

## 1 5

**incomplete do later**

Ex. Find where line L intersects plane  $5x - 2y + 4z = 18$

$L : x = -4t, y = 5 + t, z = 2 + 3t$

$$5(-4t) - 2(5 + t) + 4(2 + 3t) = 18 \quad (1)$$

$$-20t - 10 - 2t + 8 + 12t = 18 \quad (2)$$

$$-10t = 20 \quad (3)$$

$$t = -2 \quad (4)$$

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1. Two planes are parallel if their normal vectors are parallel.
2. Two planes that are not parallel intersect along a line
3. The angle between intersecting planes is the angle between their normal vectors

Ex.: Consider planes  $x + y + z = 1$  and  $3x + y - 2z = 1$

a) Find the angle between the planes

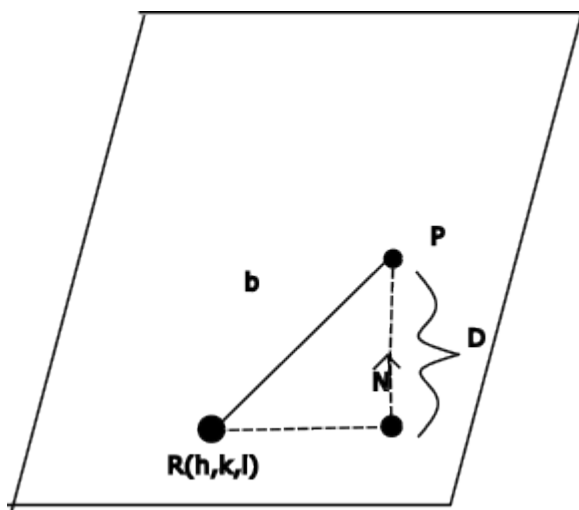
### 1.1 6

$$\vec{n}_1 = \langle 1, 1, 1 \rangle, \vec{n}_2 = \langle 3, 1, -2 \rangle \quad (1)$$

$$\vec{n}_1 \cdot \vec{n}_2 = |\vec{n}_1| |\vec{n}_2| \cos \theta \quad (2)$$

Use the equations of two planes to describe a line

Distance from a point to a plane



$$P_1(x_1, y_1, z_1)$$

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

EX: Find the distance between the parallel planes

## 1.2 E

x: Find the distance between the lines  $L_1$  and  $L_2$

The distance between  $L_1$  and  $L_2$  is the same as the distance between the two parallel planes that contain these lines.

The normal vector  $\vec{n}$  for these two planes must be orthogonal to  $\vec{v}_1$  and  $\vec{v}_2$