Planeamiento de Mecánicas y Dinámicas de juego

Trabajo Práctico N° 1: Los vectores

Año: 2024

Alumno: Torres Flores Joaquin Victor

LU: TUV000547

Desarrollo

Ejercicio 1: $\vec{p} = (2,2,1)$ $\vec{q} = (1,-2,0)$

a) $\vec{p} \cdot \vec{q}$

$$\vec{p} \cdot \vec{q} = (2 * 1 + 2 * (-2) + 1 * 0)$$
$$\vec{p} \cdot \vec{q} = (2 - 2 + 0)$$
$$\vec{p} \cdot \vec{q} = -2$$

b) $\vec{p} \times \vec{q}$

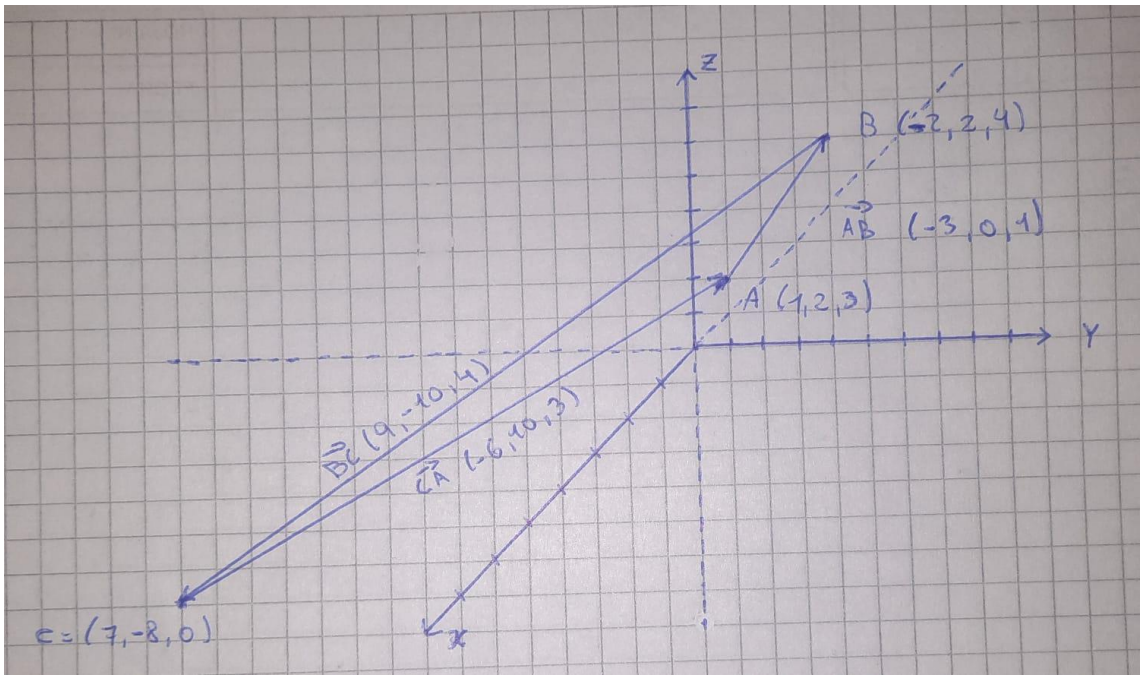
$$\begin{bmatrix} 2 \\ 2 \\ 1 \end{bmatrix} \times \begin{bmatrix} 1 \\ -2 \\ 0 \end{bmatrix} = \begin{bmatrix} 2 * 0 - 1 * (-2) \\ 1 * 1 - 2 * 0 \\ 2 * (-2) - 2 * 1 \end{bmatrix} = \begin{bmatrix} 0 + 2 \\ 1 - 0 \\ -4 - 2 \end{bmatrix} = \begin{bmatrix} 2 \\ 1 \\ -6 \end{bmatrix}$$

