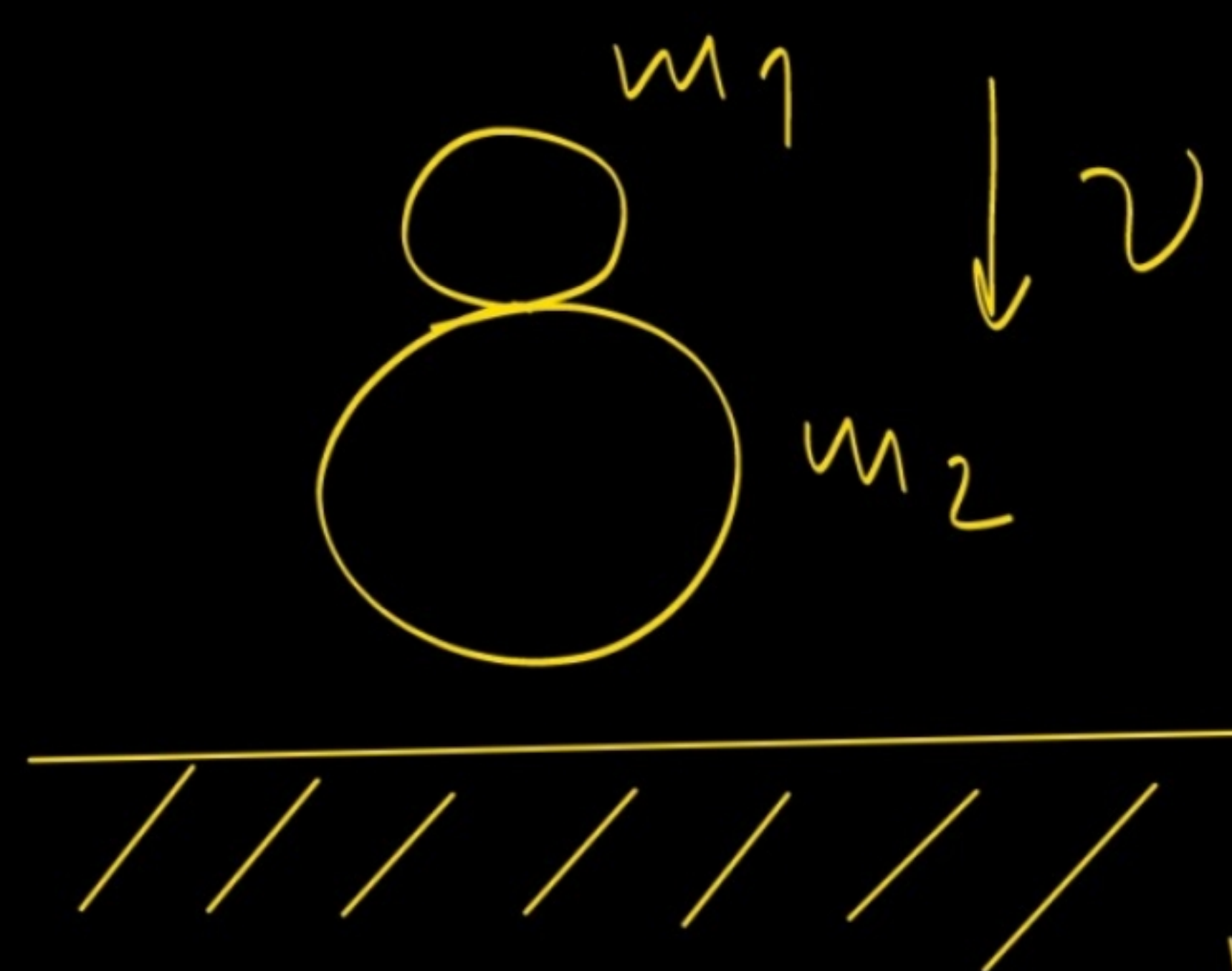


Άσκηση



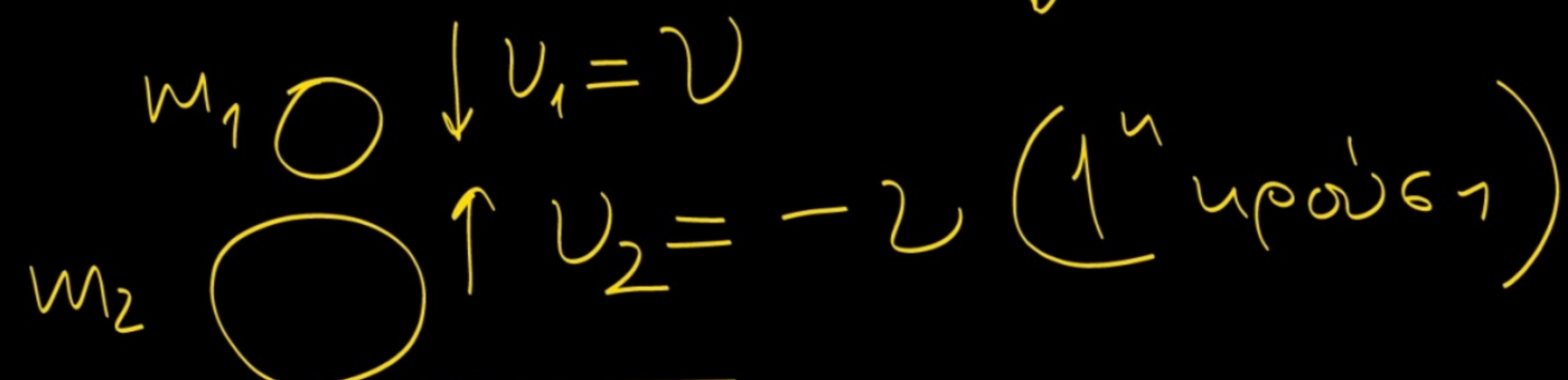
Πριν την προύση
 γέ το έδαφος και
 οι δύο γνάνες
 κατεβαίνουν γέ
