

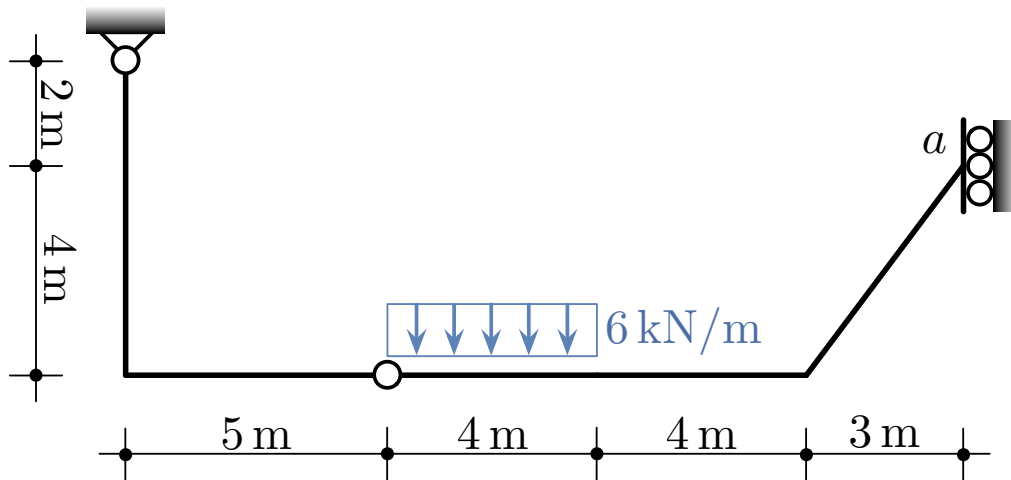
# FONDAMENTI DI MECCANICA DELLE STRUTTURE

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PROVA di VERIFICA – 27 novembre 2017

STUDENTE:

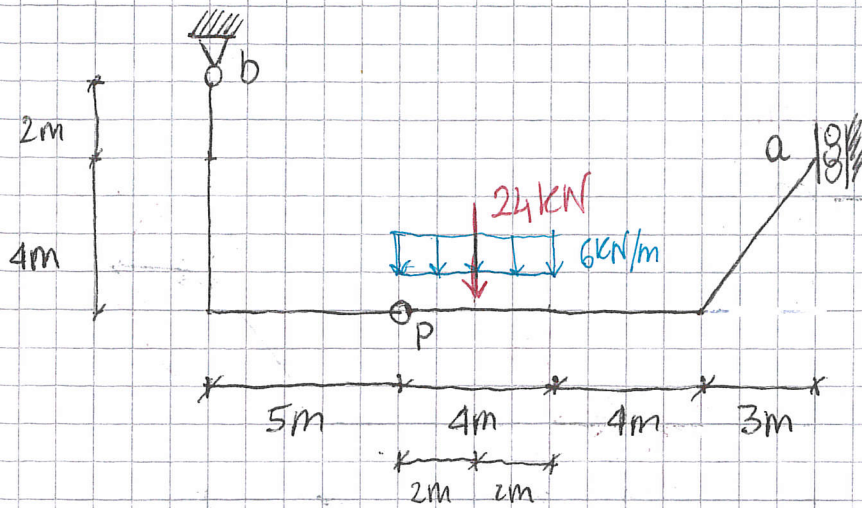
traccia **E**



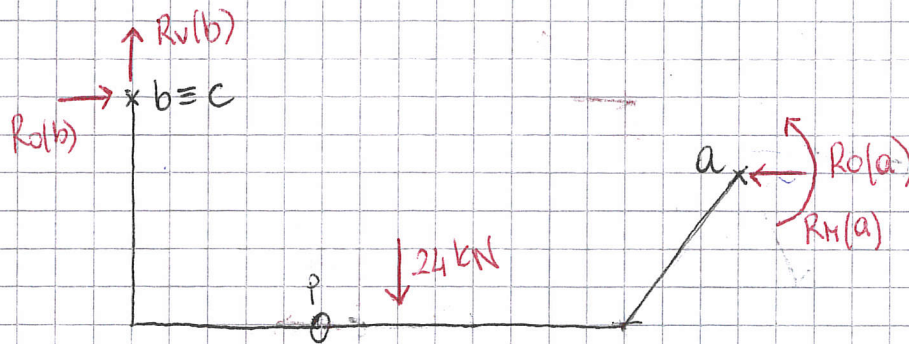
## Parte 1

Del sistema isostatico rappresentato in figura, si chiede di:

- 1.1. determinare il valore delle reazioni vincolari con il metodo dei corpi liberi.
- 1.2. verificare il valore della reazione vincolare **a rotazione**  $R_m(a)$  fornita dal **pattino in a**, utilizzando il metodo della potenza.
- 1.3. tracciare i grafici delle caratteristiche della sollecitazione ( $N$ ,  $T$ ,  $M$ ).



