

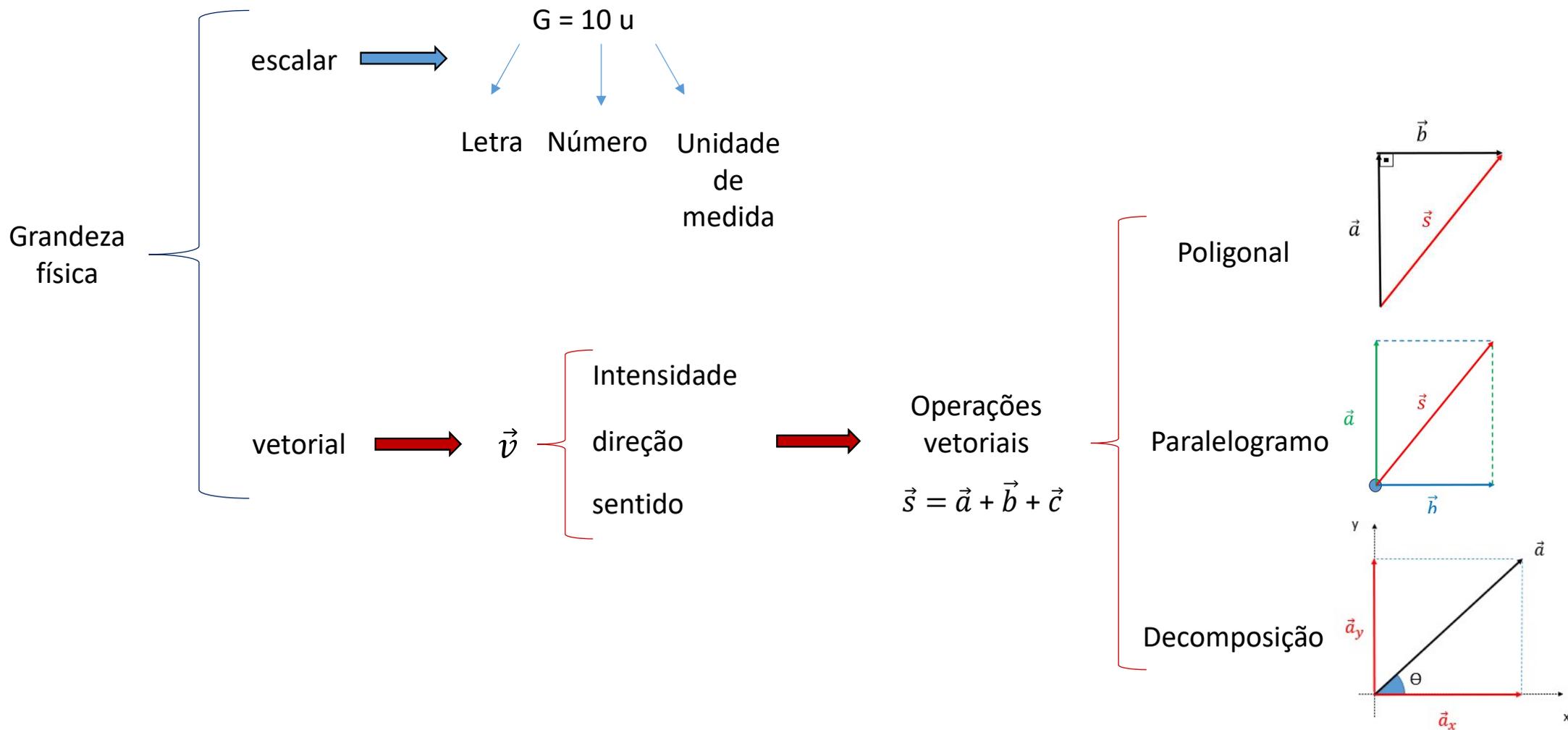
Operações com vetores

- Conteúdo extra

Apresentação e demais documentos: fisicasp.com.br

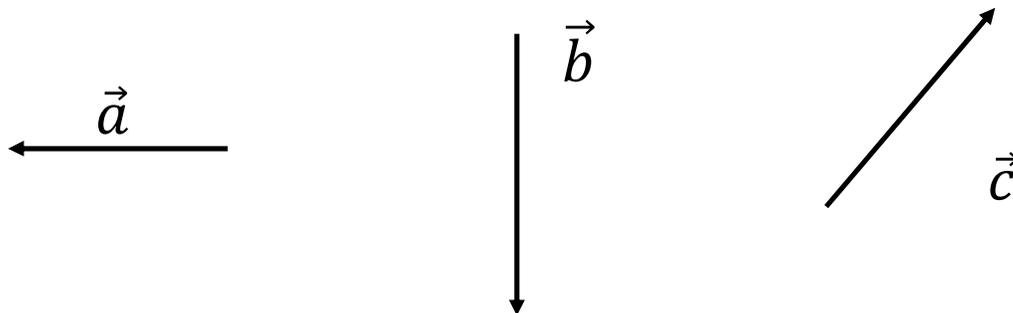
Professor Caio

1. Grandeza escalar x vetorial



2. Resultante de dois ou mais vetores

$$\vec{s} = \vec{a} + \vec{b} + \vec{c}$$

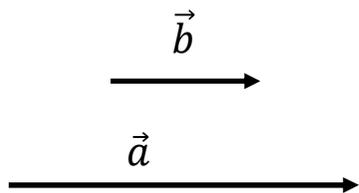


Não é a simples soma algébrica de suas intensidades!