 κοινή ταχύτητα
 v .



$$K_A + U_A = K_r + U_r \Rightarrow$$

$$0 + m_1 g h = \frac{1}{2} m_1 v^2 + 0 \Rightarrow$$

$$v = \sqrt{2gh}$$



m_2 αναπηδάει ελαστικά στο έδαφος
 (δύναμη πολύ μεγαλύτερη γάβας) και αμέσως

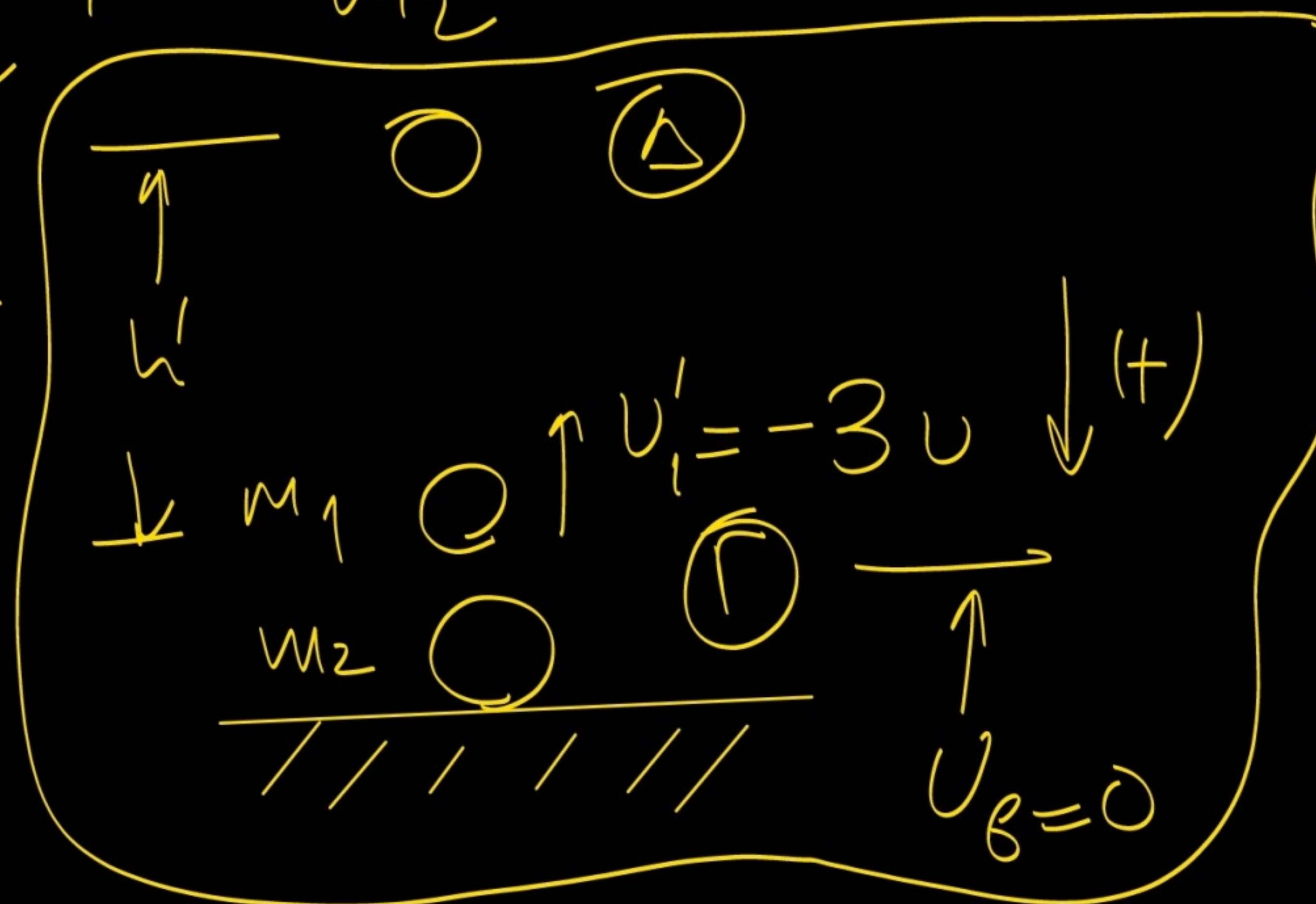
γέτά την 1^η προύση ανεβαίνει γέ ταχύτητα $v_2 = -v$
 ενώ η m_1 μόνη κατεβαίνει.

