Mecânica dos Sólidos

Diagramas de Cortante e Treliças - Exercícios

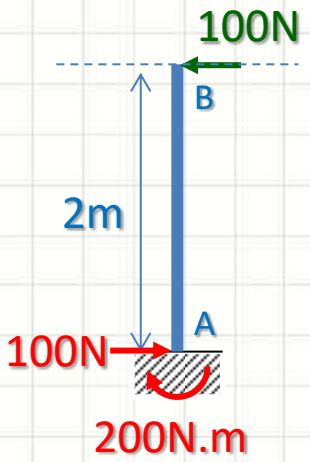
Prof. Dr. Daniel Caetano

2020 - 1

Diagramas de Cortante

Exercício 1

- Trace o Diagrama de Cortante para a viga:



Exercício 1

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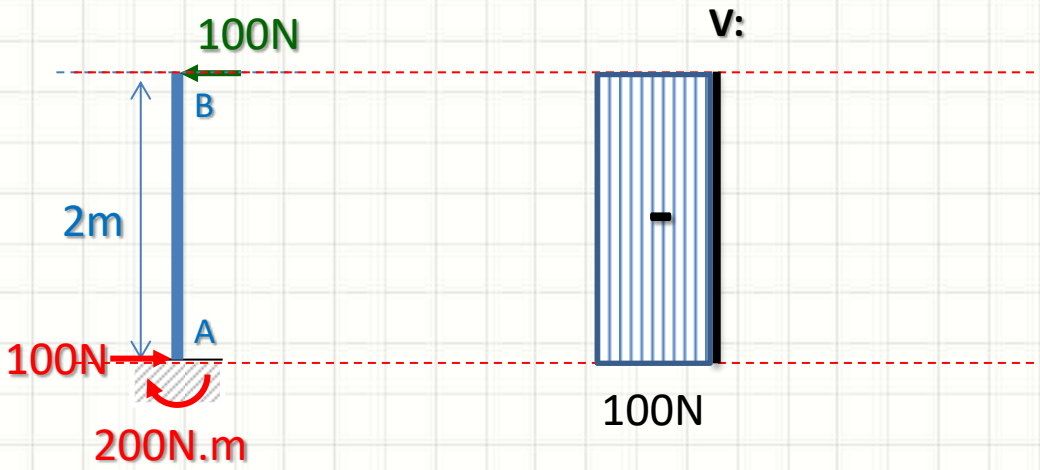
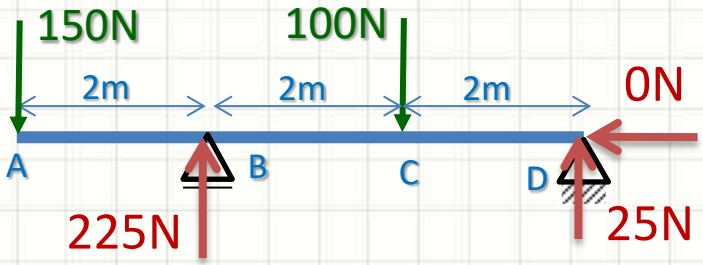


