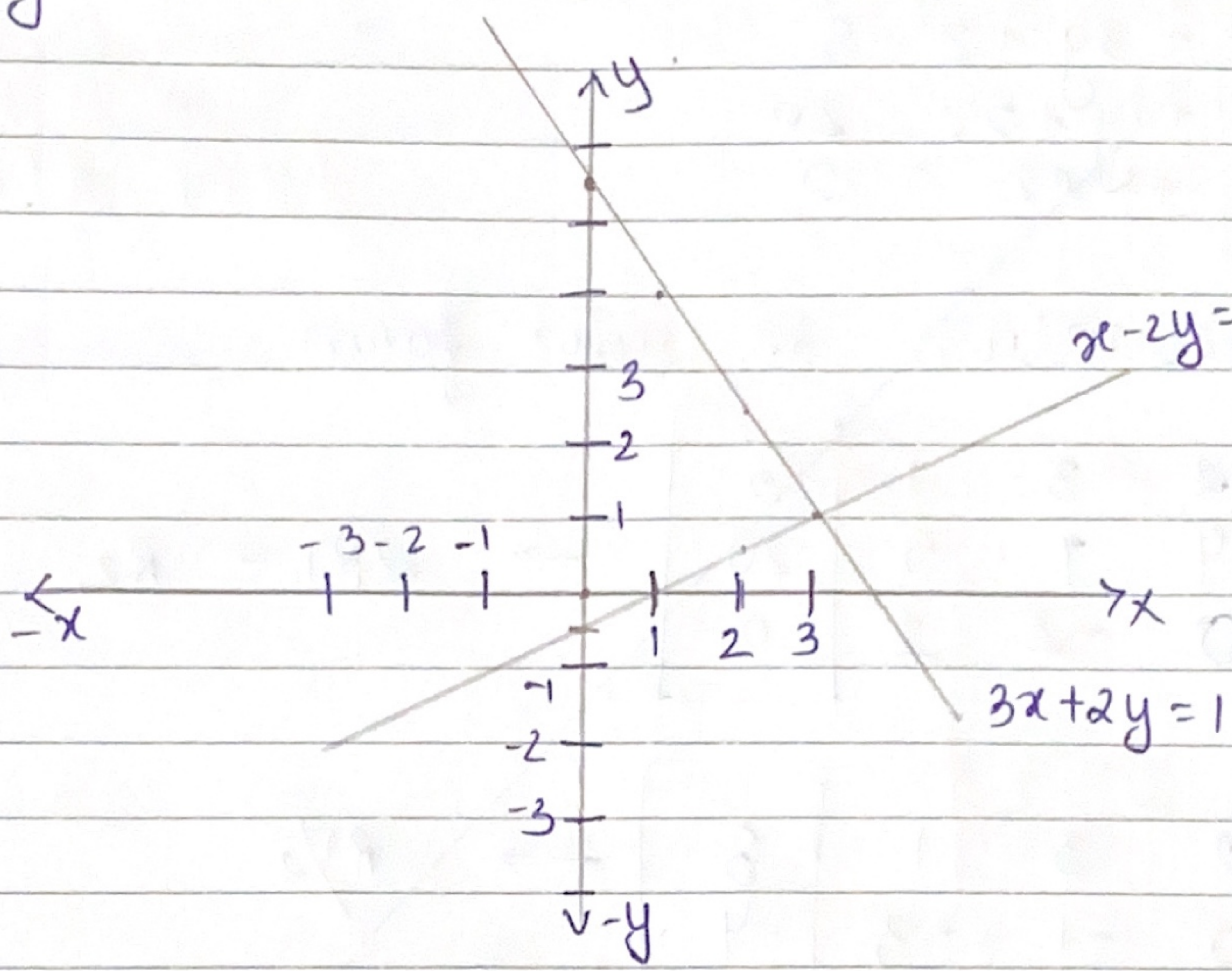
Q1. $x - 2y = 1$
$3x + 2y = 11$

~~3x+2y~~

$x - 1 = 2y$

$y = \frac{x-1}{2}$

$y = \frac{11 - 3x}{2}$



System has unique solution because both the lines of equations are intersecting at (3,1).

