2)

$$N = AB \times AC$$

$$AB = B - A$$

$$AC = C - A$$

$$N = \begin{vmatrix} i & j & k \\ x_{AB} & y_{AB} & z_{AB} \\ x_{AC} & y_{AC} & z_{AC} \end{vmatrix}$$

$$N = i \begin{vmatrix} y_{AB} & z_{AB} \\ y_{AC} & z_{AC} \end{vmatrix} - j \begin{vmatrix} x_{AB} & z_{AB} \\ x_{AC} & z_{AC} \end{vmatrix} + k \begin{vmatrix} x_{AB} & y_{AB} \\ x_{AC} & y_{AC} \end{vmatrix}$$

$$N_1 (x - x_A) + N_2 (y - y_A) + N_3 (z - z_A) = 0$$

$$A = \begin{pmatrix} 1 \\ -1 \\ 2 \end{pmatrix} \quad B = \begin{pmatrix} 0 \\ -1 \\ 3 \end{pmatrix} \quad C = \begin{pmatrix} 3 \\ 0 \\ 2 \end{pmatrix} \quad A = (1, -1, 2) \quad B = (0, -1, 3) \quad C = (3, 0, 2)$$

$$AB = \begin{pmatrix} (0) - (1) \\ (-1) - (-1) \\ (3) - (2) \end{pmatrix} = \begin{pmatrix} -1 \\ 0 \\ 1 \end{pmatrix} = (-1, 0, 1)$$

$$AC = \begin{pmatrix} (3) - (1) \\ (0) - (-1) \\ (2) - (2) \end{pmatrix} = \begin{pmatrix} 2 \\ 1 \\ 0 \end{pmatrix} = (2, 1, 0)$$

$$AB = (-1, 0, 1) \qquad AC = (2, 1, 0)$$

$$N = \begin{vmatrix} i & j & k \\ -1 & 0 & 1 \\ 2 & 1 & 0 \end{vmatrix} \qquad N = i \begin{vmatrix} 0, & 1 \\ 1, & 0 \end{vmatrix} - j \begin{vmatrix} -1 & 1 \\ 2 & 0 \end{vmatrix} + k \begin{vmatrix} -1 & 0 \\ 2 & 1 \end{vmatrix}$$

$$= (0)(0) - (1)(1) \qquad = (-1)(0) - (1)(2) \qquad = (-1)(1) - (0)(2)$$

$$= -1 \qquad = -2 \qquad = -1$$

$$N = \begin{vmatrix} i & j & k \\ x_{AB} & y_{AB} & z_{AB} \\ x_{AC} & y_{AC} & z_{AC} \end{vmatrix} \qquad N = (-1, 2, -1)$$

$$A = (1, -1, 2)$$

$$N_1 (x - x_A) + N_2 (y - y_A) + N_3 (z - z_A) = 0$$

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

$$-x + 1 + 2y + 2 - z + 2 = 0$$

$$-x + 2y - z = -5 \dashrightarrow \underline{x - 2y + z = 5}$$