PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

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PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

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EXERCISE - 3.1

1) Let the present age of Aftab be 'x'
And, present age of his daughter $= y$

Seven years ago,
Age of Aftab $= (x-7)$
Age of daughter $= (y-7)$

A/Q

$$(x-7) = 7(y-7)$$
$$x-7 = 7y-49$$
$$x-7y = -42 \quad \text{—— (1)}$$

Three years hence,
Age of Aftab $= x+3$
Age of his daughter $= y+3$
A/Q

$$\Rightarrow (x+3) = 3(y+3)$$
$$\Rightarrow x+3 = 3y+9$$
$$\Rightarrow x-3y = 6 \quad \text{—— (2)}$$

Therefore, the algebraic representation is

$$x-7y = -42$$
$$x-3y = 6$$

For, $x-7y = -42$
$$x = -42+7y$$

The solution table is -

x	-7	0	7
y	5	6	7

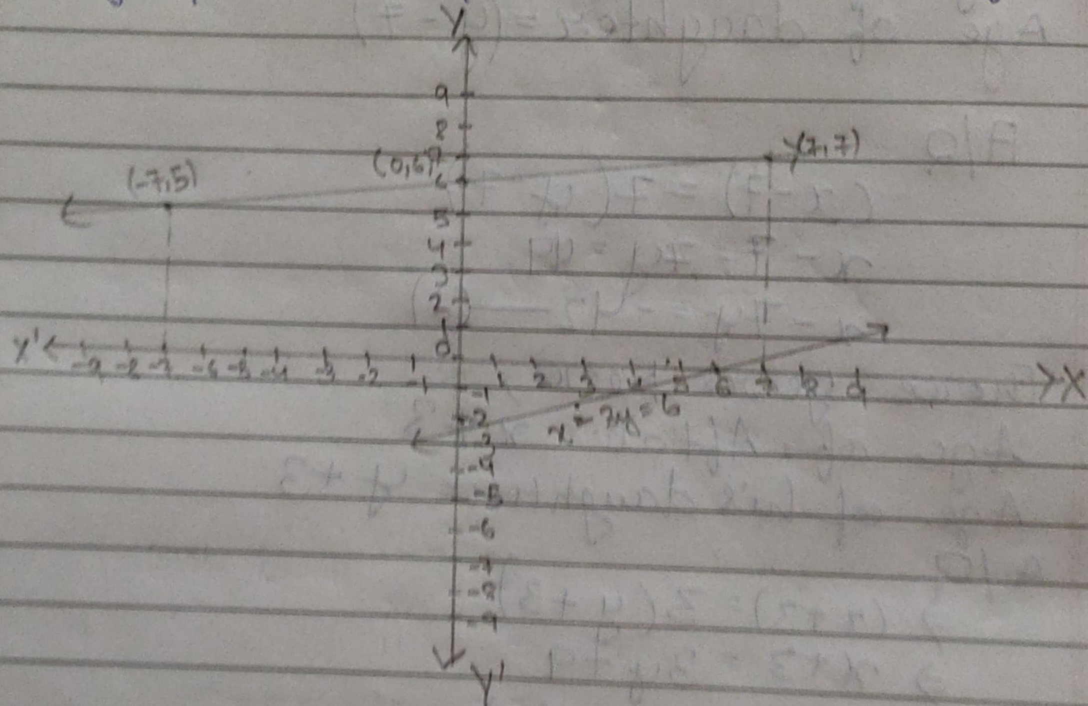
For $x - 3y = 6$

$x = 6 + 3y$

The solution table is

x	6	3	0
y	0	-1	-2

The graphical representation is as follows.



2) Let the cost of a bat and a ball be ₹x and ₹y respectively.

