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MAC 2313.8443
Cyr

Quiz 2
You must show all work to receive full credit!!

Problem 1. (8 pts) Find the scalar form of the equation of the plane passing through the points $P = (1, 0, 1)$, $Q = (2, 1, 0)$, and $R = (0, 2, 1)$.

① Find two vectors in the plane:

$$\vec{PQ} = \langle 1, 1, -1 \rangle, \quad \vec{PR} = \langle -1, 2, 0 \rangle$$

② Find normal vector to plane by taking cross product of vectors from ①:

$$\vec{n} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & 1 & -1 \\ -1 & 2 & 0 \end{vmatrix} = \langle 0 + (+2), -(0 - 1), 2 + (+1) \rangle$$

$$= \langle 2, 1, 3 \rangle$$

③ Find plane equation: $\vec{n} \cdot \langle x, y, z \rangle = \vec{n} \cdot \langle x_0, y_0, z_0 \rangle$

$$\Rightarrow \langle 2, 1, 3 \rangle \cdot \langle x, y, z \rangle = \langle 2, 1, 3 \rangle \cdot \langle 1, 0, 1 \rangle$$

$$\Rightarrow \boxed{2x + y + 3z = 5}$$

Problem 2. (2 pts) Find the equation of the plane parallel to the y, z-plane which contains the point $(2, -6, 7)$.

Normal vector is parallel to normal vector for y, z-plane

$$\Rightarrow \text{take } \vec{n} = \langle 1, 0, 0 \rangle.$$

$$\text{Then } \vec{n} \cdot \langle x, y, z \rangle = \vec{n} \cdot \langle 2, -6, 7 \rangle$$

$$\Rightarrow \boxed{x = 2}$$

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