

② Angulo Gama del vector A

$$A = \langle -1, -3, -3 \rangle$$

$$|v| = \sqrt{(-1)^2 + (-3)^2 + (-3)^2} = \sqrt{1+9+9} = \sqrt{19}$$

$$y = \cos^{-1}\left(\frac{-3}{\sqrt{19}}\right) = 133.4915^\circ$$

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① Angulo en Radianes del seno, del vector D

$$D = \langle 1, -3 \rangle$$

$$|D| = \sqrt{(1)^2 + (-3)^2} = \sqrt{1+9} = \sqrt{10}$$

$$\text{Sen } \theta = \frac{a_2}{|A|} = \theta = \sin^{-1}\left(\frac{-3}{\sqrt{10}}\right) = -1.2490$$

$$\theta = -1.2490$$

③ Proyección escalar de A sobre C

$$A = \langle -1, -3, -3 \rangle$$

$$C = \langle 1, -2, -1 \rangle$$

$$|p_{A/B}| = \frac{A \cdot B}{|B|} = |A| \cos \theta = |p_{A/C}| = \frac{A \cdot C}{|C|} = |A| \cos \theta$$

$$A \cdot C = (-1)(1) + (-3)(-2) + (-3)(-1) = -1 + 6 + 3 = \boxed{8}$$

$$|A| = \sqrt{(-1)^2 + (-3)^2 + (-3)^2} = \sqrt{1+9+9} = \sqrt{19}$$

$$|C| = \sqrt{(1)^2 + (-2)^2 + (-1)^2} = \sqrt{1+4+1} = \sqrt{6}$$

$$|p_{A/C}| = \frac{8}{\sqrt{6}} = \sqrt{19} \cos(0.723839254)$$

$$\theta = \cos^{-1} \left(\frac{A \cdot B}{|A| \cdot |B|} \right) = \cos^{-1} \left(\frac{8}{(\sqrt{19})(\sqrt{6})} \right) = 0.723839254$$

$$|p_{A/C}| = 3.2659 = 3.2659$$

(4)

$$\vec{p} A/B = \frac{A \cdot B}{|B|^2} \cdot \vec{B} = \vec{p} A/C = \frac{A \cdot C}{|C|^2} \cdot \vec{C}$$

$$A = \langle -1, -3, -3 \rangle$$

$$C = \langle 1, -2, -1 \rangle$$

$$A \cdot C = (-1)(1) + (-3)(-2) + (-3)(-1) = -1 + 6 + 3 = \boxed{8}$$

$$|A| = \sqrt{(-1)^2 + (-3)^2 + (-3)^2} = \sqrt{1+9+9} = \sqrt{19}$$

$$|C| = \sqrt{(1)^2 + (-2)^2 + (-1)^2} = \sqrt{1+4+1} = \sqrt{6}$$

$$\vec{p} A/C = \frac{8}{6} \cdot (1, -2, -1)$$

$$\vec{p} A/C = (1.3333)(1, -2, -1)$$

$$\vec{p} A/C = \langle 1.33, -2.66, -1.33 \rangle$$

⑤

$$A = \langle -1, -3, -3 \rangle$$

$$C = \langle 1, -2, -1 \rangle$$

$$T = ?$$

$$\vec{A} = 5N \quad \left(\vec{A} \right) (5N) = 5N(-1, -3, -3) = -35$$

$$A = -5i - 15j - 15k$$

$$C = 1i - 2j - 1k$$

$$T = A \cdot C = (-5)(1) + (-15)(-2) + (-15)(-1)$$

$$T = A \cdot C = -5 + 30 + 15 = 40$$

$$T = 40N$$

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Angulo en grados del vector A con el C

$$A = \langle -1, -3, -3 \rangle$$

$$C = \langle 1, -2, -1 \rangle$$

$$\theta = \cos^{-1} \frac{A \cdot C}{|A| \cdot |C|}$$

$$A \cdot C = (-1)(1) + (-3)(-2) + (-3)(-1) = -1 + 6 + 3 = \boxed{8}$$

$$|A| = \sqrt{(-1)^2 + (-3)^2 + (-3)^2} = \sqrt{19}$$

$$|C| = \sqrt{(1)^2 + (-2)^2 + (-1)^2} = \sqrt{6}$$

$$\theta = \cos^{-1} \left(\frac{8}{(\sqrt{19})(\sqrt{6})} \right) = \boxed{41.4729^\circ}$$

⑦

$$B \angle -2, 2, 1$$

$$C \angle 1, -2, -1$$

$$B \times C \begin{bmatrix} i & j & k \\ -2 & 2 & 1 \\ 1 & -2 & -1 \end{bmatrix} = i \begin{bmatrix} 2 & -1 \\ -2 & 1 \end{bmatrix} - j \begin{bmatrix} -2 & 1 \\ 1 & -1 \end{bmatrix} + k \begin{bmatrix} -2 & 2 \\ 1 & -2 \end{bmatrix}$$

$$B \times C = i(2-2) - j(2-1) + k(4-2)$$

$$B \times C = \boxed{0i - 1j + 2k}$$

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

$$\text{Area} = \sqrt{5} \text{ u}^2 = \boxed{2.2360 \text{ u}^2}$$

⑧ Volumen del Paralelepípedo generado
por los Vectores A, B y C

$$A = \langle -1, -3, -3 \rangle$$

$$B = \langle -2, 2, 1 \rangle$$

$$C = \langle 1, -2, -1 \rangle$$

$$\text{Volumen del Paralelepípedo} = |A \cdot (B \times C)|$$

$$B \times C = \begin{bmatrix} i & j & k \\ -2 & 2 & 1 \\ 1 & -2 & -1 \end{bmatrix} = i \begin{bmatrix} 2 & 1 \\ -2 & -1 \end{bmatrix} - j \begin{bmatrix} -2 & 1 \\ 1 & -1 \end{bmatrix} + k \begin{bmatrix} -2 & 2 \\ 1 & -2 \end{bmatrix}$$

$$B \times C = i(-2 + 2) - j(2 - 1) + k(4 - 2)$$

$$B \times C = \boxed{0i + 1j + 2k}$$

$$|A \cdot (B \times C)| = (-1)(0) + (-3)(1) + (-3)(2)$$

$$|A \cdot B \times C| = 0 - 3 - 6 \quad \boxed{22 \text{ u}^3}$$

$$|A \cdot B \times C| = |-9| = \boxed{9 \text{ u}^3}$$