

1. Задатак (50% условни задатак) – време трајања израде условног задатка: 1 сат и 15 минута

1a), 1b), 1c), 1d) Нацртати дијаграме сила у пресеку.

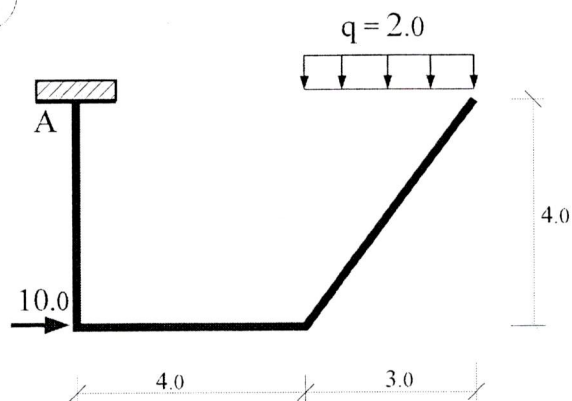
2. Задатак (35%)

Применом опште једначине статике одредити реакције ослоња А у задатку 1b и реакције ослоња В у задатку 1c.

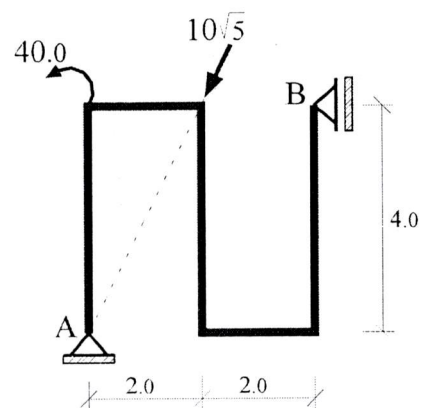
3. Задатак (15%)