$\Rightarrow 3x + 6y = 3900$

$\Rightarrow x + 2y = 1300$ — (i)

$x + 3y = 1300$ — (ii)

From (i), we get

$x = 1300 - 2y$

Three solutions of this equation can be written in a table as follows.

x	300	100	-100
y	500	600	700

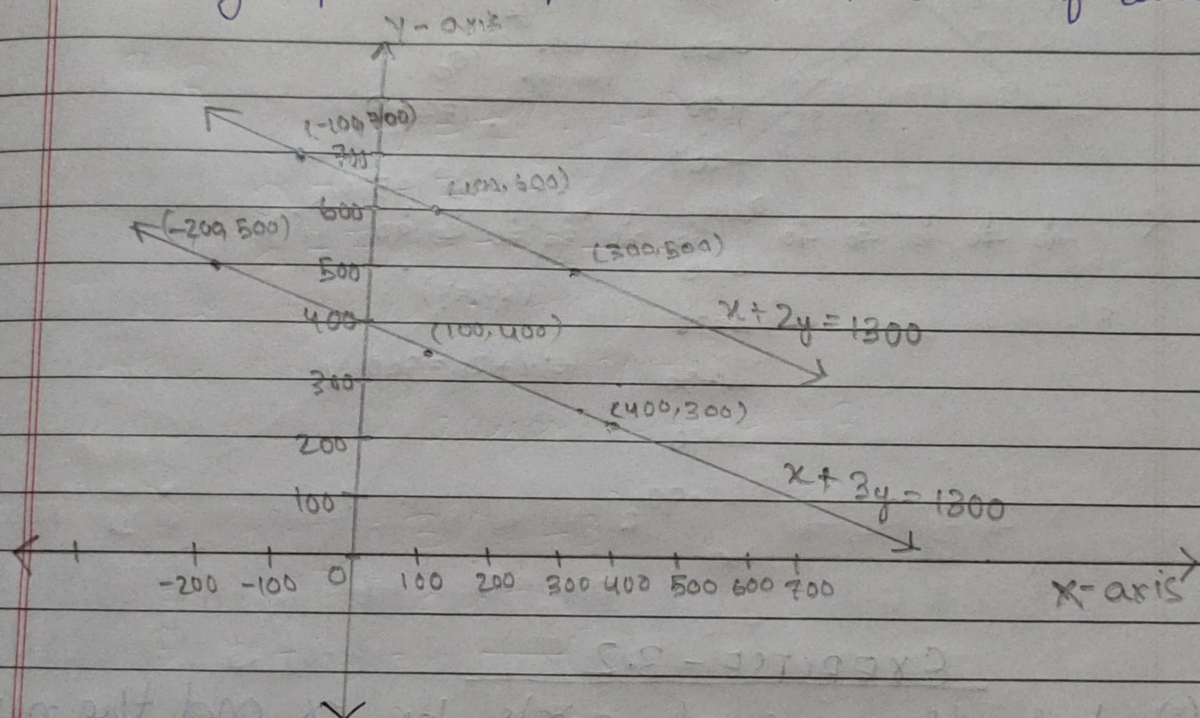
From (ii), we get

$x = 1300 - 3y$

Three solutions of this equation can be written in a table as follows -

x	100	400	-200
y	400	300	500

The graphical representation is as follows:-



3) Let the cost of 1 kg of apples be ₹x

And, cost of 1kg of grapes = ₹y

A/q the algebraic representation is -

$2x + y = 160$

$4x + 2y = 300$

For, $2x + y = 160$

$y = 160 - 2x$

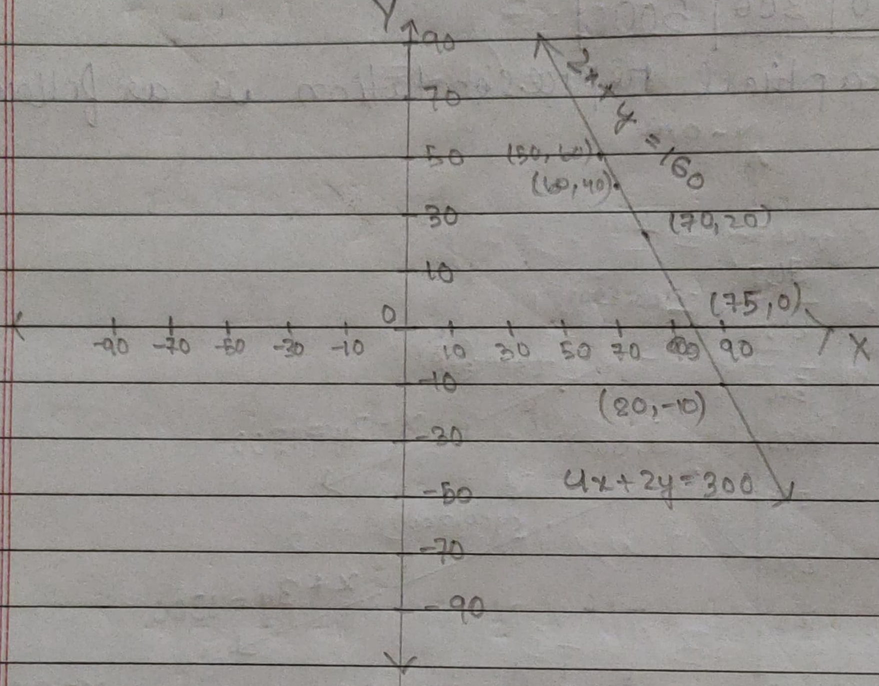
The solution table is -

x	50	60	70
y	60	40	20

For $4x+2y=300$

$y = \frac{300-4x}{2}$

x	70	80	75
y	10	-10	0



EXERCISE - 3.2

1)(i) Let the no.s of girls be x and the nos of boys be 'y'.