1) CORPI LIBERI



EQL. GLOBALE

$$\sum F_H \Rightarrow R_o(b) = R_o(a) = 20$$

$$\sum F_V \Rightarrow R_v(b) = 24 \text{ kN}$$

$$\sum M_{C \equiv b} \Rightarrow 24 \times 7 - R_v(a) + R_o(a) \times 2 = 0 \Rightarrow -R_v(a) = -R_o(a) \times 2 - 168$$

$$\Rightarrow R_v(a) = 168 + R_o(a) \times 2$$

EQL. LOCALE DX

$$\sum F_H \Rightarrow R_o(p) = R_o(a) = 20$$

$$\sum F_V \Rightarrow R_v(p) = 24 \text{ kN}$$

$$\sum M_{C \equiv p} \Rightarrow 24 \times 2 - R_v(a) + R_o(a) \times 4 = 0$$

$$\Rightarrow +R_v(a) = +R_o(a) \times 4 + 48 \Rightarrow R_v(a) = 20 \times 4 + 48 = 128$$

Posso eguagliare le somme dei momenti:

$$R_o(a) \times 4 + 48 = 168 + R_o(a) \times 2$$

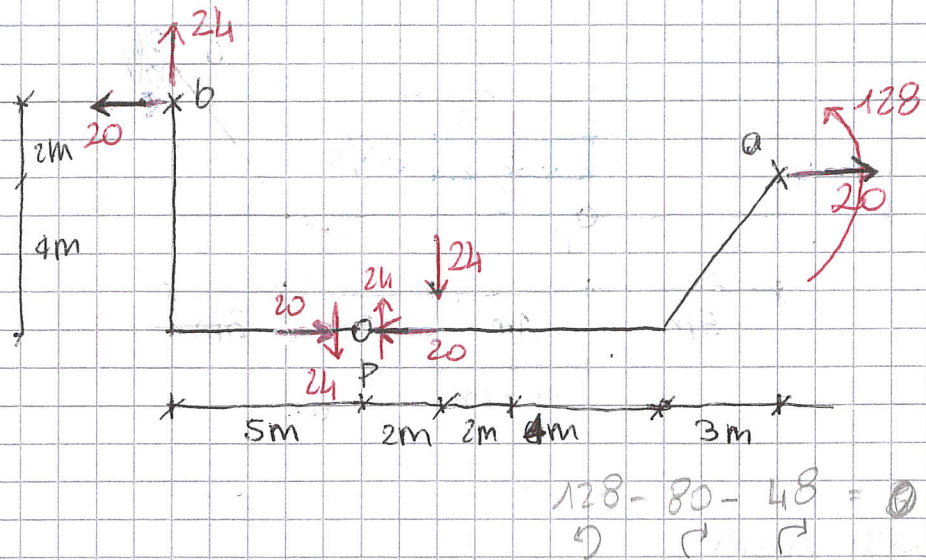
$$+ R_o(a) \times 6 = -168 + 48 \Rightarrow R_o(a) = \frac{-120}{6} = -20$$

quindi  
cambia  
il verso



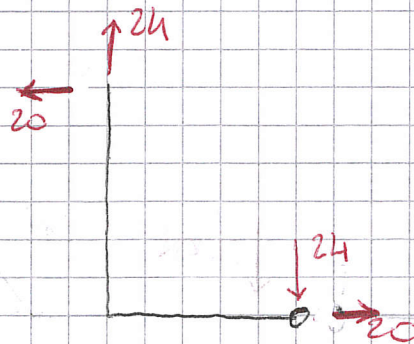
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$$\begin{aligned} R_o(b) &= 20 \text{ kN} \\ R_o(p) &= 20 \text{ kN} \\ R_o(a) &= 20 \text{ kN} \\ R_v(b) &= 24 \text{ kN} \\ R_v(p) &= 24 \text{ kN} \\ R_M(b) &= 128 \text{ kN} \end{aligned}$$



