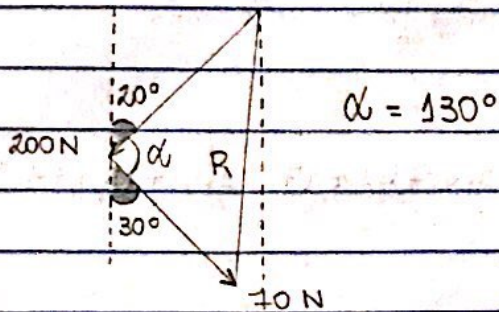


# Mecânica Geral - Resolução lista 1

1 -



$$R^2 = 200^2 + 70^2 - 2 \cdot 200 \cdot 70 \cdot \cos 130^\circ$$

$$R = 250,8 \text{ N}$$

$$\frac{\sin 130^\circ}{250,8} = \frac{\sin \beta}{70} \rightarrow \beta = 12,35^\circ$$

$$\gamma = 20 - 12,35^\circ = 7,65^\circ$$

2 -  $R = F (dx \hat{i} + dy \hat{j} + dz \hat{k}) ; F = 2400 \text{ N}$

$$rd = \sqrt{dx^2 + dy^2 + dz^2}$$

$$rd = \sqrt{(-35)^2 + (70)^2 + (25)^2}$$

$$rd = 82,16 \text{ m}$$

$$R = 2400 (-35 \hat{i} + 70 \hat{j} + 25 \hat{k})$$

$$82,16$$

$$R = -1022,35 \hat{i} + 2044,7 \hat{j} + 730,25 \hat{k}$$

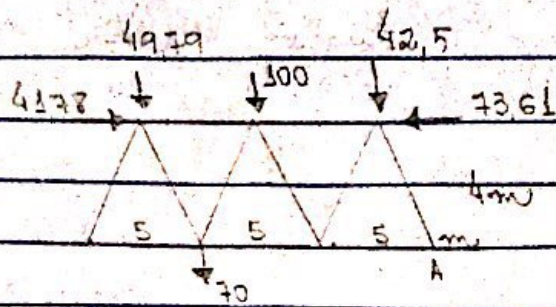
$$F_x = -1022,35 \text{ N} \rightarrow F \cdot \cos \theta_x = 115^\circ$$

$$F_y = 2044,7 \text{ N} \rightarrow F \cdot \cos \theta_y = 31^\circ$$

$$F_z = 730,25 \text{ N} \rightarrow F \cdot \cos \theta_z = 72^\circ$$

3 -  $F_1 \rightarrow F_x \cdot \cos 50^\circ \rightarrow 41,78 \hat{i} \text{ N}$   
 (65 N)  $F_y \cdot \sin 50^\circ \rightarrow -49,79 \hat{j} \text{ N}$

$F_3 \rightarrow F_x \cdot \cos 30^\circ \rightarrow -73,61 \hat{i} \text{ N}$   
 (85 N)  $F_y \cdot \sin 30^\circ \rightarrow -42,5 \hat{j} \text{ N}$



$$M_A = (73,61 \cdot 4) + (42,5 \cdot 2,5) + (100 \cdot 7,5) + (70 \cdot 10) + (49,79 \cdot 12,5) + (-41,78 \cdot 4) = 0$$

$$M_A = 2305,945 \text{ N}\cdot\text{m}$$

\* cálculo da resultante canalada

$$F_R^2 = \sum F_x^2 + \sum F_y^2$$

$$\sum F_x = -31,82 \text{ N}$$

$$F_R^2 = (-31,82)^2 + (-262,29)^2$$

$$\sum F_y = -262,29 \text{ N}$$

$$F_R = 264,2 \text{ N}$$