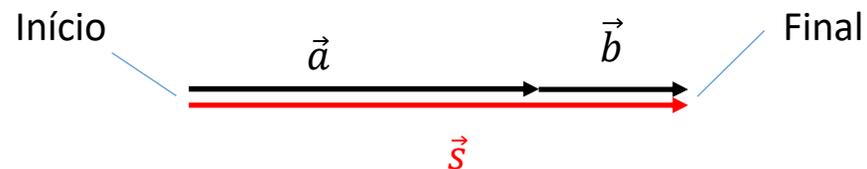
3. Regra da linha poligonal

Mesma direção e sentido



$$a = 4 \text{ e } b = 3$$

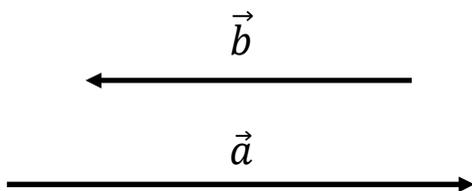
$$\vec{s} = \vec{a} + \vec{b}$$



$$s = a + b$$

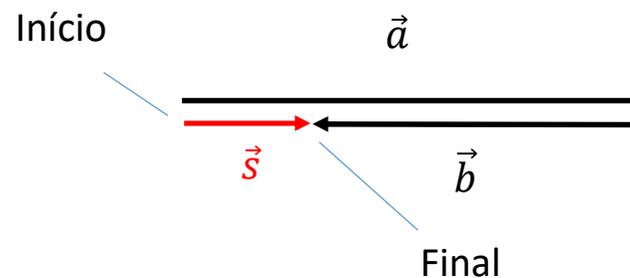
$$s = 4 + 3 = 7$$

Mesma direção e sentidos contrários



$$a = 4 \text{ e } b = 3$$

$$\vec{s} = \vec{a} + \vec{b}$$

