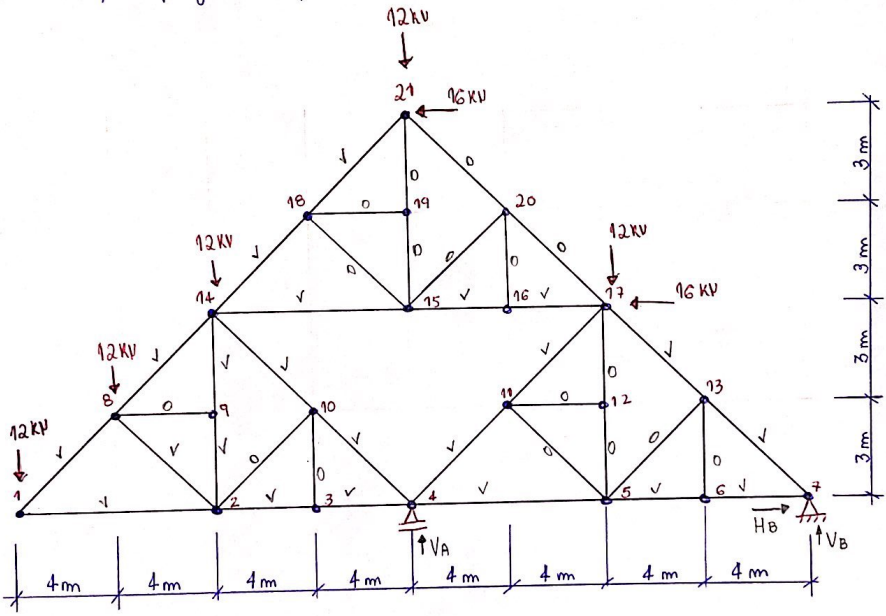
Universidade do Estado do Rio de Janeiro.
Rio de Janeiro, 16 de Maio de 2021.
Grupo: Sobrenatural (Igor Felipe, Narcisio Fernandes e Thayná Vellozo)

P2 de Resmat II

1- Após aplicar os dados do seu grupo, traçar o diagrama de esforços normais da treliça abaixo, empregando qualquer método de resolução. (3,0)



Reação de apoio:

$\Sigma F_H = 0$

$H_B - 16 - 16 = 0$

$H_B = 32\ KN$ ✓

$\Sigma F_V = 0$

$V_A + V_B - 12 - 12 - 12 - 12 - 12 = 0$

$V_A + V_B = 60$

$V_B = 60 - 99$

$V_B = -39\ KN$ ✓

$\Sigma M_B = 0$

$-16 \cdot 6 - 16 \cdot 12 - 12 \cdot 32 - 12 \cdot 28 - 12 \cdot 24 - 12 \cdot 16 - 12 \cdot 8 + 16 V_A = 0$

$-96 - 192 - 384 - 336 - 288 - 192 - 96 + 16 V_A = 0$

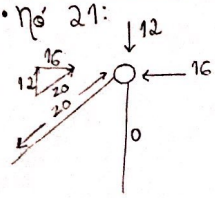
$16 V_A = 1584$

$V_A = \frac{1584}{16}$

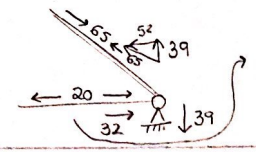
$V_A = 99\ KN$ ✓

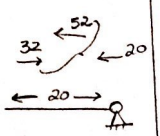
↳ Método dos nós:

• Nó 21:

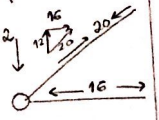


• Nó 7:

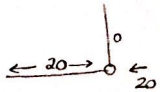




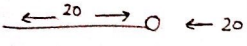
• Nó 1



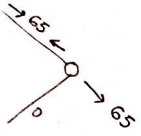
• Nó 6:



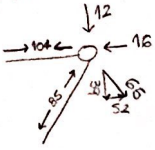
• Nó 5:



