

Escuela Politécnica Nacional

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Pregunta 1.

$$\vec{v} \begin{cases} |\vec{v}| = 10 \text{ m/s} \\ \vec{u}_v = \frac{8}{\sqrt{80}} \vec{i} + \frac{4}{\sqrt{80}} \vec{j} \end{cases}$$

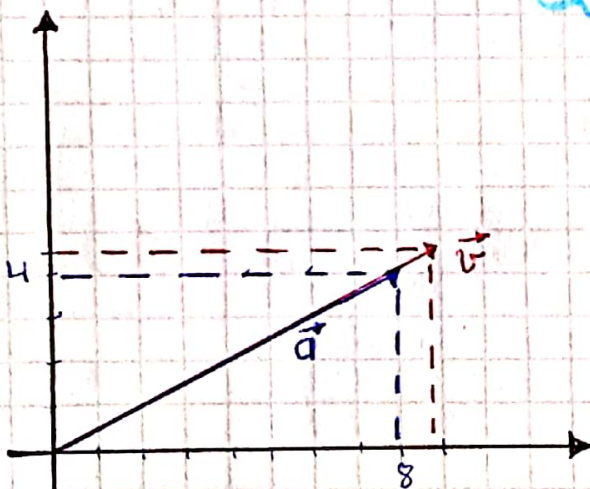
\vec{v} misma dirección \vec{a}

$$\vec{u}_v = \vec{u}_a$$

$$\vec{a} = 8\vec{i} + 4\vec{j} \frac{\text{m}}{\text{s}^2} \begin{cases} |\vec{a}| = \sqrt{8^2 + 4^2} = \sqrt{80} \text{ m/s}^2 \\ \vec{u}_a = \frac{8}{\sqrt{80}} \vec{i} + \frac{4}{\sqrt{80}} \vec{j} \end{cases}$$

$$\vec{v} = |\vec{v}| \vec{u}_v = 10 \left(\frac{8}{\sqrt{80}} \vec{i} + \frac{4}{\sqrt{80}} \vec{j} \right)$$

$$\vec{v} = \frac{80}{\sqrt{80}} \vec{i} + \frac{40}{\sqrt{80}} \vec{j} \text{ m/s} \rightarrow \vec{v} = 8,94 \vec{i} + 4,47 \vec{j} \text{ m/s}$$



"La educación y la cortesía abren todas las puertas"

Thomas Carlyle

Pregunta 2.

$$\vec{v} = -8\vec{i} - 3\vec{j} \text{ m/s} \quad \left\{ \begin{array}{l} |\vec{v}| = \sqrt{(-8)^2 + (-3)^2} = \sqrt{73} \\ \vec{v}_v = \frac{-8}{\sqrt{73}}\vec{i} - \frac{3}{\sqrt{73}}\vec{j} \end{array} \right.$$

$$\Delta\vec{r} \quad \left\{ \begin{array}{l} 25 \text{ m} = |\Delta\vec{r}| \\ \vec{u}_{\Delta\vec{r}} = \frac{-8}{\sqrt{73}}\vec{i} - \frac{3}{\sqrt{73}}\vec{j} \end{array} \right.$$