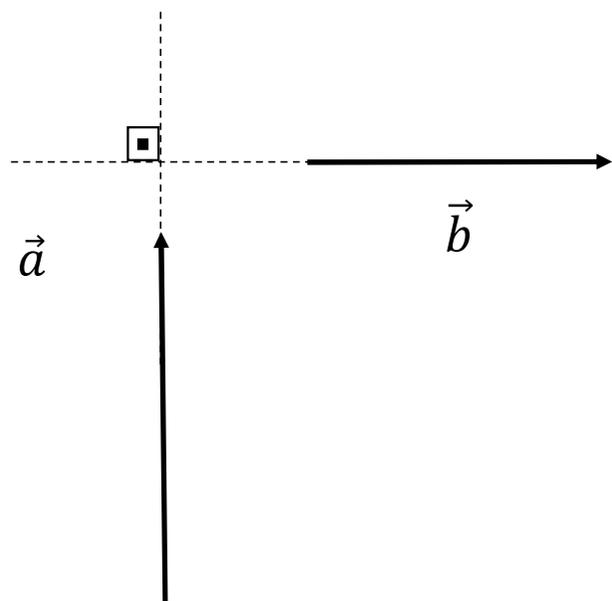


$$s = a - b$$

$$s = 4 - 3 = 1$$

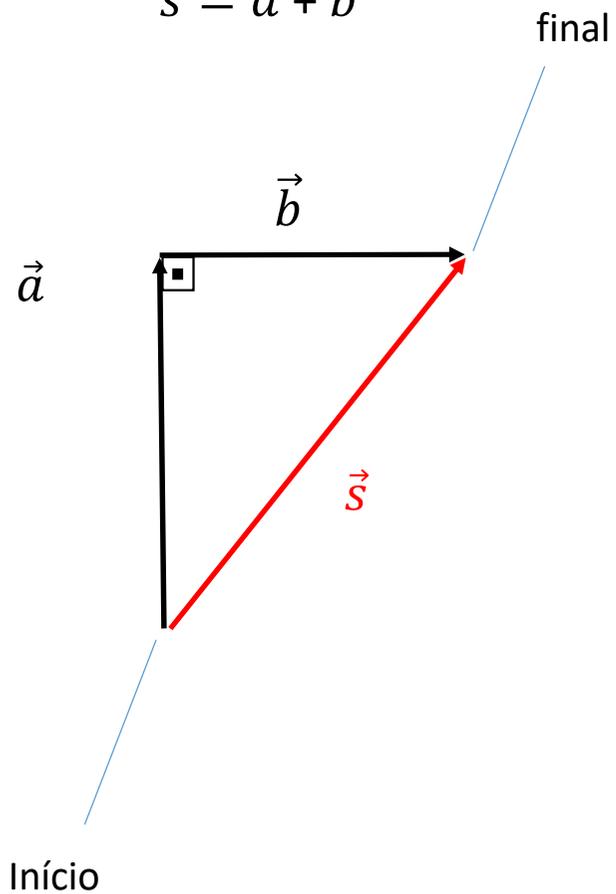
3. Regra da linha poligonal

Vetores perpendiculares entre si



$$a = 4 \text{ e } b = 3$$

$$\vec{s} = \vec{a} + \vec{b}$$



$$s^2 = a^2 + b^2$$

$$s^2 = 4^2 + 3^2$$

$$s^2 = 16 + 9$$

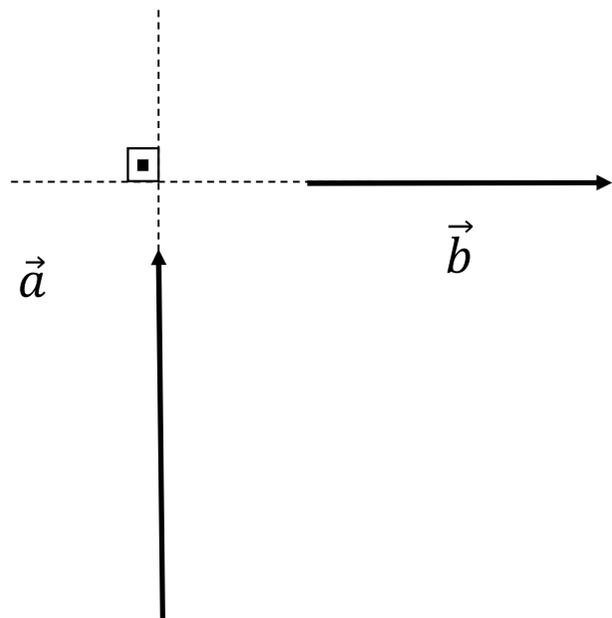