Ejercicio 2: $A = (1,2,3)$ $B = (-2,2,4)$ $C = (7,-8,0)$

$\overrightarrow{AB} = (-2 - 1, 2 - 2, 4 - 3) = (-3, 0, 1)$

$\overrightarrow{BC} = (7 - (-2), -8 - 2, 0 - 4) = (9, -10, -4)$

$\overrightarrow{CA} = (1 - 7, 2 - (-8), 3 - 0) = (-6, 10, 3)$

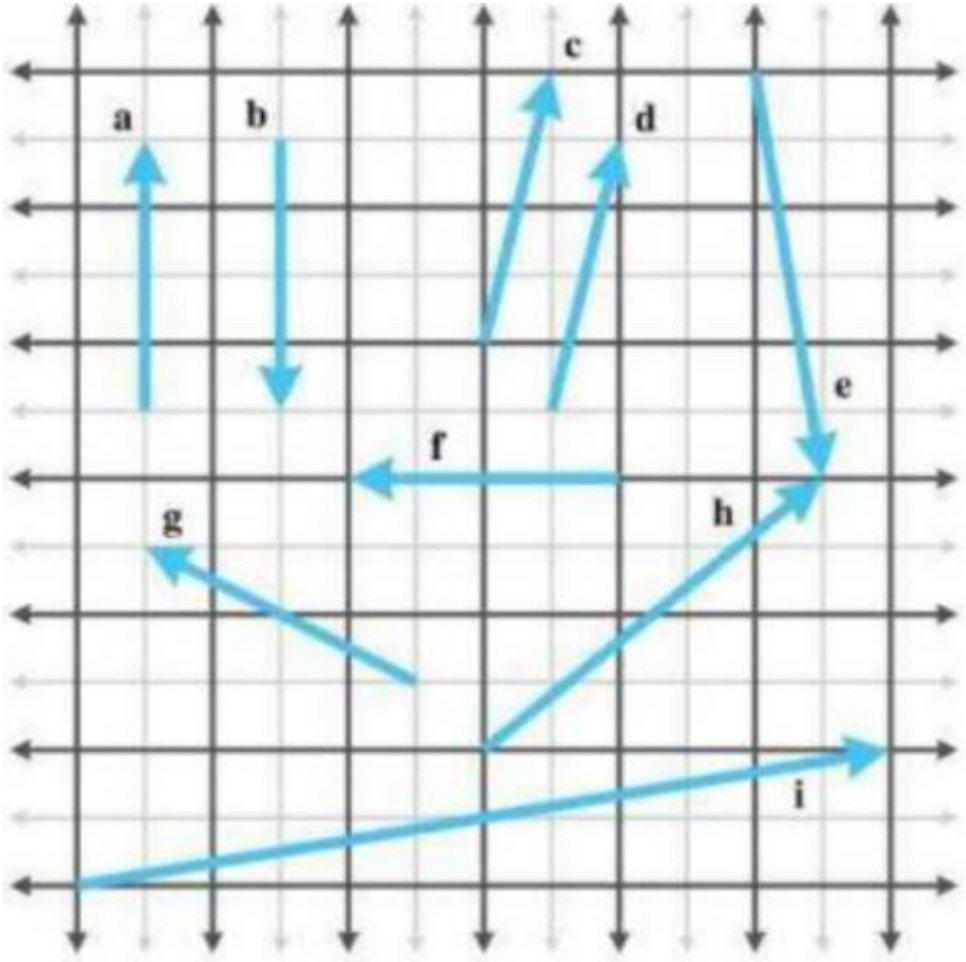


$$A_{\Delta} = \frac{|\overrightarrow{AB} \times \overrightarrow{AC}|}{2}$$

$$\overrightarrow{AB} \times \overrightarrow{AC} = \begin{bmatrix} -3 \\ 0 \\ 1 \end{bmatrix} \times \begin{bmatrix} -6 \\ 10 \\ 3 \end{bmatrix} = \begin{bmatrix} 0 * 3 - 1 * 10 \\ 1 * (-6) - (-3) * 3 \\ -3 * 10 - 0 * (-6) \end{bmatrix} = \begin{bmatrix} 0 - 10 \\ -6 + 9 \\ -30 - 0 \end{bmatrix} = \begin{bmatrix} -10 \\ 3 \\ -30 \end{bmatrix}$$

$$A_{\Delta} = \frac{\left|\overrightarrow{AB} \times \overrightarrow{AC}\right|}{2} = \frac{\sqrt{(-10)^2 + (3)^2 + (-30)^2}}{2} = \frac{\sqrt{100 + 9 + 900}}{2} \approx 15.88$$

Ejercicio 3:



$\vec{a} = (0, 2)$

$\vec{b} = (0, -2)$

$\vec{c} = (0.5, 2)$

$\vec{d} = (0.5, 2)$

$\vec{e} = (0.5, -3)$

$\vec{f} = (-2, 0)$

$\vec{g} = (-2, 1)$

$\vec{h} = (2.5, 2)$

$\vec{\imath} = (6, 1)$

Ejercicio 4:

a) $(7,-2,0.3)+(\,6,6,-4)=\big(7+6,-2+6,0.3+(-4)\big)=(13,4,-3.7)$

b) $[\,2,9,-1]+\ [-2,-9,1]=[\,2+(-2),9+(-9),-1+1]=(0,0,0)$

c) $\begin{bmatrix}3\\10\\7\end{bmatrix}-\begin{bmatrix}8\\-7\\4\end{bmatrix}=\begin{bmatrix}3-8\\10-(-7)\\7-4\end{bmatrix}=\begin{bmatrix}-5\\17\\3\end{bmatrix}$

d) $\begin{bmatrix}4\\5\\-11\end{bmatrix}-\begin{bmatrix}-4\\-5\\11\end{bmatrix}=\begin{bmatrix}4-(-4)\\5-(-5)\\-11-11\end{bmatrix}=\begin{bmatrix}8\\10\\-22\end{bmatrix}$

e) $3\begin{bmatrix}a\\b\\c\end{bmatrix}-4\begin{bmatrix}2\\10\\-6\end{bmatrix}=\begin{bmatrix}3a\\3b\\3c\end{bmatrix}-\begin{bmatrix}8\\40\\-24\end{bmatrix}=\begin{bmatrix}3a-8\\3b-40\\3c+24\end{bmatrix}$

Ejercicio 5:

a) $(\,10,6),(-14,30)$

$d=\sqrt{(-14-10)^2+(30-6)^2}$
$d=\sqrt{(-24)^2+(24)^2}$
$d=\sqrt{576+576}$
$d=\sqrt{1152}\approx 33.94$

b) $(\,0,0),(-12,5)$

$d=\sqrt{(-12-0)^2+(5-0)^2}$
$d=\sqrt{(-12)^2+(5)^2}$
$d=\sqrt{144+25}$
$d=\sqrt{169}=13$

c) $(\,3,10,7),(8,-7,4)$

$d=\sqrt{(8-3)^2+(-7-10)^2+(4-7)^2}$
$d=\sqrt{(5)^2+(-17)^2+(-3)^2}$
$d=\sqrt{25+289+9}$
$d=\sqrt{323}\approx 17.97$

d) $(-2,-4,9),(6,-7,9.5)$

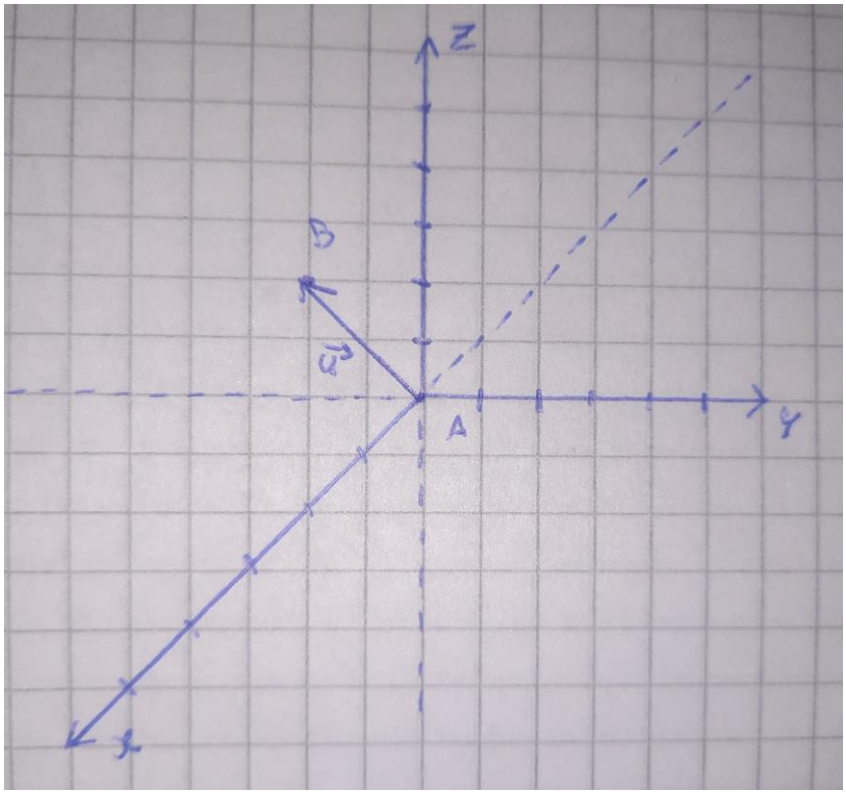
$$d = \sqrt{(6-(-2))^2 + (-7-(-4))^2 + (9.5-9)^2}$$
$$d = \sqrt{(10)^2 + (-3)^2 + (0.5)^2}$$
$$d = \sqrt{100 + 9 + 0.25}$$
$$d = \sqrt{109.25} \approx 10.45$$

