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

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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.

$$\begin{aligned} 11x - 4 &< 15x + 4 \\ \Rightarrow -8 &< 15x - 11x \\ \Rightarrow -2 &< x \end{aligned}$$

Lets solve for right inequation.

$$\begin{aligned} 15x + 4 &\leq 13x + 14 \\ \Rightarrow 2x &\leq 10 \\ \Rightarrow x &\leq 5 \\ -2 < x &\leq 5, x \in W \\ \Rightarrow x &= 0, 1, 2, 3, 4, 5 \end{aligned}$$

vector equations of lines:

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

$$\begin{aligned} \text{L1} &\equiv \begin{pmatrix} 11 & -1 \end{pmatrix} \mathbf{p1} = 4 \\ \Rightarrow &\begin{pmatrix} 11 & -1 \end{pmatrix} \begin{pmatrix} x \\ y1 \end{pmatrix} = 4 \\ L2 &\equiv \begin{pmatrix} 15 & -1 \end{pmatrix} \mathbf{p2} = -4 \\ \Rightarrow &\begin{pmatrix} 15 & -1 \end{pmatrix} \begin{pmatrix} x \\ y2 \end{pmatrix} = -4 \\ L3 &\equiv \begin{pmatrix} 13 & -1 \end{pmatrix} \mathbf{p3} = -14 \\ \Rightarrow &\begin{pmatrix} 13 & -1 \end{pmatrix} \begin{pmatrix} x \\ y3 \end{pmatrix} = -14 \end{aligned}$$

y1=y2

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

$$\Rightarrow -8 = 4x$$

$$\Rightarrow -2 = x$$

$y2 = y3$

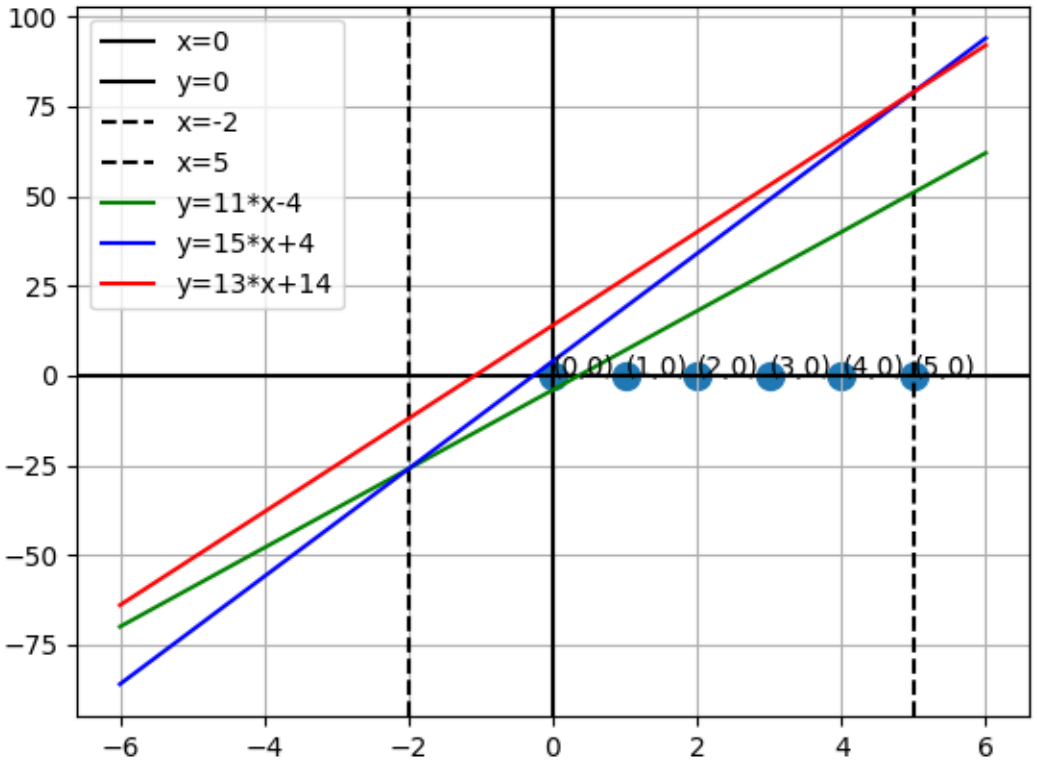
$$\Rightarrow \begin{pmatrix}15 & 4\end{pmatrix}\begin{pmatrix}x\\1\end{pmatrix} = \begin{pmatrix}13 & 14\end{pmatrix}\begin{pmatrix}x\\1\end{pmatrix}$$

$$\Rightarrow 2x = 10$$

$$\Rightarrow x = 5$$

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