1º $A(-1, 2)$ $B=(2,-2)$ son dos vertices contiguos de un rectangulo de área $50m^2$ Obtenga las cordeenadas de sus otros vertices y dibuje considerando que el sistema esta en m

$\vec{AB} = \bar{a} = (3,-4)$

$\bar{a}^{\perp} = (4,3)$

$|\bar{a}| = l_1 = \sqrt{(-4)^2+(3)^2} = \underline{5}$

$50m^2 = l_1 * l_2 \Rightarrow \frac{50m^2}{5m} = l_2 = \underline{10m}$

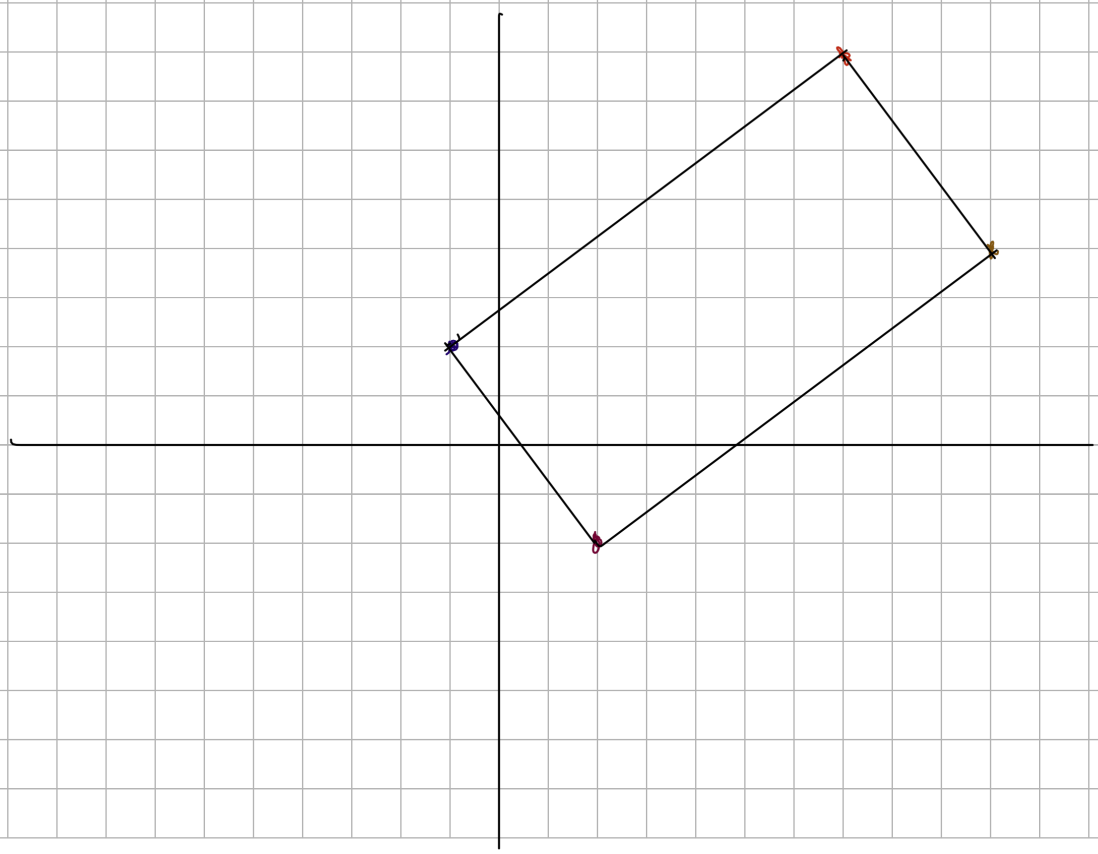
$l_2 = 2\bar{a}^{\perp} = 2(3,4) \Rightarrow (8,6)$

$(8,6) = (x+1, y-2) \Rightarrow 8 = x+1 \Rightarrow x = 7$
$6 = y-2 \Rightarrow y = 8$

