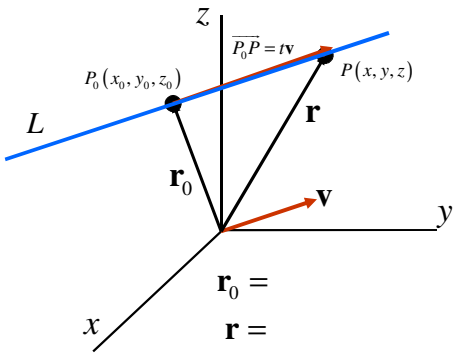
12.5 Equations of Lines and Planes

In order to find the equation of a line, we need :

A)

B)

_____ of line L



$\mathbf{r}_0 =$

$\mathbf{r} =$

$\overrightarrow{P_0P} =$

_____ of the line L

_____ of the line L

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Find parametric equations of the line containing $(5,1,3)$ and $(3,-2,4)$.

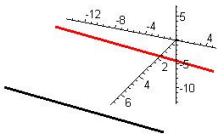
In order to find the equation of a line, we need :

A)

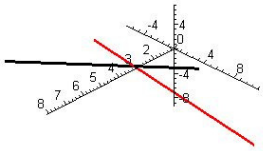
B)

Two lines in 3 space can interact in 3 ways:

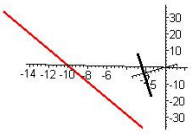
A) **Parallel Lines** -



B) **Intersecting Lines** -



C) **Skew Lines** -



their direction vectors are ___ parallel and there is ___ values of t and s that make the lines share the same point.

Determine whether the lines L_1 and L_2 are parallel, skew or intersecting. If they intersect, find the point of intersection.

$$L_1 \qquad\qquad L_2$$
$$x = 3 - t \qquad x = 8 + 2s$$
$$y = 5 + 3t \qquad y = -6 - 4s$$
$$z = -1 - 4t \qquad z = 5 + s$$

Determine whether the lines L_1 and L_2 are parallel, skew or intersecting. If they intersect, find the point of intersection.

L_1

$x = 4 + t$

$y = -8 - 2t$

$z = 12t$

L_2

$x = 3 + 2s$

$y = -1 + s$

$z = -3 - 3s$

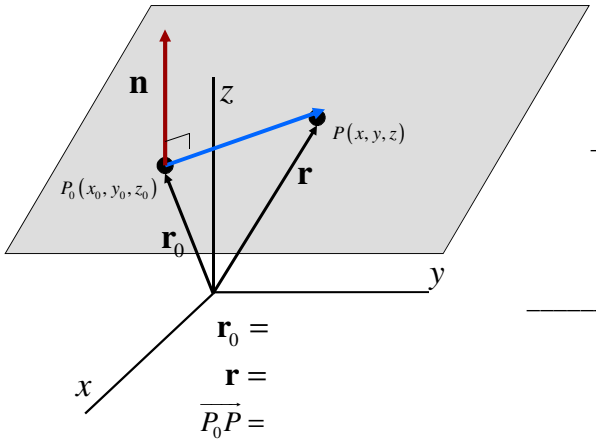
Planes

In order to find the equation of a plane, we need :

A)

B)

this vector is called the _____ to the plane



_____ of the plane

_____of the plane

$\mathbf{r}_0 =$

$\mathbf{r} =$

$\overrightarrow{P_0P} =$

$\mathbf{n} =$

_____of the plane

Determine the equation of the plane that contains the lines L_1 and L_2.

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$$L_1: \quad x = 3 - t, \quad y = 5 + 3t, \quad z = -1 - 4t$$

$$L_2: \quad x = 8 + 2s, \quad y = -6 - 4s, \quad z = 5 + s$$

In order to find the equation of a plane, we need :

A)

B)

Determine the equation of the plane that passes through $(1,2,3), (3,2,1),$ and $(-1,-2,2)$.

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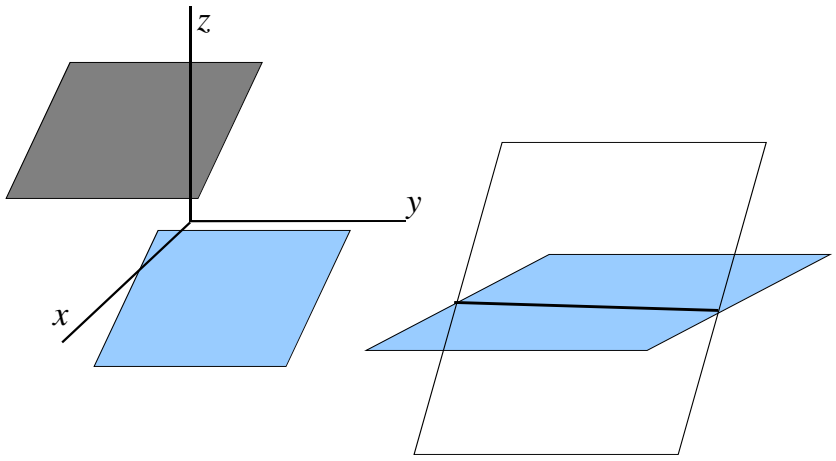
In order to find the equation of a plane, we need :

A) a point on the plane

B) a vector that is orthogonal to the plane

$\mathbf{n} = \langle a, b, c \rangle$

Two distinct planes in 3-space either are _____ or _____.



Find the line of intersection of the two planes

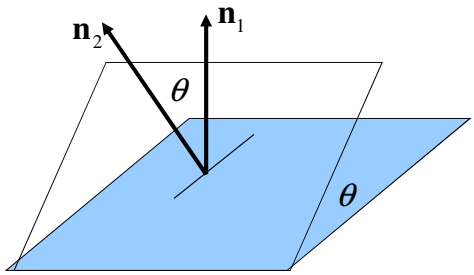
$x - 2y + z = 0$

$2x + 3y - 2z = 0$

If two planes intersect, then you can determine the angle between them.

$\measuredangle$ between _____ = $\measuredangle$ between _____

$\cos\theta =$



Find the angle between the planes

$x - 2y + z = 0$

$2x + 3y - 2z = 0$

Distance between a point and a plane:

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$D =$