$$v_1' = \frac{m_1 - m_2}{m_1 + m_2} v_1 + \frac{2m_2}{m_1 + m_2} v_2 = \frac{m_1 - m_2}{m_1 + m_2} v + \frac{2m_2}{m_1 + m_2} (-v) \approx$$

$$v_2' = \frac{2m_1}{m_1 + m_2} v_1 + \frac{m_2 - m_1}{m_1 + m_2} v_2$$

$$v_2' \approx \frac{2m_1}{m_2} v_1 + \frac{m_2}{m_2} v_2 \Rightarrow$$

$$v_2' \approx v_2$$



$$= \frac{-m_2}{m_2} v + \frac{2m_2}{m_2} (-v) =$$

$$= -3v$$

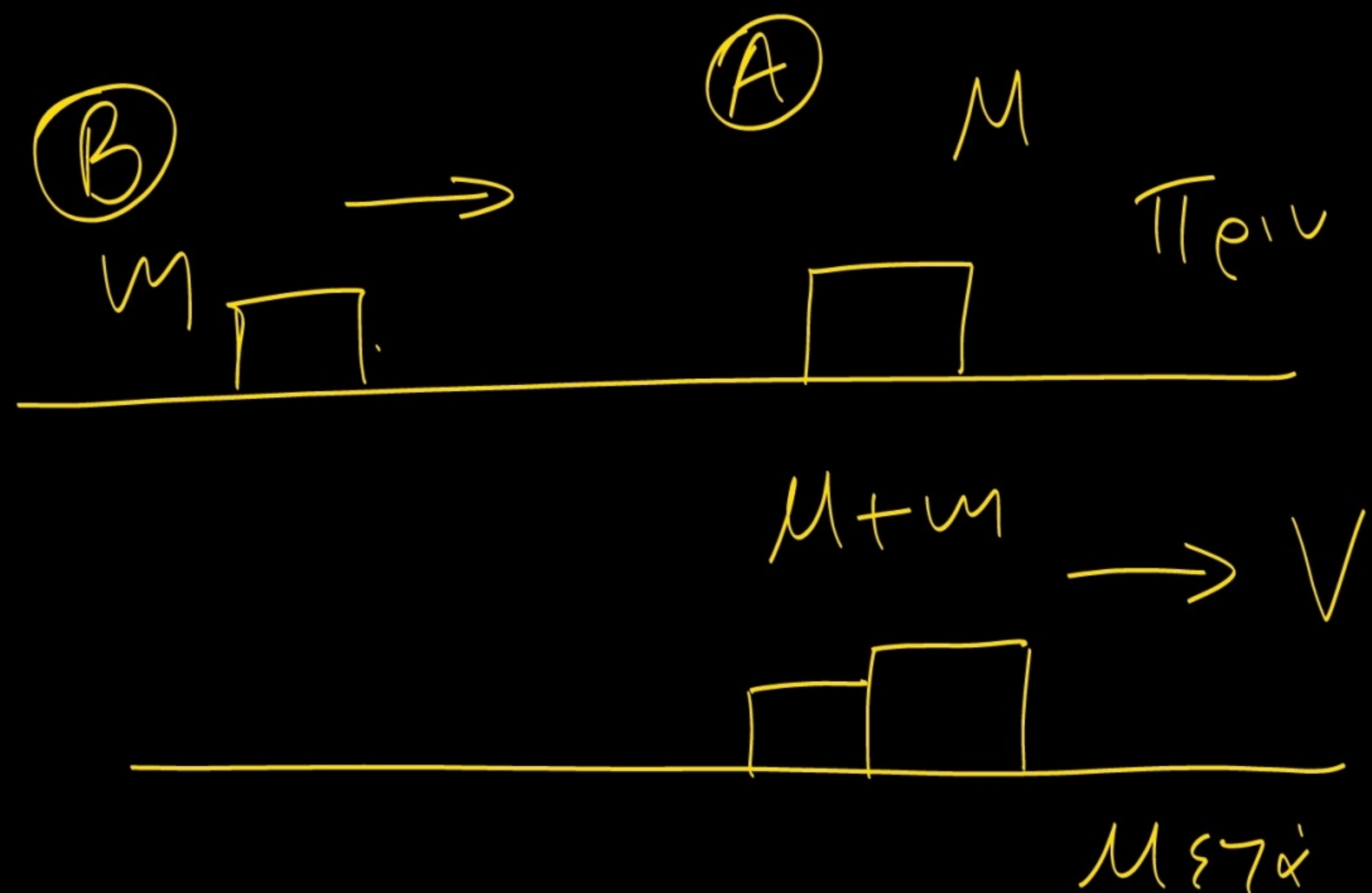
Για την m_1 μετά την πρόσκλιση έχουμε:

$$K_f + U_f = K_\Delta + U_\Delta \Rightarrow \frac{1}{2} m_1 v_1'^2 + 0 = m_1 g h' + 0 \Rightarrow$$

$$\frac{(-3v)^2}{2} = g h' \Rightarrow \frac{9v^2}{2} = g h' \Rightarrow \frac{9 \cdot 2gh}{2} = g h'$$

$$\Rightarrow h' = 9h$$

Ep. 1.38 | 68.16.