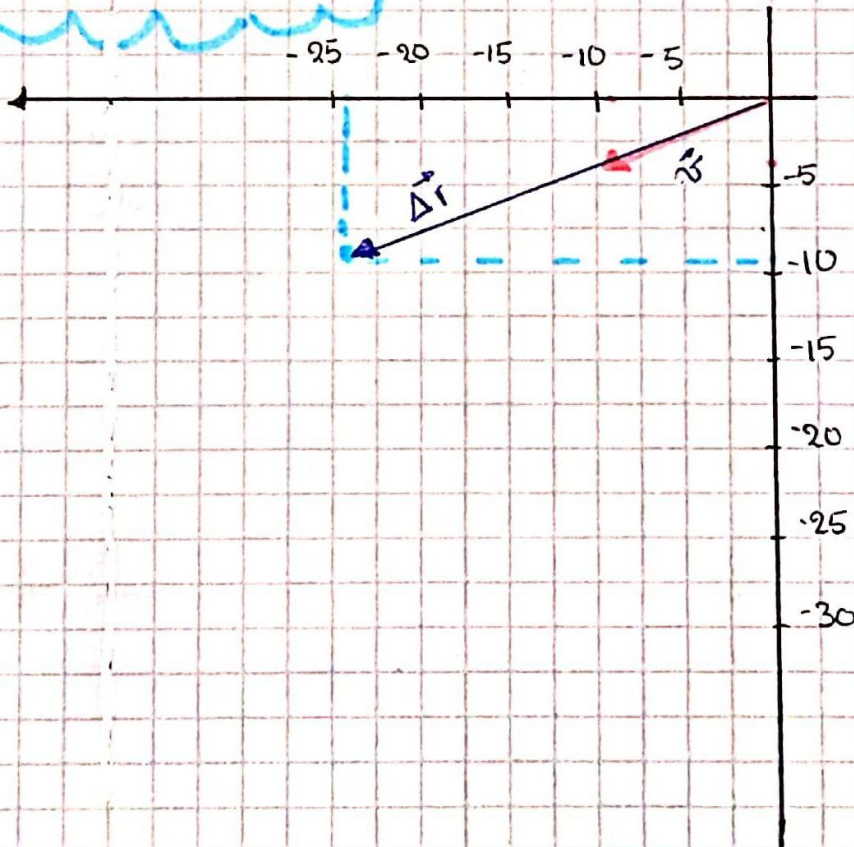
misma dirección

$$v_v = v_{\Delta}$$

$$\Delta\vec{r} = 25 \text{ m} \left(\frac{-8}{\sqrt{73}}\vec{i} - \frac{3}{\sqrt{73}}\vec{j} \right) \text{ m}$$

$$25 \text{ m} (-0,936\vec{i} - 0,351\vec{j})$$

$$\Delta\vec{r} = -23,4\vec{i} - 8,775\vec{j}$$



Pregunta 3.

$$\vec{v} \begin{cases} |\vec{v}| = 6 \text{ m/s} \\ \vec{u}_v = -\frac{8}{\sqrt{80}}\vec{i} - \frac{4}{\sqrt{80}}\vec{j} \end{cases}$$

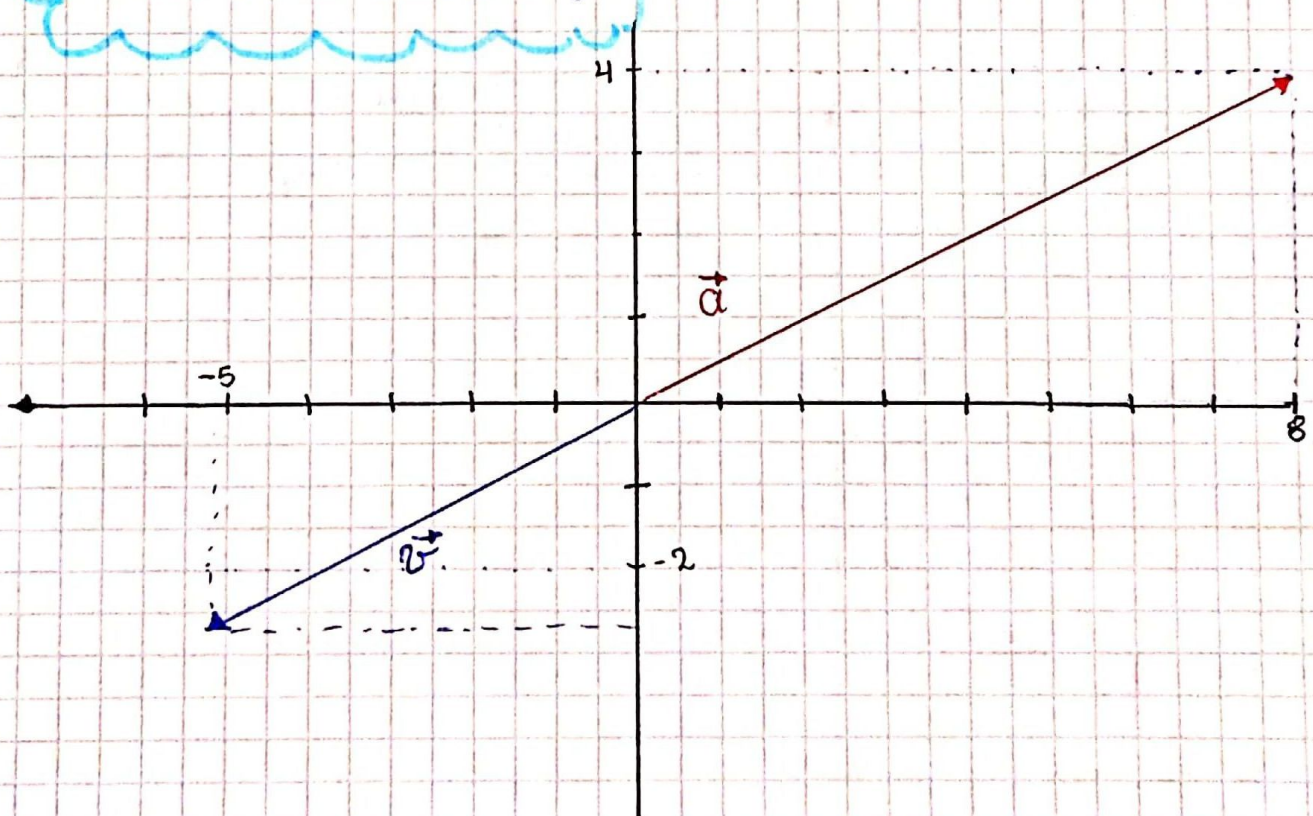
$$\vec{a} = 8\vec{i} + 4\vec{j} \text{ m/s}^2 \begin{cases} |\vec{a}| = \sqrt{8^2 + 4^2} = \sqrt{80} \\ \vec{u}_a = \frac{8}{\sqrt{80}}\vec{i} + \frac{4}{\sqrt{80}}\vec{j} \end{cases}$$

