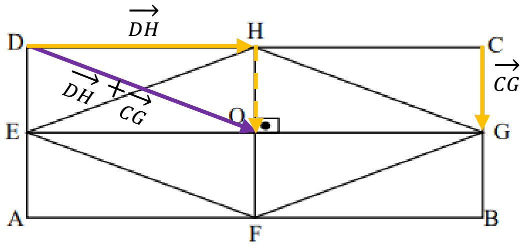
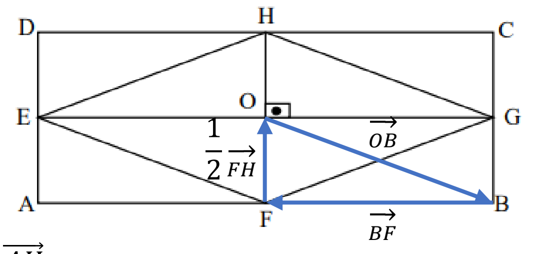
Nomes: Ana Beatriz Stahl, Leandro Henke Pereira e Adriano Borges

1) Com base na figura abaixo, calcule:

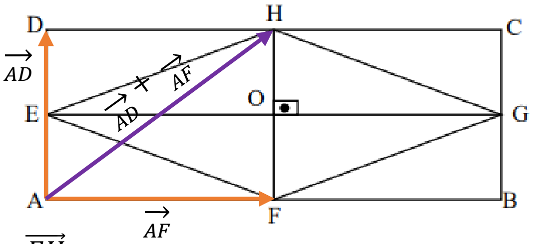
a) $\overrightarrow{DH} + \overrightarrow{CG} = \overrightarrow{DO}$



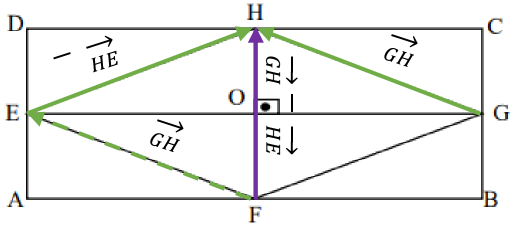
b) $\overrightarrow{BF} + \frac{1}{2}\overrightarrow{FH} + \overrightarrow{OB} = \vec{0}$



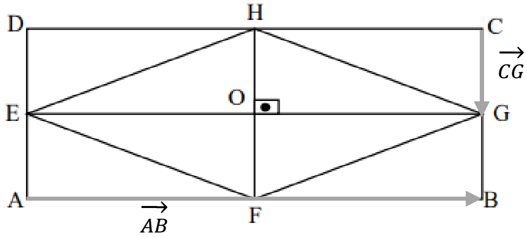
c) $\overrightarrow{AD} + \overrightarrow{AF} = \overrightarrow{AH}$



d) $\overrightarrow{GH} - \overrightarrow{HE} = \overrightarrow{FH}$



E) $\overrightarrow{AB}.\overrightarrow{CG}$=0, pois o ângulo entre os dois vetores é de 90°, então o produto escalar é igual a 0.



---

2) Considere os vetores $\vec{u} = 3\vec{i} + 2\vec{j} + 6\vec{k}$ e $\vec{v} = -2\vec{i} + 3\vec{j} + \vec{k}$

a) Encontre o versor do vetor $2\vec{u} + \vec{v}$.

$2\vec{u} = (3 * 2, 2 * 2, 6 * 2) = (6,4,12)$

$2\vec{u} + \vec{v} = (6, 4, 12) + (-2, 3, 1) = (6 - 2, 4 + 3, 12 + 1) = (4, 7, 13)$

$$|2\vec{u}+\vec{v}| = \sqrt[2]{4^2+7^2+13^2} = \sqrt{16+49+169} = \sqrt{234} = 3\sqrt{26}$$

$$\vec{w} = \frac{2\vec{u}+\vec{v}}{|2\vec{u}+\vec{v}|} = \frac{4\vec{\imath}+7\vec{\jmath}+13\vec{k}}{3\sqrt{26}} = \frac{4\vec{\imath}}{3\sqrt{26}} + \frac{7\vec{\jmath}}{3\sqrt{26}} + \frac{13\vec{k}}{3\sqrt{26}}$$

b) Encontre um vetor simultaneamente ortogonal a $\vec{u}$ e a $\vec{v}$.