$$P_{\text{περι}} = P_{\text{μετα}} \Rightarrow$$

$$mu = (m+M)V$$

$$Q = \frac{1}{2}mv^2 - \frac{1}{2}(m+M)V^2 =$$

$$= \frac{1}{2}mv^2 - \frac{1}{2}(m+M) \frac{m^2v^2}{(m+M)^2} =$$

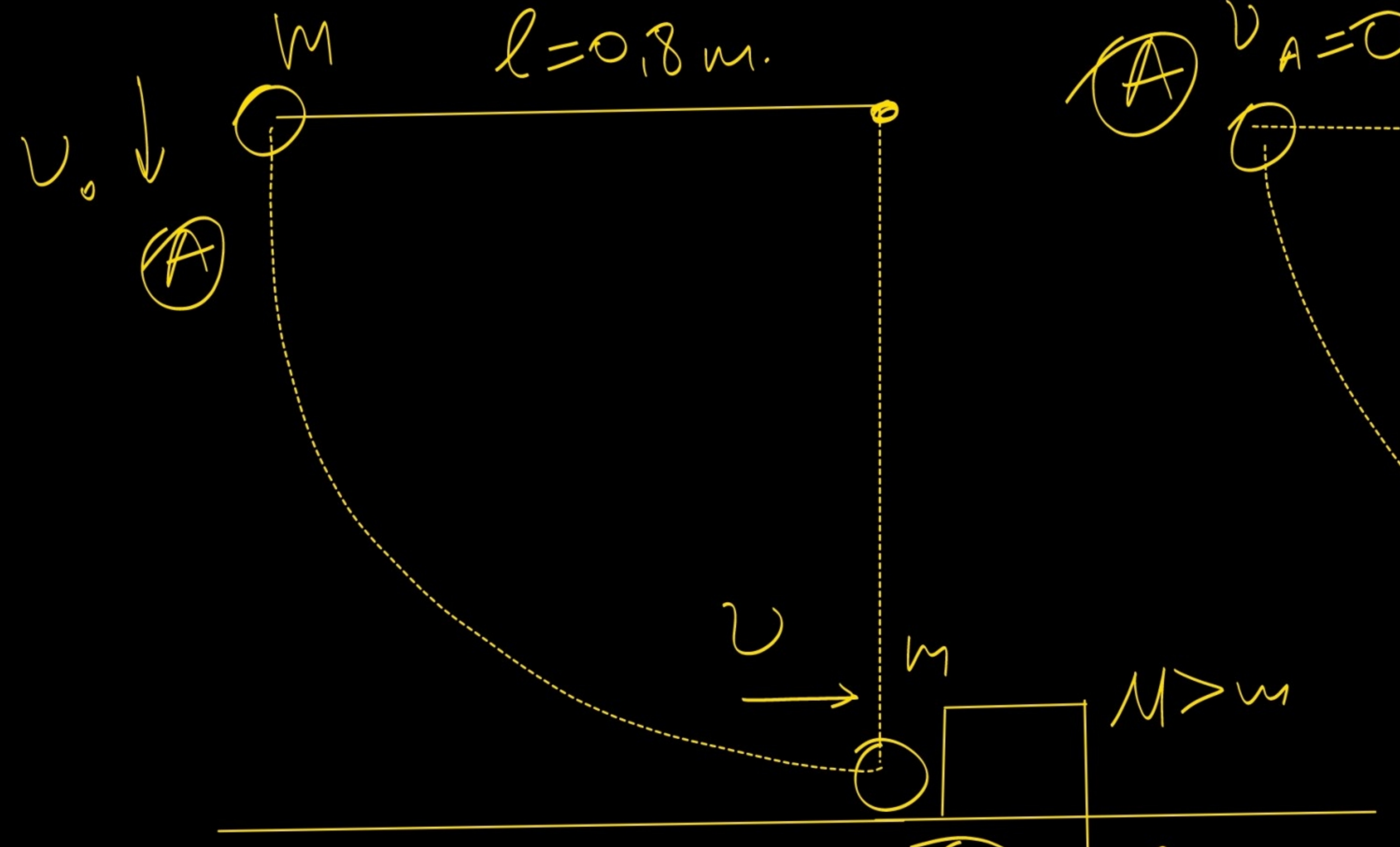
$$= \frac{1}{2}mv^2 \left(1 - \frac{m}{m+M} \right) =$$

$$Q = \frac{1}{2}mv^2 \cdot \frac{M}{m+M} \Rightarrow \frac{Q}{K_{\text{αρχ}}} = \frac{M}{m+M}$$

$$\frac{Q}{K_{\text{αρχ}}} \cdot 100\% = 80\% \Rightarrow Q = 0,8 K_{\text{αρχ}}$$

(Αρχ: $\frac{0,8 K_{\text{αρχ}}}{K_{\text{αρχ}}} = \frac{M}{m+M} \Rightarrow 0,8M + 0,8m = M \Rightarrow M = 4m$)