$$\vec{u}_v = -\vec{u}_a$$

$$\vec{u}_v = -\frac{8}{\sqrt{80}}\vec{i} - \frac{4}{\sqrt{80}}\vec{j}$$

$$\vec{v} = 6(-0,894\vec{i} - 0,447\vec{j})$$

$$\vec{v} = -5,364\vec{i} - 2,682\vec{j}$$



"La educación y la cortesía abren todas las puertas"

Thomas Edison

Pregunta 4.

$$\vec{r} \begin{cases} 8\text{ m} = |\vec{r}| \end{cases}$$

$$\mu_{\vec{r}} = -\frac{5}{\sqrt{34}} + \frac{3}{\sqrt{34}}$$

$$\vec{a} = 5\vec{i} - 3\vec{j} \text{ m/s}^2$$

$$|\vec{a}| = \sqrt{5^2 + (-3)^2} = \sqrt{34}$$

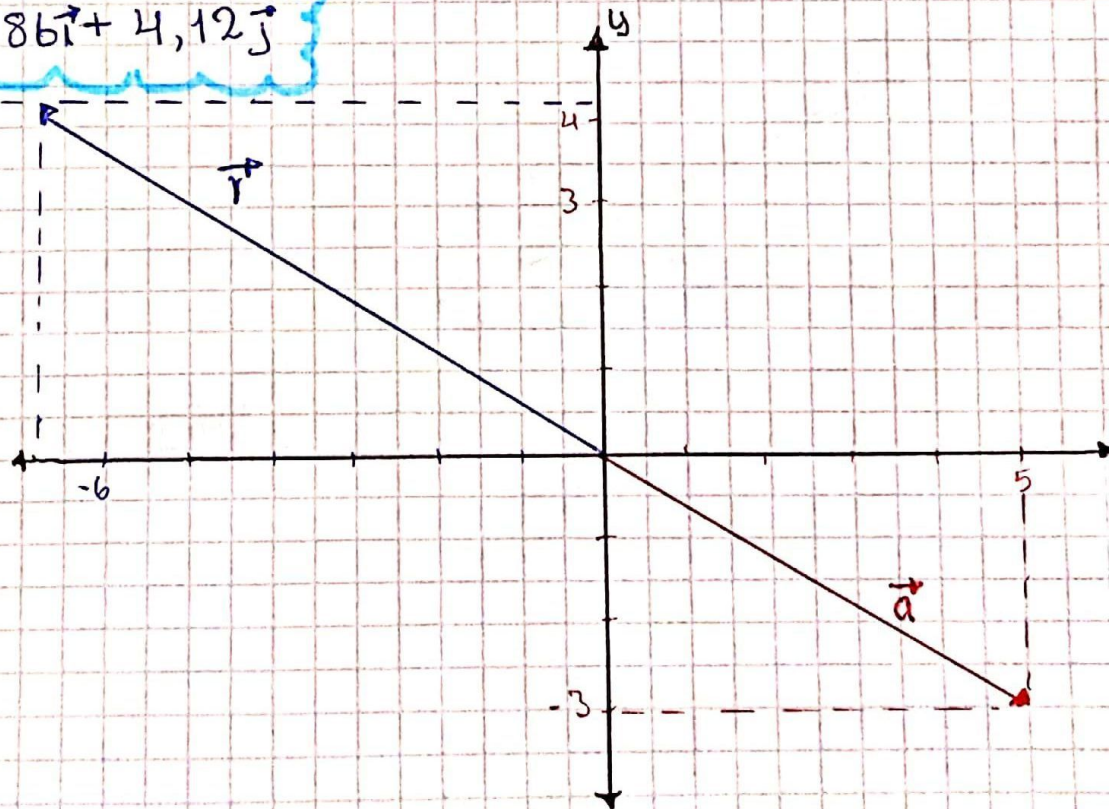
$$\mu_{\vec{a}} = \frac{5}{\sqrt{34}} - \frac{3}{\sqrt{34}}$$

