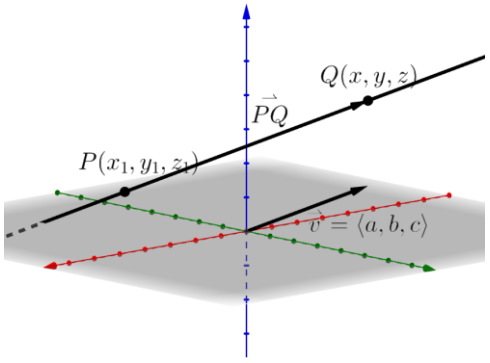
Precalculus

11-04 Lines and Planes in Space

Lines



General form

$$\langle x - x_1,\ y - y_1,\ z - z_1 \rangle = \langle at,\ bt,\ ct \rangle$$

Parametric Equations of Line

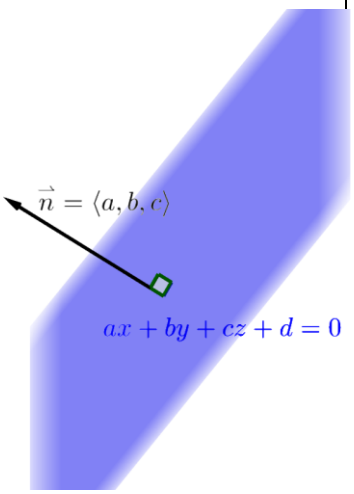
$$x = at + x_1$$
$$y = bt + y_1$$
$$z = ct + z_1$$

Symmetric Equation of Line

$$\frac{x - x_1}{a} = \frac{y - y_1}{b} = \frac{z - z_1}{c}$$

Find a set of parametric equations of the line that passes through (1, 3, −2) and (4, 0, 1).

Planes



Standard form

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

General form

$$ax + by + cz + d = 0$$

Find the general equation of plane passing through $A(3,\ 2,\ 2)$, $B(1,\ 5,\ 0)$, and $C(1,\ -3,\ 1)$

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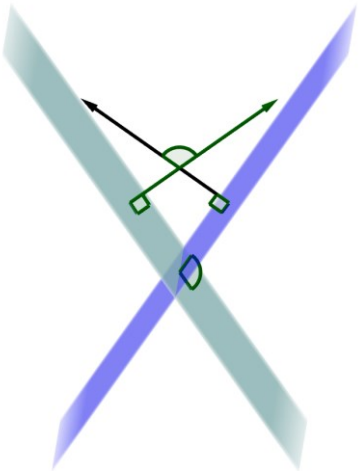
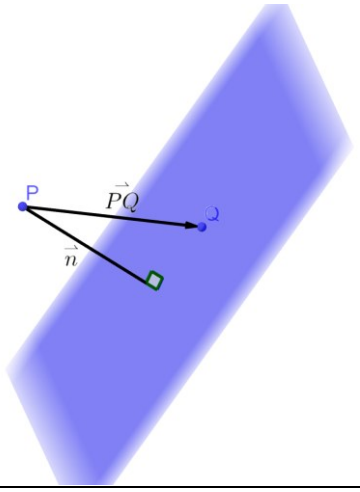
Angle between two planes



- Find the angle between _____vectors
- Normal vectors are _____in the equations of the plane

$$|\overrightarrow{n_1} \cdot \overrightarrow{n_2}| = \|\overrightarrow{n_1}\|\|\overrightarrow{n_2}\| \cos\theta$$

Distance between a Point and a Plane



$$D = \left\|proj_{\vec{n}} \overrightarrow{PQ}\right\|$$

$$D = \frac{\left|\overrightarrow{PQ} \cdot \vec{n}\right|}{\|\vec{n}\|}$$

Graphing planes in space

1. Find the _____
2. _____ the intercepts
3. Draw a _____to represent the plane

Sketch $3x + 4y + 6z = 24$