Приказати трансформацију произвољног система сила у простору

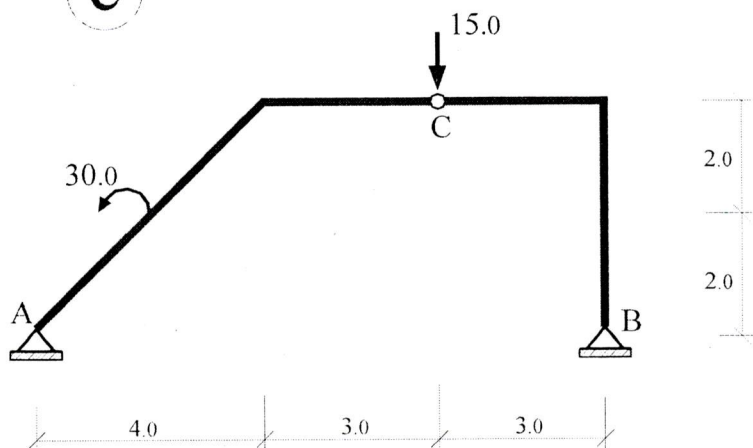
a



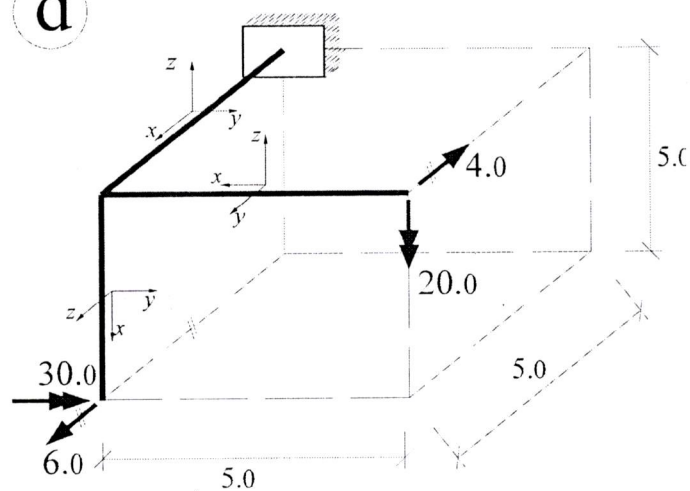
b



c



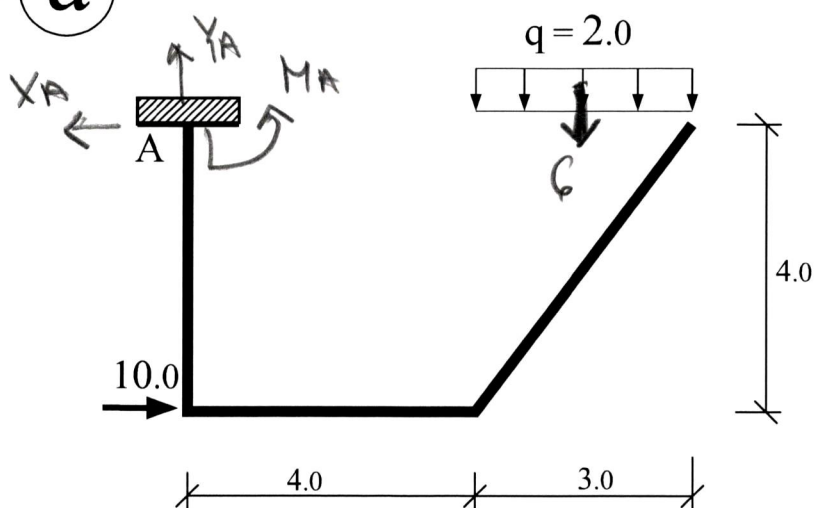
d



