③ 1) Demostrar que $-\vec{u}\cdot\vec{t} = 0$

Según el problema:

$$\vec{t} = (10, 12, 18)$$

$$\vec{u} = \frac{\vec{v} \times \vec{w}_c}{|\vec{v} \times \vec{w}_c|} \quad ; \quad \vec{v} = (1, 1, 0)$$

$$\vec{w}_c = \frac{\vec{n}}{|\vec{n}|} \quad ; \quad \vec{n} = (10, 12, 18)$$

Calcularemos $-\vec{u}\cdot\vec{t}$ pero sin redondear:

$$\vec{w}_c = \frac{\vec{n}}{|\vec{n}|} = \frac{(10,12,18)}{\sqrt{10^2+12^2+18^2}} \quad ; \text{ Sea: } \sqrt{10^2+12^2+18^2} = a$$

$$\vec{w}_c = \left(\frac{10}{a}, \frac{12}{a}, \frac{18}{a}\right)$$

ahora:

$$\vec{v} \times \vec{w}_c = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & 1 & 0 \\ \frac{10}{a} & \frac{12}{a} & \frac{18}{a} \end{vmatrix} = \left(\frac{18}{a}\hat{i} + 0\hat{j} + \frac{12}{a}\hat{k}\right) - \left(\frac{10}{a}\hat{k} + 0\hat{i} + \frac{18}{a}\hat{j}\right)$$

$$\vec{v} \times \vec{w}_c = \left(\frac{18}{a}, -\frac{18}{a}, \frac{2}{a}\right)$$

$$\text{Sea: } \sqrt{\left(\frac{18}{a}\right)^2 + \left(\frac{18}{a}\right)^2 + \left(\frac{2}{a}\right)^2} = b$$

$$\vec{u} = \frac{\left(\frac{18}{a}, \frac{-18}{a}, \frac{2}{a}\right)}{b} = \left(\frac{18}{ab}, \frac{-18}{ab}, \frac{2}{ab}\right)$$

Finalmente:

$$-\vec{u}\cdot\vec{t} = -\left(\frac{18}{ab}, \frac{-18}{ab}, \frac{2}{ab}\right)\cdot(10, 12, 18) = -\Big[\underbrace{\frac{180}{ab} - \frac{216}{ab} + \frac{36}{ab}}_{0}\Big]$$

$-\vec{u}\cdot\vec{t} = \underline{0}$; el error de redondeo explica la diferencia