Exercise 3B

Question 14:

The given equations are:

$7(y + 3) - 2(x + 2) = 14$

$4(y - 2) + 3(x - 3) = 2$

$7(y + 3) - 2(x + 2) = 14$

$\Rightarrow 7y + 21 - 2x - 4 = 14$

$\Rightarrow 7y - 2x = 14 + 4 - 21$

$\Rightarrow -2x + 7y = -3 \quad ---(1)$

$4(y - 2) + 3(x - 3) = 2$

$\Rightarrow 4y - 8 + 3x - 9 = 2$

$\Rightarrow 4y + 3x = 2 + 8 + 9$

$\Rightarrow 3x + 4y = 19 \quad ---(2)$

Multiplying (1) by 4 and (2) by 7, we get

$-8x + 28y = -12 \quad ---(3)$

$21x + 28y = 133 \quad ---(4)$

Subtracting (3) and (4), we get

$29x = 145$

$x = 5$

Substituting $x = 5$ in (1), we get

$-2 \times 5 + 7y = -3$

$7y = -3 + 10$

$7y = 7 \Rightarrow y = 1$

$\therefore$ Solution is $x = 5, y = 1$

Question 15:

The given equations are:
$6x + 5y = 7x + 2y + 1 = 2(x + 6y - 1)$

Therefore, we have
$6x + 5y = 2(x + 6y - 1)$
$6x + 5y = 2x + 12y - 2$
$6x - 2x + 5y - 12y = -2$
$4x - 7y = -2 \quad ----(1)$

$7x + 3y + 1 = 2(x + 6y - 1)$
$7x + 3y + 1 = 2x + 12y - 2$
$7x - 2x + 3y - 12y = -2 - 1$
$5x - 9y = -3 \quad ---(2)$

Multiplying (1) by 9 and (2) by 7, we get
$36x - 63y = -18 \quad ---(3)$
$35x - 63y = -21 \quad ---(4)$
Subtracting (4) from (3), we get
$x = 3$
Substituting $x = 3$ in (1), we get
$4 \times 3 - 7y = -2 \Rightarrow -7y = -2 - 12$
$-7y = -14$
$y = 2$

$\therefore$ solution is $x = 3, y = 2$

Question 16:

The given equations are:

$$\frac{x+y-8}{2} = \frac{x+2y-14}{3} = \frac{3x+y-12}{11}$$

Therefore we have,

$$\frac{x+y-8}{2} = \frac{3x+y-12}{11}$$

By cross multiplication, we get

$11x + 11y - 88 = 6x + 2y - 24$

$11x - 6x + 11y - 2y = -24 + 88$

$5x + 9y = 64 \quad ---(1)$

$$\frac{x+2y-14}{3} = \frac{3x+y-12}{11}$$

By cross multiplication, we get

$11x + 22y - 154 = 9x + 3y - 36$

$11x - 9x + 22y - 3y = -36 + 154$

$2x + 19y = 118 \quad ---(2)$

By Multiplying (1) by 19 and (2) by 9

$95x + 171y = 1216 \quad ---(3)$

$18x + 171y = 1062 \quad ---(4)$

Subtracting (4) from (3), we get

$77x = 154 \Rightarrow x = 2$

Substituting $x = 2$ in (1), we get

$5 \times 2 + 9y = 64 \Rightarrow 9y - 54$

$y = 6$

$\therefore$ solution is $x = 2, y = 6$

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