$$s^2 = 25$$

$$s = 5$$

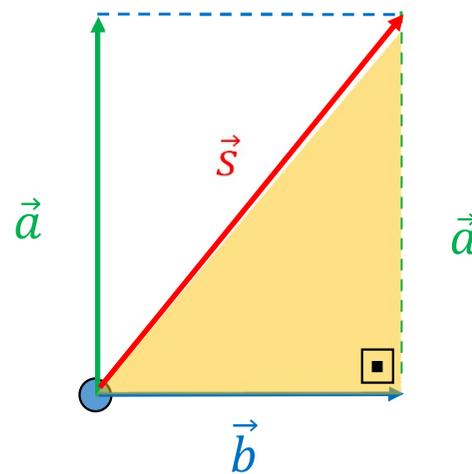
4. Regra do paralelogramo

Vetores perpendiculares entre si

$$\vec{s} = \vec{a} + \vec{b}$$



$$a = 4 \text{ e } b = 3$$



$$s^2 = a^2 + b^2$$

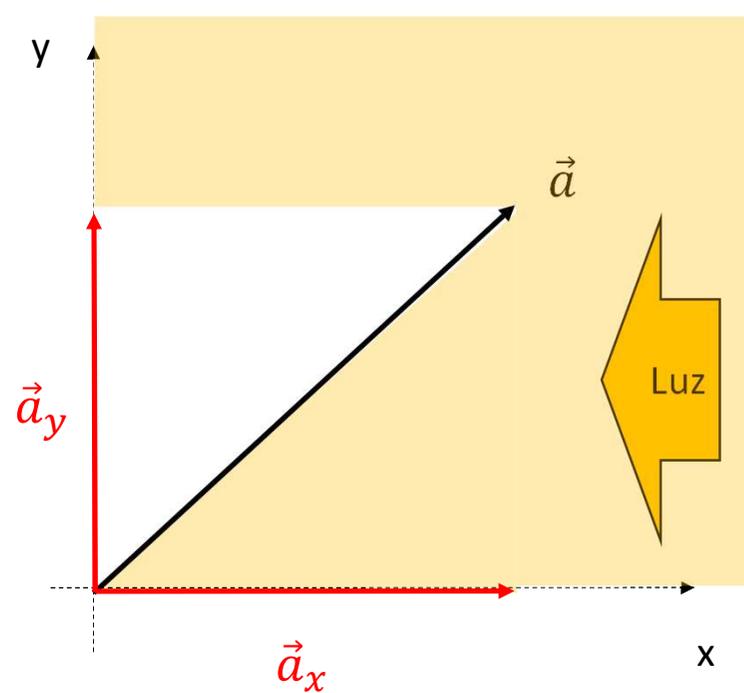
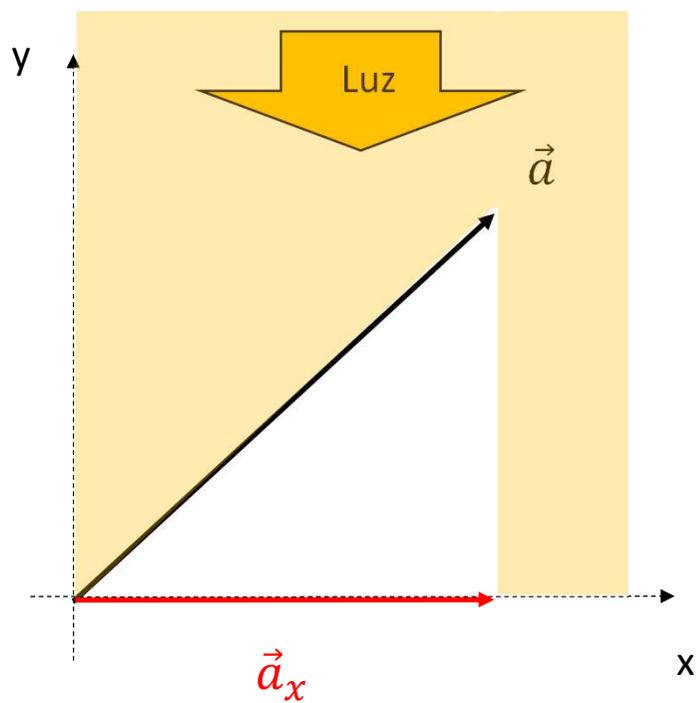
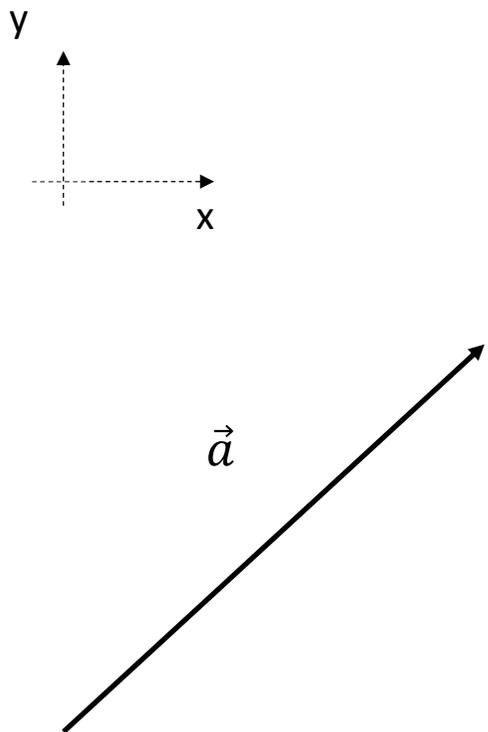
$$s^2 = 4^2 + 3^2$$

