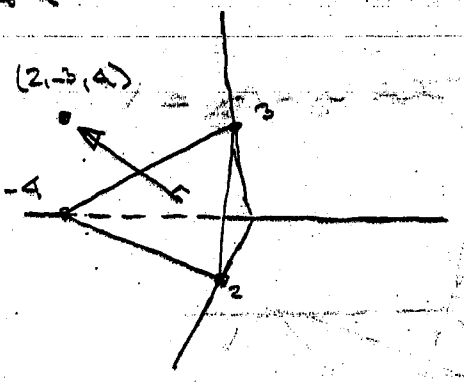
#1



$x = 2 + 2t$

$y = -3 - t$

$z = 4 + 3t$

#2 $3x + 2y - 4z = 1$

$3(3+2t) + 2(6-5t) - 4(2+3t) = 1$

$9 + 6t + 12 - 10t - 8 - 12t = 1$

$13 - 16t = 1$

$16t = 12$

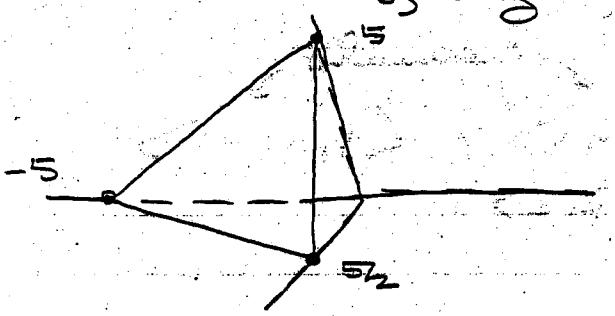
$t = 3/4$

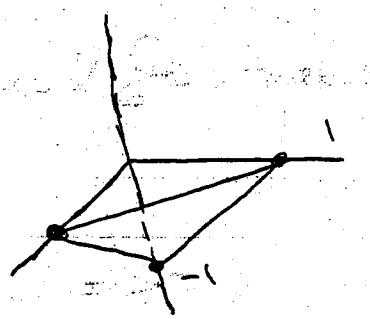
$x = 3 + 2(3/4) = 9/2$

$y = 6 - 5(3/4) = 9/4$

$z = 2 + 3(3/4) = 17/4$

#3 $2x - y + z = 5$ $\quad x + y - z = 1$





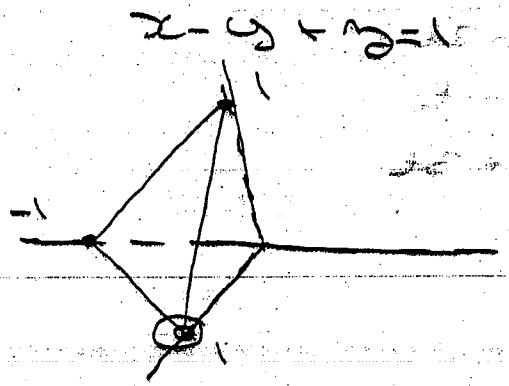
cosine of the angle between planes

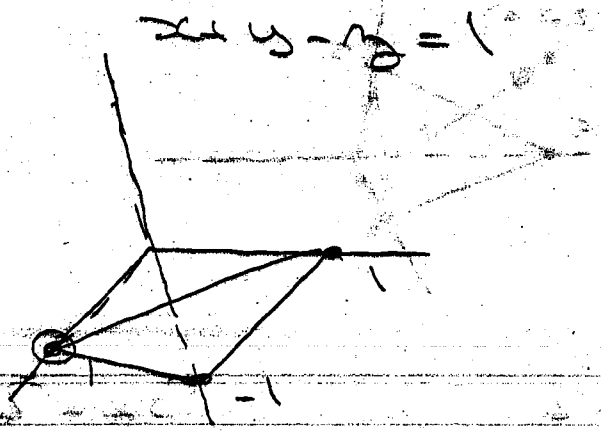
= cosine of the angle between normals

$$= \frac{\langle 2,-1,1\rangle \cdot \langle 1,1,-1\rangle}{|\langle 2,-1,1\rangle||\langle 1,1,-1\rangle|} = \frac{2-1-1}{\sqrt{6}\sqrt{3}} = 0$$