$$\mu_{\vec{r}} = -\mu_{\vec{a}}$$

$$\mu_{\vec{r}} = -\frac{5}{\sqrt{34}} + \frac{3}{\sqrt{34}}$$

$$\vec{r} = 8 \left(-\frac{5}{\sqrt{34}}\vec{i} + \frac{3}{\sqrt{34}}\vec{j} \right)$$

$$\vec{r} = -6,86\vec{i} + 4,12\vec{j}$$



Pregunta 5

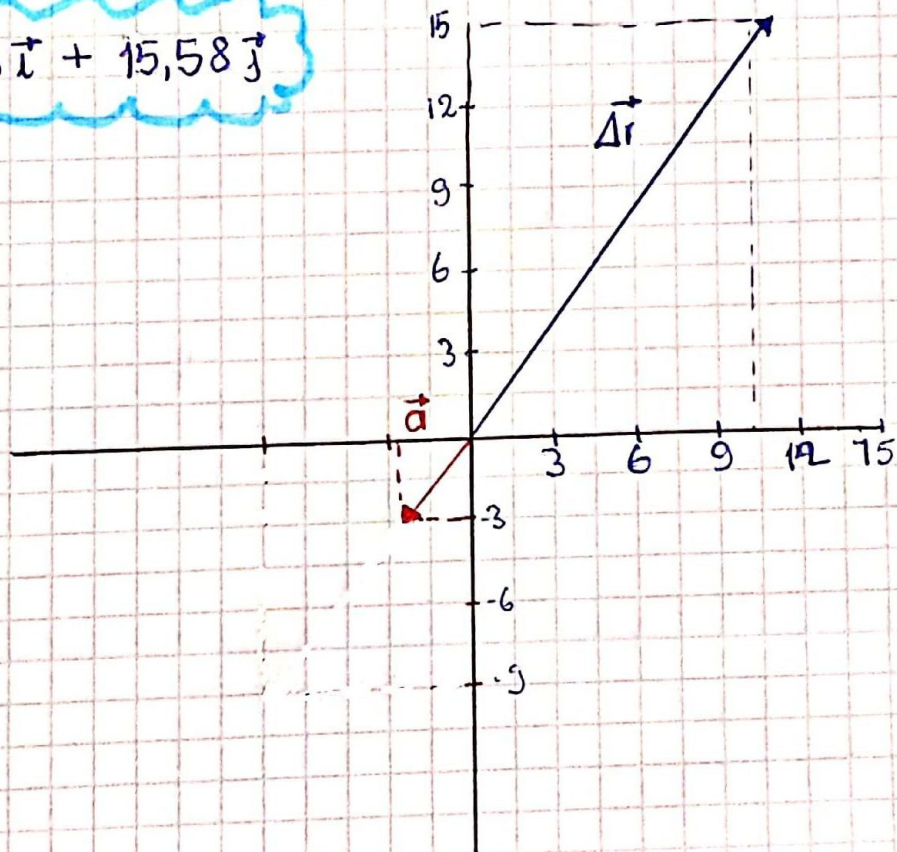
$$\vec{\Delta r} = \begin{cases} 9 \text{ m} = |\vec{\Delta r}| \\ \vec{u}_{\Delta r} = +\frac{2}{\sqrt{13}} \vec{i} + \frac{3}{\sqrt{13}} \vec{j} \end{cases}$$

