ASSIGNMENT NO.1
COURSE CODE-AI1110
Probability And Random Variables

NAME-Abhishek Kumar ROLL NO.=AI21BTECH11003

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Question 1a

Solve the following inequation and write down the solution set:

$$11x - 4 < 15x + 4 \leq 13x + 14, x \in W$$

Represent the solution on number line .

Solution

There are two inequatilities.

$$11x - 4 < 15x + 4 \leq 13x + 14, x \in W$$

Lets solve for left inequation.
$$11x - 4 < 15x + 4$$
$$\Rightarrow -8 < 15x - 11x$$
$$\Rightarrow -2 < x$$

Lets solve for right inequation.

$$15x + 4 \leq 13x + 14$$
$$\Rightarrow 2x \leq 10$$
$$\Rightarrow x \leq 5$$
$$-2 < x \leq 5, x \in W$$
$$\Rightarrow x = 0, 1, 2, 3, 4, 5$$

vector equations of lines:

$$\text{L1} \equiv 11x - 4 - y1 = 0$$
$$L2 \equiv 15x + 4 - y2 = 0$$
$$L3 \equiv 13x + 14 - y3 = 0$$

$$\text{L1} \equiv \begin{pmatrix} 11 & -1 \end{pmatrix} \mathbf{p} = 4$$
$$\Rightarrow \begin{pmatrix} 11 & -1 \end{pmatrix} \begin{pmatrix} x \\ y1 \end{pmatrix} = 4$$
$$L2 \equiv \begin{pmatrix} 15 & -1 \end{pmatrix} \mathbf{p} = -4$$
$$\Rightarrow \begin{pmatrix} 15 & -1 \end{pmatrix} \begin{pmatrix} x \\ y2 \end{pmatrix} = -4$$
$$L3 \equiv \begin{pmatrix} 13 & -1 \end{pmatrix} \mathbf{p} = -14$$

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$$\Rightarrow \begin{pmatrix} 13 & -1 \end{pmatrix} \begin{pmatrix} x \\ y3 \end{pmatrix} = -14$$

y1=y2

$$\Rightarrow \begin{pmatrix} 11 & -1 \end{pmatrix} \begin{pmatrix} x \\ 1 \end{pmatrix} = \begin{pmatrix} 15 & 4 \end{pmatrix} \begin{pmatrix} x \\ 1 \end{pmatrix}$$

$$\Rightarrow -8 = 4x$$

$$\Rightarrow -2 = x$$

$$y2 = y3$$

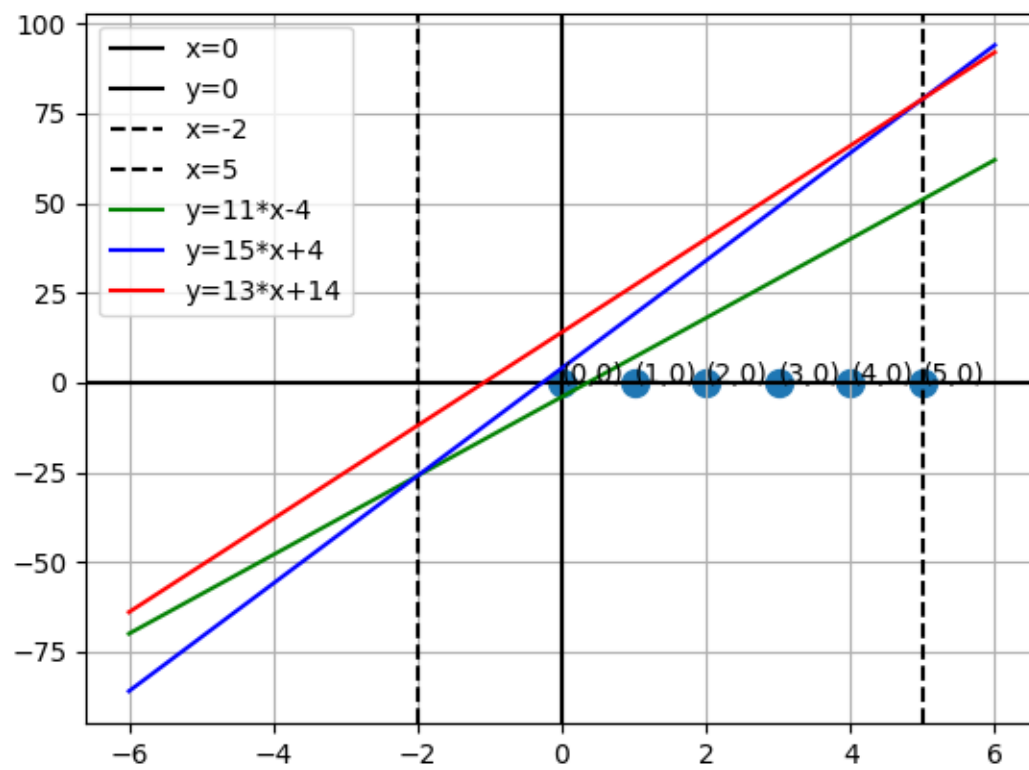$$\Rightarrow \begin{pmatrix} 15 & 4 \end{pmatrix} \begin{pmatrix} x \\ 1 \end{pmatrix} = \begin{pmatrix} 13 & 14 \end{pmatrix} \begin{pmatrix} x \\ 1 \end{pmatrix}$$

$$\Rightarrow 2x = 10$$

$$\Rightarrow x = 5$$

MATRIX CALCULATIONS TO FIND
INTERSECTION OF
L1 AND L2 ,L2 AND L3

THIS PLOT SHOWS LINES L1,L2,L3
INTERSECTING EACH OTHER

THE DOTS ARE THE POSSIBLE SOLUTIONS