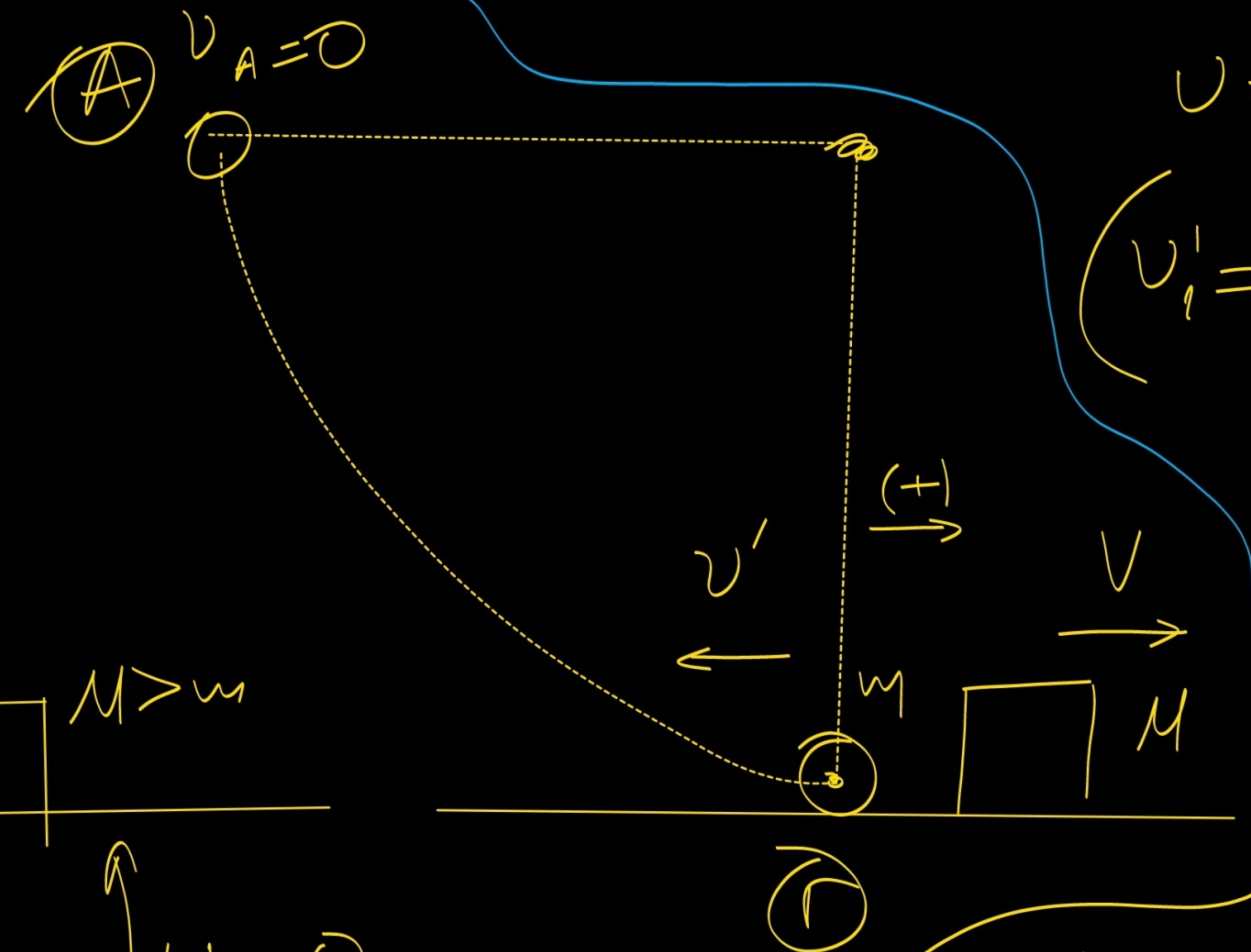
Абу. 1.56 682. 21.)



Пприв (Г) $v_B = 0$

~~Аса: $\frac{m-M}{m+M} \cdot 8 =$~~
 ~~$+(m+M) = 2m - 2M \Rightarrow$~~
 ~~$m+M = 2m - 2M \Rightarrow m = 3M \Rightarrow \frac{m}{M} = 3$~~

а) $\frac{1}{2}mv_0^2 + mgl = \frac{1}{2}mv^2 \Rightarrow v_0^2 + 2gl = v^2 \Rightarrow$
 $16 \cdot 3 + 2 \cdot 0,8 \cdot 10 = v^2 \Rightarrow 16 \cdot 4 = v^2 \Rightarrow$



$M \gg m$

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

$$v_1' = \frac{m_1 - m_2}{m_1 + m_2} v_1$$

$$v' = \frac{m - M}{m + M} v$$

АДЕ: (Г) $\rightarrow$ (А)

