

# Quiz 2 Zixin Qu (Sammy).

$$Q1. (a) a \times b = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & 1 & 1 \\ 3 & -2 & -1 \end{vmatrix}$$

$$= (-1+2)\hat{i} - (-1-3)\hat{j} + (-2-3)\hat{k}$$

$$\rightarrow \vec{a} \times \vec{b} = \hat{i} + 4\hat{j} - 5\hat{k}$$

$$\therefore a \cdot c = a_x c_x + a_y c_y + a_z c_z$$

$$= (1 \times 1) + (1 \times 4) + (1 \times (-5))$$

$$= 5 - 5$$

$$= 0$$

$\therefore$  they are orthogonal.

$$(b). A = (4, 3) \quad B = (2, -4)$$

$$A \cdot B = 4 \times 2 + 3 \times (-4) = -4$$

$\therefore -4 < 0$ , it is obtuse.

$$Q2. V = (0, 1, -1) \quad W = (1, -1, 0)$$

$$V \times W = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & 1 & -1 \\ 1 & -1 & 0 \end{vmatrix}$$

$$= (0-1)\hat{i} - (0+1)\hat{j} + (0-1)\hat{k}$$

$$= -\hat{i} - \hat{j} - \hat{k}$$

$$= (-1, -1, -1)$$

So the answer of  $V \times W = (-1, -1, -1)$

