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Quiz 2

Show all your work for full credit. To maximize credit, cross out incorrect work.

No credit will be given for unsupported answers.

1. (10 points) Find a normal vector to the plane through

$$P = (1,0,1), \quad Q = (1,1,0), \quad R = (0,1,1).$$

Solution

$$\bar{n} = \overline{PQ} \times \overline{PR}$$

$$\overline{PQ} = \overline{OQ} - \overline{OP} = \langle 1,1,0 \rangle - \langle 1,0,1 \rangle$$

$$= \langle 0, 1, -1 \rangle$$

$$\overline{PR} = \overline{OR} - \overline{OP} = \langle 0,1,1 \rangle - \langle 1,0,1 \rangle$$

$$= \langle -1, 1, 0 \rangle$$

$$\overline{PQ} \times \overline{PR} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & 1 & -1 \\ -1 & 1 & 0 \end{vmatrix}$$

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

$$= \hat{i} + \hat{j} + \hat{k} \quad (or) \quad \langle 1,1,1 \rangle$$

Alternate solution:

$$\bar{n} = -\hat{i} - \hat{j} - \hat{k} \quad (or) \quad \langle -1, -1, -1 \rangle$$

Good luck! ☺