

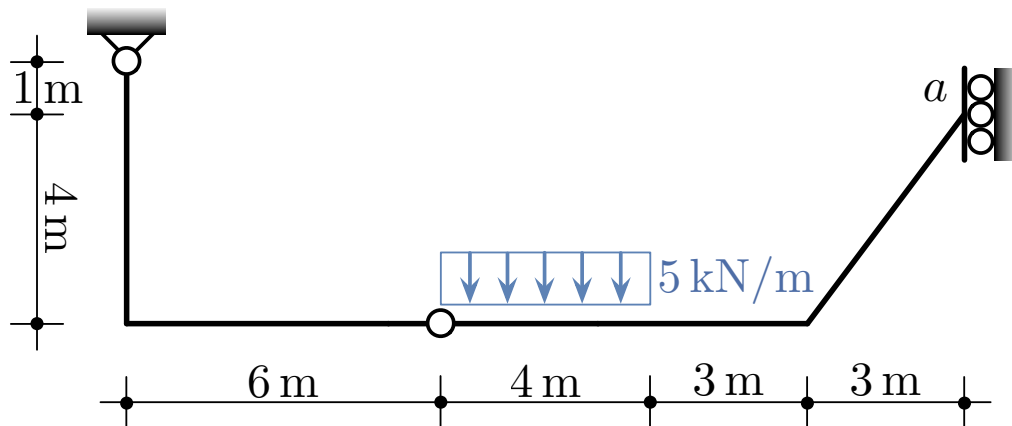
# FONDAMENTI DI MECCANICA DELLE STRUTTURE

(docente: G. FORMICA)

PROVA di VERIFICA – 27 novembre 2017

STUDENTE: \_\_\_\_\_

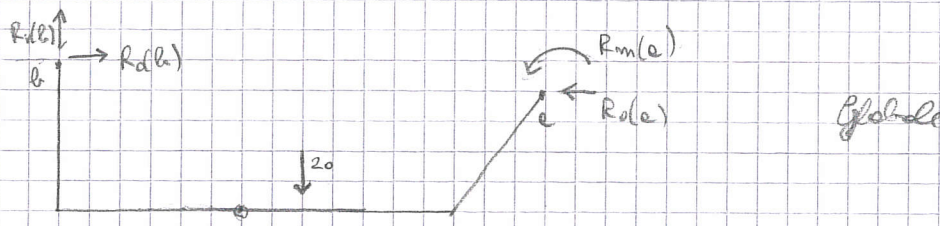
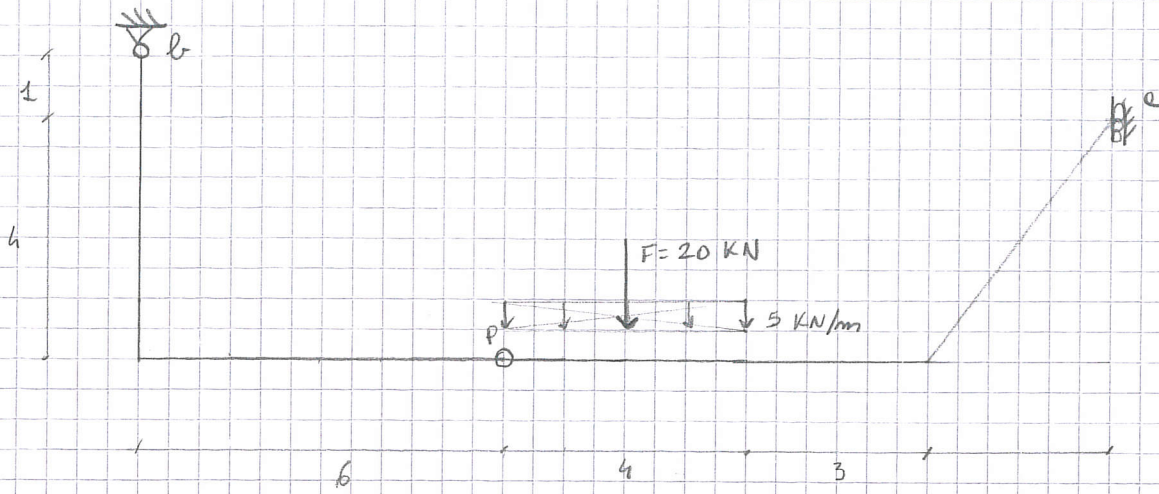
traccia **F**



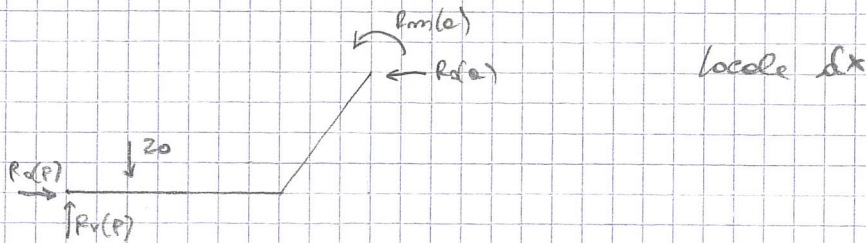
## Parte 1

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 ( $N$ ,  $T$ ,  $M$ ).