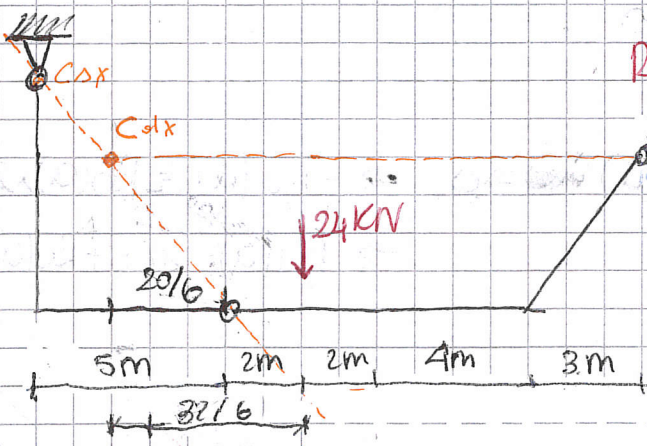
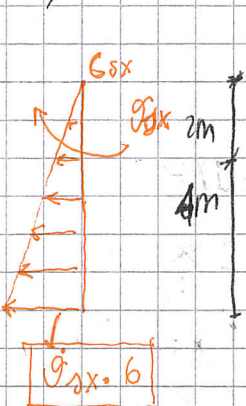
EQU. LOCALI A SX

$$\begin{aligned} \sum M_{C=P} &= 24 \times 5 - 20 \times 6 = 0 \\ &\Rightarrow 120 - 120 = 0 \quad \checkmark \end{aligned}$$

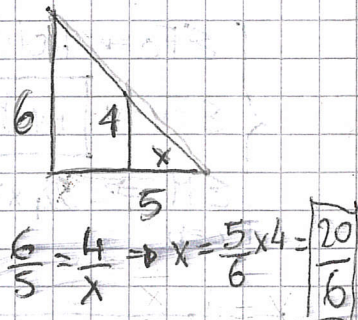
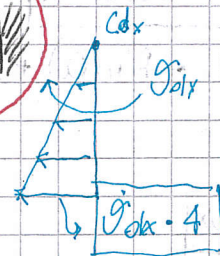


2) CONTROLLO CON METODO DELLA POTENZA

$R_M(a)$



$R_M(a) = 128 \text{ kN}$



$$\dot{G}_{sx} \cdot 6 = \dot{G}_{dx} \cdot 4$$

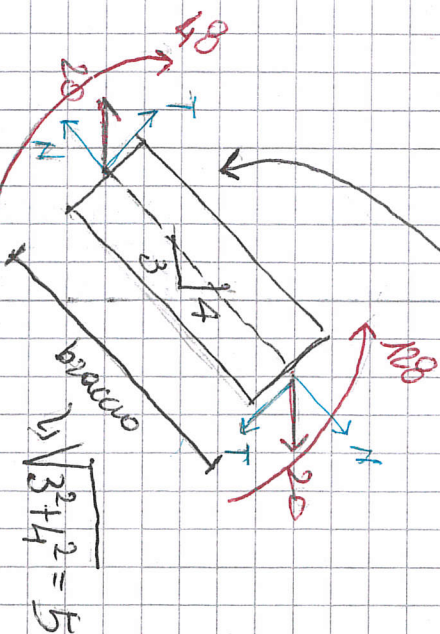
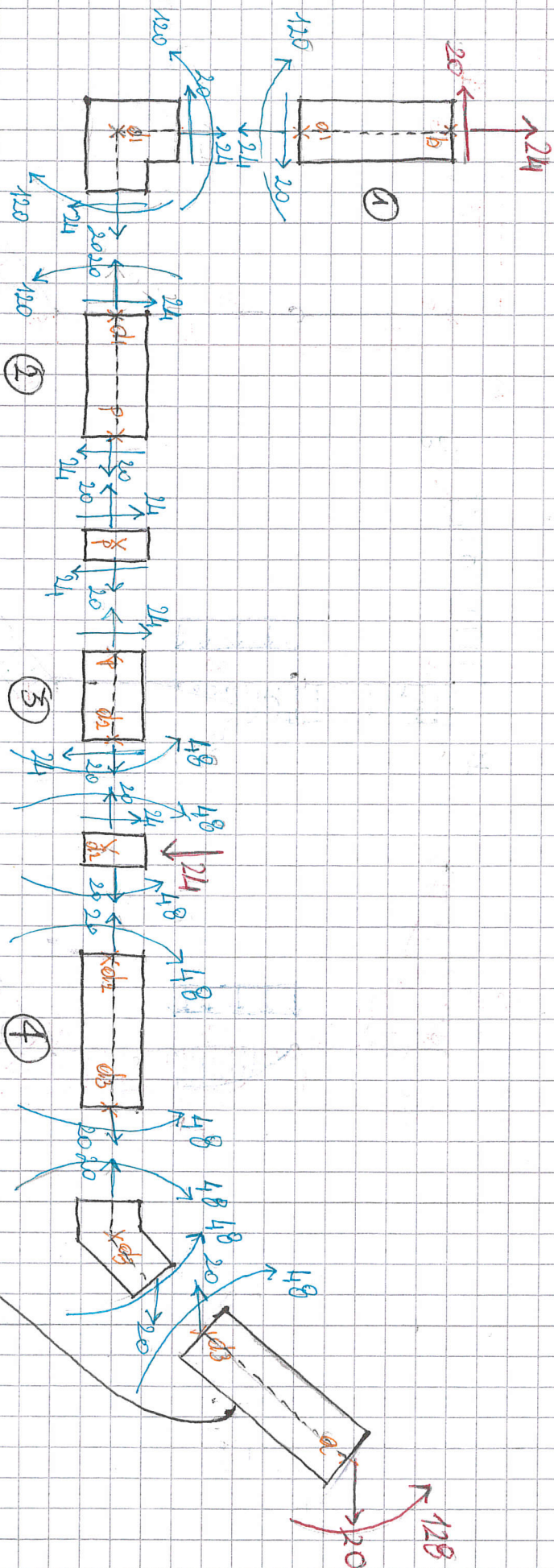
$$\dot{G}_{sx} = \dot{G}_{dx} \cdot \frac{4}{6}$$