e) $(4, -4, -4, 4), (-6, 6, 6, -6)$

$$d = \sqrt{(-6-4)^2 + (6-(-4))^2 + (6-(-4))^2 + (-6-4)^2}$$
$$d = \sqrt{(-10)^2 + (10)^2 + (10)^2 + (-10)^2}$$
$$d = \sqrt{100 + 100 + 100 + 100}$$
$$d = \sqrt{400} = 20$$

Ejercicio 6: $A = (0, 0, 0)$ $B = (5, 3, 7)$

$$\vec{u} = (5-0, 3-0, 7-0) = (5, 3, 7)$$



Magnitud

$$|\vec{u}| = \sqrt{5^2 + 3^2 + 7^2}$$

$$|\vec{u}| = \sqrt{25 + 9 + 49}$$

$$|\vec{u}| = \sqrt{83}$$

Normalizado

$$\vec{v} = \left(\frac{5}{\sqrt{83}}, \frac{3}{\sqrt{83}}, \frac{7}{\sqrt{83}}\right)$$

$$|\vec{v}| = \sqrt{\frac{5^2}{\sqrt{83}^2} + \frac{3^2}{\sqrt{83}^2} + \frac{7^2}{\sqrt{83}^2}}$$

$$|\vec{v}| = \sqrt{\frac{25}{83} + \frac{9}{83} + \frac{49}{83}}$$

$$|\vec{v}| = \sqrt{\frac{83}{83}} = \sqrt{1} = 1$$

Ejercicio 7: $v = 2 \qquad t = 3$

$$v_t = v * t$$

$$v_t = 2 * 3 = 6$$

$$\vec{v} = \left(\frac{5}{\sqrt{83}}, \frac{3}{\sqrt{83}}, \frac{7}{\sqrt{83}}\right)$$

$$P_f = 6 * \left(\frac{5}{\sqrt{83}}, \frac{3}{\sqrt{83}}, \frac{7}{\sqrt{83}}\right)$$

$$P_f = \left(\frac{5 * 6}{\sqrt{83}}, \frac{3 * 6}{\sqrt{83}}, \frac{7 * 6}{\sqrt{83}}\right)$$

$$P_f = \left(\frac{30}{\sqrt{83}}, \frac{18}{\sqrt{83}}, \frac{42}{\sqrt{83}}\right)$$

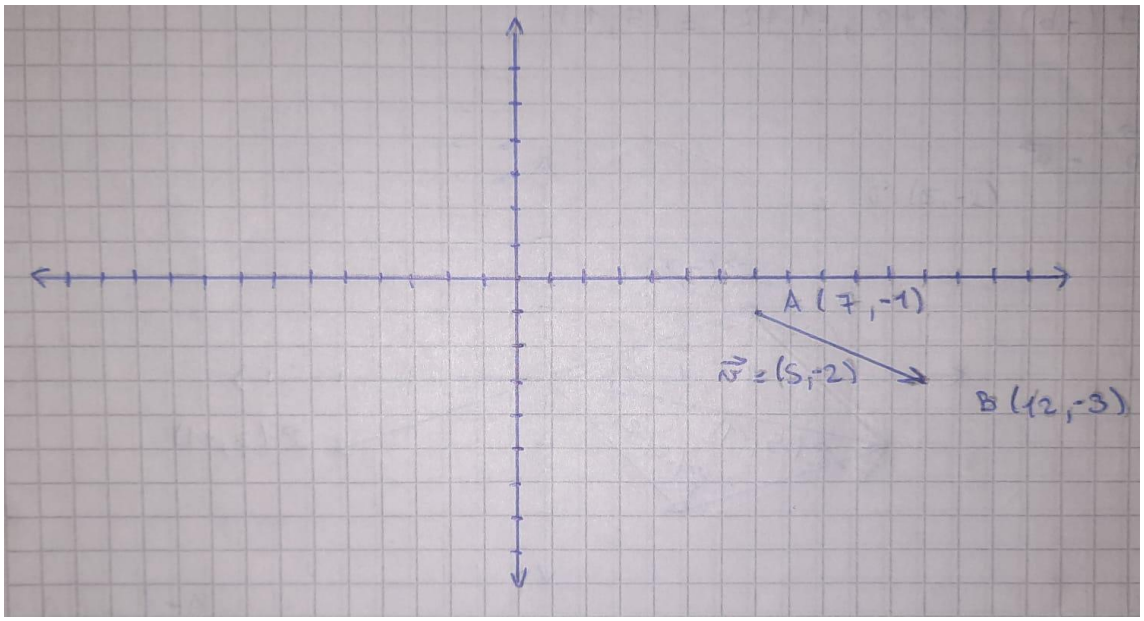
Ejercicio 8:

$\vec{v} = (5, -2)$

$A = ?$

$B = (12, -3)$

$\overrightarrow{AB} = \vec{v} = (5, -2)$



$A = B - AB$

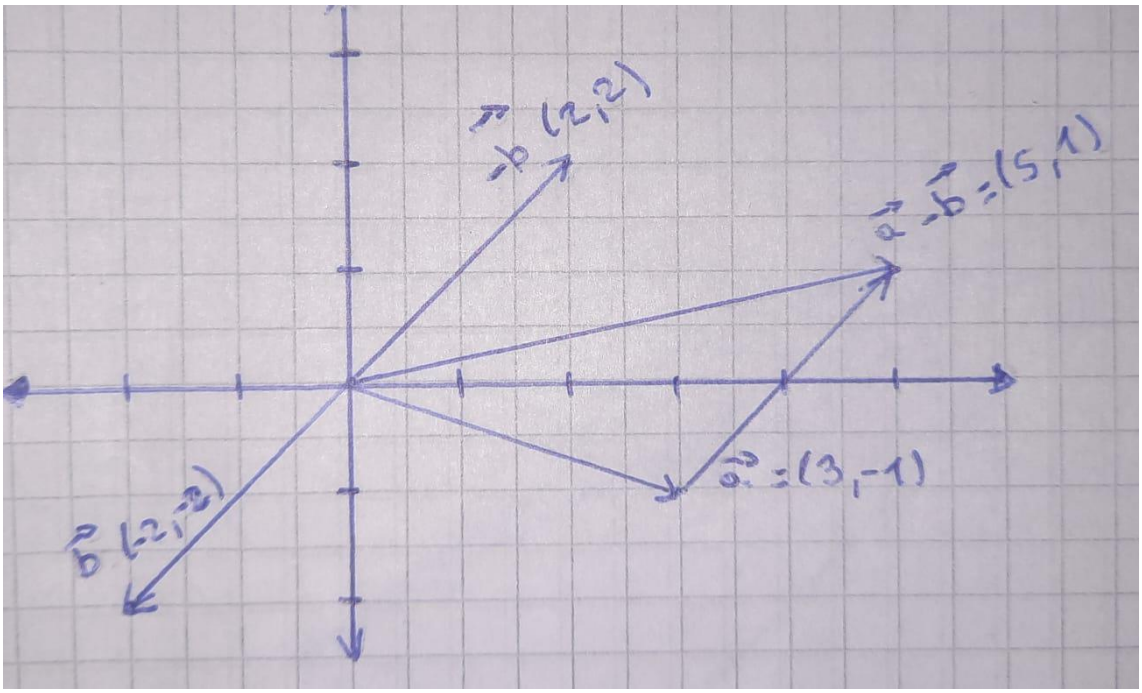
$A = (\ 12, -3) - (\ 5, -2)$

$A = (\ 12 - 5, -3 + 2)$

$A = (\ 7, -1)$

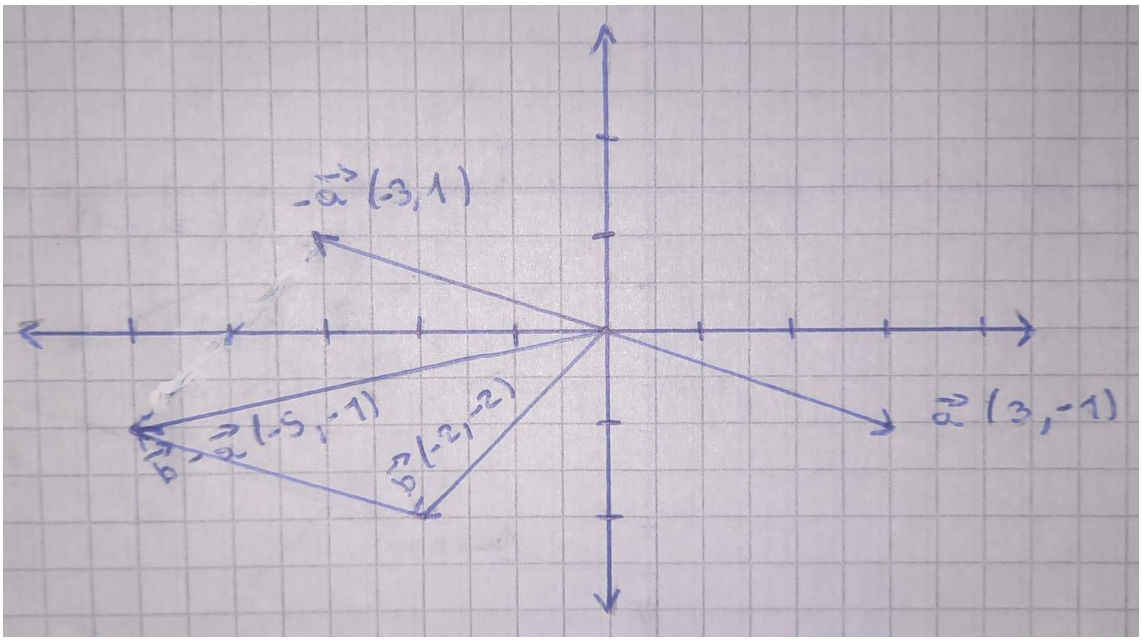
Ejercicio 9: $\vec{a} = (\ 3, -1)$ $\vec{b} = (-2, -2)$ $\vec{c} = (-3, -1)$