Напомена: У свим задацима димензије су: m, kN

1)

(a)

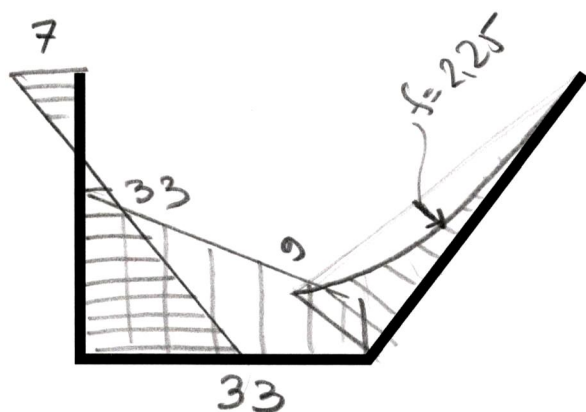
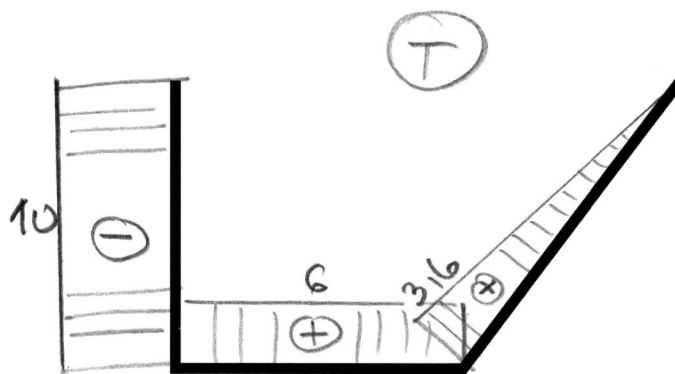
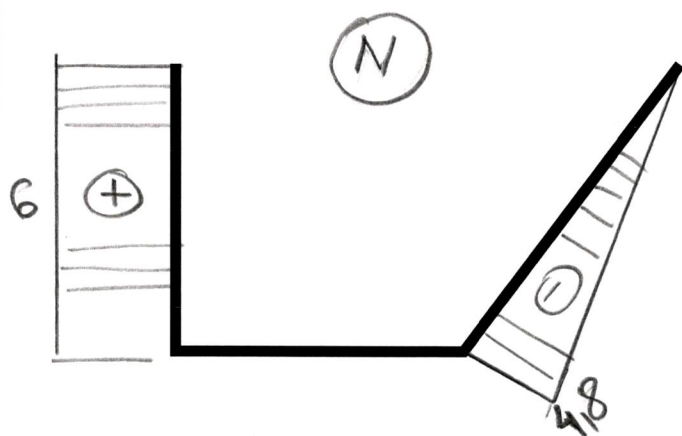
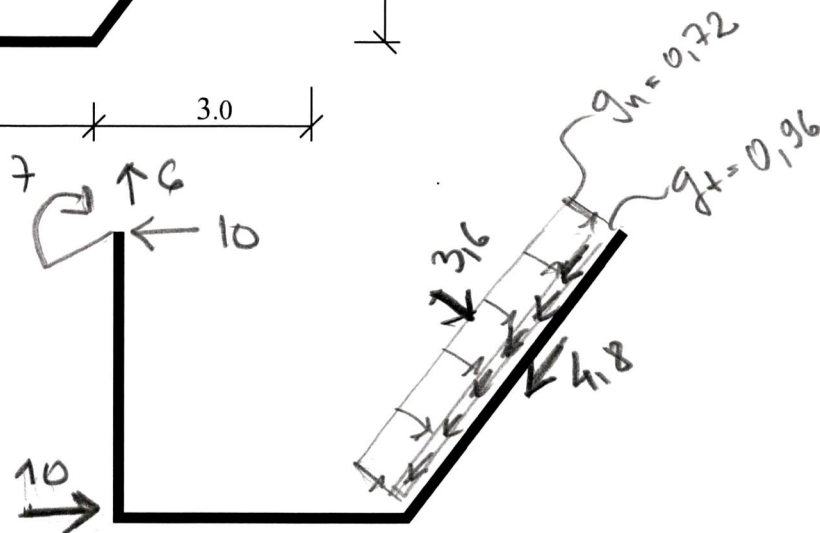