A/Q

$x+y=10$

$x-y=4$

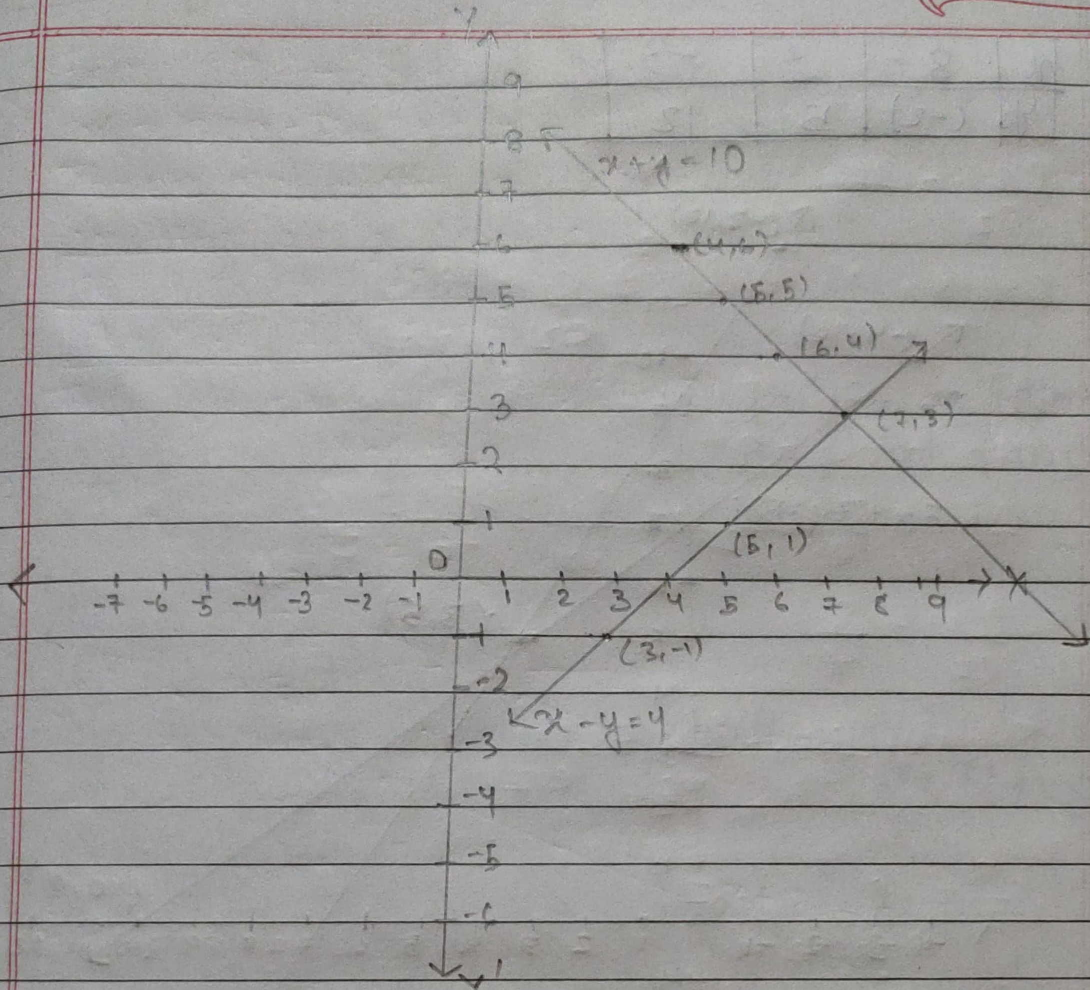
For, $x+y=10$,

$x = 10-y$

x	5	4	6
y	5	6	4

For, $x-y=6$

x	5	4	3
y	1	0	-1



Therefore, the no. of girls and boys in the class are 7 and 3 respectively.

(ii) Let the cost of 1 pencil be ₹ x and the cost of 1 pen be ₹ y.