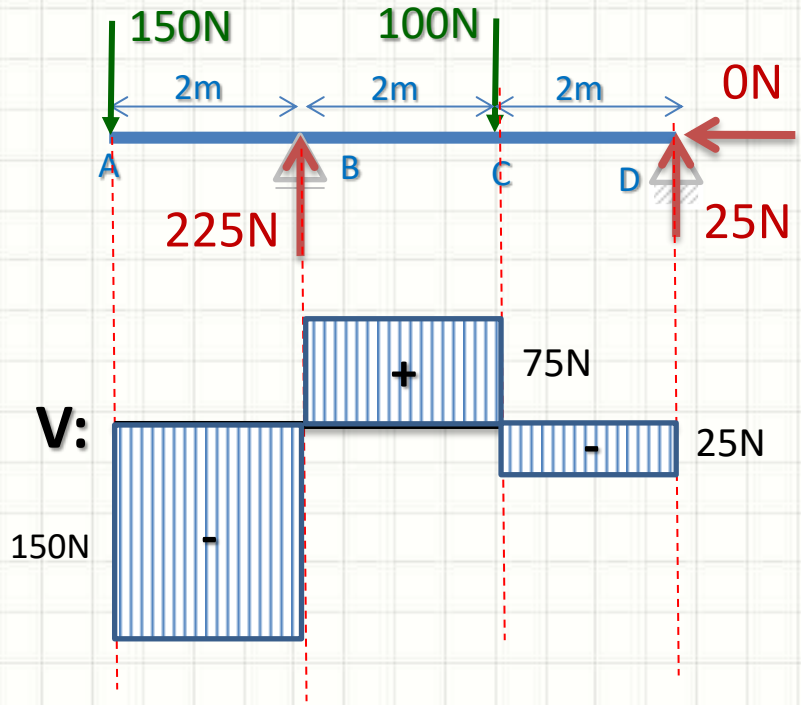
Exercício 2

- Trace o Diagrama de Cortante para a viga:



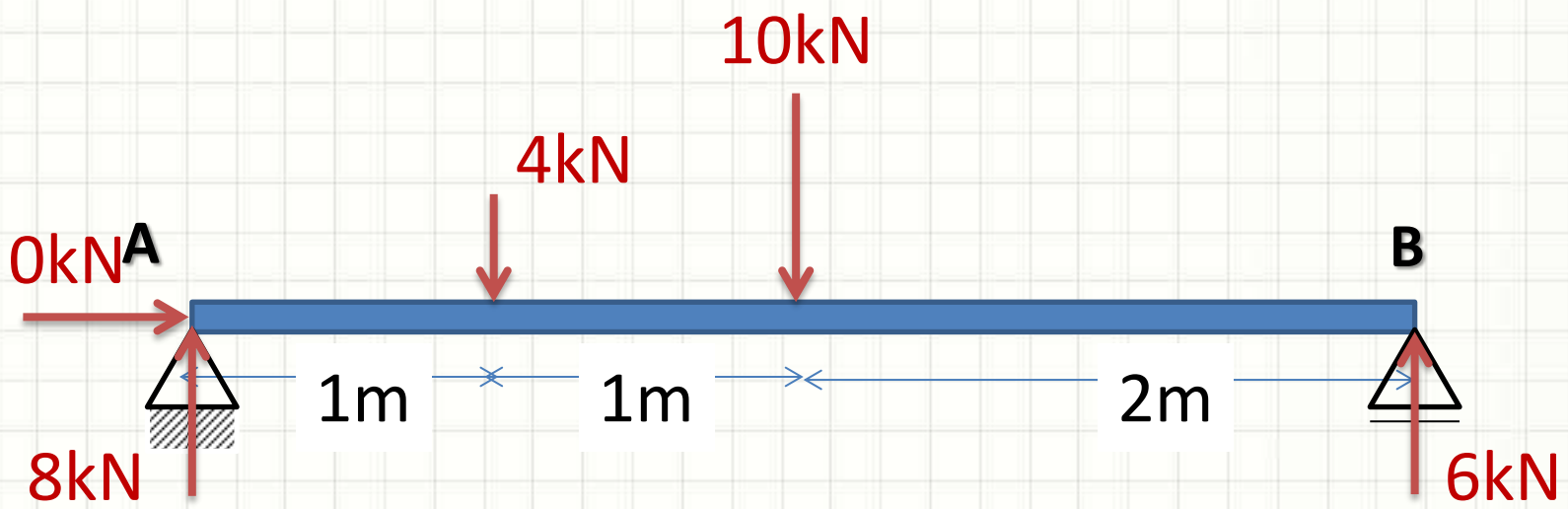
Exercício 2

- Trace o Diagrama de Cortante para a viga:



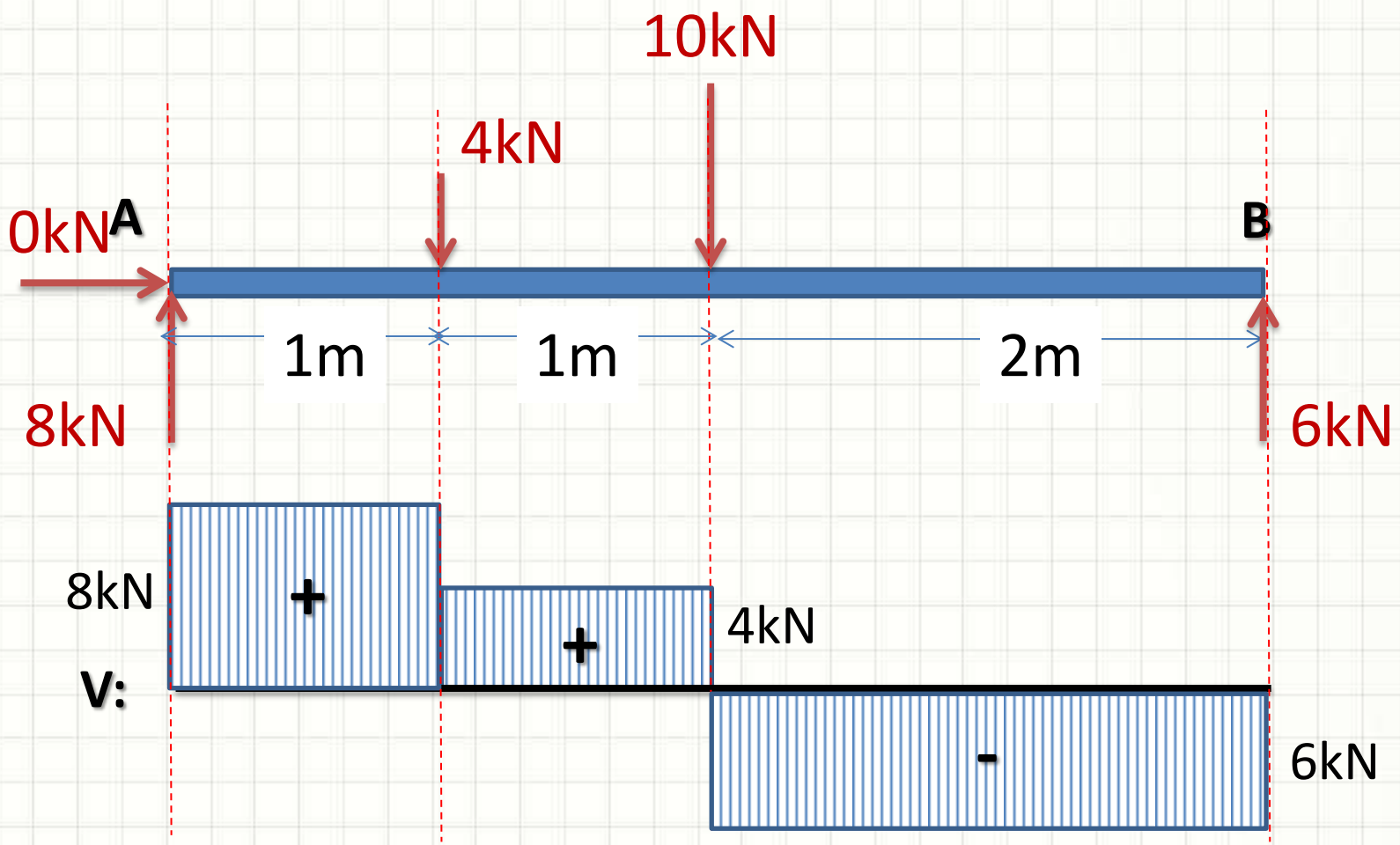
Exercício 3

- Trace o Diagrama de Cortante:



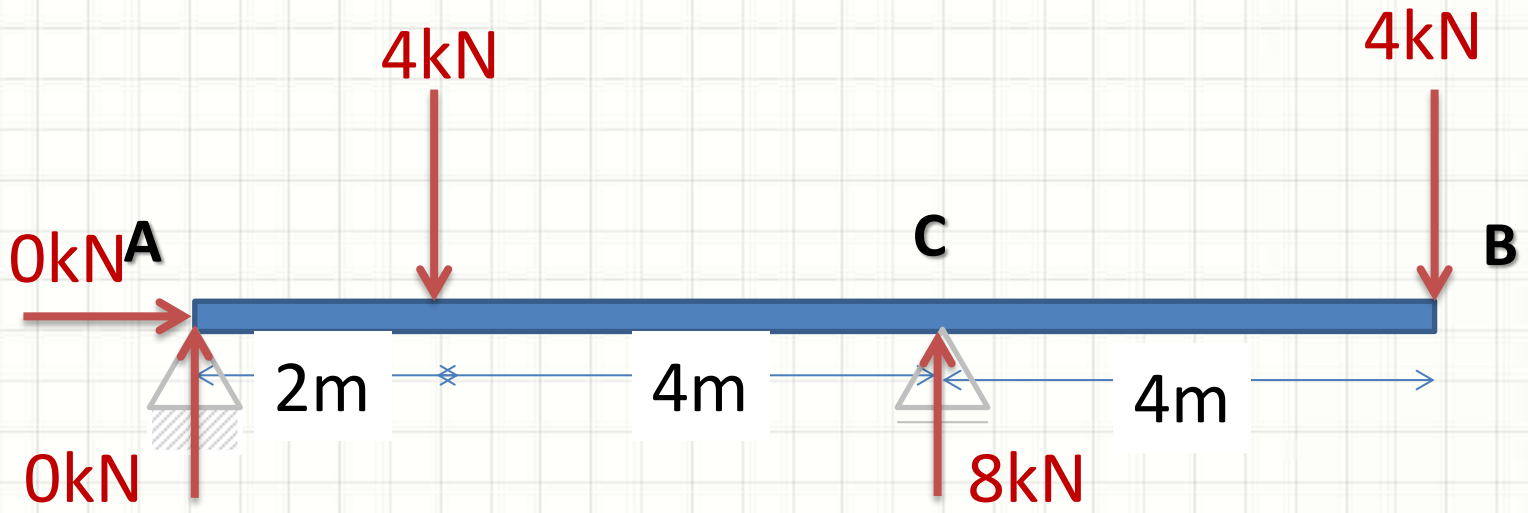
Exercício 3

- Trace o Diagrama de Cortante:



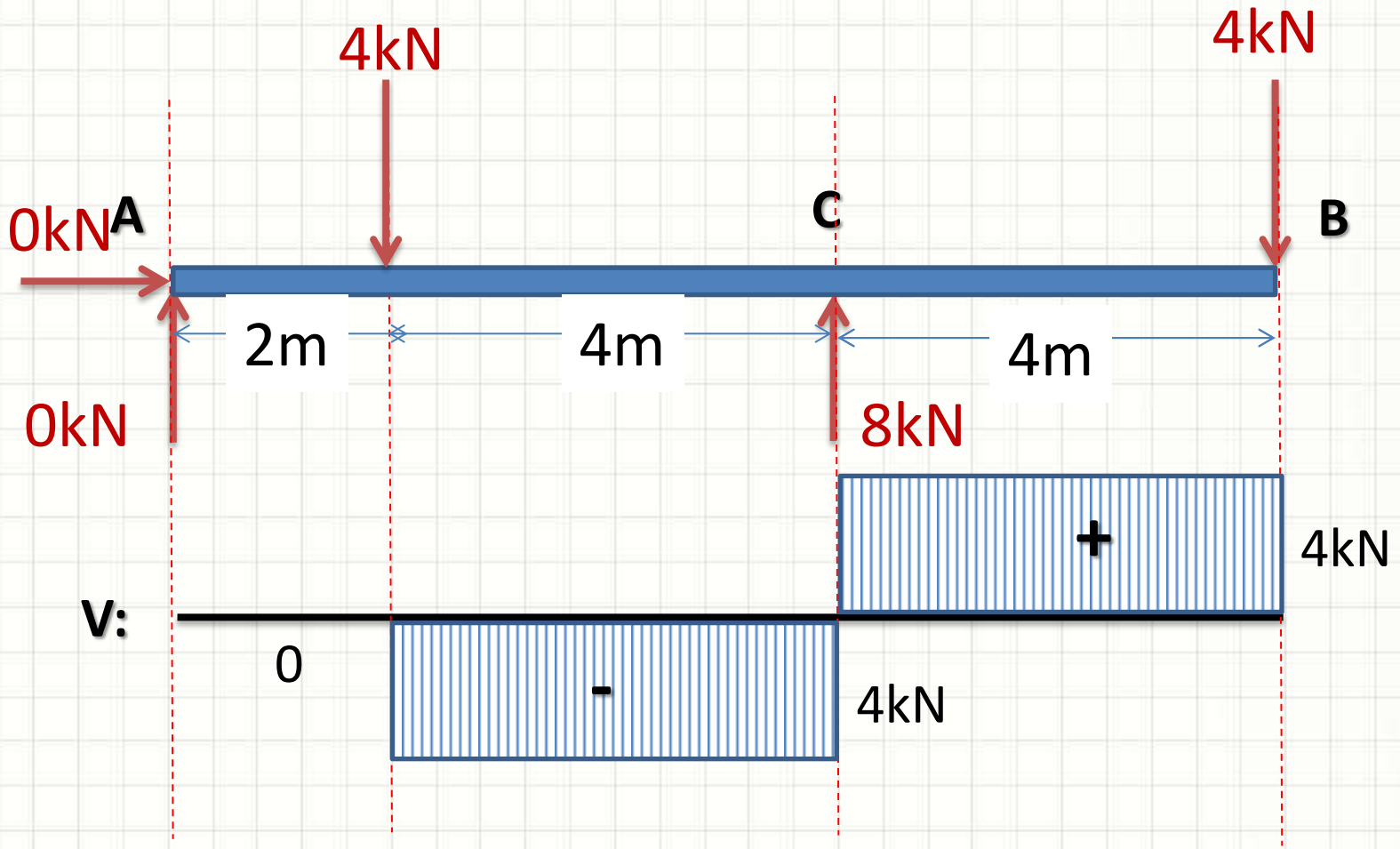
Exercício 4

- Trace o Diagrama de Cortante para a viga:



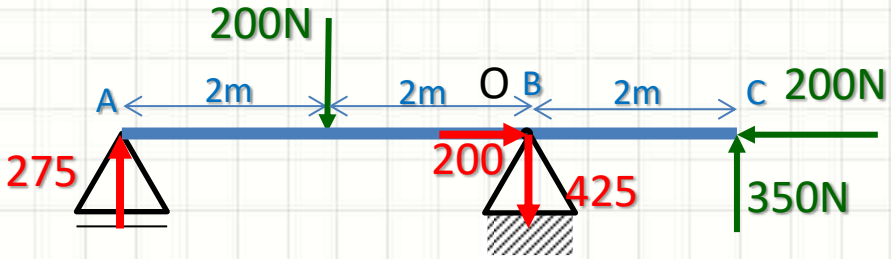
Exercício 4

- Trace o Diagrama de Cortante para a viga:



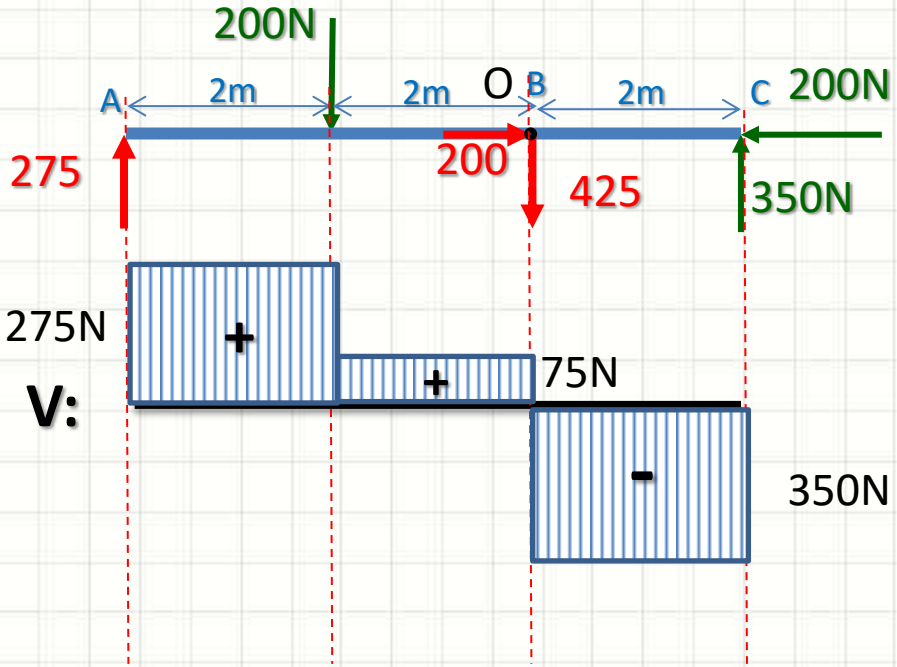
Exercício 5

- Trace o diagrama de cortante



Exercício 5

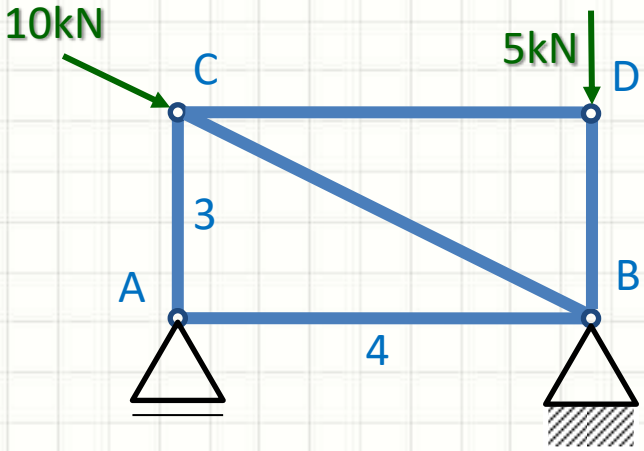
- Trace o diagrama de momento fletor:



TRELIÇAS

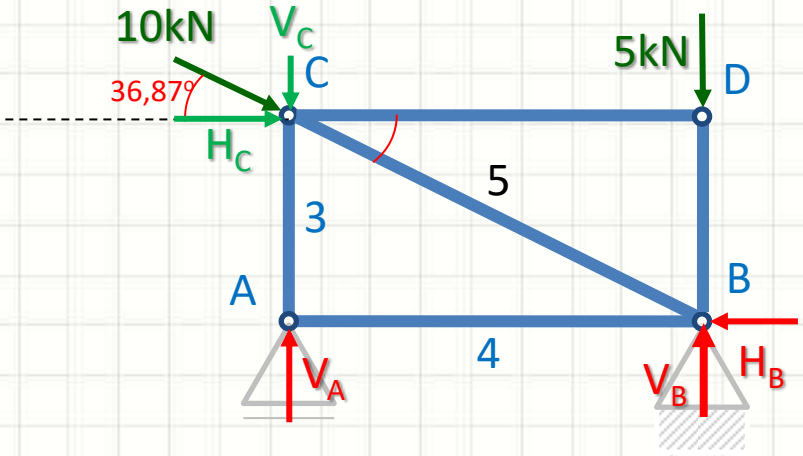
Exercício 6

- Calcule os esforços nas barras AB e AC



Exercício 6

- Calcule os esforços nas barras AB e AC



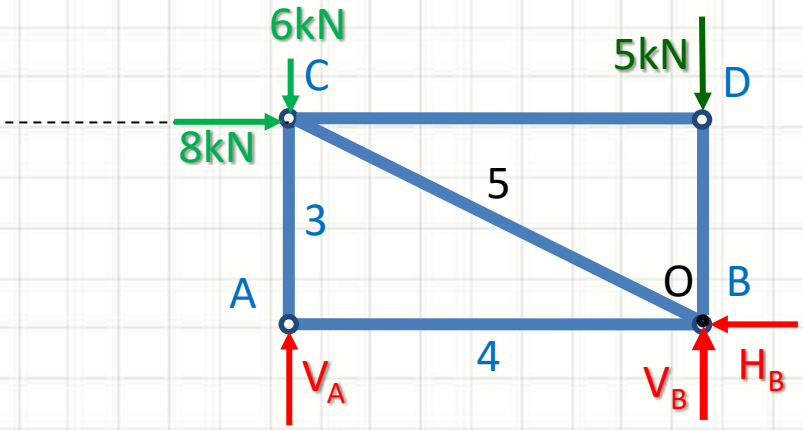
1. Corpo livre
2. Decompor esforços

$$H_c = 10000.\cos 36{,}87° = 8kN$$

$$V_c = 10000.\operatorname{sen} 36{,}87° = 6kN$$

Exercício 6

- Calcule os esforços nas barras AB e AC



1. Corpo livre
2. Decompor esforços

$H_c = 10000.\cos 36{,}87° = 8kN$

$V_c = 10000.\text{sen}\, 36{,}87° = 6kN$

3. Identificar as direções positivas
4. Determinar as reações

$$\sum F_x = 0 \Rightarrow \ +8000 \ -H_B \ = 0 \qquad \Rightarrow \boldsymbol{H_B = 8kN}$$

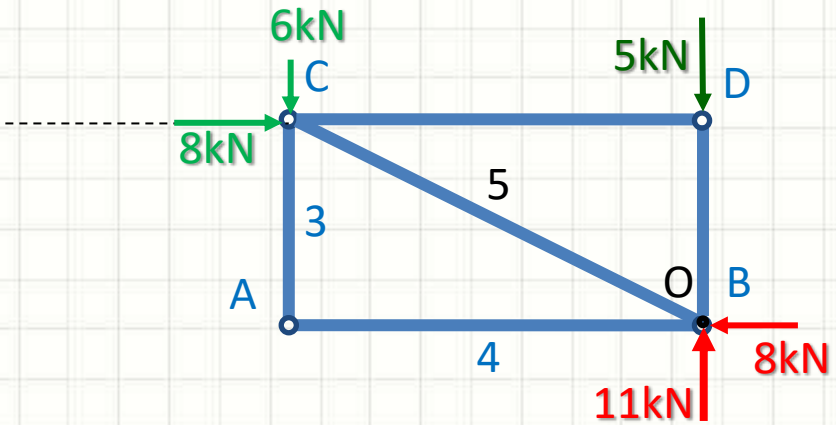
$$\sum F_y = 0 \Rightarrow \ -6000 \ -5000 \ +V_A \ +V_B \ = 0 \ \Rightarrow \boldsymbol{V_B = 11000 - V_A}$$

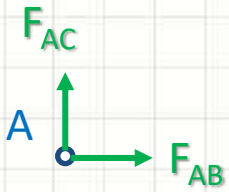
$$\sum M_o = 0 \Rightarrow \ +(V_A.4) \ +(8000.3) \ -(6000.4) \ = 0 \ \Rightarrow \boldsymbol{V_A = \ 0kN}$$

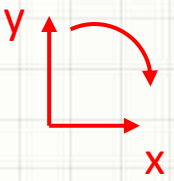
$$\therefore \boldsymbol{V_B = \ 11kN}$$

Exercício 6

- Calcule os esforços nas barras AB e AC





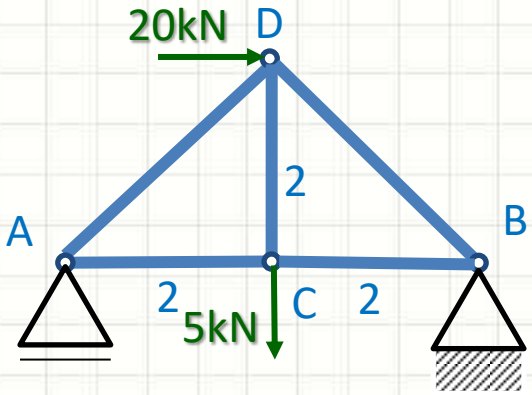


$$\sum F_x = 0 \Rightarrow \quad F_{AB} = 0 \quad \Rightarrow \boldsymbol{F_{AB} = 0kN}$$

$$\sum F_y = 0 \Rightarrow \quad F_{AC} = 0 \quad \Rightarrow \boldsymbol{F_{AC} = 0kN}$$