$C = (7,8)$

$(8,6) = (x-2, y+2) \Rightarrow 8 = x-2 = 10$
$6 = y+2 = 4$

$D = (10,4)$



2º Obtenga el valor de k para los vectores $a = (2, -\frac{16}{5})$ y $b(\frac{23}{10}, k)$

considera que en cada caso

a) Son paralelos: $-\frac{92}{25}$

b) Perpendiculares: $\frac{23}{16}$

c) Forman un ángulo de 30°: 1.129

a) $a = r b$

$$(2, -\frac{16}{5}) = r(\frac{23}{10}, k)$$

$$2 = r\frac{23}{10} \quad r = \frac{20}{23}$$

$$-\frac{16}{5} = r k$$

$$\frac{-\frac{16}{5}}{\frac{20}{23}} = k \Rightarrow \frac{-16(23)}{5(20)} \Rightarrow \frac{-368}{100} \Rightarrow \frac{184}{50} \Rightarrow -\frac{92}{25}$$

b) $(2, -\frac{16}{5}) = (-x(-\frac{16}{5}), x(2)) \Rightarrow (\frac{23}{10}, 2)$

$$\frac{23}{10} = -x(-\frac{16}{5}) = -\frac{23(5)}{16(10)} = -x = \frac{23}{16}$$

c) $\cos 30° = \frac{a \cdot b}{\|a\|\|b\|} \Rightarrow 0.866 = \frac{\frac{23}{10} - \frac{16k}{5}}{3.77 * \sqrt{(\frac{23}{10})^2 + k^2}} \Rightarrow \frac{4.6 - 3.2k}{3.2} = \sqrt{5.3 + k^2}$

$$5.3 + \cancel{k^2} = 2.06 - 2.87k + \cancel{k^2}$$

$$5.3 - 2.06 = 2.87k$$

$$\frac{3.24}{2.87} = k \Rightarrow 1.129$$

3º Determine el vector de magnitud 10 que es perpendicular a
$r = 4\hat{i} - 3\hat{j}$

$r^{\perp} = (3\hat{i} + 4\hat{j})$

$\|\vec{r}\| = 5$ $\qquad$ $\underline{2\vec{r}^{\perp} = 6\hat{i} + 8\hat{j}}$ //

$2\|\vec{r}\| = 10$

4º Dados los vectores $v = -3\hat{i} - 5\hat{j}$ y $u = 3\hat{i} - 4\hat{j}$ halle la proyección en v de u grafique

$\text{Proy}\,\frac{v}{u} \quad \frac{\bar{v}\cdot\bar{u}}{\|\bar{u}\|^2}(\bar{u}) = \frac{3}{5}(\bar{u}) = \underline{\frac{9}{25}\hat{i} - \frac{12}{25}\hat{j}}$ //

$\bar{v}\cdot\bar{u} = (-9+12) = 3$

$\|\bar{u}\| = \sqrt{3^2+4^2} = 5$

5º Obtenga el valor del vector x tal que cumpla con la ecuación
$-3a + 2x = 5b + 3x$