$\frac{1}{2}mv'^2 = mgl \Rightarrow$

$|v'| = \sqrt{2gl} = 4 \text{ m/s}$

или $v' = -4 \text{ m/s}$

$$v' = \frac{m-M}{m+M} \cdot v \Rightarrow$$

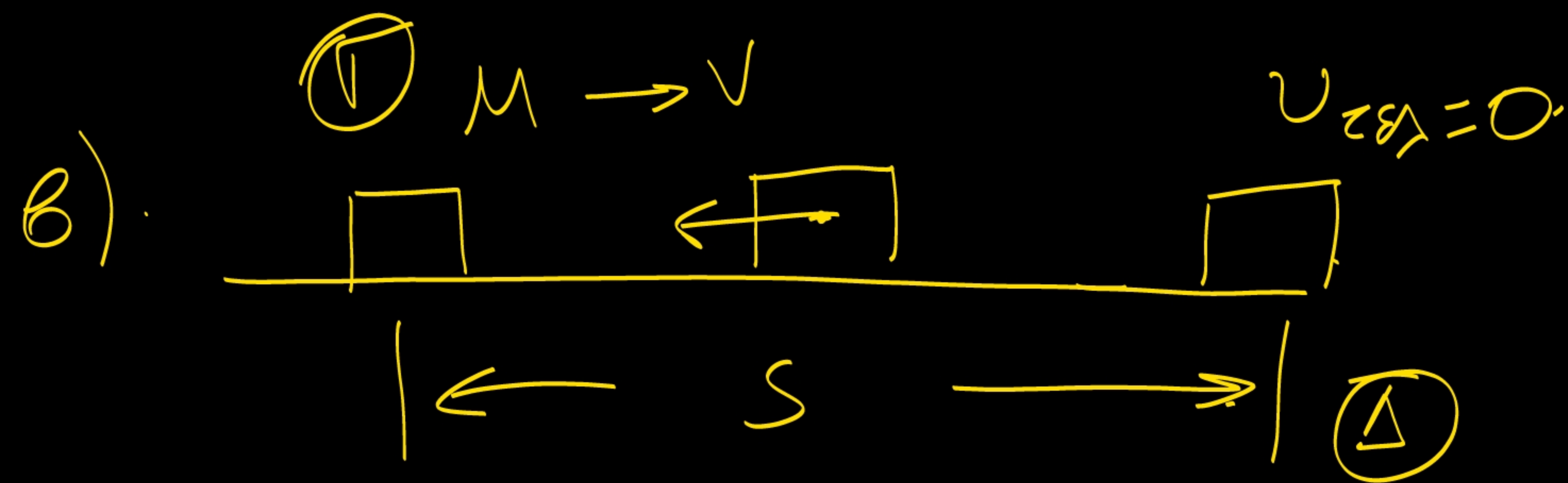
$$-4 = \frac{m-M}{m+M} \cdot 8 \Rightarrow$$

$$-m-M = 2m-2M \Rightarrow 0 - \frac{1}{2} M v^2 = -T \cdot S \Rightarrow$$

$$+2M-M = 3m \Rightarrow$$

$$M = 3m \Rightarrow$$

$$\frac{m}{M} = \frac{1}{3}$$



$$\text{Work KE: } \textcircled{1} \rightarrow \textcircled{2}$$

$$\frac{1}{2} M v^2 = -\mu M g S \Rightarrow$$

$$S = \frac{v^2}{2\mu g} = \frac{4^2}{2 \cdot 0,2 \cdot 10} = \frac{16}{4} = 4 \text{ m.}$$

