

Quiz #4  
MTH 113: Fall 2026  
Instructor: John Gemmer

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You cannot use a calculator for this quiz

Problem 1. Find an equation of the plane containing the following three points

$$P = (1, 0, 2), \quad Q = (3, 1, 1), \quad R = (0, 2, 3).$$

$$\begin{aligned}\vec{PQ} &= \langle 3-1, 1-0, 1-2 \rangle & \vec{PR} &= \langle 0-1, 2-0, 3-2 \rangle \\ &= \langle 2, 1, -1 \rangle & &= \langle -1, 2, 1 \rangle\end{aligned}$$

$$\Rightarrow \vec{PQ} \times \vec{PR} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 2 & 1 & -1 \\ -1 & 2 & 1 \end{vmatrix} = \hat{i}(1-(-2)) - \hat{j}(2-1) + \hat{k}(4-(-1)) = 3\hat{i} - \hat{j} + 5\hat{k}$$

Consequently, the equation of the plane is

$$3(x-1) - y + 5(z-2) = 0$$

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