Considere $a = (1, -3, 5)$
$b = (0, -2, -1)$

$-3(1, -3, 5) + 2x = 5(0, -2, -1) + 3x$

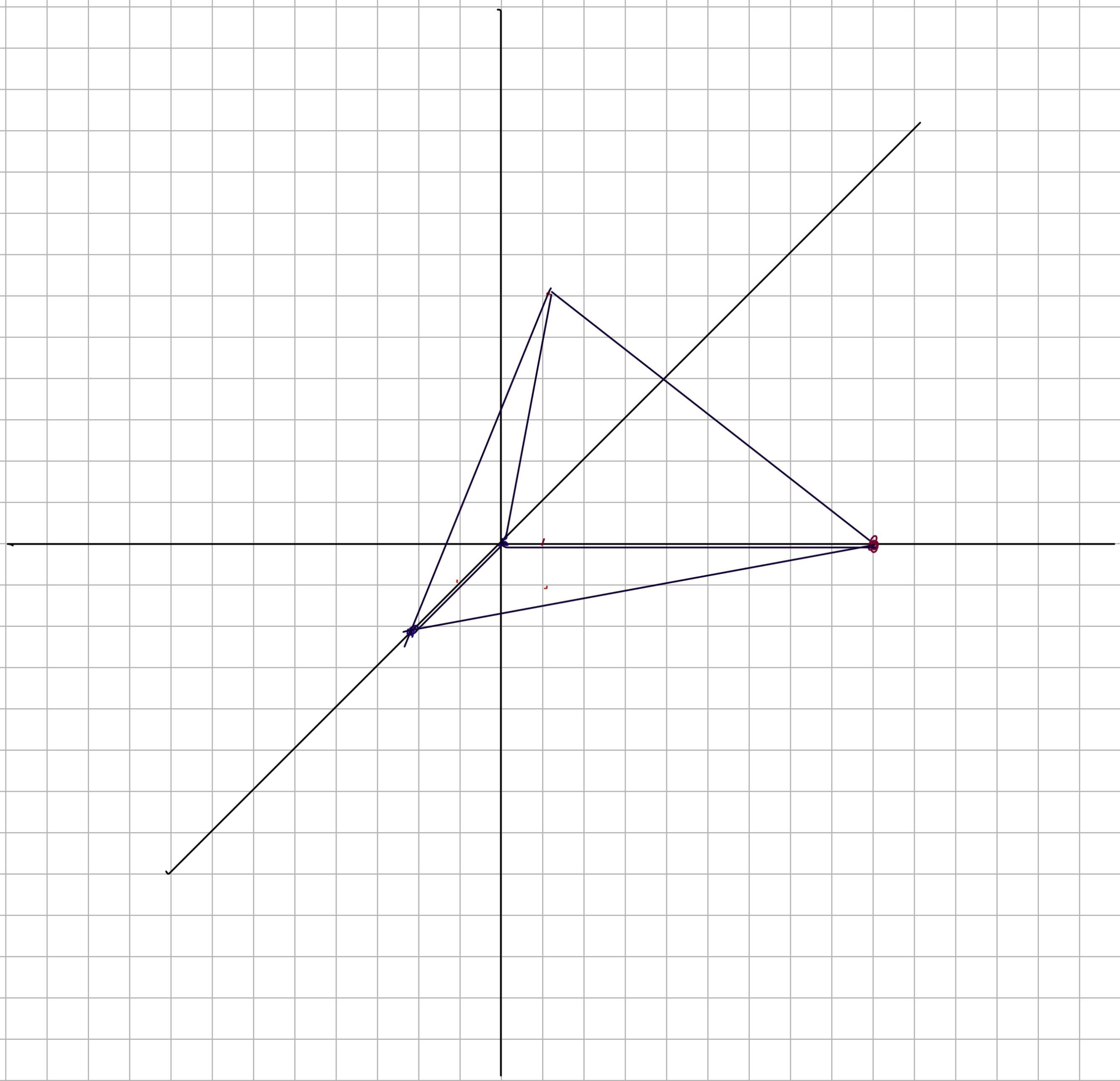
$(-3, 9, -15) - (0, -10, -5) = x$

$\underline{(-3, 19, -10) = x}$ //

6º Obtenga el valor del tetraedro (pirámide) cuyos vértices son $A(0,0,0)$
$B(6,0,0)$
$C(0,9,0)$
$D(3,2,7)$

$\vec{AB} = \bar{a} = (6,0,0)$
$\vec{AC} = \bar{b} = (0,9,0)$
$\vec{AD} = \bar{c} = (3,2,7)$

$$\frac{1}{6}\bar{a}\cdot(\bar{b}\times\bar{c}) = \begin{vmatrix} 6 & 0 & 0 \\ 0 & 9 & 0 \\ 3 & 2 & 7 \end{vmatrix} = 6(63) = \underline{63u^3}$$



7º Dados $a = (1, a_y, 4)$ obtenga a_x y b_y tomando en cuenta

$b = (2, b_y, 3)$ $\qquad \bar{a} \times \bar{b} = (10, 5, -5)$

$$\bar{a}\times\bar{b} \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & a_y & 4 \\ 2 & b_y & 3 \end{vmatrix} (a_y(3) - b_y(4))\hat{i} - (3-8)\hat{j} + (1b_y - 2a_y)\hat{k}$$

$3a_y - 4b_y = 10$ $\qquad 3a_y - 4b_y = 10$

$1b_y - 2a_y = -5$ $\qquad (-2a_y + b_y = -5)4$

$3a_y - \cancel{4b_y} = 10$

$-8a_y + \cancel{4b_y} = -20$

$-5a_y = -10$ $\qquad -2(2) + b_y = -5$ $\qquad a_y = 2$

$b_y = -1$

$\underline{a_y = 2}$ $\qquad -4 + b_y = -5$

$\underline{b_y = -1}$

8º Los puntos $A = (63, 58, -5)$ $B = (15, 18, -9)$ y $C = (39, 10, -21)$

a) Si el triangulo es rectangulo

b) El area de este

$\vec{AB} = \bar{a} = (-48, -40, -4)$ $\quad \|\bar{a}\| = 28\sqrt{5}$

$\vec{AC} = \bar{b} = (-24, -48, -16)$ $\quad \|\bar{b}\| = 56$

$\vec{BC} = \bar{c} = (24, -8, -12)$ $\quad \|\bar{c}\| = 28$

Si es rectangulo

$\|\bar{b}\|^2 + \|\bar{c}\|^2 = \|\bar{a}\|^2$

$56^2 + 28^2 = (28\sqrt{5})^2$

$3920 = 3920$