$$c) \frac{p'_M}{p'_m} = \frac{Mv}{-mv'} = \frac{3m \cdot 4}{-m \cdot 4} = -3$$

$$v'_2 = \frac{2m_1}{m_1+m_2} v_1$$

$$\text{Ap } \alpha: v = \frac{2m}{m+M} \cdot v =$$

$$= \frac{2m}{m+3m} \cdot 8 =$$

$$= \frac{2}{4} \cdot 8 = 4 \text{ m/s.}$$

$$\delta) K_{\text{πριν}} = \frac{1}{2} m v^2$$

$$K_{\text{ψετὰ}} = \frac{1}{2} m v'^2$$

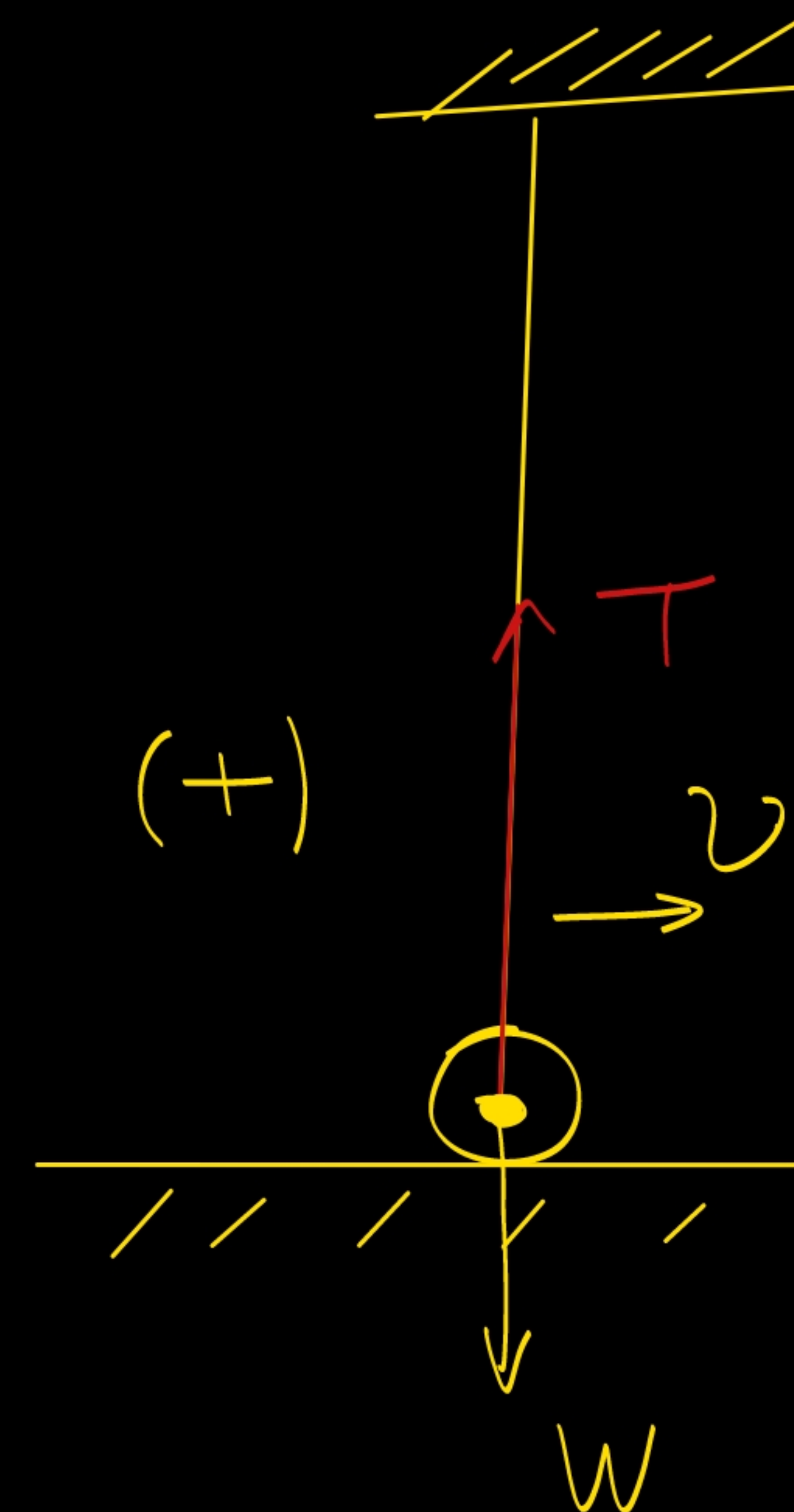
$$\text{Ποσοστό ψεταβολῆς} = \frac{\Delta K}{K_{\text{πριν}}} \cdot 100 =$$

$$= \frac{K_{\text{ψετὰ}} - K_{\text{πριν}}}{K_{\text{πριν}}} \cdot 100 = \frac{\frac{1}{2} m v'^2 - \frac{1}{2} m v^2}{\frac{1}{2} m v^2} \cdot 100 =$$

$$= \frac{v'^2 - v^2}{v^2} \cdot 100 = \frac{4^2 - 8^2}{4^2} \cdot 100 = \frac{-48}{64} \cdot 100 = -75\%$$

$$\text{Άρα: } \frac{T}{T'} = \frac{90\text{m}}{30\text{m}} = 3$$

ε)



$$\Sigma F = F_k \Rightarrow$$

$$T - W = \frac{m v^2}{l} \Rightarrow$$

$$T = mg + \frac{m v^2}{l} =$$

$$= 10\text{m} + \frac{m \cdot 8^2}{0,8}$$

$$= 10\text{m} + 80\text{m}$$

$$= 90\text{m}$$

Ουότεως:

$$T' = mg + \frac{m v'^2}{l} =$$

$$T' = 10\text{m} + \frac{m \cdot 16}{0,8} = 30\text{m}$$

Abu. 1.50 bel. 18.