$$s^2 = 16 + 9$$

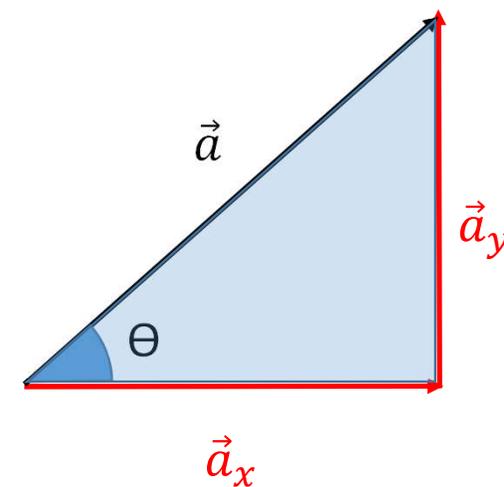
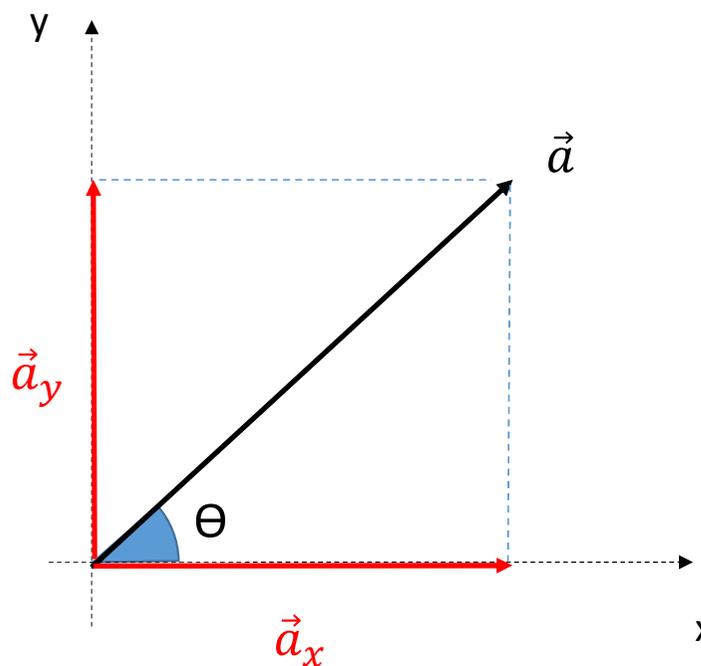
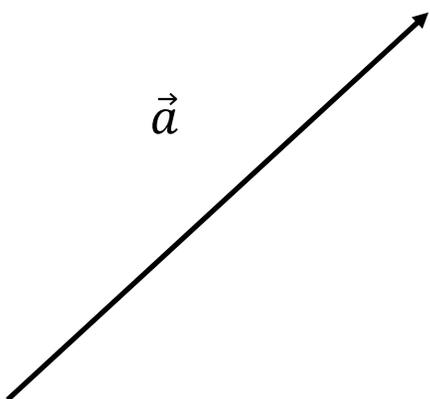
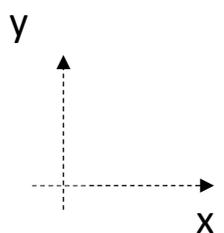
$$s^2 = 25$$

$$s = 5$$

5. Decomposição de um vetor



5. Decomposição de um vetor



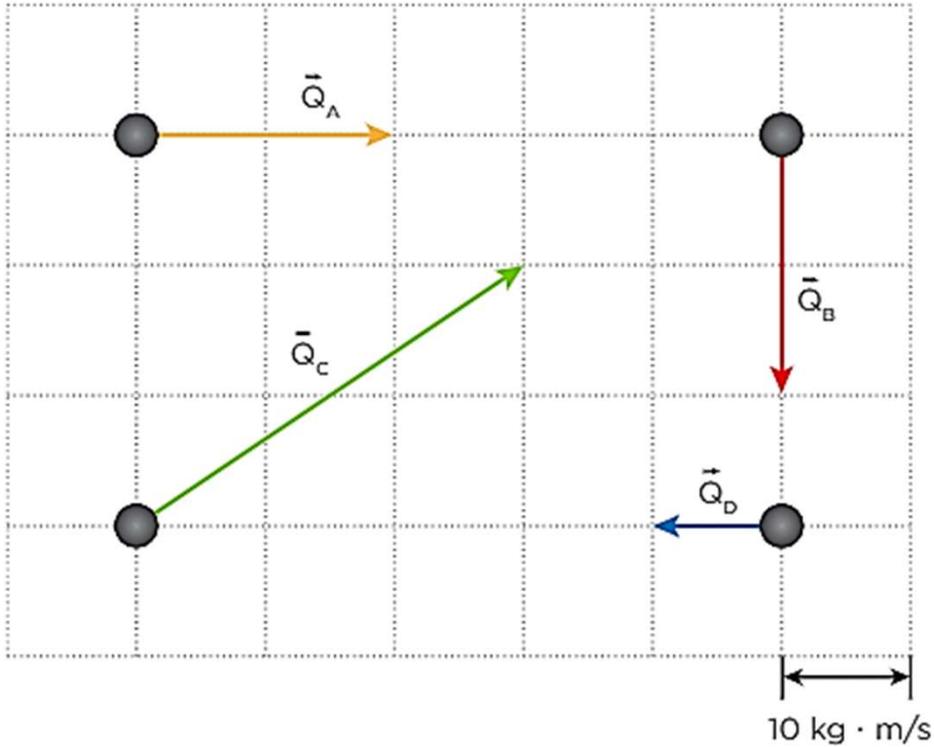
Se o triângulo for retângulo: $\text{sen } \theta = \frac{a_y}{a} \Rightarrow a_y = a \cdot \text{sen } \theta$

$\text{cos } \theta = \frac{a_x}{a} \Rightarrow a_x = a \cdot \text{cos } \theta$

