nte tambem
tridimencionais.

se $\vec{v} = 0$

e A e b tiverem as

3 ou mais é LD

LD

)

Lista GA 5 Guilherme Falcucci 2025.1.08.027

1) a) $\vec{BF} = f + (-b)$

b) $\vec{AG} = AF + FG = c + f$

c) $\vec{AE} = AF + FE = f - f = 0$

d) $\vec{BG} = BA + AC + CG = (-b) + c + b = \vec{c}$

e) $\vec{HB} = -HA + AB = (-f) + b$

f) $\vec{AB} + \vec{FG} = b + b = 2\vec{b}$

g) $\vec{AD} + \vec{HG} = AC + AB = c + b$

h) $\vec{HF} + \vec{AG} - \vec{EF} = c + b + c + b = 2c$

i) $\vec{2AD} - \vec{FG} - \vec{BH} + \vec{GH} = 2Ac - b - f + b - b = 2c - b - f$

2) a) $\vec{DF} = \vec{DE} + \vec{DC}$

b) $\vec{DA} = DC + DC + DE = 2DC + DE$

c) $\vec{DB} = DC - DE$

d) $\vec{DO} = -DC - DE$

e) $\vec{EC} = DC - DE$

f) $\vec{EB} = -2DE + DC$

g) $\vec{OB} = DC + DE$

h) $\vec{AF} = -DE$

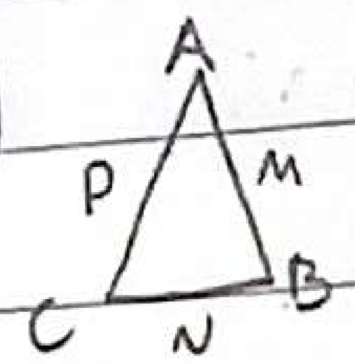
3) a) 0, pois soma-se todos os vetores = Soma simétrica

b) 0, pois todo o trajeto é fechado

c) $\vec{FA} = -OF - d = FA = -(e - d) - d = FA = -e$

d) $-d - e + d + e = 0$

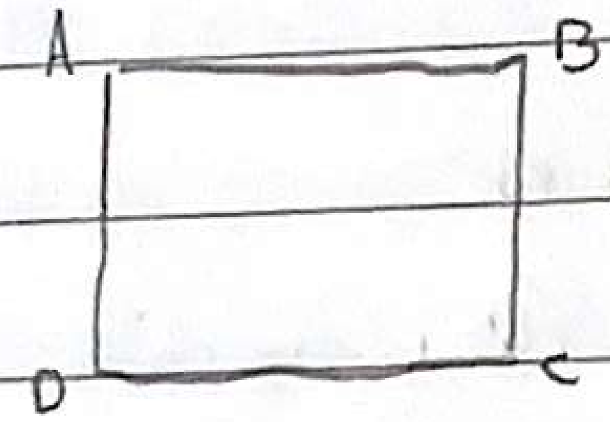
$\vec{AF}+\vec{DE} = e+(e-d) = 2e-d$

4) 

$M = \frac{\vec{A+B}}{2}$ $N = \frac{B+C}{2} = \frac{AD+AC-AB}{2} = \frac{\vec{AB}+\vec{AC}}{2}$

$P = \frac{\vec{C+A}}{2}$ $BP = P-B = \vec{AC}/2 - \vec{AB}$

$AN = N-A = \frac{\vec{AB+AC}}{a}$ $CM = M-C = \frac{\vec{AB}}{2} - \vec{AC}$

5) 

$BD = BA+AD = -2v+5u$

$CA = CB+BA = -3u-2v$

$CD = CB+BA+AD = (-3u-2v)+5u = 2u-2v$

b) como ele possui lados opostos e paralelos, no caso AD+BC possuindo como sentido o $\vec{u}$ porem com valores diferentes sendo b e 3 respectivamente.

6) $\vec{OD} = OA+AD = OD = a + 1/4c$, $\vec{OE} = OB+BE = b+5/6\vec{a}$

$\vec{DE} = OE-OD$

$\vec{DE} = b+5/6a - a - 1/4c = b - 1/6a - 1/4c$

7) $\vec{AC} = OC-OA = 5a+xb-a-2b = 4a-2b+xb$

$\vec{BC} = OC-Ob = 5a+xb-3a+2b = 2a+2b+xb$

$Ac = \lambda Bc$ QUANDO $\lambda = 2$ os Vetores SÃO LD.