$$\sum X = 0 \Rightarrow X_A = 10$$

$$\sum Y = 0 \Rightarrow Y_A = 6$$

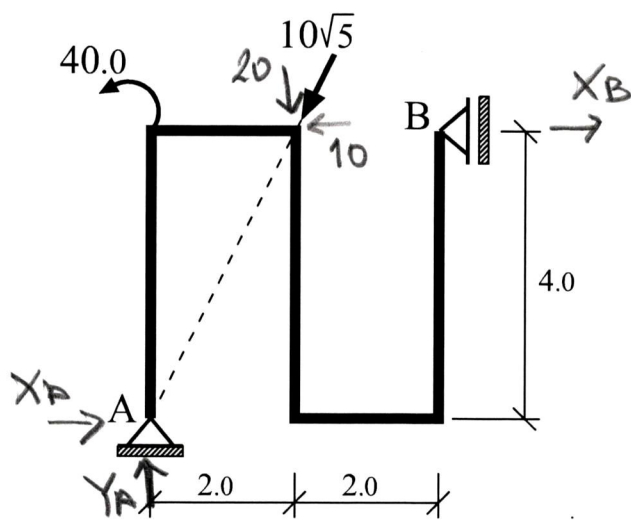
$$\sum M_A = 0: 6 \cdot 5.5 - 10 \cdot 4$$

$$-M_A = 0 \Rightarrow M_A = -7$$



(M)

b

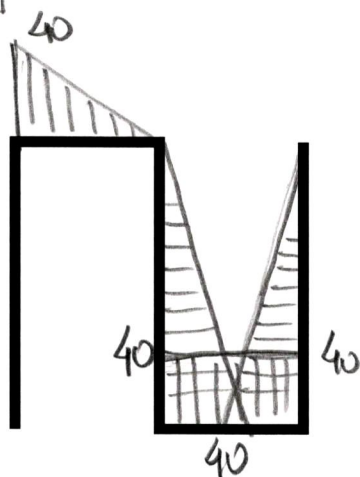
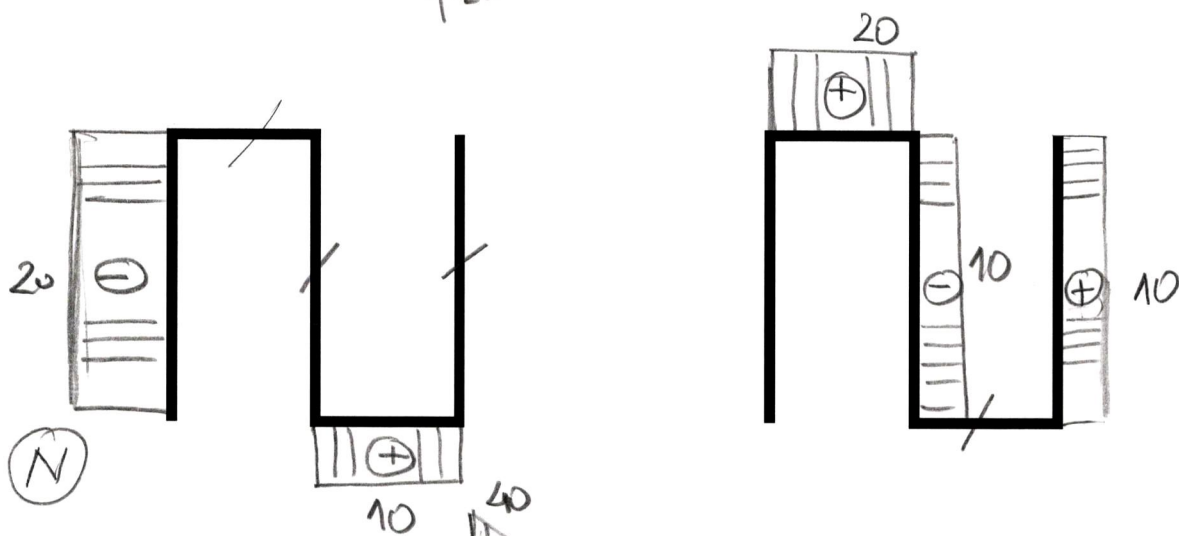
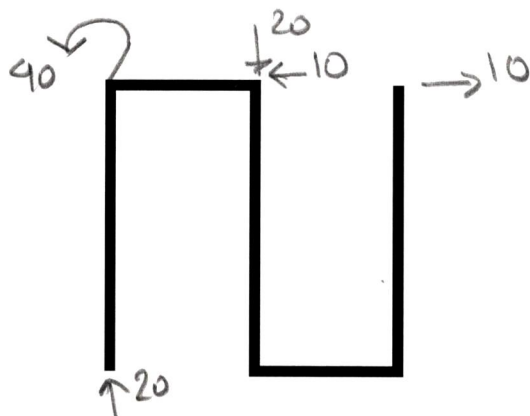