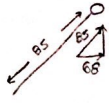
• Nó 13:



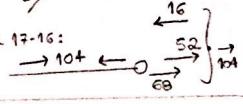
• Nó 17:



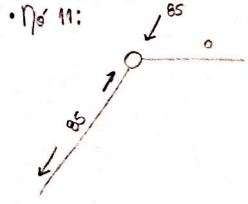
Barra 17-1:



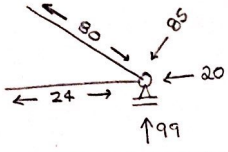
Barra 17-16:



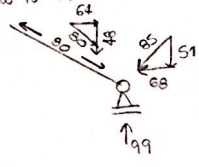
• Nó 11:



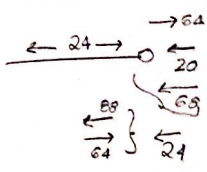
• Nó 4:



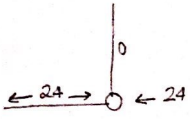
Barra 10-4:



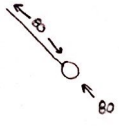
Barra 4-3:



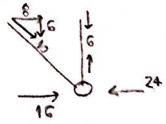
• Nó 3



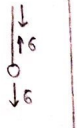
• Nó 10:



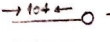
• Nó 2:



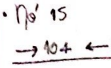
• Nó 9



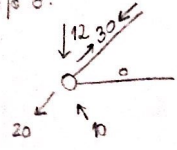
• Nó 16

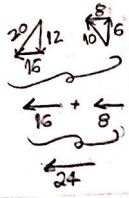


• Nó 15

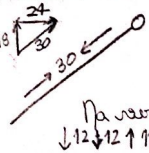


• Nó 8:





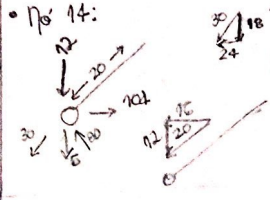
• Barra 8-14:



Na vertical:

$\downarrow 12 \downarrow 12 \uparrow 18\ 16 = 0$ ✓

• Nó 14:



• Na vertical:

$\downarrow 18 \downarrow 6 \downarrow 12 \uparrow 18$

6, falta 12↓

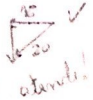
• Na horizontal:

$\leftarrow 24$

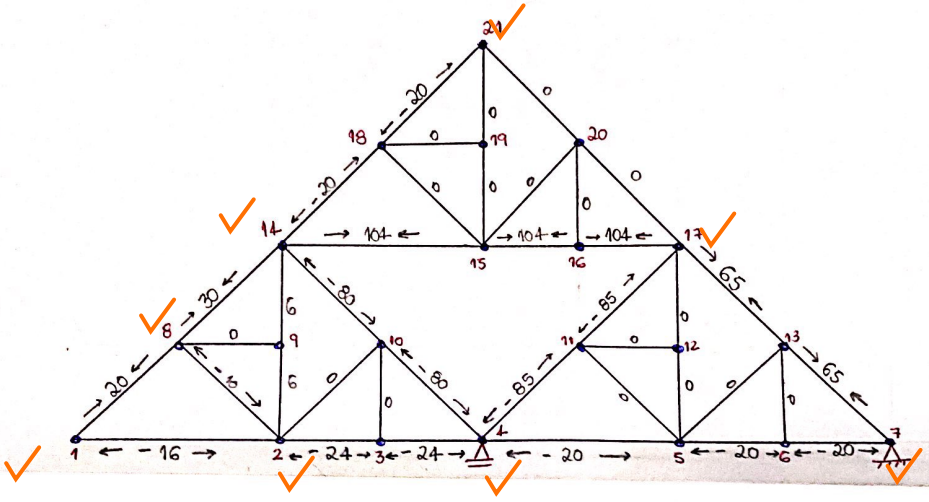
$\leftarrow 64$

$\rightarrow 104$

falta $\leftarrow 16$



obtendo



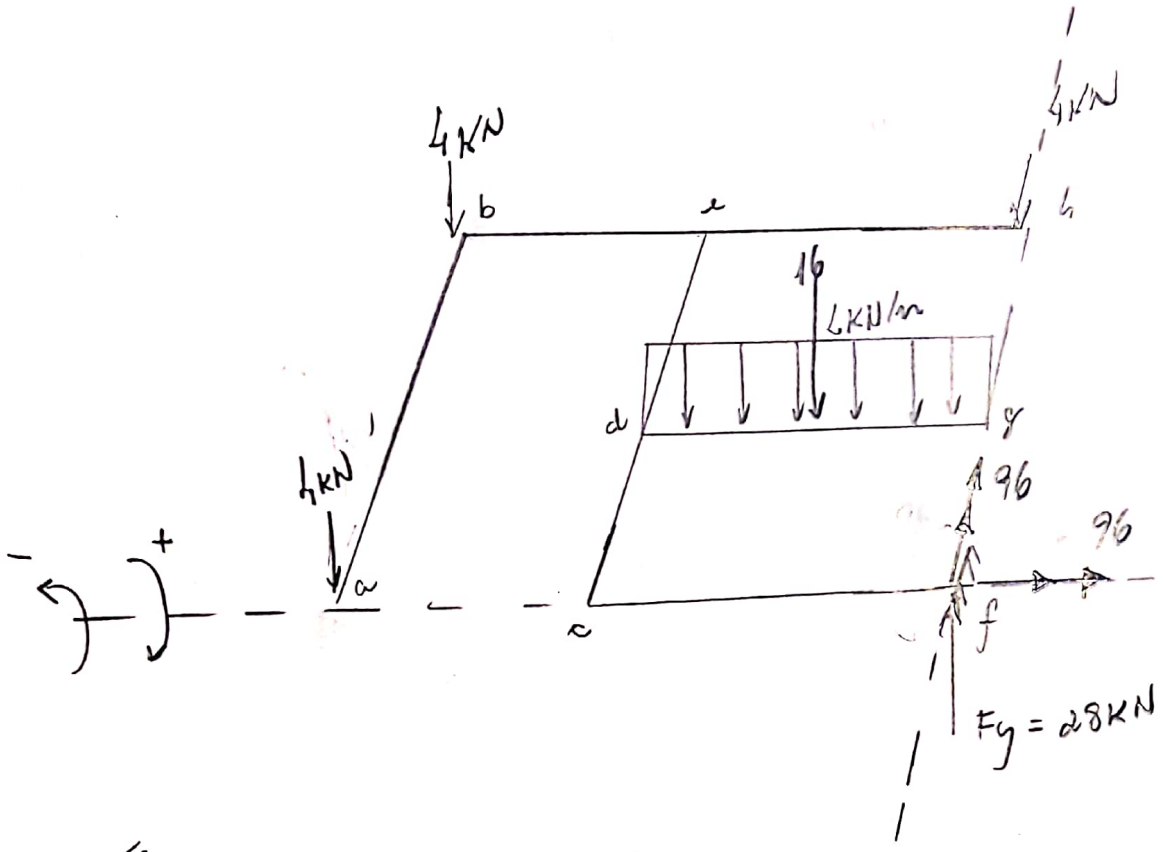
Questão 2:

Grelha 1 → Narcísio

Grelha 2 → Khayná

Grelha 3 → Igor

Questão 1



Cálculos:

$\Sigma F_y = 0 \rightarrow F_y - 4 - 4 - 4 - 16 = 0$

$F_y = 28\,KN$ ✓

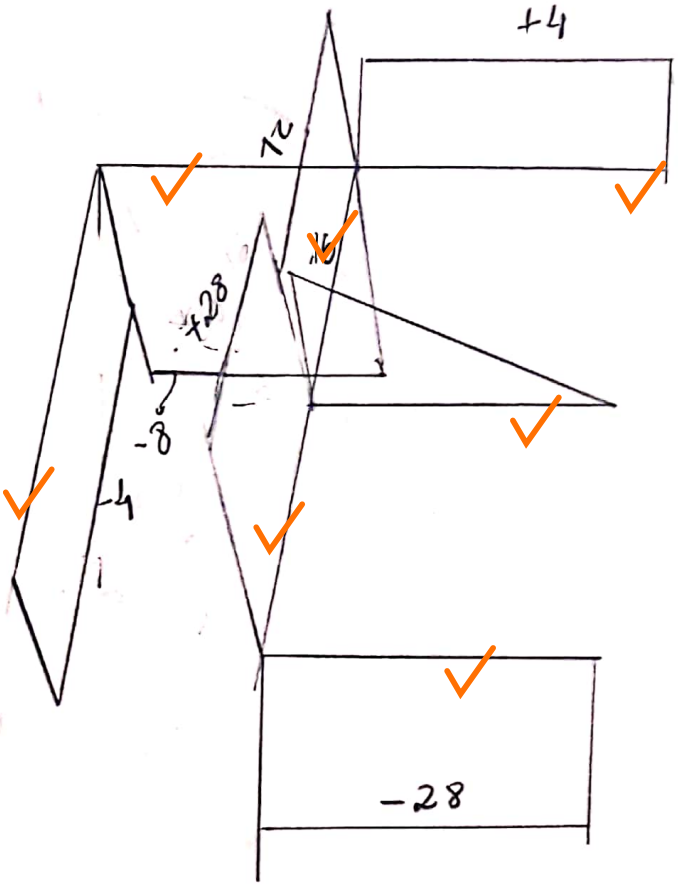
- $\Sigma M_{f-a} = 0 \rightarrow -4(6) - 4(6) - 16(3) + M_{F_x} = 0$