Exercícios do Caio

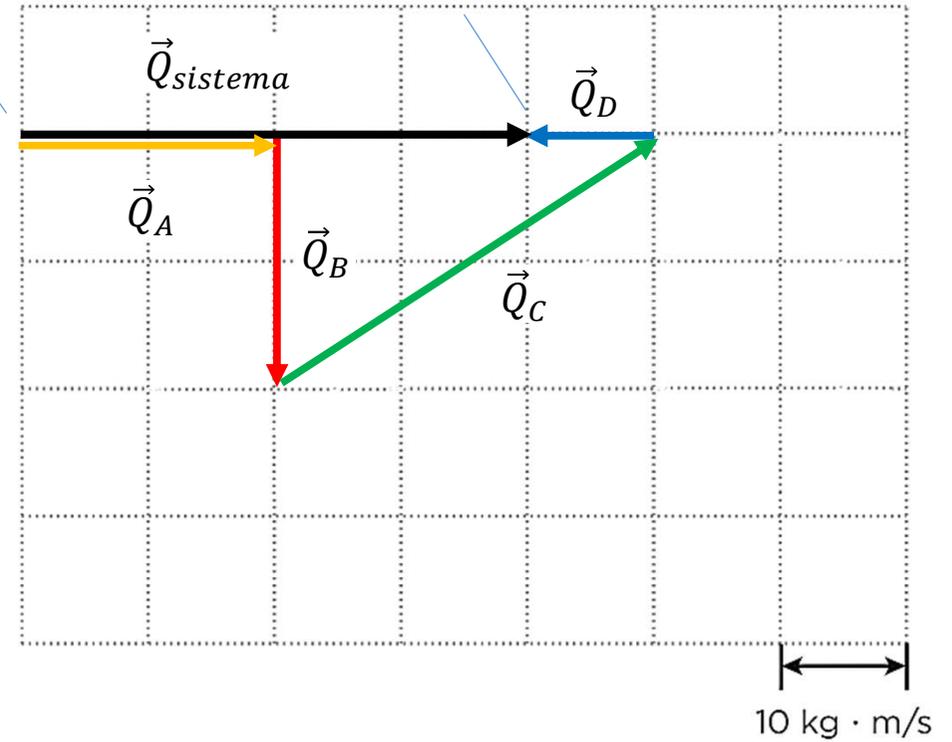
1. a) Observe o sistema de quatro corpos a seguir e caracterize o vetor

$$\vec{Q}_{sistema} = \vec{Q}_A + \vec{Q}_B + \vec{Q}_C + \vec{Q}_D$$



Início

final



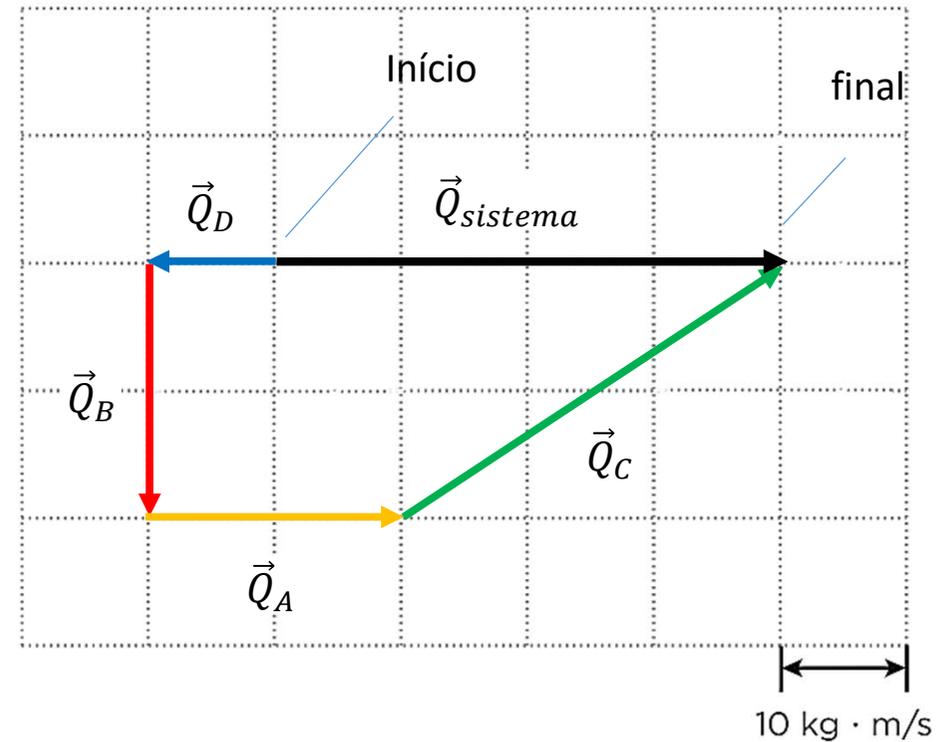
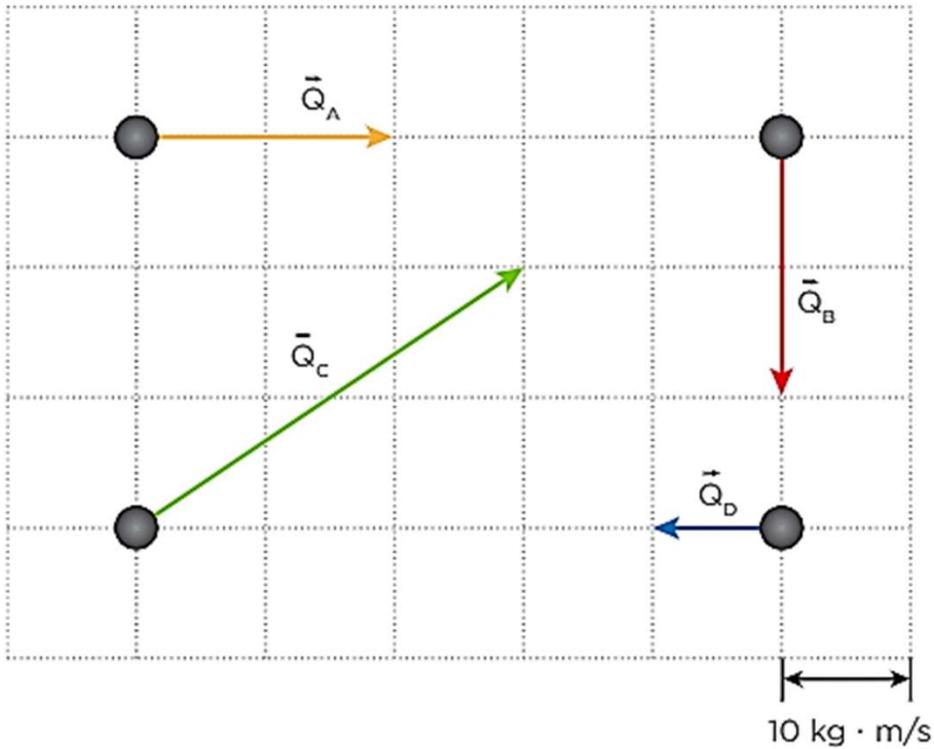
$\vec{Q}_{sistema}$