8) $\vec{AB} = B-A = (1/m\,\vec{Om}) - (Om-Om) = \left(\frac{1-m}{m}\right)Om - Om$

$\vec{AC} = C-A = (1/1+m) - (Om+Om) = Om + (1/1+m^{-1})Om =$

$-Om + \left(\frac{1-(1+m)}{1+m}\right)Om = -Om - (m/1+m)Om$

10) $\lambda(u+v) + B(u-v+w)\ \theta(u+v+w) = 0$

O sistema possui solução unica em que $\lambda = B = \theta = 0$, Logo, ele é Linearmente independente.

b) $x(u+t) + y(v+t) + z(w+t) = 0$

$x[(a+1)u + bv + cw] + y[a+u(b+1)v + cw] + z[au + bv + (c+1)w] = 0$

$(a+1)x + ay + az = 0$

$bx + (b+1)y + bz = 0$

$cx + cy + (c+1)z = 0$

$$\begin{vmatrix} a+1 & a & a \\ b & b+1 & b \\ c & c & c+1 \end{vmatrix} \neq 0$$

$a+b+c+1 \neq 0$

9) $\lambda(2u+v) + B(u-2v) = (0,0)$

$2\lambda u + \lambda v + Bu - 2Bv = 0$

$(2\lambda+B)u + (2B-\lambda)v = 0$

$2\lambda + B = 0$ $\quad 2B+\lambda = 0$

$2.2B + B = 0$ $\quad \lambda = 2B$

$5B = 0$ $\quad \lambda = 2.0$

$B = 0$ $\quad \lambda = 0$

11) a) $AB = B - A \quad (0,-3,-3)$

$BC = C - B \quad (0,1,1)$

$CA = A - C \quad (0,2,2)$

b) $AB + 2/3 \cdot BC = (0, -7/3, -7/3)$

c) $C + 1/2 \cdot AB = (1, -1/2, -3/2)$

d) $A \cdot 2BC = (1,1,0)$

12) $\{(2,3),(0,2)\}$ não é Li

b) $\{(3,0),(-2,0)\}$ é LD

c) $\{(2,3,4),(0,3,3)\}$ é Li

d) $\lambda(1,-1,2) + \beta(1,1,0) + \theta(1,-1,1) = (0,0,0)$

$$\begin{cases} \lambda + \beta + \theta = 0 & \theta = -2\lambda & \lambda + 3\lambda - 2\lambda = 0 \\ -\lambda + \beta - \theta = 0 & -\lambda + \beta - 2\lambda = 0 & \lambda = 0 \\ 2\lambda + \theta = 0 & \beta = 3\lambda & \end{cases}$$

é Li //

e) $\lambda(1,-1,1) + \beta(-1,2,1) + \gamma(-1,2,2)$

$$\begin{cases} \lambda - \beta - \gamma = 0 & \lambda = \beta + \gamma & 3\gamma = -2\beta \quad \lambda = 0 \\ -\lambda + 2\beta + 2\gamma = 0 & \lambda = 2\beta + 2\gamma & \lambda = -\gamma \quad \gamma = 0 \\ \lambda + \beta + 2\gamma = 0 & \beta + \gamma + \beta + 2\gamma = 0 & \end{cases}$$

f) $\lambda(1,0,1) + \beta(0,0,1) + \gamma(2,0,5)$

$$\begin{cases} \lambda + 2\gamma = 0 \\ \lambda + \beta + 5\gamma = 0 \end{cases}$$

é LD //

$\lambda = -2\gamma \quad -2\gamma + 5\gamma + \beta$

$\beta = -3\gamma \quad \gamma \in \mathbb{R}$

13) a) $\vec{w} = \lambda v + \beta u$

$(1,1) = \lambda(1,-1) + \beta(2,-1)$

$$\begin{cases} \lambda + 2\beta = 1 & -\lambda = 1 + \beta & \beta = 2 \\ -\lambda - \beta = 1 & 2\beta = 1 + \beta + 1 & \lambda = -3 \end{cases}$$

$\vec{w} = -3v + 2u$

b) $\vec{z} = \lambda a + \beta b + \theta c$

$(1,2,3) = \lambda(1,1,1) + \beta(0,1,1) + \theta(1,1,0)$

$$\begin{cases} \lambda + \theta = 1 & \lambda = 1 - \theta & \lambda = 2 \\ \lambda + \beta + \theta = 2 & 1 - \theta + \beta + \theta = 2 & \theta = -1 \\ \lambda + \beta = 3 & \beta = 1 & \end{cases}$$