$$\sum M_A = 0: X_B \cdot 4 - 40 = 0$$

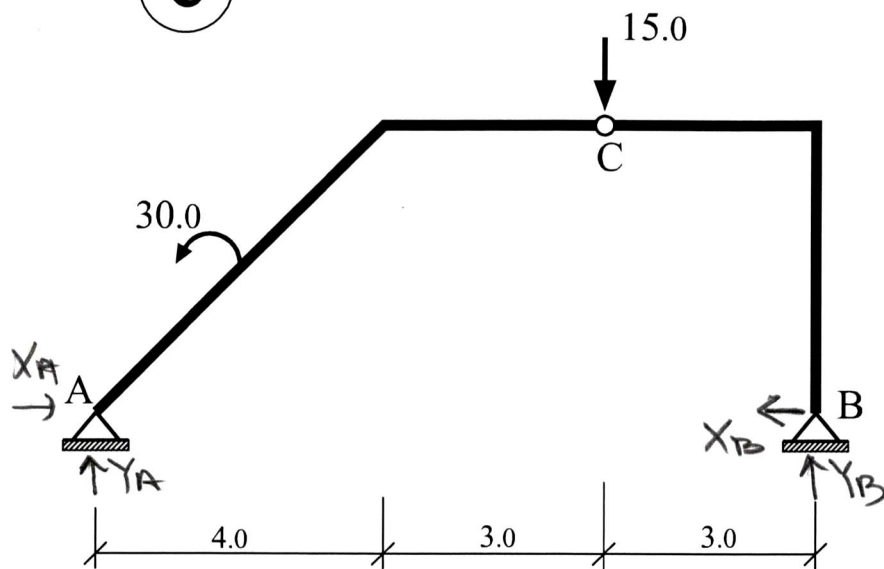
$$X_B = 10$$

$$\sum X = 0 \Rightarrow X_A = 0$$

$$\sum Y = 0 \Rightarrow Y_A = 20$$



(C)