Intensidade: $|\vec{Q}| = 40 \text{ kg} \cdot \text{m/s}$

Direção: horizontal

Sentido: para direita

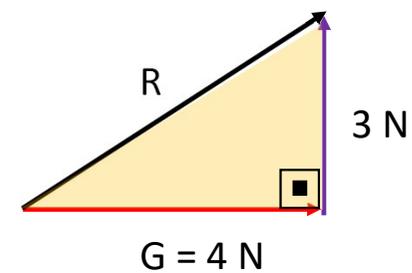
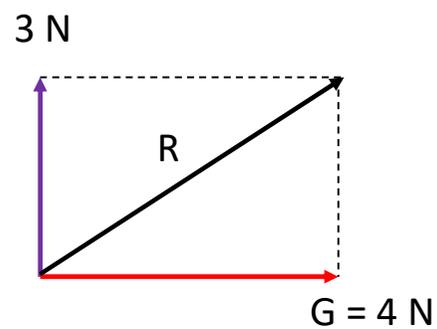
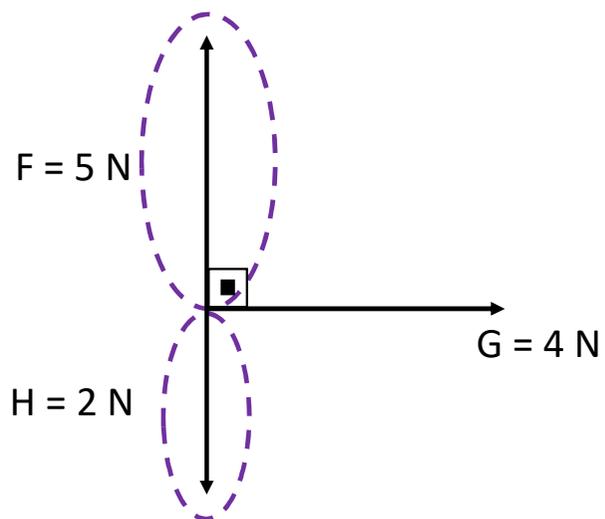
1. b) Observe o sistema de quatro corpos a seguir e caracterize o vetor $\vec{Q}_{sistema} = \vec{Q}_D + \vec{Q}_B + \vec{Q}_A + \vec{Q}_C$



$\vec{Q}_{sistema}$ {

- Intensidade: $|\vec{Q}| = 40 \text{ kg} \cdot \text{m/s}$
- Direção: horizontal
- Sentido: para direita