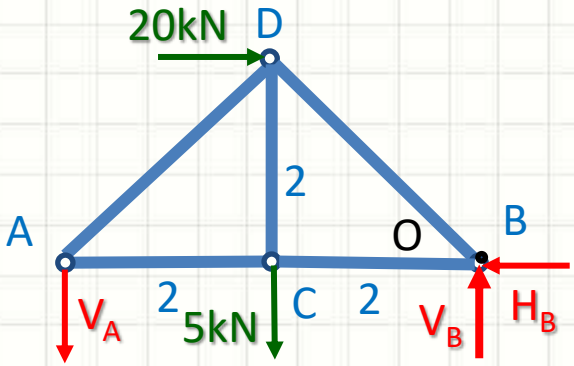
Exercício 7

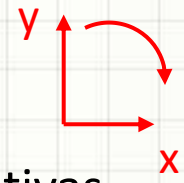
- Calcule os esforços nas barras AC e AD



Exercício 7

- Calcule os esforços nas barras AC e AD





1. Corpo livre
2. Decompor esforços
3. Identificar as direções positivas
4. Determinar as reações

$$\sum F_x = 0 \Rightarrow -H_B + 20000 = 0 \qquad \Rightarrow \boldsymbol{H_B = 20kN}$$

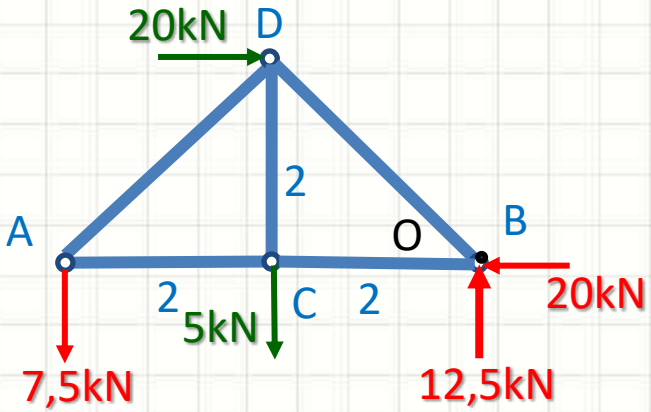
$$\sum F_y = 0 \Rightarrow -V_A - 5000 + V_B = 0 \qquad \Rightarrow \boldsymbol{V_B = 5000 + V_A}$$

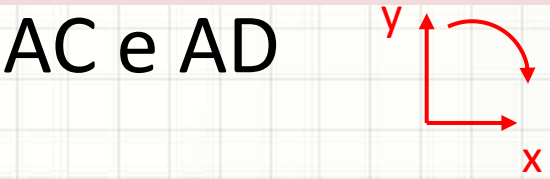
$$\sum M_o = 0 \Rightarrow -(V_A.4) + (20000.2) - (5000.2) = 0 \qquad \Rightarrow \boldsymbol{V_A = \frac{30000}{4} = 7,5kN}$$

$$\therefore \boldsymbol{V_B = 12,5kN}$$

Exercício 7

- Calcule os esforços nas barras AC e AD





$$\sum F_y = 0 \Rightarrow -7500 + F_{AD}.\operatorname{sen} 45^o = 0 \Rightarrow \boldsymbol{F_{AD} = 10,6kN}$$

$$\sum F_x = 0 \Rightarrow -F_{AC} + F_{AD}.cos\, 45^o = 0 \Rightarrow \boldsymbol{F_{AC} = -7,5kN}$$