Ciência da Computação

Lista 6 - Igor Radtke

1- $\vec{u} = (3, -1, 1)$, $\vec{v} = (1, 2, 2)$ e $\vec{w} = (2, 0, -3)$

a) $(\vec{u}, \vec{v}, \vec{w})$ $\left[\begin{array}{ccc|cc} 3 & -1 & 1 & 3 & -1 \\ 1 & 2 & 2 & 1 & 2 \\ 2 & 0 & -3 & 2 & 0 \end{array}\right] = (-18-4) - (3+4) = -29$

b) $(\vec{v}, \vec{u}, \vec{w})$ $\left[\begin{array}{ccc|cc} 1 & 2 & 2 & 1 & 2 \\ 3 & -1 & 1 & 3 & -1 \\ 2 & 0 & -3 & 2 & 0 \end{array}\right] = (3+4) - (-18-4) = 29$

2- Sabendo que $(\vec{u}, \vec{v}, \vec{w}) = -5$, calcular:

a) $\vec{w} \cdot (\vec{v} \times \vec{u}) = 5$ Permutação entre os vetores.

b) $\vec{v} \cdot (\vec{u} \times \vec{w}) = 5$ Permutação entre os vetores

c) $\vec{w} \cdot (\vec{u} \times \vec{v}) = -5$ houveram duas permutações

d) $\vec{v} \cdot (\vec{w} \times \vec{u}) = -5$ houve duas permutações.

4- $\vec{u} = (2, -1, K)$, $\vec{V} = (1, 0, 2)$ e $\vec{w} = (K, 3, K)$

$$\det = \begin{vmatrix} 2 & -1 & K \\ 1 & 0 & 2 \\ K & 3 & K \end{vmatrix} \begin{matrix} 2 & -1 \\ 1 & 0 \\ K & 3 \end{matrix} = \begin{matrix} (-2K + 3K) - (-K + 12) = \\ -2K + 3K + K - 12 = \\ K + K = 12 \Rightarrow 2K = 12 = \frac{12}{6} = 6 \end{matrix}$$

5- $A(1, 1, 0)$, $B(-2, 1, -6)$, $C(-1, 2, -1)$ e $D(2, -1, -4)$

$AB = B - A = (-3, 0, -6)$

$AC = C - A = (-2, 1, -1)$

$AD = D - A = (1, -2, -4)$

$$\text{Det} = \begin{vmatrix} -3 & 0 & -6 \\ -2 & 1 & -1 \\ 1 & -2 & -4 \end{vmatrix} \begin{matrix} -3 & 0 \\ -2 & 1 \\ 1 & -2 \end{matrix} =$$

$(12 - 24) - (-6 - 6) =$ Sim.

$-12 + 12 = 0$

6- $\vec{a} = (0, -1, 2)$, $\vec{b} = (-4, 2, -1)$ e $\vec{c} = (3, m, -2)$ seja igual a 33.

$V = 33 = |(\vec{a}, b, c)|$ $\quad (\vec{a}, \vec{b}, \vec{c}) = \begin{vmatrix} 0 & -1 & 2 \\ -4 & 2 & -1 \\ 3 & m & -2 \end{vmatrix} \begin{matrix} 0 & -1 \\ -4 & 2 \\ 3 & m \end{matrix}$

$\Rightarrow 8m = 34$

$m = \frac{34}{8} = \frac{17}{4}$

$V = 33 = \text{base} \cdot \text{altura}$

$\text{altura} = \frac{33}{\text{Area}} = \frac{33}{|\vec{a} \times \vec{b}|}$

$\Rightarrow -8m - 1 = -33$

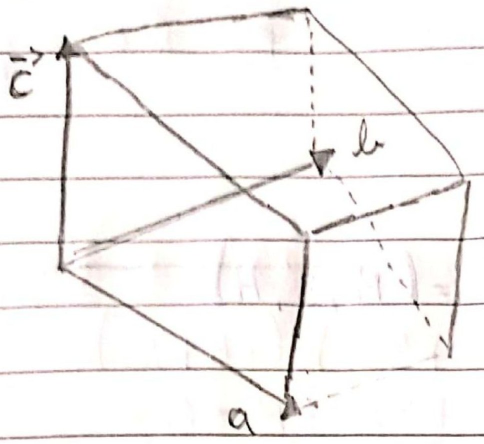
$-m = -\frac{32}{8}$

4

$$\vec{a} \times \vec{b} = \begin{vmatrix} 0 & -1 & 2 \\ 4 & 2 & -1 \end{vmatrix} \begin{matrix} 0 & -1 \\ 4 & 2 \end{matrix}$$

$\vec{a} \times \vec{b} = (-3, -8, -4)$

$|\vec{a} \times \vec{b}| = \sqrt{8+64+16} = \sqrt{89}$ $\qquad \dfrac{33}{\sqrt{89}}$ altura



7 - A(2, 1, 1), B(-1, 0, 1) e C(3, 2, -2) Determine o ponto D.

