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1)

b) $\|\vec{u}-\vec{v}\| = \sqrt{3^2+(-4)^2+(-5)^2+(-3)^2}$

$\|\vec{u}-\vec{v}\| = \sqrt{59}$

c)

$\|\vec{u}-\vec{v}\| = \sqrt{7^2+(-4)^2+(-1)^2+(-5)^2+(-3)^2+24^2+1^2}$

$\|\vec{u}-\vec{v}\| = \sqrt{677}$

2)

a) $\|u\| = \sqrt{27}$, $\|v\| = \sqrt{17}$

$\|u-v\| = \sqrt{2^2+3^2+(-1)^2} = \sqrt{14}$

$14 = 27+17-2\cdot\sqrt{27}\cdot\sqrt{17}\cdot\cos\theta$

$14 = 44-2\sqrt{459}\cdot\cos\theta$

$-30 = -2\sqrt{459}\cos\theta$

$\cos\theta = \dfrac{\cancel{30}^{15}}{\cancel{2}\sqrt{459}} \rightarrow \cos\theta = \dfrac{15}{\sqrt{459}} \cong 44°$

Angulo agudo

b)

$\|\vec{u}\| = \sqrt{6}$; $\|\vec{v}\| = \sqrt{45}$

$\|\vec{u} - \vec{v}\| = \sqrt{59}$

$59 = 6 + 45 - 2 \cdot \sqrt{6} \cdot \sqrt{45} \cdot \cos\theta$

$8 = -2 \cdot \sqrt{270} \cdot \cos\theta$

$\cos\theta = \frac{-4}{\sqrt{270}}$ Angulo Obtuso

c)

$\|\vec{u}\| = \sqrt{225} \to 15$; $\|\vec{v}\| = \sqrt{180}$

$\|\vec{u} - \vec{v}\| = \sqrt{677}$

$677 = \underbrace{255 + 180}_{435} - 2 \cdot \sqrt{225} \cdot \sqrt{180} \cdot \cos\theta$

$242 = -2 \cdot 15 \cdot \sqrt{180} \cdot \cos\theta$

$\cos\theta = -\frac{121}{15 \cdot \sqrt{180}}$ Angulo Obtuso

3

c) $\dfrac{1}{\sqrt{16}} \cdot (-3, 2, \sqrt{3})$

$4 \cdot 4$

$\left(-\dfrac{3}{4} ; \dfrac{\cancel{2}^{1}}{\cancel{4}_{2}} ; \dfrac{\sqrt{3}}{4}\right)$

d)

$\dfrac{1}{\sqrt{55}} \cdot (1, 2, 3, 4, 5)$

$\left(\dfrac{1}{\sqrt{55}} ; \dfrac{2}{\sqrt{55}} ; \dfrac{3}{\sqrt{55}} ; \dfrac{4}{\sqrt{55}} ; \dfrac{5}{\sqrt{55}}\right)$

5

$$\vec{u} \times \vec{v} = (0-1, 1-0, 1-0) = (-1, 1, 1)$$

$$\|\vec{u} \times \vec{v}\| = \sqrt{3}$$

$$\left(-\frac{1}{\sqrt{3}} ; \frac{1}{\sqrt{3}} ; \frac{1}{\sqrt{3}}\right)$$

(6)

a)

$-2(x-(-1)) + 1(y-3) - 1(z-(-2))$

$-2(x+1) + 1(y-3) - 1(z+2) = 0$

b)

$2(z-0) = 0$

$2z = 0$

c)

