Exercise 3A

Question 23:

On a graph paper, draw horizontal line X'OX and a vertical line YOY' as x-axis and y-axis respectively.

The given system of equations is
$5x - y = 7, x - y + 1 = 0$

Graph of $5x - y = 7$:

$5x - y - 7 = 0 \Rightarrow y = 5x - 7$ ---(1)
Thus, we have the following table for equation (1)

x	0	1	2
y	-7	-2	3

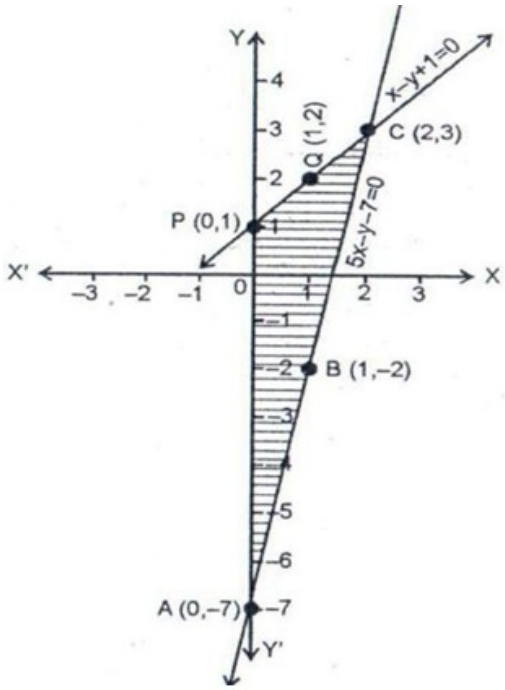
On the graph paper plot the points A (0, -7), B (1, -2) and C (2, 3)
Join AB and BC to get AC
Thus, AC line is the graph of $5x - y = 7$

Graph of $x - y + 1 = 0$:

$x - y + 1 = 0 \Rightarrow y = x + 1$ ---(2)
thus, we have the table for following equation (2)

x	0	1	2
y	1	2	3

On the same graph paper plot the points P (0, 1) and Q (1, 2).
The other point C (2, 3) has been already plotted.
Join PA.



These lines cut the y-axis at (0, -7) (0, 1) intersecting at (2, 3)
$\therefore$ x = 2, y = 3 is the solution of the given system of equations

Clearly, the vertices of ΔAPC formed by these lines and the y-axis are A (0, -7), P (0, 1) and C (2, 3)

Consider the triangle ΔAPC:
height of the triangle = 2 units and base(AP)= 8 units

Area of triangle ΔAPC:

$$\text{Area of } \Delta APC = \left(\frac{1}{2} \times \text{Base} \times \text{Height}\right)$$

$$= \left(\frac{1}{2} \times 8 \times 2\right) \text{sq.units} = 8 \text{ sq.units}$$

Question 24:

On a graph paper, draw horizontal line X'OX and a vertical line YOY' as x-axis and y-axis respectively.

The given system of equations is
x - 2y = 2, 4x - 2y = 5

Graph of x - 2y = 2:

$$x - 2y = 2 \Rightarrow y = \frac{x-2}{2} \quad ---(1)$$

Thus, we have following table for equation (1)

x	0	2	1
y	-1	0	-0.5

On graph paper plot the points A (0, -1), B (2, 0) and C (1, -0.5)
Join AC and BC to get AB
Thus line, AB is the graph of equation x - 2y = 2

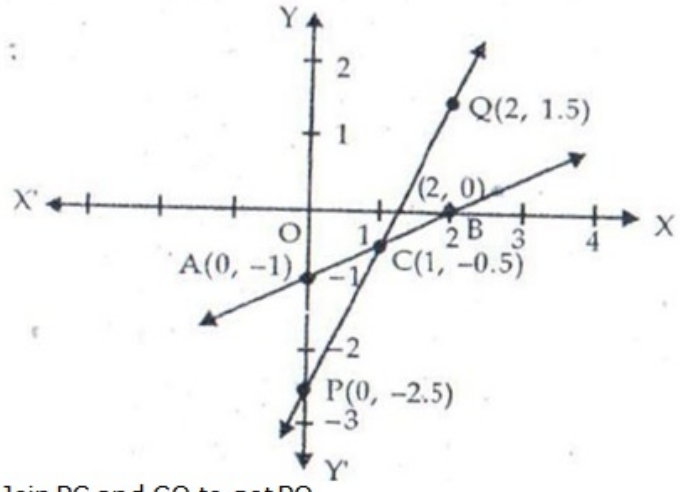
Graph of 4x - 2y = 5:

$$4x - 2y = 5 \Rightarrow y = \frac{4x-5}{2} \quad ---(2)$$

Thus, we have following table for equation (2)

x	0	1	2
y	-2.5	-0.5	1.5

On graph paper plot the points P (0, -2.5) and Q (2, 1.5).
The point C (1, -0.5) has already been plotted



Join PC and CQ to get PQ
Then line PQ is the graph of equation 4x - 2y = 5

Thus, we find that two graph lines intersect at (1, -0.5)
Hence, the given system of equations is consistent.

********** END **********