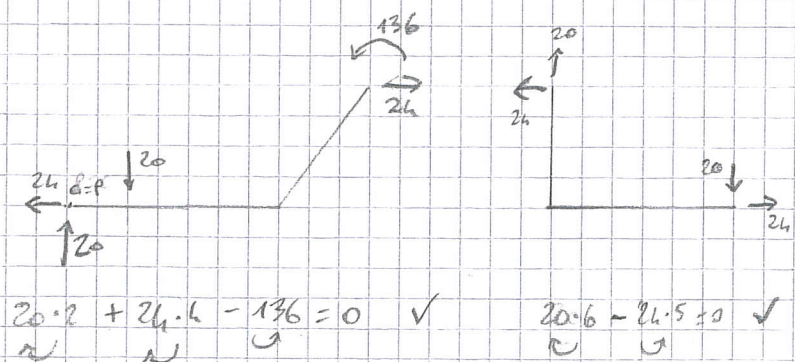
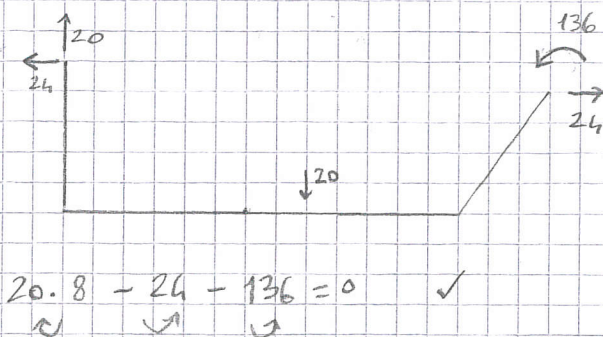
$$c=b \quad \begin{cases} R_v(b) - 20 = 0 \\ R_d(b) - R_d(e) = 0 \\ 20 \cdot 8 + R_d(e) - R_m(e) = 0 \end{cases} \quad \begin{cases} R_v(b) = 20 \\ R_d(b) = R_d(e) \\ R_m(e) = 160 + R_d(e) \end{cases}$$



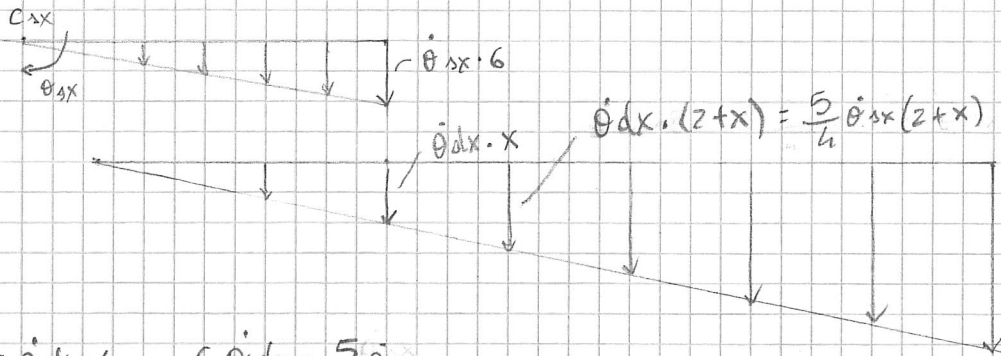
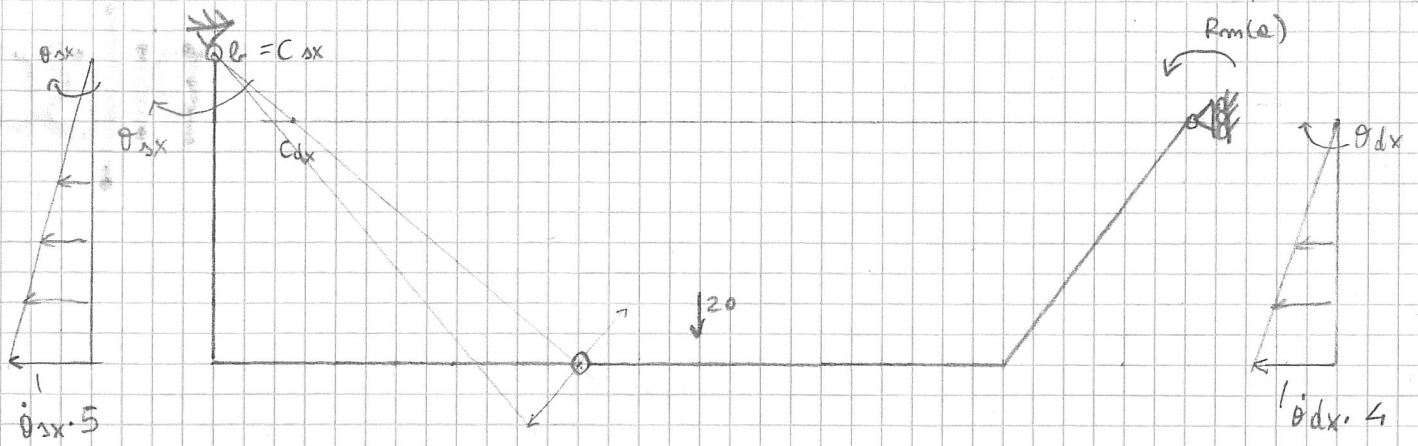
$$c=p \quad \begin{cases} R_v(p) - 20 = 0 \\ R_d(p) - R_d(e) = 0 \\ 20 \cdot 2 - R_d(e) \cdot 4 - R_m(e) = 0 \end{cases} \quad \begin{cases} R_v(p) = 20 \\ R_d(p) = R_d(e) \\ R_m(e) = 40 - 4 R_d(e) \end{cases}$$