$1(x-0) + 2(y-0) + 3(z-0)$

$x + 2y + 3z = 0$

(7)

a)

componentes

$\frac{(u \cdot a)}{\|\vec{a}\|^2} \cdot \vec{a}$

$\vec{u} \cdot \vec{a} = 18 - 18 = 0$

$\|a\|^2 = \sqrt{9+81}^{\,2} = 90$

$\frac{0}{90} \cdot (3, -9) = \underline{\underline{(0, 0)}}$

$V = (6, 2) - (0, 0)$

$V = \underline{\underline{(6, 2)}}$

d)

$$\frac{\vec{u}\cdot\vec{a}}{\|\vec{a}\|^2}\cdot\vec{a}$$

$u\cdot a = 8\cdot(-4) + 2\cdot(-4)$

$u\cdot a = 2$

$\|\vec{a}\|^2 = 16+16+4+4 = 40$

$\frac{\cancel{2}\,1}{\cancel{40}\,20}\cdot(4,-4,2,-2)$

$\Downarrow$

$\left(\frac{\cancel{4}\,1}{\cancel{20}\,5};\ -\frac{1}{5};\ \frac{1}{10};\ -\frac{1}{10}\right)$

$v = \vec{u} - \left(\frac{1}{5}, -\frac{1}{5}, \frac{1}{10}, -\frac{1}{10}\right)$

$\vec{V} = \left(\frac{9}{5}, \frac{6}{5}, \frac{9}{10}, \frac{21}{10}\right)$

9

a) $P = (3,1,-2)$

$$D = \frac{|x+2y-2z-4|}{\sqrt{1^2+2^2+(-2)^2}} = \frac{3+2+4-4}{3} = \frac{5}{3}$$

11

a)

$$\begin{vmatrix} i & j & k & i & j \\ 0 & 2 & -3 & 0 & 2 \\ 2 & 6 & 7 & 2 & 6 \end{vmatrix} = 14i - 6j - (-18i + 4k) = 32i - 6j - 4k$$

$\Downarrow$

$(32, -6, -4)$

CamScanner

c)

$$\left|\begin{matrix} i & j & k \\ 3 & 2 & -1 \\ 0 & 2 & -3 \end{matrix}\;\vdots\;\begin{matrix} i & j \\ 3 & 2 \\ 0 & 2 \end{matrix}\right| = -6i + 6k - (-2i - 9j)$$

$$-4i + 9j + 6k \Rightarrow (-4, 9, 6)$$

$$\left|\begin{matrix} i & j & k \\ -4 & 9 & 6 \\ 2 & 6 & 7 \end{matrix}\;\vdots\;\begin{matrix} i & j \\ -4 & 9 \\ 2 & 6 \end{matrix}\right| = 63i + 12j - 24k - (18k + 36i - 28j)$$

$$27i + 40j - 42k \Rightarrow (27, 40, -42)$$

14

a) $\begin{vmatrix} u_1 & u_2 & u_3 \\ w_1 & w_2 & w_3 \\ v_1 & v_2 & v_3 \end{vmatrix} \to u \cdot (w \times v)$ $\qquad \begin{vmatrix} u_1 & u_2 & u_3 \\ v_1 & v_2 & v_3 \\ w_1 & w_2 & w_3 \end{vmatrix} \to u(v \times w)$

$3 \cdot (-1) = \underline{-3}$

c) $\begin{vmatrix} w_1 & w_2 & w_3 \\ u_1 & u_2 & u_3 \\ v_1 & v_2 & v_3 \end{vmatrix}$ $\quad L_2 \to L_1 \quad L_3 \to L_2$ $\qquad -1 \cdot (-1) \cdot 1$

$3 \cdot 1 = 3$

16

$$\underbrace{(u \times u)}_{0} + (u \times (-v)) + (v \times u) + \underbrace{(v \times (-v))}_{0}$$

$$-(u \times v) + (v \times u)$$

$$+$$

$$+(v \times u)$$

$$R: 2(v \times u)$$

17

$\underbrace{a \times b}_{\vec{v}}$ e $\underbrace{c \times d}_{\vec{w}}$, são perpendiculares, $\theta = 90°$

$$\vec{v} \times \vec{w} = \|\vec{v}\| \times \|\vec{w}\| \cdot \operatorname{sen}\theta \to 0$$

$$\vec{v} \times \vec{w} = 0$$