$$\vec{a} = -2\vec{i} - 3\vec{j} \text{ m/s}^2 \begin{cases} |\vec{a}| = \sqrt{(-2)^2 + (-3)^2} = \sqrt{13} \\ \vec{u}_a = -\frac{2}{\sqrt{13}} \vec{i} - \frac{3}{\sqrt{13}} \vec{j} \end{cases}$$

$$\vec{u}_{\Delta r} = -\vec{u}_a$$

$$\vec{\Delta r} = 9 \left(\frac{2}{\sqrt{13}} \vec{i} + \frac{3}{\sqrt{13}} \vec{j} \right)$$

$$\vec{\Delta r} = 10,39 \vec{i} + 15,58 \vec{j}$$



"La educación y la ciencia abren todas las puertas"

6. Pregunta # 6.

$$\vec{a} = 3\vec{i} + 6\vec{j} \quad \left\{ \begin{array}{l} |\vec{a}| = \sqrt{45} \\ \vec{u}_a = \frac{3\vec{i}}{\sqrt{45}} + \frac{6\vec{j}}{\sqrt{45}} \end{array} \right.$$

$$\vec{r} \quad |\vec{r}| = 10\text{m}$$

$$\vec{u}_r =$$

$$\vec{u}_a \perp \vec{u}_r$$

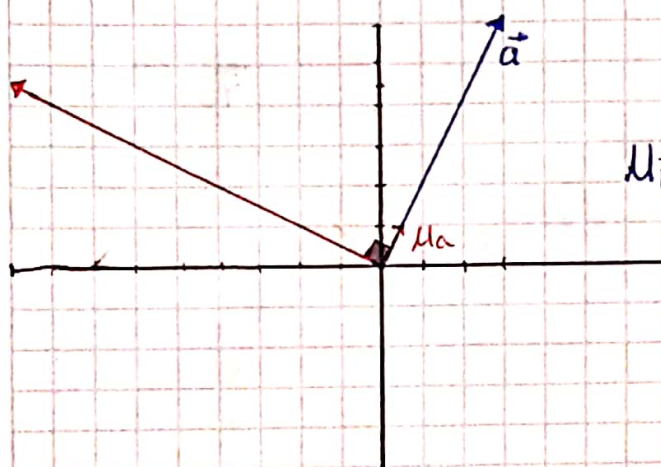
$$\frac{3\vec{i}}{\sqrt{45}} + \frac{6\vec{j}}{\sqrt{45}}$$

$$\vec{u}_r = -\frac{6\vec{j}}{\sqrt{45}} + \frac{3\vec{i}}{\sqrt{45}}$$

$$\vec{u}_r = -0,894\vec{i} + 0,447\vec{j}$$

$$|\vec{r}| \cdot \vec{u}_r = \vec{r}$$

$$\vec{r} = -8,94\vec{i} + 4,47\vec{j}$$



Pregunta # 7

$$\vec{r} = 8\vec{i} + 5\vec{j} \text{ m} \quad \left\{ \begin{array}{l} |\vec{r}| = \sqrt{89}\text{m} \\ \vec{u}_r = \frac{8\vec{i}}{\sqrt{89}} + \frac{5\vec{j}}{\sqrt{89}} \end{array} \right.$$

$$\vec{v} \quad \left\{ \begin{array}{l} 7 \text{ m/s} \\ 0,529\vec{i} - 0,848\vec{j} \end{array} \right.$$

$$\vec{u}_r \perp \vec{u}_v$$

$$\frac{8\vec{i}}{\sqrt{89}} + \frac{5\vec{j}}{\sqrt{89}}$$

$$\vec{u}_v = \frac{5\vec{i}}{\sqrt{89}} - \frac{8\vec{j}}{\sqrt{89}} = 0,529\vec{i} - 0,848\vec{j}$$

$$\vec{v} = |\vec{v}| \cdot \vec{u}_v = 7 \text{ m/s} (0,529\vec{i} - 0,848\vec{j})$$

$$\vec{v} = 3,70\vec{i} - 5,94\vec{j}$$