A/Q

$5x + 7x = 50$

$7x + 5y = 46$

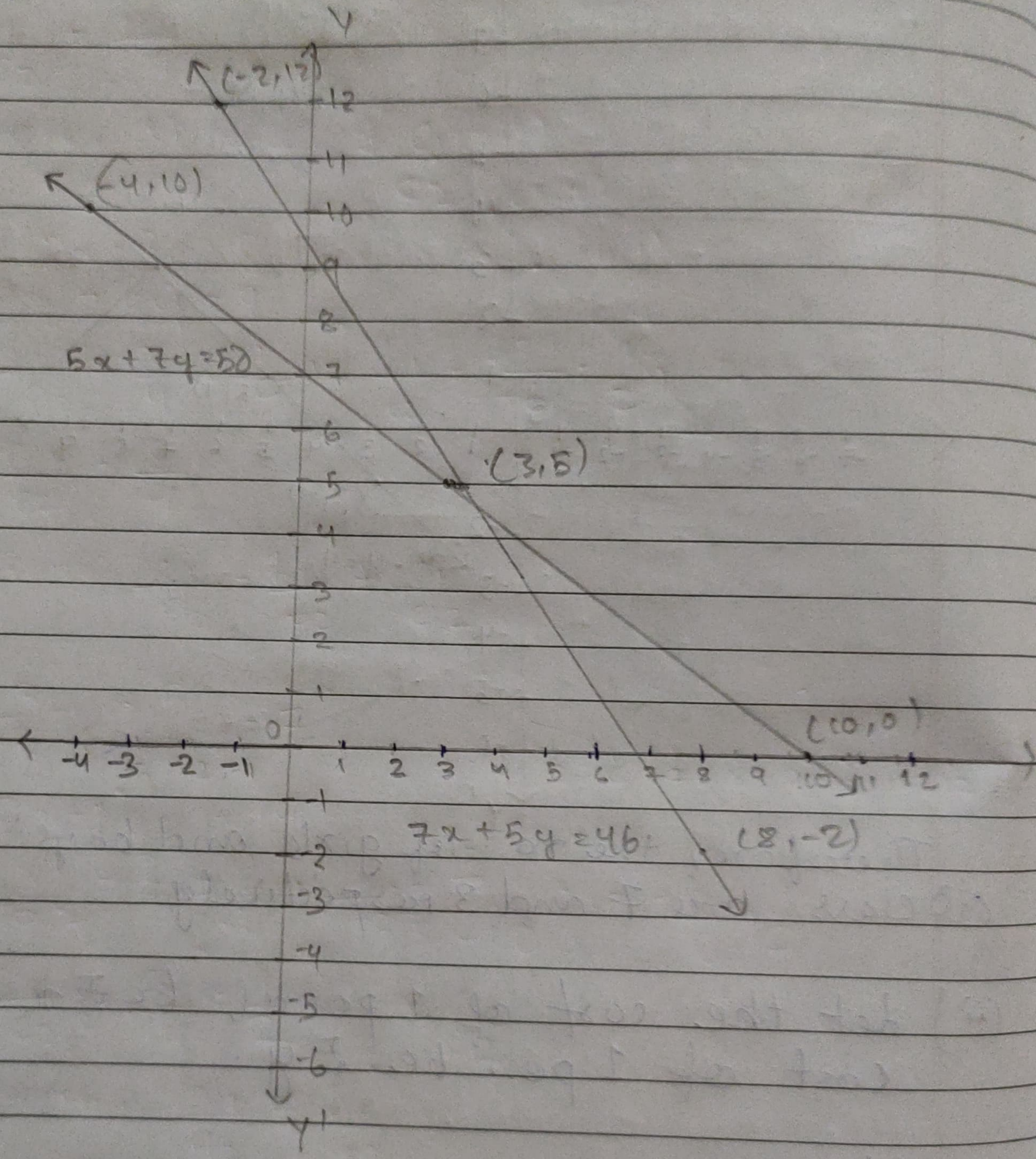
For $5x + 7y = 50$

$x = \frac{50 - 7y}{5}$

x	3	10	-4
y	5	0	10

$\Rightarrow 7x + 5y = 6 \quad \Rightarrow x = \frac{46 - 5y}{7}$

x	8	3	-3
y	(-2)	5	12



Therefore the cost of a pencil and a pen are ₹3 & ₹5 respectively.

(2) (i) $5x - 4y + 8 = 0$

$7x + 6y - 9 = 0$

Comparing these eq. with $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, we obtain

$a_1 = 5$, $b_1 = -4$, $c_1 = 8$

$\frac{a_1}{a_2} = \frac{5}{2}$; $\frac{b_1}{b_2} = \frac{-4}{6} = \frac{-2}{3}$

Since, $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

Hence, the lines representing the given pair of equations have ~~a~~ unique ~~a~~ solution and the pair of lines intersects at exactly one point.

(ii) $9x + 3y + 12 = 6$
$18x + 6y + 24 = 0$
comparing these eq. with $a_1x_1 + b_1y + c_1 = 0$
$a_2x + b_2y + c_2 = 0$