$$\Rightarrow 160 + R_d(e) = 40 - 4 R_d(e) \quad \text{S } R_d(e) = -120 \rightarrow R_d(e) = -24 \text{ kN} = R_d(e) = R_d(p)$$

$$R_m(e) = 136$$



$$20 \cdot 6 - 24 \cdot 5 = 0 \quad \checkmark$$

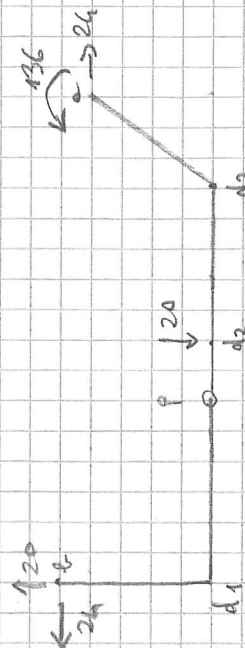


$$\begin{cases} \dot{\theta}_{sx} \cdot 5 = \dot{\theta}_{dx} \cdot 4 \\ \dot{\theta}_{sx} \cdot 6 = \dot{\theta}_{dx} \cdot x \end{cases} \quad \begin{cases} \dot{\theta}_{dx} = \frac{5}{4} \dot{\theta}_{sx} \\ x = 6 \dot{\theta}_{sx} \cdot \frac{4}{5 \dot{\theta}_{sx}} = \frac{24}{5} \end{cases}$$

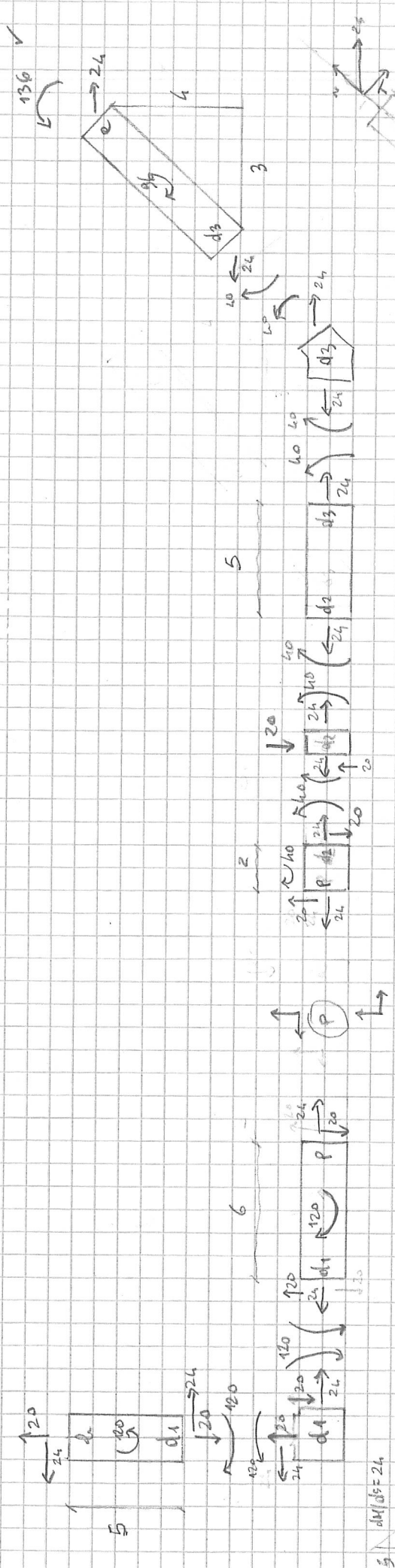
$$P = 20 \cdot \frac{5}{4} \dot{\theta}_{sx} (2+x) - \frac{5}{4} \dot{\theta}_{sx} R_m(0) = 0$$

$$25 \left( 2 + \frac{24}{5} \right) \dot{\theta}_{sx} = \frac{5}{4} R_m(0) \dot{\theta}_{sx}$$

$$\Rightarrow R_m(0) = \frac{25 \cdot \frac{34}{5} \cdot \frac{4}{5}}{1} = 136 \quad \checkmark$$