$M_{F_x} = 96\,kN.m$ ✓

$\Sigma M_{f-4} = 0 \rightarrow -16(2) - 96 - 4(8) + M_{F_y} = 0$

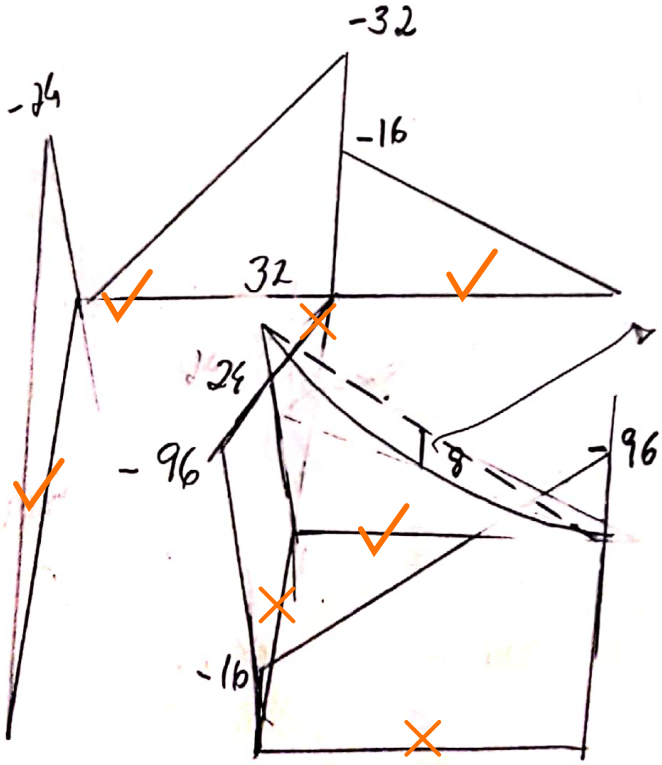
$M_{F_y} = 96\,KN.m$ ✓

D.Q



12
16
28

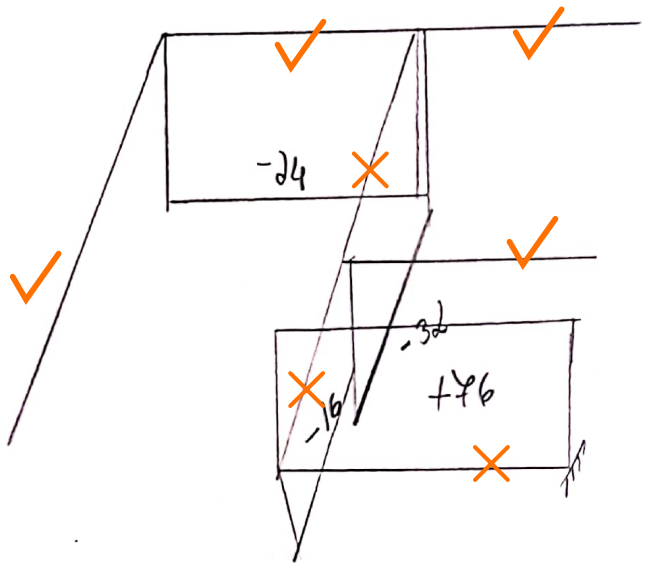
D.M



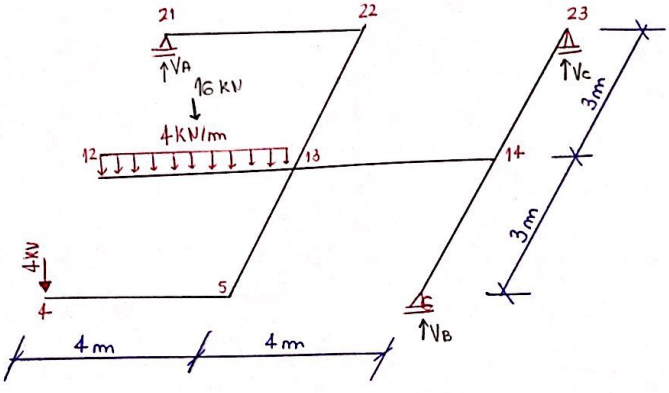
$M_{MÁX} = \frac{q l^2}{8} = \frac{4 \cdot 4^2}{8}$

$= 8$

D.T



2) Cada integrante do grupo deve escolher uma das três grelhas isostáticas abaixo para calcular reação de apoio (1,0) e traçar os diagramas de cortante (1,5), momento fletor (3,0) e torçor (1,5):



Reação de apoio:

$\Sigma F_v = 0$

$V_A + V_B + V_C - 4 - 16 = 0$

$V_A + V_B + V_C = 20$

$V_A + V_B + V_C = 20$

$V_C = 20 - V_A - V_B$

$V_C = 20 - 12 - 16$

$V_C = 20 - 28$

$V_C = -8\ KV$ ✓

$\Sigma M^{x}_{AC} = 0$

$-16 \cdot 3 - 4 \cdot 6 + 6V_B = 0$

$-48 - 24 + 6V_B = 0$

$6V_B = 72$

$V_B = 12\ KV$ ✓

$\Sigma M^{z}_{BC} = 0$

$V_A(-8) - 16(6) - 4(-8) = 0$

$-8V_A + 96 + 32 = 0$

$8V_A = 128$

$V_A = 16\ KV$ ✓

Diagrama de Cortante:

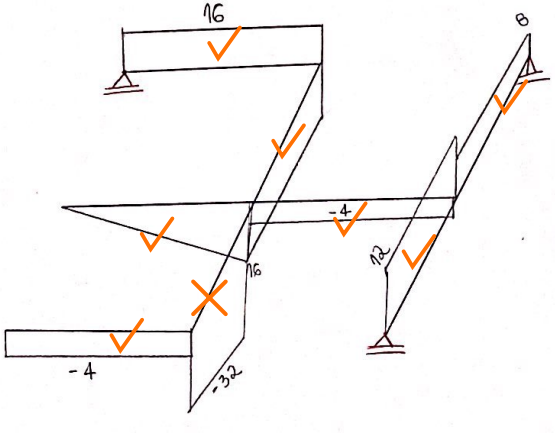


Diagrama de Forças:

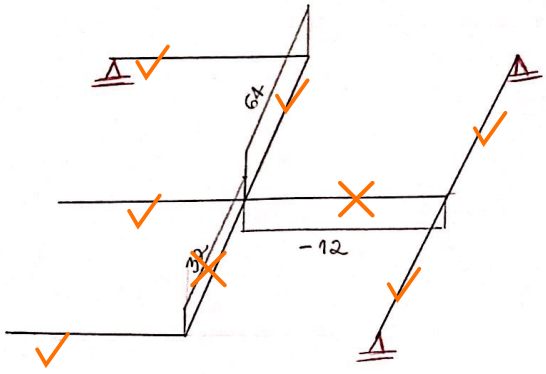
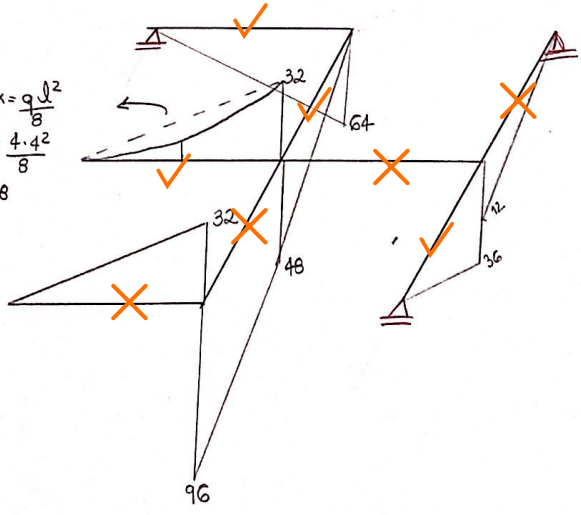


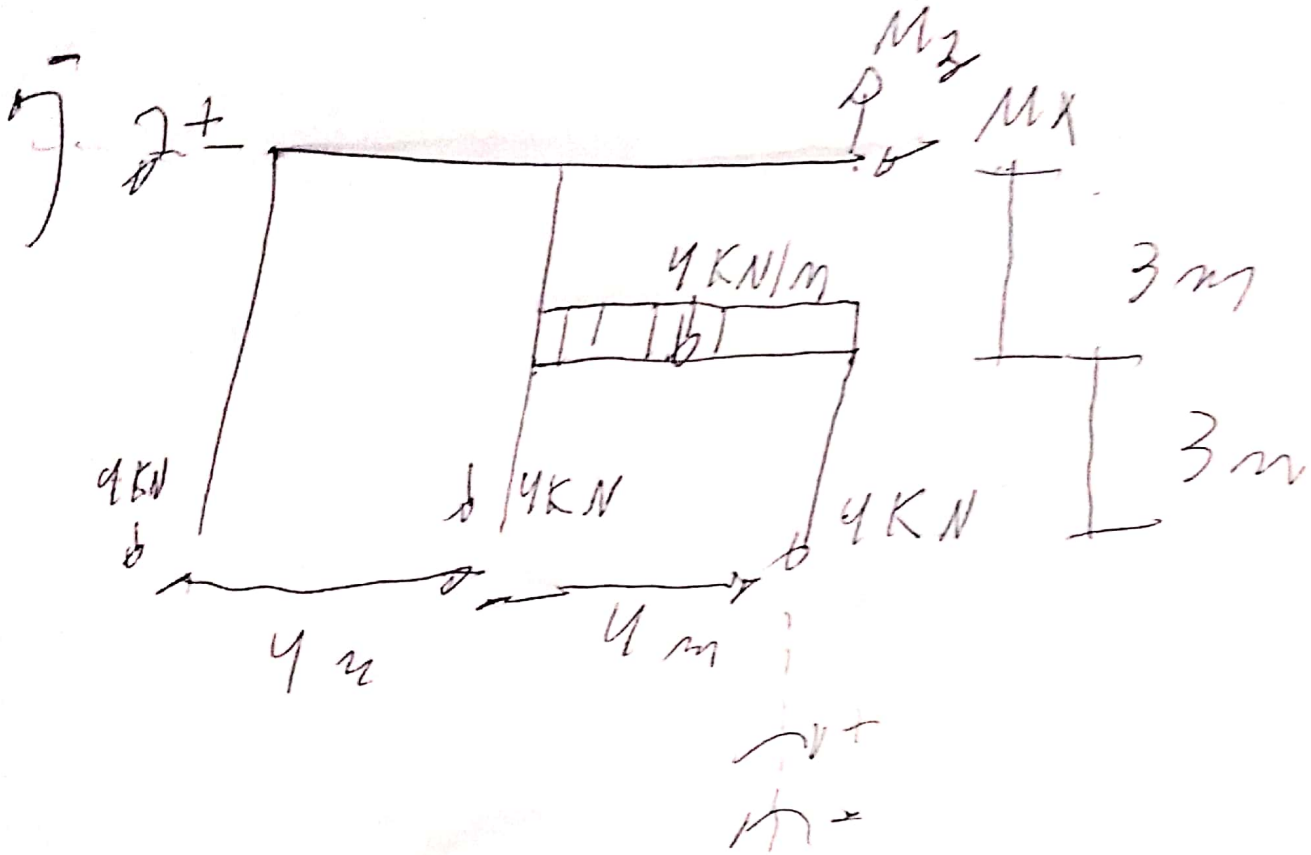
Diagrama de Momentos:

$M_{MAX} = \frac{q l^2}{8}$

$M_{MAX} = \frac{4 \cdot 4^2}{8}$

$M_{MAX} = 8$





$$\sum fy \quad Ay - 4 - 4 - 4 - 12 = 0$$

$$Ay = 16\ KN$$

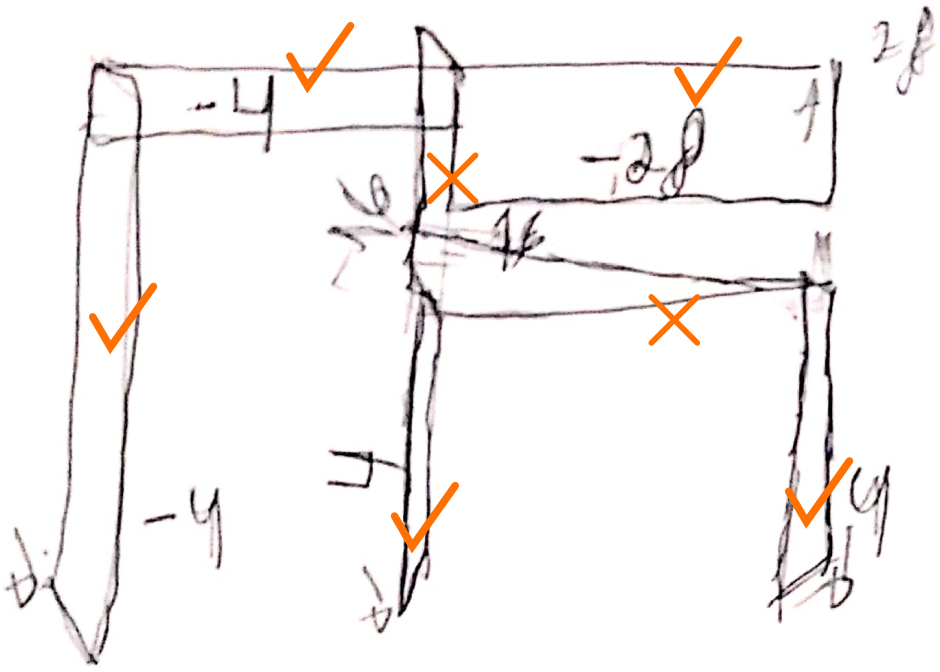
Questão 3

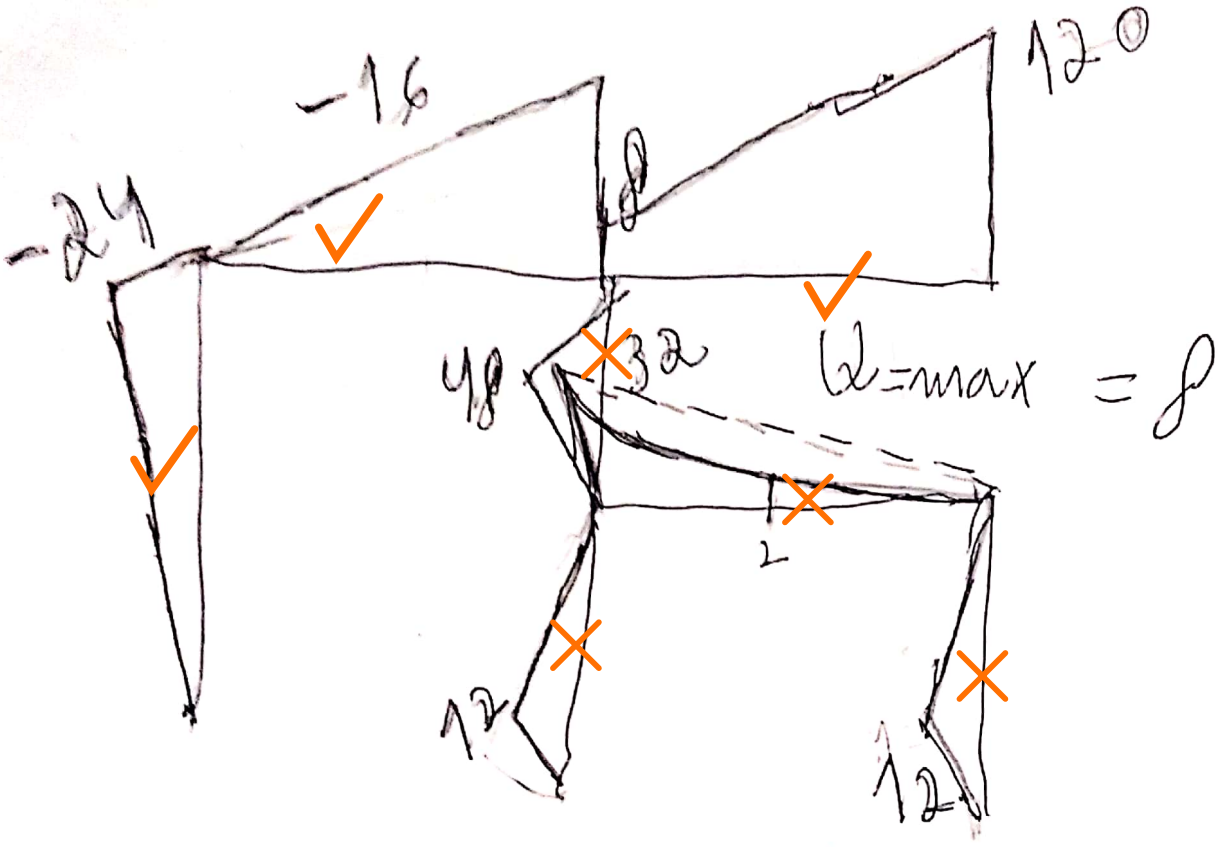
$$\Sigma M_{mz} \quad -4(8) - 4.2 - 16.2 + M_x = 0$$

$$M_z = 80\ KN\,m$$

$$\Sigma F_x = 0 \quad 4.6 + 4.6 + 4.6 + 16.3 - M_x = 0$$

$$M_x < 120\ kN\,m$$





$\omega = max = \beta$

$\omega_{max} = \frac{4 \cdot 4^2}{8} = \beta$

momento