$\vec{z} = 2a + 1b - 1c$

14) a) $\vec{u} = (1, m-1, m) \quad \vec{v} = (m, 2m, 4)$

$\lambda(1, m-1, m) + \gamma(m, 2m, 4) \neq 0$

$$\begin{cases} \lambda + \gamma m \neq 0 \\ \lambda(m-1) + \gamma(2m) \neq 0 & \lambda m - \lambda + \gamma 2m \neq 0 \\ \lambda m + 4\gamma \neq 0 & \lambda m \neq \lambda - \gamma 2m \end{cases}$$

$\lambda - \gamma 2m + 4\gamma \neq 0, \quad \gamma 2m \neq 4\gamma + \lambda$

$$\begin{cases} m = k \\ 2m = k(m-1) = 2m = k(k-1) = k^2 - k = 2m \\ 4 = m^2 = \sqrt{4} = \mp 2 \end{cases}$$

$m' = 2^2 - 2/2 = 1 \qquad 1 \text{ e } 3 //$

$m'' = 2^2 + 2/2 = 3$

b) $\vec{u} = (1, m, m+1)$, $\vec{v} = (m, m+1, 8)$

$\lambda(1, m, m+1)\ \gamma(m, m+1, 8)$

$$\begin{cases} \lambda + \gamma m = 0 & \lambda = -\gamma m \\ \lambda m + \gamma(m+1) = 0 & \lambda m + \gamma m + \gamma = 0 \\ \lambda(m+1) + 8\gamma = 0 & \lambda m + \lambda + \gamma 8 = 0 \end{cases}$$

$m+1 = m^2 \to m+1 = 4 \to m = 3$

$m^3 = 8 \quad m = \sqrt[3]{8} \quad m = 2$

15) $\vec{u}(m, -1, m^2+1)\ v(m^2+1, m, 0)\ w(m, 1, 1)$

$$\begin{cases} \lambda m + B(m^2+1) + \gamma m = 0 \\ -\lambda + B + \gamma = 0 \\ \lambda(m^2+1) + 0 + \gamma = 0 \end{cases}$$

$$\left|\begin{array}{ccc|cc} m & m^2+1 & m & m & m^2+1 \\ -1 & 1 & 1 & -1 & 1 \\ m^2+1 & 0 & 1 & m^2+1 & 0 \end{array}\right.$$

$-m^2(m^2+1) + m^2 + 1 \quad m^2 + 2m^2 + 2$

$3m^2 + 2 \neq 0$

16) a)

$$\left|\begin{array}{ccc|cc} 1 & 1 & 0 & 1 & 1 \\ 1 & 0 & 1 & -1 & 0 \\ 1 & 1 & -1 & 1 & 1 \end{array}\right\} \begin{array}{l} -1 \neq 0 \\ \text{é Li} \end{array}$$

$-(0+1+1) + (0+1+0) = -1$

b) $2F + 3F + 7F$

$2(1,1,0) + 3(1,0,1) + 7(1,1,-1) = (2,2,0) + (3,0,3) + (7,7,-7)$

$x = 2+3+7 = 12 \qquad z = 3-7 = -4$

$y = 2+7 = 9$

$\vec{u}(12, 9, -4)$

c) $\vec{v} = (2, 3, 7)$

$a(1,1,0)\ b(1,0,1)\ c(1\ 1\ -1) = (2,3,7)$

$$\begin{cases} a+b+c = 2 & b = -1 \\ a+c = 3 & c = -8 \qquad \vec{v} = (11, -1, 8) \\ b-c = 7 & a = 11 \end{cases}$$

// — //

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1) $\vec{J} = (1, 1, 1) \quad \|\vec{J}\| = \sqrt{1+1+1} = \sqrt{3}$

b) $\vec{v} = 3i + 4k \quad \vec{v} = (3, 0, 4)$

$\|V\| = \sqrt{3^2+4^2} \quad \|V\| = \sqrt{25} = 5$

c) $\vec{v} = -i + j \quad \vec{v} = (-1\ 1\ 0)$

$\|V\| = \sqrt{(-1)^2 + 1^2} = \sqrt{2}$

d) $\vec{v} = 4i + 3j - k \quad \vec{v} = (4, 3, -1)$

$\|V\| = \sqrt{4^2 + 3^2 + (-1)^2} = \sqrt{26}$