$$P = R_M(a) \cdot \dot{G}_{dx} - 24 \cdot \dot{G}_{dx} \cdot \frac{32}{6} = 0$$

$$R_M(a) = 24 \cdot \frac{32}{6} = 128$$

$$\frac{20}{6} + 2 = \frac{10 + 12}{6} = \frac{32}{6}$$





$$T \cdot 5 = 128 - 48 \Rightarrow T = \frac{80}{5} = 16$$

$$\sqrt{N^2 + 16^2} = 20 \Rightarrow$$

$$\Rightarrow N = \sqrt{20^2 - 16^2} = 12$$

$$① \quad 20 \times 6 = 120$$

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$$② \quad 120 - 24 \times 5 = 0$$

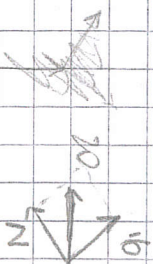
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$$③ \quad 24 \times 2 = 48$$

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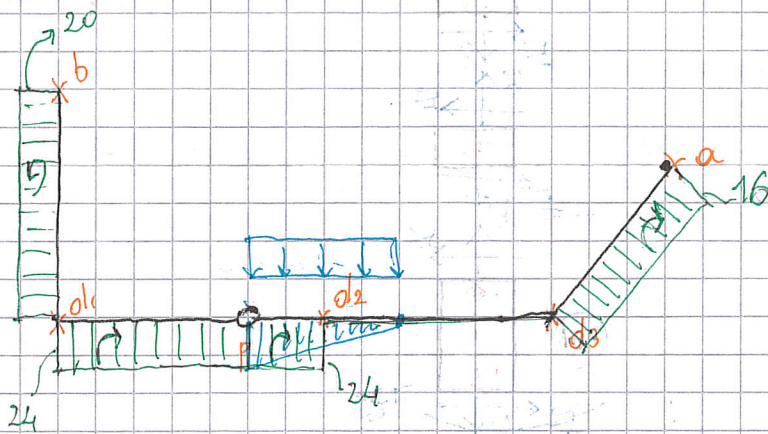
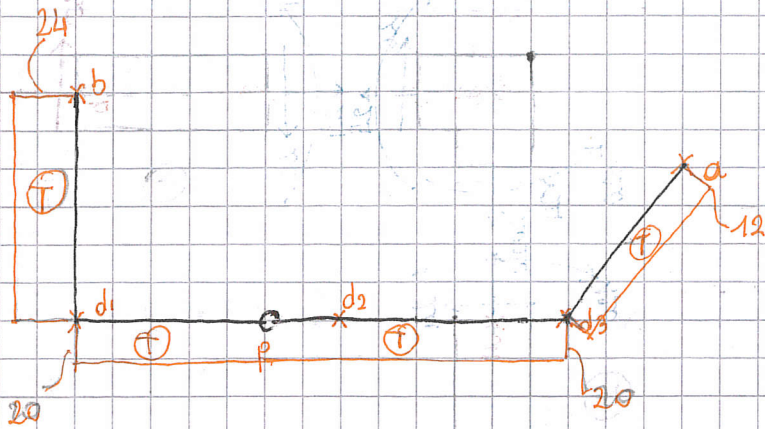
$$④ \quad 48 = 48$$

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$$\sqrt{12^2 + 16^2} = 20$$





con il carico distribuito