$$\sum M_A = 0: Y_B \cdot 10 - 15 \cdot 7 + 30 = 0 \Rightarrow Y_B = 7.5$$

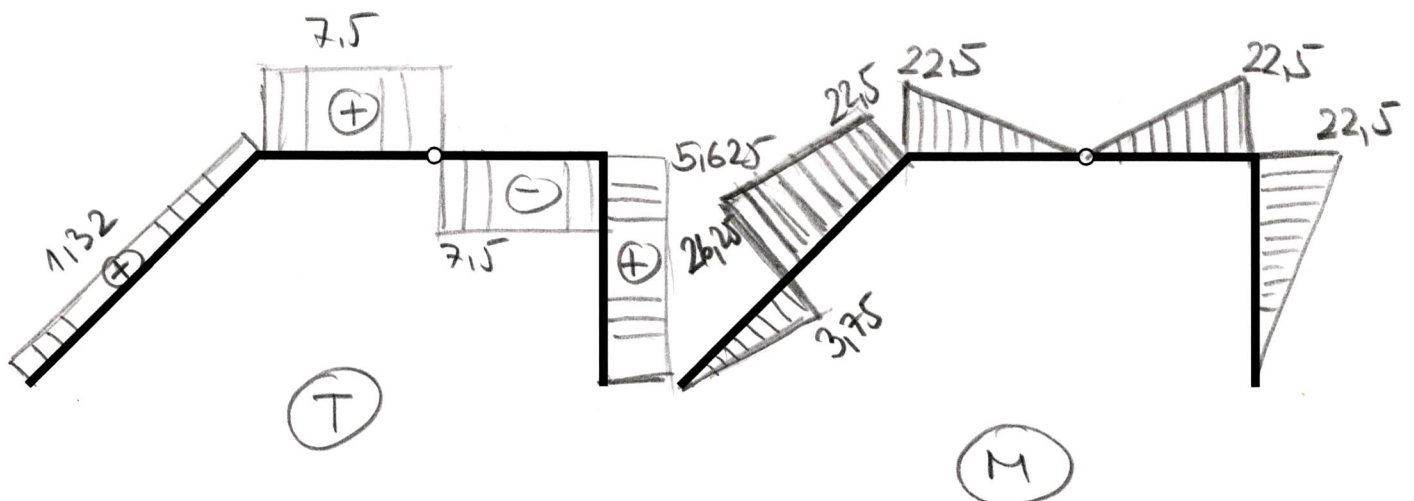
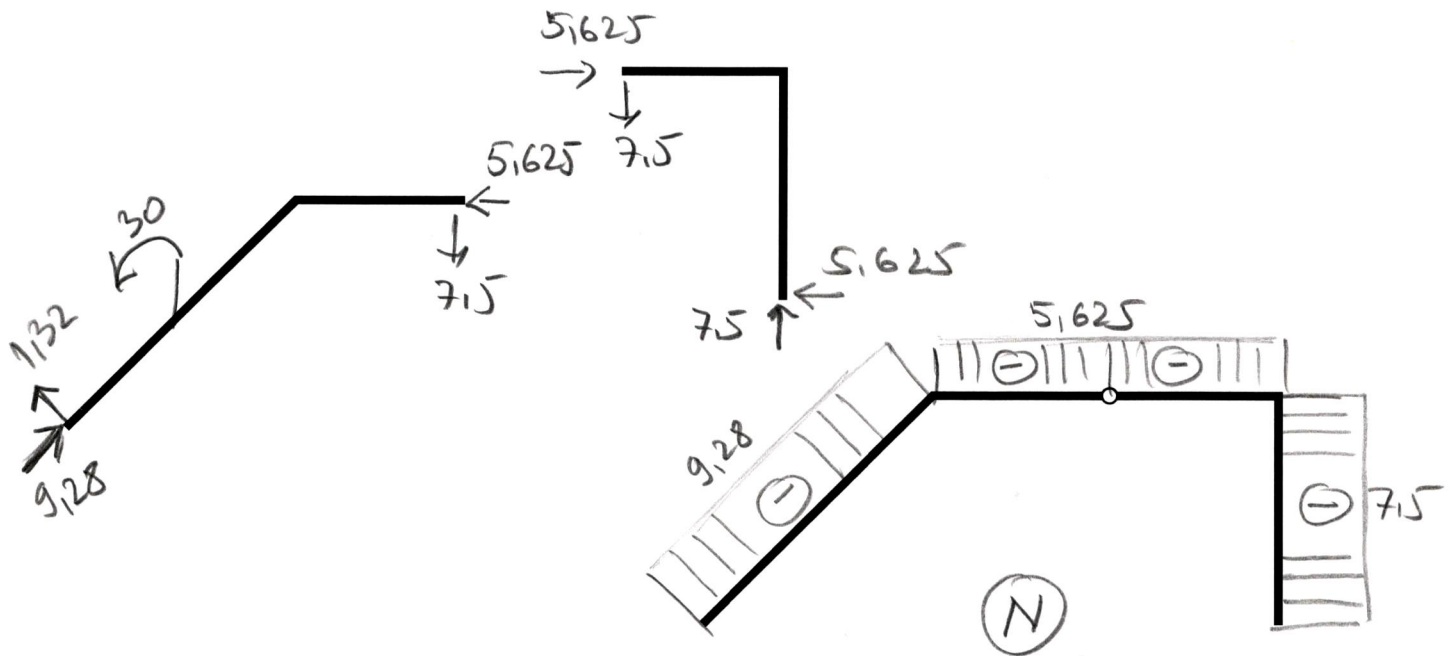
$$\sum Y = 0 \Rightarrow Y_A = 7.5$$