a) $\vec{a} - \vec{b}$



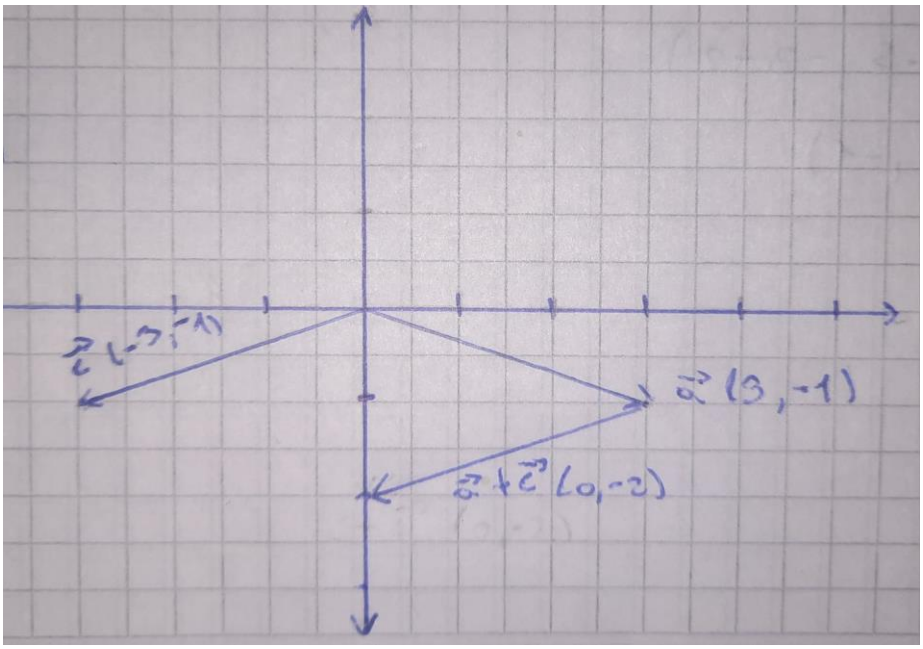
$\vec{a} + (-b) = (3 + 2, -1 + 2) = (5, 1)$

b) $\vec{b} - \vec{a}$



$\vec{b} + (-\vec{a}) = (-2 + (-3), -2 + 1) = (-5, -1)$

c) $\vec{a} + \vec{c}$



$\vec{a} + \vec{c} = \big(3 + (-3), -1 + (-1)\big) = (0, -2)$