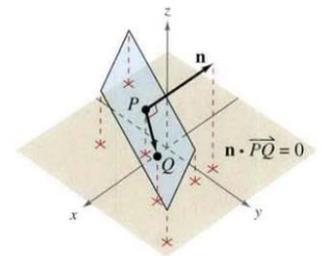


## Notes 11.4 Day 2: Finding Equations of a Plane in Three Space

### Standard Equation of a Plane in Space

The plane containing the point  $(x_1, y_1, z_1)$  and having normal vector  $\mathbf{n} = \langle a, b, c \rangle$  can be represented by the **standard form of the equation of a plane**

$$a(x - x_1) + b(y - y_1) + c(z - z_1) = 0.$$



- The plane consists of all points for which  $\overrightarrow{PQ}$  is orthogonal to  $\vec{n}$ .
- $\overrightarrow{PQ} = \langle x - x_1, y - y_1, z - z_1 \rangle$
- $\vec{n} = \langle a, b, c \rangle$
- $\overrightarrow{PQ} \cdot \vec{n} = a(x - x_1) + b(y - y_1) + c(z - z_1) = 0$

Ex. 1 Find an equation of the plane that passes through:  $P(3, -1, 2)$   $Q(2, 1, 5)$   $R(1, -2, -2)$