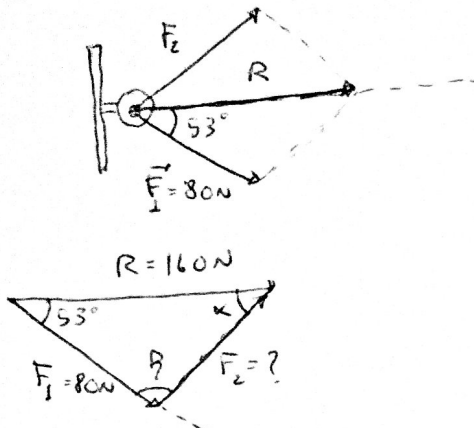


Atividade de Física

Semana 2

Exercício 1



Usando a lei dos senos:

$$\frac{F_1}{\sin \alpha} = \frac{R}{\sin \beta} \Rightarrow \frac{\sin \beta}{\sin \alpha} = \frac{160}{80}$$

$$\frac{\sin \beta}{\sin \alpha} = 2 \Rightarrow \sin \beta = 2 \sin \alpha$$

Sabendo que $\beta + \alpha + 53^\circ = 180^\circ$

$$\beta + \alpha = 127 \Rightarrow \boxed{\beta = 127^\circ - \alpha}$$

$$\sin(127^\circ - \alpha) = 2 \sin \alpha$$

$$\sin 127^\circ \cos \alpha - \sin \alpha \cos 127^\circ = 2 \sin \alpha$$

$$0,8 \cos \alpha + 0,6 \sin \alpha = 2 \sin \alpha$$

$$0,8 \cos \alpha = 1,4 \sin \alpha$$

$$\cos \alpha = \frac{1,4 \sin \alpha}{0,8} \Rightarrow \boxed{\cos \alpha = 1,75 \sin \alpha}$$

Usando $\cos^2 \alpha + \sin^2 \alpha = 1$

$$(1,75 \sin \alpha)^2 + \sin^2 \alpha = 1$$

$$3 \sin^2 \alpha + \sin^2 \alpha = 1$$

$$4 \sin^2 \alpha = 1$$

$$\sin \alpha = \pm \frac{1}{2} \text{ logo } \alpha = 30^\circ$$

$\sin \alpha = -\frac{1}{2} \Rightarrow$ o vetor está no 3º quadrante

Para achar F_2 temos que usar

$$R^2 = F_1^2 + F_2^2 + 2F_1F_2 \cos \theta$$

$$\theta = 30^\circ + 53^\circ = 83^\circ$$

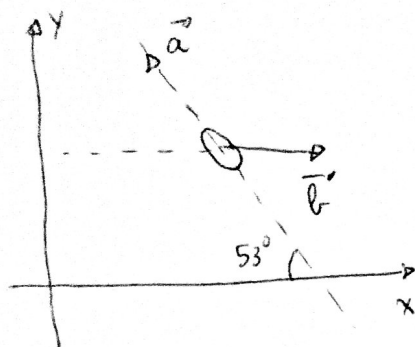
$$160^2 = 80^2 + F_2^2 + 160F_2 \cos 83^\circ$$

$$F_2^2 + 19,5F_2 - 19.200 = 0$$

Resolvendo essa equação de 2º grau temos:

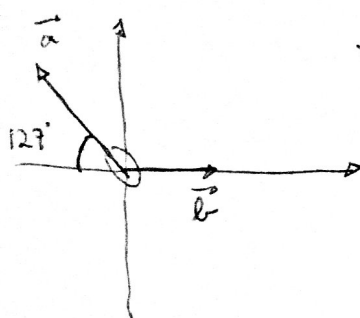
$$\boxed{F_2 = 129,15 \text{ N}}$$

Exercício 2



a) Deslocamos a origem sobre o

barco



$$v_{ax} = a \cos 127^\circ$$

$$v_{ay} = a \sin 127^\circ$$

$$v_{ax} = 10 \cdot (-0,6)$$

$$v_{ax} = -6$$

$$v_{ax} = -6 \text{ m/s}$$

$$v_{ay} = +8 \text{ m/s}$$

$$v_{bx} = b \cos 0^\circ$$

$$v_{by} = b \sin 0^\circ$$

$$v_{bx} = 6 \cdot 1$$

$$v_{by} = 6 \cdot 0$$

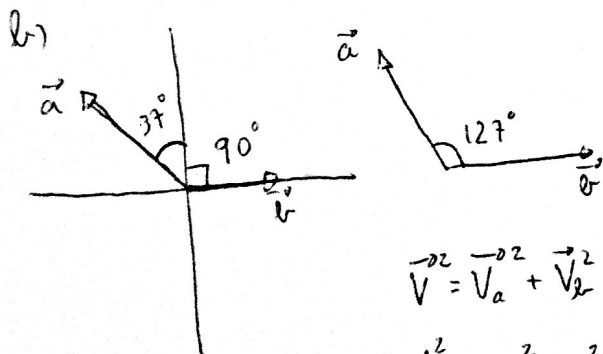
$$v_{bx} = 6 \text{ m/s}$$

$$v_{by} = 0 \text{ m/s}$$

As expressões analíticas são:

$$\vec{v}_a = -6\hat{i} + 8\hat{j} \quad v_a = (-6, 8)$$

$$\vec{v}_b = 6\hat{i} \quad v_b = (6, 0)$$



$$V^2 = v_a^2 + v_b^2 + 2\vec{v}_a \cdot \vec{v}_b \cos 127^\circ$$

$$V^2 = 10^2 + 6^2 + 2 \cdot 10 \cdot 6 \cdot (-0,6)$$

$$V^2 = 64 \quad \boxed{V = 8 \text{ m/s}}$$