$$\sum M_C = 0:$$

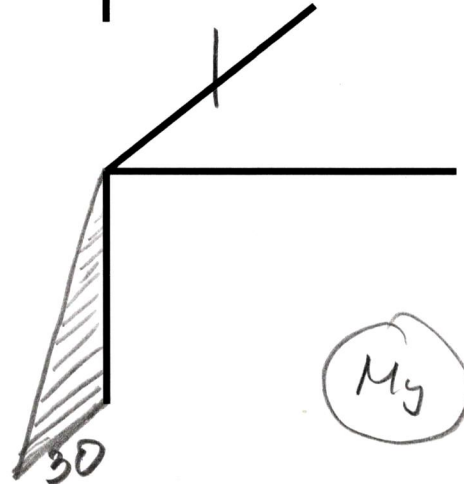
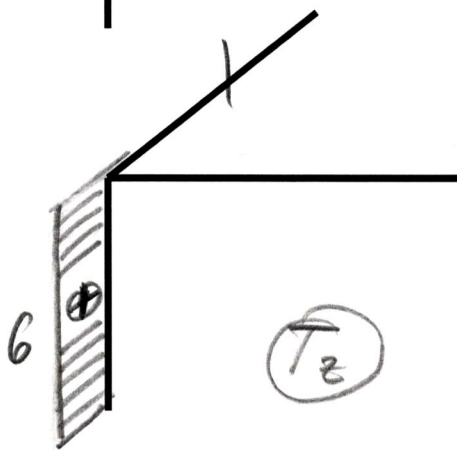
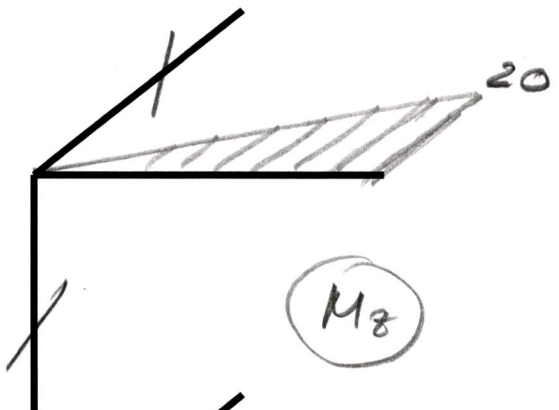
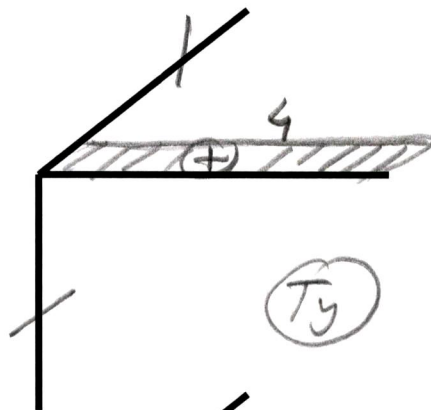
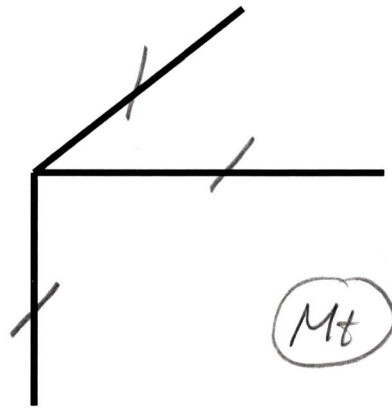
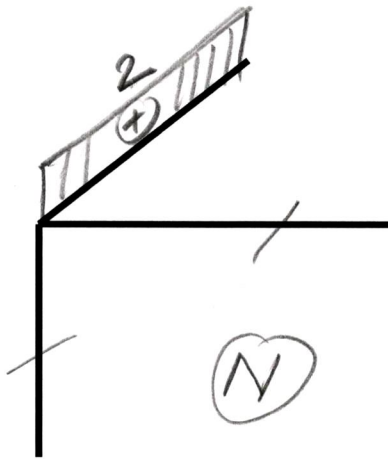
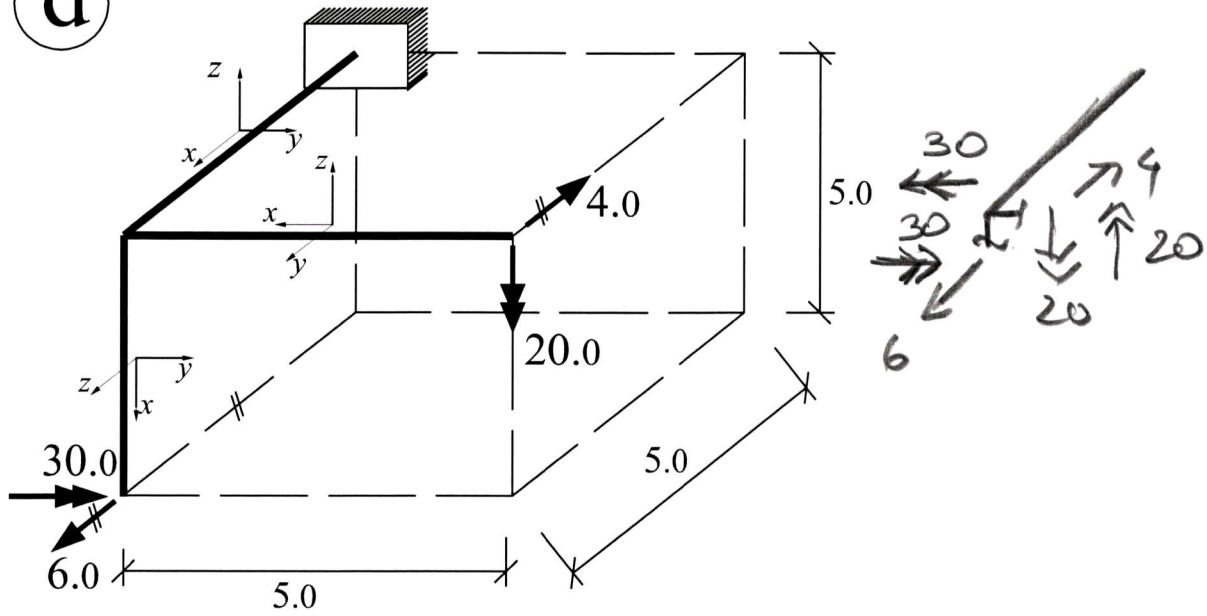
$$Y_B \cdot 3 - X_B \cdot 4 = 0$$