The planes are orthogonal

#4





$$\begin{cases} x - y + z = 1 \\ x + y - z = 1 \end{cases}$$

$$2x = 2$$

$$x = 1$$

$$1 - y + z = 1$$

$$-y + z = 0$$

$$y = z$$

Set $y = 0$, then $z = 0$

$(1,0,0)$ is a point on the line of intersection.

direction of line = $\langle 1,-1,1 \rangle \times \langle 1,1,-1 \rangle$ (normals)

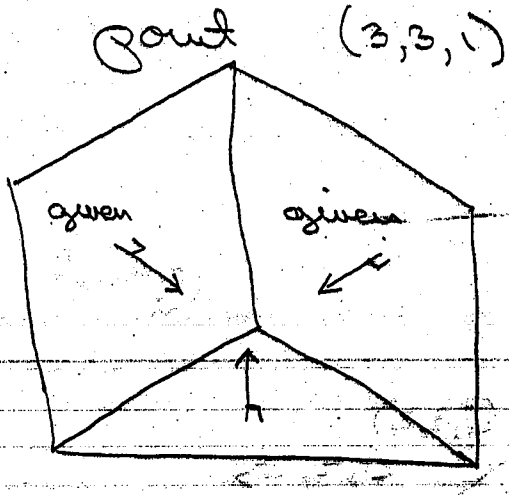
$= \langle 0,2,2 \rangle$

$x = 1$

$y = 2t$

$z = 2t$

#5

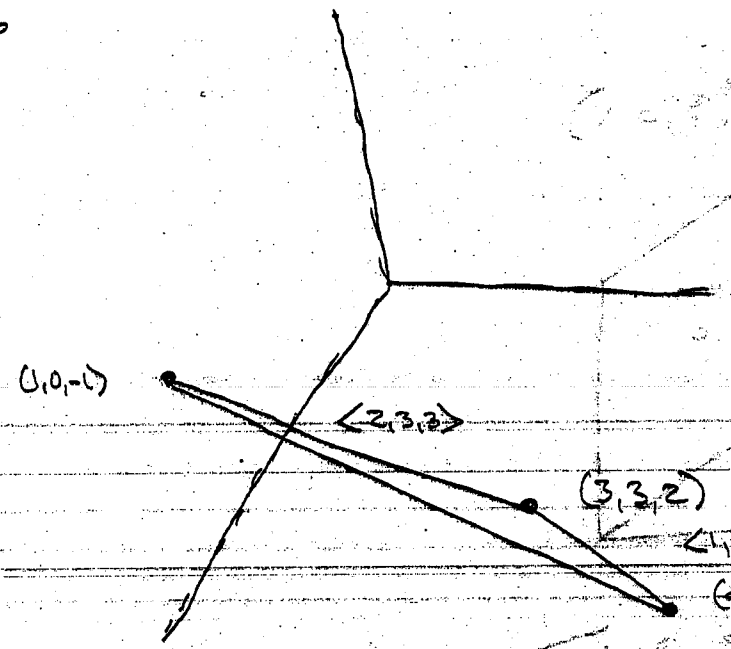


point $(3,3,1)$

normal $\langle 1,1,-2\rangle \times \langle 2,0,1\rangle = \langle 1,-5,-2\rangle$

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

#6

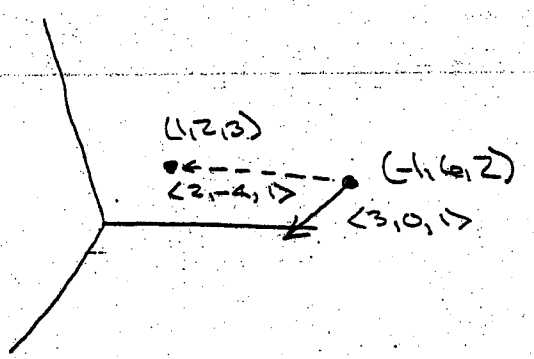


point (3,3,2)

Normal $\langle 2,3,3\rangle \times \langle 1,2,-3\rangle = \langle -15, 9, 1\rangle$

$$-15(x-3) + 9(y-3) + 1(z-2) = 0$$

#7



point $(-1,6,2)$

$\langle 2,-4,1\rangle \times \langle 3,0,1\rangle = \langle -4, 1, 12\rangle$

$$-4(x+1) + 1(y-6) + 12(z-2) = 0$$