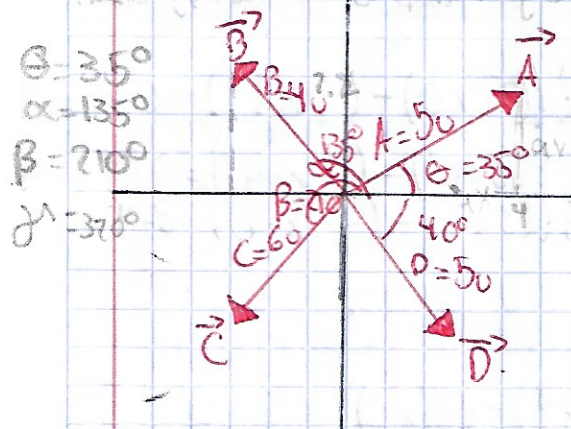


Sol.

Tarea 1:



a) $\vec{A} = (a_x, a_y) =$

$$a_x = 5 \cos 35^\circ = 4$$

$$a_y = 5 \sin 35^\circ = 2.8$$

$$\vec{A} = (5 \cos 35^\circ \hat{i} + 5 \sin 35^\circ \hat{j})$$

$$\vec{B} = (b_x, b_y) =$$

$$b_x = 4 \cos 135^\circ = -2.8$$

$$b_y = 4 \sin 135^\circ = 2.8$$

$$\vec{B} = 4 \cos 135^\circ \hat{i} + 4 \sin 135^\circ \hat{j}$$

$$\vec{A} + \vec{B} = (a_x b_x + a_y b_y) = (4 + (-2.8) 2.8 + 2.8) = (1.2, 5.6) = \vec{E}$$

$$\vec{C} = (c_x, c_y) =$$

$$c_x = 6 \cos 210^\circ = -5.1$$

$$c_y = 6 \sin 210^\circ = -3$$

$$\vec{E} - \vec{C} = (1.2 - (-5.1), 5.6 - (-3))$$

$$\vec{F} = (6.3, 8.6)$$

$$\vec{D} = (d_x, d_y) =$$

$$d_x = 5 \cos 320^\circ = 3.8$$

$$d_y = 5 \sin 320^\circ = 3.2$$

$$\vec{F} - \vec{D} = (6.3 - 3.8, 8.6 - 3.2) = (2.5, 5.4)$$

b) $|\vec{G}| = \sqrt{a_x^2 + a_y^2} \rightarrow \sqrt{(2.5)^2 + (5.4)^2} =$

$$\theta = \tan^{-1}\left(\frac{a_y}{a_x}\right) = \tan^{-1}\left(\frac{5.4}{2.5}\right) = 65^\circ$$

$$\vec{G} = 5.9, 65^\circ$$

Tarea 2: $\vec{A} = 2\hat{i} - 3\hat{j} + 5\hat{k}$, $\vec{B} = \hat{i} - 2\hat{j} + 3\hat{k}$, $\vec{C} = 3\hat{j} - 2\hat{k}$

a) $\vec{A} \cdot \vec{C} \rightarrow (2 \cdot 0 + -3 \cdot 3 + 5 \cdot (-2)) = 0 - 9 - 10 = -19$

b) $\vec{A}(\vec{C} \cdot \vec{B}) \rightarrow \vec{C} \cdot \vec{B} (0 \cdot 1 + 3 \cdot -2 + -2 \cdot 3) = 0 - 6 - 6 = -12$

$\vec{C} \cdot \vec{B} = \vec{D} \rightarrow \vec{A} \cdot \vec{D} = (2 \cdot 0 + -3 \cdot -6 + 5 \cdot -6) = 0 + 18 - 30$

$= -12$

c)

$\vec{C} \cdot \vec{B} = |\vec{C}| |\vec{B}| \cos \theta$

$\theta = \cos^{-1} \left(\frac{\vec{C} \cdot \vec{B}}{|\vec{C}| |\vec{B}|} \right)$