2. Determine a intensidade da resultante das forças.



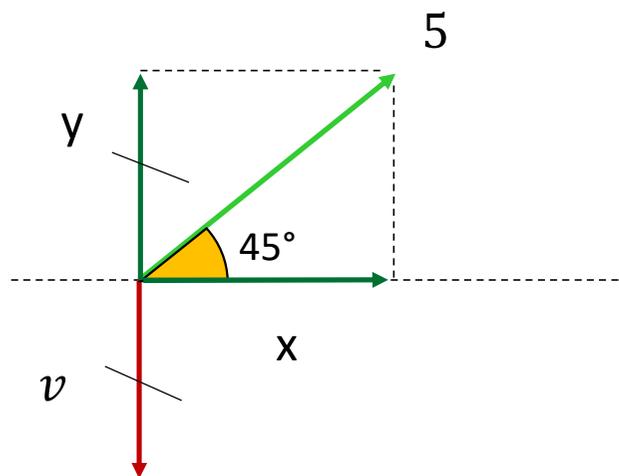
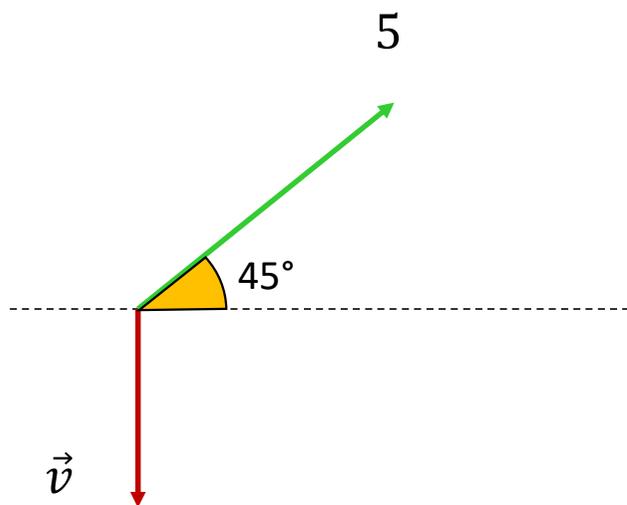
$$R^2 = 4^2 + 3^2$$

$$R^2 = 16 + 9$$

$$R^2 = 25$$

$$R = 5\text{ N}$$

3. Determine a intensidade do vetor \vec{v} sabendo que a resultante dos vetores tem somente componente horizontal

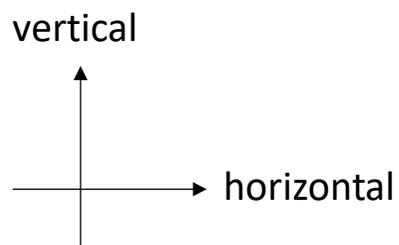


$$v = y$$

$$\text{sen } 45^\circ = \frac{y}{5}$$

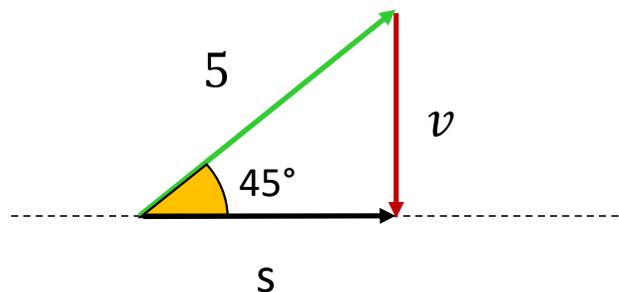
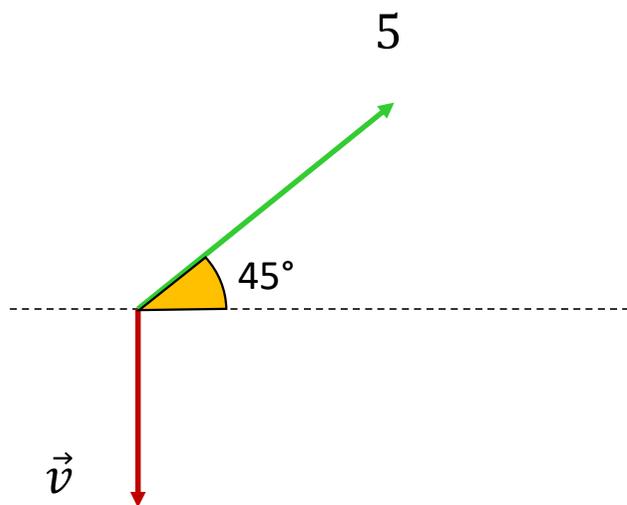
$$\frac{\sqrt{2}}{2} = \frac{y}{5}$$

$$y = \frac{5\sqrt{2}}{2}$$



$$\therefore v = y = \frac{5\sqrt{2}}{2}$$

3. Determine a intensidade do vetor \vec{v} sabendo que a resultante dos vetores tem somente componente horizontal



$$\text{sen } 45^\circ = \frac{v}{5}$$

$$\frac{\sqrt{2}}{2} = \frac{v}{5}$$

$$v = \frac{5\sqrt{2}}{2}$$