$$\Rightarrow X_B = 5.625$$

$$\sum X = 0 \Rightarrow X_A = 5.625$$

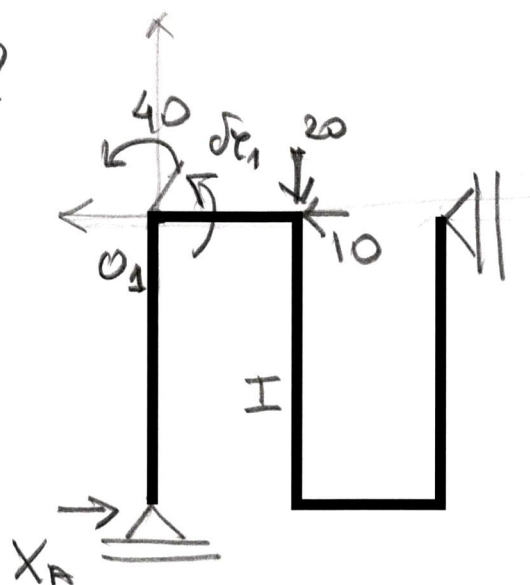


d



2.

$X_A = ?$



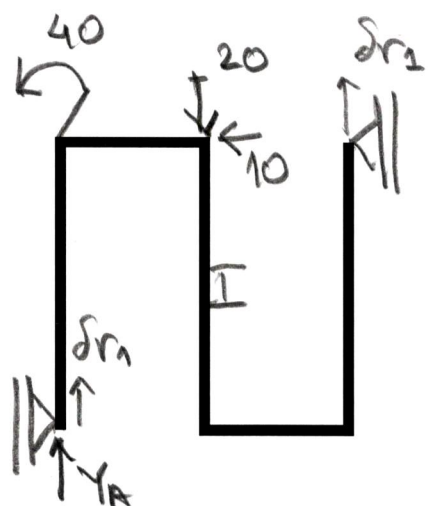
$$\delta A = 40 \delta e_1 + X_A \cdot 4 \cdot \delta e_1$$

$$- 20 \cdot 2 \cdot \delta e_1 = 0$$

$$\Rightarrow 4 X_A = 0$$

$$\Rightarrow X_A = 0$$

$Y_A = ?$

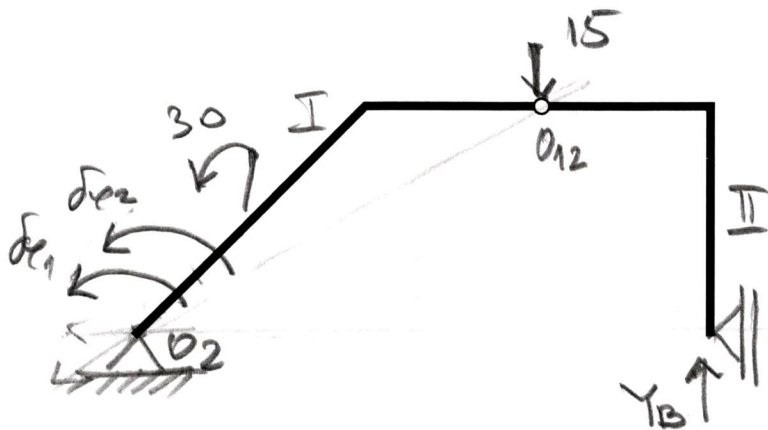


$$\delta A = 0$$

$$Y_A \cdot \delta r_1 - 20 \cdot \delta r_1 = 0$$

$$\Rightarrow Y_A = 20$$

$Y_B = ?$



$$\delta e_1 \cdot 7 = \delta e_2 \cdot 7$$

$$\Rightarrow \delta e_1 = \delta e_2$$

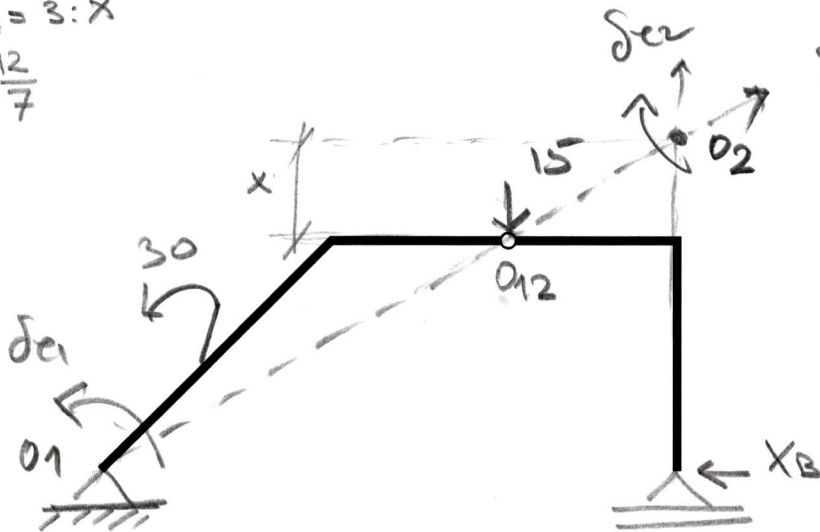
$$\delta A = 30 \cdot \delta e_1 - 15 \cdot 7 \cdot \delta e_1 + Y_B \cdot 10 \cdot \delta e_2 = 0$$

$$\Rightarrow Y_B = 7.5$$

$X_B = ?$

$$7:4 = 3:X$$

$$X = \frac{12}{7}$$



$$\delta e_1 \cdot 7 = \delta e_2 \cdot 3$$

$$\Rightarrow \delta e_2 = \frac{7}{3} \delta e_1$$

$$\delta A = 30 \delta e_1 - 15 \cdot 7 \cdot \delta e_1 + X_B \cdot \left(4 + \frac{12}{7}\right) \cdot \frac{7}{3} \delta e_1 = 0$$

$$30 \delta e_1 - 105 \delta e_1 + X_B \cdot \frac{40}{7} \cdot \frac{7}{3} \delta e_1 = 0$$

$$X_B = \frac{75 \cdot 3}{40} = \frac{225}{40} \Rightarrow X_B = 5.625$$