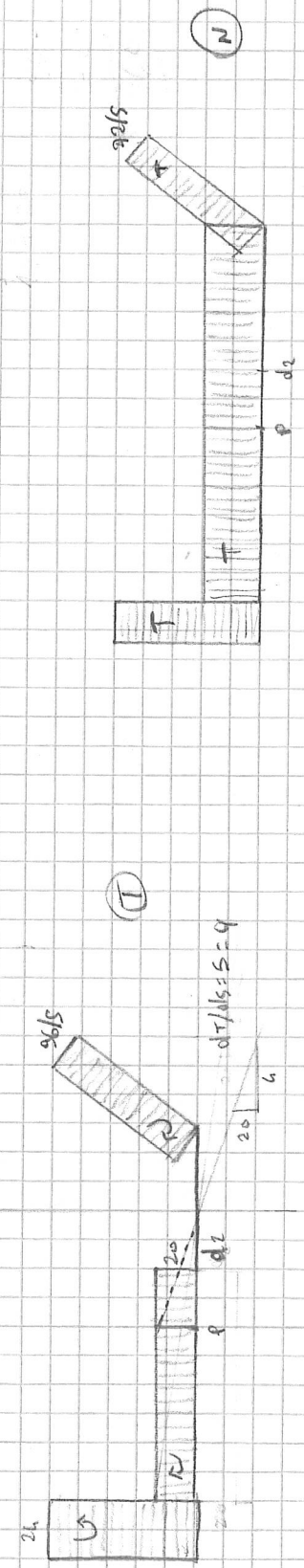
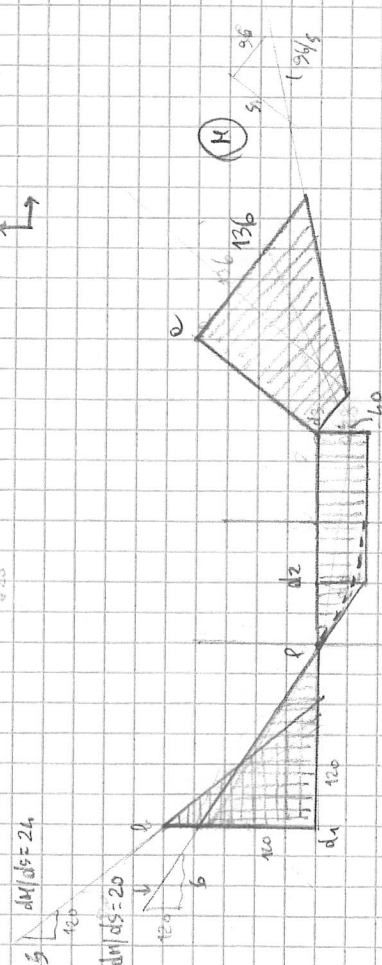


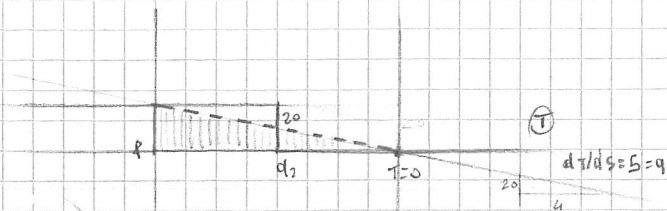
$ST = 86$   
 $\Rightarrow T = 96/5$   

$$\sqrt{\left(\frac{96}{5}\right)^2 + N^2} = 24$$
  

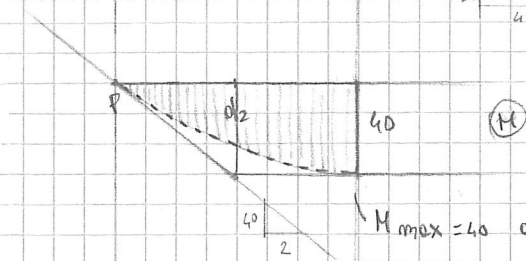
$$N^2 = 24^2 - \left(\frac{96}{5}\right)^2$$
  

$$\Rightarrow N = \sqrt{576 - 9216/25} = 72/5$$





--- carico distribuito  
— carico concentrato



$M_{max} = 40$  anche per carico distribuito

$$dM/ds = 20 = T$$