D = (0, 0, z)

AB = B - A = (3, -1, 0)

AC = C - A = (1, 1, 3)

AD = D - A = (-2, -1, -17)

$$Det = \left|\begin{array}{ccc|cc} -3 & -1 & 0 & -3 & -1 \\ 1 & 1 & 3 & 1 & 1 \\ -2 & -1 & -17 & -2 & -1 \end{array}\right|$$

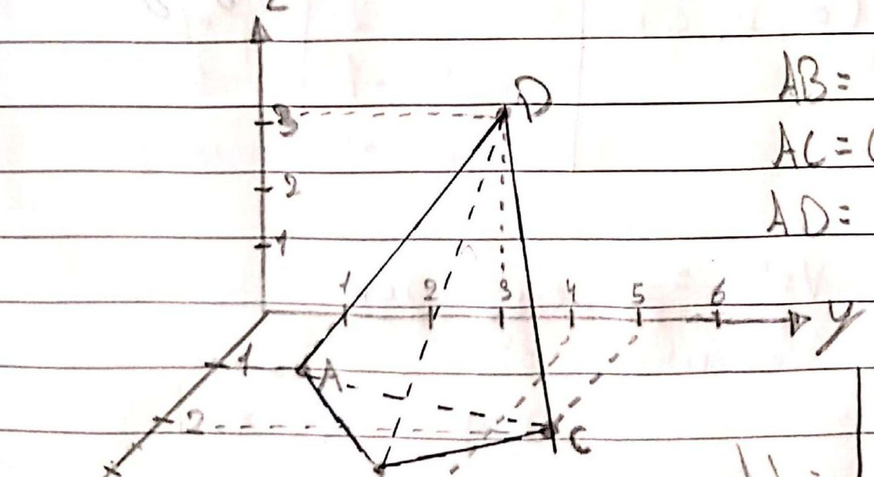
(37 - 6) - (17 + 6)

37 - 6 - 17 - 6

$27 - 12 = z = \dfrac{12}{2} = 6$

D = (0, 0, -10)

D - Tetraedro ABCD, A(1, 1, 0), B(6, 4, 1), C(2, 5, 0) e D(0, 3, 3)



AB = B - A = (5, 3, 1)

AC = C - A = (1, 4, 0)

AD = D - A = (-1, 2, 3)

$$det = \left|\begin{array}{ccc|cc} 5 & 3 & 1 & 5 & 3 \\ 1 & 4 & 0 & 1 & 4 \\ -1 & 2 & 3 & -1 & 2 \end{array}\right| = 57$$

(60 - 0 + 2) - (9 - 0 - 4)

62 - 9 + 4 = 57

53 + 4

9 - A(-2, 4, -1), B(-3, 2, 3) e C(1, -2, -1).

$AB = B - A = (-1, -2, 4)$

$AC = C - A = (3, -6, 0)$

$AD = D - A = (2, -4y, 1)$

$$\begin{vmatrix} -1 & -2 & 4 \\ 3 & -6 & 0 \\ 2 & -4y & 1 \end{vmatrix} = 6 \rightarrow \begin{vmatrix} -1 & -2 & 3 \\ 3 & -6 & 0 \\ 2 & -4y & 1 \end{vmatrix} = 36$$

$6 + 12(-4y) + 4\lambda + 6 = 36$

$12y - 4\lambda + 4\lambda + 12 = 36$

$12y = 36 - 12$

$y = \frac{24}{12} \qquad y = 2$

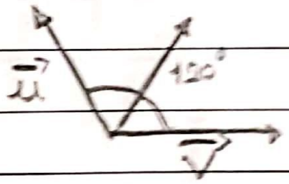
$D = (0, 2, 0)$

10 - $|\vec{u}| = 3$, $|\vec{v}| = 4$

a) $|\vec{u} + \vec{v}| = |\vec{u}|^2 + 2\vec{u} \cdot \vec{v} + |\vec{v}|^2$

$= 3^2 + 2 \cdot 3 \cdot 4 \cos 120 + 16 = 13$

$|\vec{u} + \vec{v}| = \sqrt{13}$

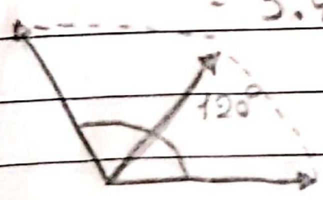


b) $|\vec{u} \times (\vec{v} - \vec{u})| = |\vec{u} \times \vec{v} - \cancel{\vec{u} \times \vec{u}}| = |\vec{u} \times \vec{v}| =$

$|\vec{u}| \cdot |\vec{v}| \operatorname{sen} \theta$

$= 3 \cdot 4 \cdot \operatorname{sen} 120° = 12 \cdot \frac{\sqrt{3}}{2} = 6\sqrt{3}$

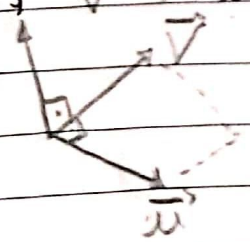
$|\vec{v}| = 4$



c) $V = |(\vec{u} \times \vec{v}, \vec{u}, \vec{v})| = \vec{u} \times \vec{v} \cdot (\vec{u} \times \vec{v}) = |\vec{u} \times \vec{v}|^2 =$

$(6\sqrt{3})^2 =$

$\underline{108 \text{ u.v}}$



$VP = AB \cdot \text{altura}$

$= |\vec{u} \times \vec{v}| \cdot |\vec{u} \times \vec{v}| = |\vec{u} \times \vec{v}|^2$