

11P #1

line: $\vec{r} = \vec{i} + \vec{k} + \lambda(\vec{i} - 2\vec{j} + \vec{k})$

$$= (1+\lambda)\vec{i} + (-2\lambda)\vec{j} + (1+\lambda)\vec{k}$$

plane: $x + y + 2z = 4$

$$(1+\lambda) + (-2\lambda) + 2(1+\lambda) = 4$$

$$\lambda = 1$$

$$\vec{r}(1) = 2\vec{i} - 2\vec{j} + 2\vec{k}$$

intersection at $(2, -2, 2)$

← this is the position

vector for

$(2, -2, 2)$

#2

line $\frac{x-1}{5} = \frac{y}{2} = \frac{z}{3}$

point: $(1, 0, 0)$

dir: $5\vec{i} + 2\vec{j} + 3\vec{k}$

plane: $-x - y + 3z = 5$

$$\vec{r} = (1+5\lambda)\vec{i} + (2\lambda)\vec{j} + (3\lambda)\vec{k}$$

$$-(1+5\lambda) - (2\lambda) + 3(3\lambda) = 5$$

intersection: $(16, 6, 9)$

$$\lambda = 3$$

11Q # 1a

System with
x and y

$$\begin{cases} \frac{x}{2} = y - 1 \rightarrow x = 2y - 2 \\ x = \frac{1}{3}y + \frac{4}{3} \end{cases}$$

$$2y - 2 = \frac{1}{3}y + \frac{4}{3}$$

$$6y - 6 = y + 4$$

$$5y = 10$$

$$y = 2$$

$$x = 2(2) - 2$$

$$x = 2$$

Line 1

$$z = y - 1$$

$$z = 1$$

Line 2

$$3 - z = x$$

$$z = 3 - x$$

$$z = 1$$

(2, 2, 1)

11 Q # 16

$$\frac{x-5}{2} = \frac{y-4}{1} = \frac{z-5}{-3}$$

$$x = y = z + 1$$

system
with y
and z

$$\left\{ \begin{array}{l} y-4 = \frac{z-5}{-3} \\ y = z+1 \end{array} \right.$$

$$\rightarrow (z+1)-4 = \frac{z-5}{-3}$$

$$-3z+9 = z-5$$

$$14 = 4z$$

$$z = \frac{7}{2}$$

$$y = \frac{9}{2}$$

$$x = \frac{9}{2}$$

$$\vec{r} = (5+2\lambda)\vec{i} + (4+\lambda)\vec{j} + (5-3\lambda)\vec{k}$$

$$\frac{x-0}{1} = \frac{y-0}{1} = \frac{z-(-1)}{1}$$

point (0,0,-1)

dir. vector $\vec{i} + \vec{j} + \vec{k}$

$$\vec{r} = \lambda\vec{i} + \lambda\vec{j} + (-1+\lambda)\vec{k}$$

$$\left\{ \begin{array}{l} \lambda = 5+2\lambda \rightarrow \\ \lambda = 4+\lambda \\ -1+\lambda = 5-3\lambda \end{array} \right.$$

3x3 systems

$$\begin{cases} x + 2y - z = 3 \\ 3x + y + 2z = 9 \\ 2x - 3y - 2z = -1 \end{cases}$$

$$\begin{bmatrix} 1 & 2 & -1 & 3 \\ 3 & 1 & 2 & 9 \\ 2 & -3 & -2 & -1 \end{bmatrix}$$

need
zeros
here

$$\begin{bmatrix} 1 & 2 & -1 & 3 \\ 0 & -5 & 5 & 0 \\ 0 & -7 & 0 & -7 \end{bmatrix}$$

$x + 2y - z = 3 \rightarrow x = 2$

$-7y = -7 \rightarrow y = 1$

$-5y + 5z = 0$
 $z = 1$

$-3R_1: -3 \quad -6 \quad 3 \quad -9$ (add to R_2)

$-2R_1: -2 \quad -4 \quad 2 \quad -6$ (add to R_3)

HW: paper typizs by Friday
(e-mail)

11 Q # 4,
11 R # 6, 2