$$.\vec{u}\ x\ \vec{v} = \begin{matrix} \vec{\imath} & \vec{\jmath} & \vec{k} \\ 3 & 2 & 6 \\ -2 & 3 & 1 \end{matrix} = \left(2\vec{\imath} - 12\vec{\jmath} + 9\vec{k}\right) - \left(-4\vec{k} + 18\vec{\imath} + 3\vec{\jmath}\right)$$

$$.\vec{u}\ x\ \vec{v} = -16\vec{\imath} - 15\vec{\jmath} + 13\vec{k}$$

c) Encontre um vetor paralelo a $2\vec{u}+\vec{v}$ e que tenha módulo 3.

$$3\vec{w} = 3 * \frac{4\vec{\imath}}{3\sqrt{26}} + 3 * \frac{7\vec{\jmath}}{3\sqrt{26}} + 3 * \frac{13\vec{k}}{3\sqrt{26}} = \frac{4\vec{\imath}}{\sqrt{26}} + \frac{7\vec{\jmath}}{\sqrt{26}} + \frac{13\vec{k}}{\sqrt{26}}$$

A) $\vec{BA} \cdot \vec{BC} = |\vec{BA}| \cdot |\vec{BC}| \cos(\theta)$

$\vec{BA} = A - B = -2, -1, 4$

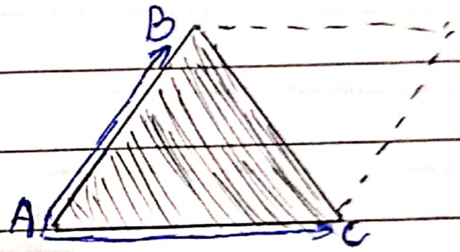
$\vec{BC} = C - B = -1, 0, 5$

$$\cos(\theta) = \frac{(-2)\cdot(-1) + (-1)\cdot 0 + 4\cdot 5}{\sqrt{(-2)^2 + (-1)^2 + 4^2} \cdot \sqrt{(-1)^2 + 5^2}}$$

$$\cos(\theta) = \frac{22}{\sqrt{21} \cdot \sqrt{26}} = \frac{22}{\sqrt{546}} = 19{,}7^\circ \qquad \boxed{19{,}7^\circ}$$

B) $\vec{AB} = B - A = 2, 1, -4$

$\vec{AC} = C - A = 1, 1, 1$



$\cancel{|\vec{AB} \cdot \vec{AC}|} =$

$$|\vec{AB} \times \vec{AC}| = \left|\begin{array}{ccc|cc} i & j & k & i & j \\ 2 & 1 & -4 & 2 & 1 \\ 1 & 1 & 1 & 1 & 1 \end{array}\right|$$

$$= (1\cdot 1 - 1\cdot(-4))i \quad ((-4)\cdot 1 - 1\cdot 2)j \quad (2\cdot 1 - 1\cdot 1)k$$

$$= 5i, -6j, k$$

$$= 5, -6, 1$$

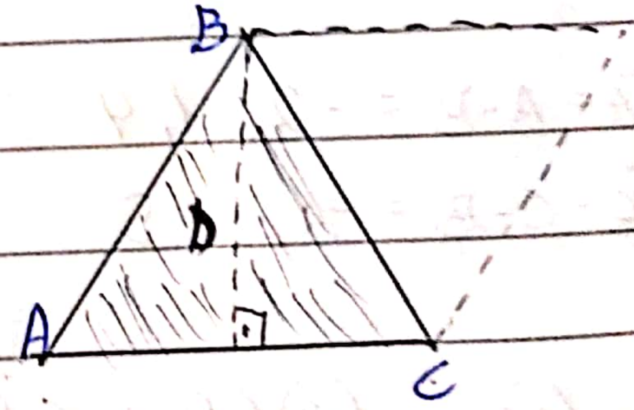
$$A_T = \frac{1}{2} A_P = \frac{1}{2}\sqrt{5^2 + (-6)^2 + 1} = \frac{1}{2}\cdot\sqrt{62} = \boxed{\frac{\sqrt{62}}{2} \text{ u.a.}}$$

c) $A_p = b \cdot A =$

$$|\overline{AB} \times \overline{AC}| = \sqrt{62}$$

$$|\overline{AC}| = \sqrt{1^2+1^2+1^2} = \sqrt{3}$$

$$d = \frac{\sqrt{62}}{\sqrt{3}} = \boxed{\frac{\sqrt{186}}{3} \text{ u.c}}$$



Digitalizado com CamScanner