$= \cos^{-1} \left(\frac{0 \cdot 1 + 3 \cdot -2 + (-2) \cdot 3}{\sqrt{0^2 + 3^2 + (-2)^2} \sqrt{1^2 + (-2)^2 + 3^2}} \right)$

$= \cos^{-1} \left(\frac{-12}{\sqrt{0+9+4} \sqrt{1+4+9}} \right) = \frac{-12}{\sqrt{13} \sqrt{14}}$

$= 157.8^\circ$

d) $2\vec{C} = 2(0, 3, -2) \rightarrow 0, 6, -4$

$\vec{A} - 2\vec{C} = (2, -3, 5) - (0, 6, -4) \rightarrow (2, -9, 9) = \vec{D}$

$\text{Proy } \vec{B} / \vec{A} - 2\vec{C} = \frac{\vec{B} \cdot \vec{D}}{D} = \frac{2 + 18 + 27}{\sqrt{166}} = \frac{47}{\sqrt{166}} = 3.6$

$D = \sqrt{2^2 + 9^2 + 9^2}$

$\vec{B} \cdot \vec{D} = (1 \cdot 2 + (-2 \cdot -9) + 3 \cdot 9)$

Tarea 3: Sean los vectores $\vec{A} = 3\hat{i} - 2\hat{j} + \hat{k}$, $\vec{B} = -4\hat{i} + 3\hat{j} - \hat{k}$, $\vec{C} = 3\hat{k}$, hallar

a) $\vec{A} \times \vec{B}$

b) $\vec{B} \times \vec{C}$

c) $\vec{A} \cdot (\vec{B} \times \vec{C})$

d) $\vec{A} \times (\vec{B} \times \vec{C})$

$$\vec{A} \times \vec{B} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 3 & -2 & 1 \\ -4 & 1 & 0 \end{vmatrix} = \hat{i}((2 \times 0) - (1 \times 1)) - \hat{j}(3 \times 0 - (1 \times -4)) + \hat{k}(3 \times 1 - (-2 \times -2)) = 0 - 1 - 1 = -1$$

a) $\vec{A} \times \vec{B} = (-1, -4, -1)$

$$\vec{B} \times \vec{C} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ -4 & 1 & 0 \\ 0 & 0 & 3 \end{vmatrix} = \hat{i}((3 \times 1) - (0 \times 0)) - \hat{j}((-4 \times 3) - (0 \times 0)) + \hat{k}((-4 \times 0) - (0 \times 0)) = 3 - 0 = 3$$

b) $\vec{B} \times \vec{C} = (3, 12, 0)$

$$\vec{C} \times \vec{B} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & 0 & 3 \\ -4 & 1 & 0 \end{vmatrix} = \hat{i}(0 \times 0 - (3 \times 1)) - \hat{j}(0 \times 0 - (3 \times -4)) + \hat{k}(0 \times 0 - (0 \times 0)) = 0 - 3 = -3$$

$\vec{D} = \vec{C} \times \vec{B} = (-3, -12, 0)$

$\vec{A} \cdot \vec{D} = (a_x d_x + a_y d_y + a_z d_z)$

$\vec{A} \cdot \vec{D} = (3 \cdot -3) + (-2 \cdot -12) + (1 \cdot 0)$

c) $= -9 + 24 + 0 = 15$

$\vec{B} \times \vec{C} = \vec{E}$

$$\vec{A} \times \vec{E} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 3 & -2 & 1 \\ 3 & 12 & 0 \end{vmatrix} = \hat{i}((-2 \times 0) - (1 \times 12)) - \hat{j}(3 \times 0 - (1 \times 3)) + \hat{k}(3 \times 12 - (-2 \times 3)) = 0 - 12 = -12$$

d) $\vec{A} \times \vec{E} = (-12, 3, 42)$