Exercise 6(C)

Solution 1:

Given equations are $4x + 3y = 17$ and $3x - 4y + 6 = 0$

Comparing with $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, we have

$a_1 = 4, b_1 = 3, c_1 = -17$ and $a_2 = 3, b_2 = -4, c_2 = 6$

Now, $x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}$ and $y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$

$\Rightarrow x = \frac{3 \times 6 - (-4) \times (-17)}{4 \times (-4) - 3 \times 3}$ and $y = \frac{-17 \times 3 - 6 \times 4}{4 \times (-4) - 3 \times 3}$

$\Rightarrow x = \frac{18 - 68}{-16 - 9}$ and $y = \frac{-51 - 24}{-16 - 9}$

$\Rightarrow x = \frac{-50}{-25}$ and $y = \frac{-75}{-25}$

$\Rightarrow x = 2$ and $y = 3$

Solution 2:

Given equations are $3x + 4y = 11$ and $2x + 3y = 8$

Comparing with $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, we have

$a_1 = 3, b_1 = 4, c_1 = -11$ and $a_2 = 2, b_2 = 3, c_2 = -8$

Now, $x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}$ and $y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$

$\Rightarrow x = \frac{4\times(-8) - 3\times(-11)}{3\times3 - 2\times4}$ and $y = \frac{-11\times2 - (-8)\times3}{3\times3 - 2\times4}$

$\Rightarrow x = \frac{-32 + 33}{9 - 8}$ and $y = \frac{-22 + 24}{9 - 8}$

$\Rightarrow x = 1$ and $y = 2$

Solution 3:

Given equations are $6x + 7y - 11 = 0$ and $5x + 2y = 13$

Comparing with $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, we have

$a_1 = 6, b_1 = 7, c_1 = -11$ and $a_2 = 5, b_2 = 2, c_2 = -13$

Now, $x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}$ and $y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$

$\Rightarrow x = \frac{7\times(-13) - 2\times(-11)}{6\times2 - 5\times7}$ and $y = \frac{-11\times5 - (-13)\times6}{6\times2 - 5\times7}$

$\Rightarrow x = \frac{-91 + 22}{12 - 35}$ and $y = \frac{-55 + 78}{12 - 35}$

$\Rightarrow x = \frac{-69}{-23}$ and $y = \frac{23}{-23}$

$\Rightarrow x = 3$ and $y = -1$

Solution 4:

Given equations are $5x + 4y + 14 = 0$ and $3x = -10 - 4y$

Comparing with $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, we have

$a_1 = 5, b_1 = 4, c_1 = 14$ and $a_2 = 3, b_2 = 4, c_2 = 10$

Now, $x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}$ and $y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$

$\Rightarrow x = \frac{4\times10 - 4\times14}{5\times4 - 3\times4}$ and $y = \frac{14\times3 - 10\times5}{5\times4 - 3\times4}$

$\Rightarrow x = \frac{40 - 56}{20 - 12}$ and $y = \frac{42 - 50}{20 - 12}$

$\Rightarrow x = \frac{-16}{8}$ and $y = \frac{-8}{8}$

$\Rightarrow x = -2$ and $y = -1$

Solution 5:

Given equations are $x - y + 2 = 0$ and $7x + 9y = 130$

Comparing with $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, we have

$a_1 = 1, b_1 = -1, c_1 = 2$ and $a_2 = 7, b_2 = 9, c_2 = -130$

Now, $x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}$ and $y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$

$\Rightarrow x = \frac{-1 \times (-130) - 9 \times 2}{1 \times 9 - 7 \times (-1)}$ and $y = \frac{2 \times 7 - (-130) \times 1}{1 \times 9 - 7 \times (-1)}$

$\Rightarrow x = \frac{130 - 18}{9 + 7}$ and $y = \frac{14 + 130}{9 + 7}$

$\Rightarrow x = \frac{112}{16}$ and $y = \frac{144}{16}$

$\Rightarrow x = 7$ and $y = 9$

Solution 6:

Given equations are $4x - y = 5$ and $5y - 4x = 7$

Comparing with $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, we have

$a_1 = 4, b_1 = -1, c_1 = -5$ and $a_2 = -4, b_2 = 5, c_2 = -7$

Now, $x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}$ and $y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$

$\Rightarrow x = \frac{-1 \times (-7) - 5 \times (-5)}{4 \times 5 - (-4) \times (-1)}$ and $y = \frac{(-5) \times (-4) - (-7) \times 4}{4 \times 5 - (-4) \times (-1)}$

$\Rightarrow x = \frac{7 + 25}{20 - 4}$ and $y = \frac{20 + 28}{20 - 4}$

$\Rightarrow x = \frac{32}{16}$ and $y = \frac{48}{16}$

$\Rightarrow x = 2$ and $y = 3$

Solution 7:

Given equations are $4x - 3y = 0$ and $2x + 3y = 18$

Comparing with $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, we have

$a_1 = 4, b_1 = -3, c_1 = 0$ and $a_2 = 2, b_2 = 3, c_2 = -18$

Now, $x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}$ and $y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$

$\Rightarrow x = \frac{-3 \times (-18) - 3 \times 0}{4 \times 3 - 2 \times (-3)}$ and $y = \frac{0 \times 2 - (-18) \times 4}{4 \times 3 - 2 \times (-3)}$

$\Rightarrow x = \frac{54 - 0}{12 + 6}$ and $y = \frac{0 + 72}{12 + 6}$

$\Rightarrow x = \frac{54}{18}$ and $y = \frac{72}{18}$

$\Rightarrow x = 3$ and $y = 4$

Solution 8:

Given equations are $8x + 5y = 9$ and $3x + 2y = 4$

Comparing with $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, we have

$a_1 = 8, b_1 = 5, c_1 = -9$ and $a_2 = 3, b_2 = 2, c_2 = -4$

Now, $x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}$ and $y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$

$\Rightarrow x = \frac{5\times(-4) - 2\times(-9)}{8\times2 - 3\times5}$ and $y = \frac{-9\times3 - (-4)\times8}{8\times2 - 3\times5}$

$\Rightarrow x = \frac{-20 + 18}{16 - 15}$ and $y = \frac{-27 + 32}{16 - 15}$

$\Rightarrow x = \frac{-2}{1}$ and $y = \frac{5}{1}$

$\Rightarrow x = -2$ and $y = 5$

Solution 9:

Given equations are $4x - 3y - 11 = 0$ and $6x + 7y - 5 = 0$

Comparing with $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, we have

$a_1 = 4, b_1 = -3, c_1 = -11$ and $a_2 = 6, b_2 = 7, c_2 = -5$

Now, $x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}$ and $y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$

$\Rightarrow x = \frac{-3\times(-5) - 7\times(-11)}{4\times7 - 6\times(-3)}$ and $y = \frac{-11\times6 - (-5)\times4}{4\times7 - 6\times(-3)}$

$\Rightarrow x = \frac{15 + 77}{28 + 18}$ and $y = \frac{-66 + 20}{28 + 18}$

$\Rightarrow x = \frac{92}{46}$ and $y = \frac{-46}{46}$

$\Rightarrow x = 2$ and $y = -1$

Solution 10:

Given equations are $4x + 6y = 15$ and $3x - 4y = 7$

Comparing with $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, we have

$a_1 = 4, b_1 = 6, c_1 = -15$ and $a_2 = 3, b_2 = -4, c_2 = -7$

Now, $x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1}$ and $y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$

$\Rightarrow x = \frac{6\times(-7) - (-4)\times(-15)}{4\times(-4) - 3\times6}$ and $y = \frac{-15\times3 - (-7)\times4}{4\times(-4) - 3\times6}$

$\Rightarrow x = \frac{-42 - 60}{-16 - 18}$ and $y = \frac{-45 + 28}{-16 - 18}$

$\Rightarrow x = \frac{-102}{-34}$ and $y = \frac{-17}{-34}$

$\Rightarrow x = 3$ and $y = \frac{1}{2}$