$\therefore x = 3$ & $y = 1$

$$\left[\begin{array}{cc|c} 1 & -2 & 1 \\ 3 & 2 & 11 \end{array}\right]$$ 1st operat^n $= -3R1 + R2$.

$$= \left[\begin{array}{cc|c} 1 & -2 & 1 \\ 0 & 8 & 8 \end{array}\right]$$ 2nd operation $= \frac{1}{4}R2 + R1$

$$= \left[\begin{array}{cc|c} 1 & 0 & 3 \\ 0 & 8 & 8 \end{array}\right]$$ 3rd operation $= \frac{1}{8} R2$.

$$= \left[\begin{array}{cc|c} 1 & 0 & 3 \\ 0 & 1 & 1 \end{array}\right]$$ $x = 3$
$y = 1$

$-R1 - R2 - R1 - R2$

Q2. Gaussian Elimination

$2x + 3y + z = 8$
$4x + 7y + 5z = 20.$
$0 - 2y + 2z = 0$

$\frac{{}^{2}\cancel{4} \times 3}{2} = 6.$

$-\frac{9}{2} + \frac{1}{2}$

$\frac{-8}{2} \; -4$

$\frac{-12}{2} + 4 = \frac{-12+8}{2}$

$\frac{-\cancel{4}}{\cancel{2}} - 2$

→ representation in row form.

$$\left[\begin{array}{ccc|c} 2 & 3 & 1 & 8 \\ 4 & 7 & 5 & 20 \\ 0 & -2 & 2 & 0 \end{array}\right] \rightarrow R1/2.$$

$$= \left[\begin{array}{ccc|c} 1 & 3/2 & 1/2 & 4 \\ 4 & 7 & 5 & 20 \\ 0 & -2 & 2 & 0 \end{array}\right] \rightarrow 4R1 - R2 = \left[\begin{array}{ccc|c} 1 & 3/2 & 1/2 & 4 \\ 0 & -1 & -3 & -4 \\ 0 & -2 & 2 & 0 \end{array}\right] \begin{array}{l} -2R2 + \\ \rightarrow R3. \end{array}$$

$$= \left[\begin{array}{ccc|c} 1 & 3/2 & 1/2 & 4 \\ 0 & -1 & -3 & -4 \\ 0 & 0 & 8 & 8 \end{array}\right] \begin{array}{l} \rightarrow -3/2\, R2 + R1 \\ \rightarrow (+1) R2 \\ \rightarrow \end{array} = \left[\begin{array}{ccc|c} +1 & 0 & -4 & -2 \\ 0 & 1 & 3 & 4 \\ 0 & 0 & 8 & 8 \end{array}\right] \begin{array}{l} \rightarrow \\ \frac{1}{2} R3 + R1 \end{array}$$

$$= \left[\begin{array}{ccc|c} 1 & 0 & 0 & 2 \\ 0 & 1 & 3 & 4 \\ 0 & 0 & 8 & 8 \end{array}\right] \begin{array}{l} \\ \rightarrow -3R3 + R2 \\ \rightarrow R3/8 \end{array} = \left[\begin{array}{ccc|c} 1 & 0 & 0 & 2. \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \end{array}\right] \quad \begin{array}{l} x = 2 \\ y = 1 \\ z = 1 \end{array}$$

Gaussian

$x + 3/2\, y + 1/2\, z = 4$
$y + 3z = 4$
$8z = 8 \qquad z = 1$

$\underline{y = 1}$

$x + \frac{3}{2} + \frac{1}{2} = 4. \Rightarrow \frac{2x + 4}{2} = 6 \Rightarrow \underline{x = 2}$

$x = 2 \quad y = 1 \quad z = 1$

Date No.

Q3. $q(x) = ax^2 + bx + c.$

$D = \{(1,4), (2,8), (3,16)\}$

1) $a + b + c = 4.$
2) $4a + 2b + c = 8$
3) $9a + 3b + c = 16.$

$(x = 1, q(x) = 4).$

In matrix form.

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 4 \\ 4 & 2 & 1 & 8 \\ 9 & 3 & 1 & 16 \end{array}\right] \begin{array}{l} \\ \leftarrow 4R1 - R2. \\ \\ \end{array}$$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 4 \\ 0 & +2 & +3 & 8 \\ 9 & 3 & 1 & 16 \end{array}\right] \begin{array}{l} \\ \\ \leftarrow 9R1 - R3. \end{array}$$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 4 \\ 0 & +2 & +3 & 8 \\ 0 & 6 & 8 & 20 \end{array}\right] \begin{array}{l} \\ \\ \leftarrow -3R2 + R3. \end{array}$$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 4 \\ 0 & 2 & 3 & 8 \\ 0 & 0 & -1 & -4 \end{array}\right]$$

$x + y + z = 4.$
$2y + 3z = 8$
$+z = +4$
$y = -2$
$\underline{x = 2}.$

$\cancel{x = 2}$
$\cancel{y = -2}$
$\cancel{z = 4}.$

$a = 2$
$b = -2$
$c = 4.$