we obtain,

$a_1 = 9$, $b_1 = 3$, $c_1 = 12$
$a_2 = 18$, $b_2 = 6$, $c_2 = 24$

$\frac{a_1}{a_2} = \frac{9}{18} = \frac{1}{2}$

$\frac{b_1}{b_2} = \frac{3}{6} = \frac{1}{2}$

$\frac{c_1}{c_2} = \frac{12}{24} = \frac{1}{2}$

$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

(iii) $6x - 3y + 10 = 0$
$2x - y + 9 = 0$
$a_1 = 6$, $b_1 = (-3)$, $c_1 = 10$
$a_2 = 2$, $b_2 = (-1)$, $c_2 = 9$

$\frac{a_1}{a_2} = \frac{6}{2} = \frac{3}{1}$

$\frac{b_1}{b_2} = \frac{-3}{-1} = \frac{3}{1}$

$\frac{c_1}{c_2} = \frac{10}{9}$

since, $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

(5) (i) $2x - 3y = 8$

$4x - 6y = 9$

$\frac{a_1}{a_2} = \frac{2}{4} = \frac{1}{2}$, $\frac{b_1}{b_2} = \frac{-3}{-6} = \frac{1}{2}$,

$\frac{c_1}{c_2} = \frac{8}{9}$

Since, $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

(ii) $\frac{3}{2}x + \frac{5}{3}y = 7$

$9x - 10y = 14$

$\frac{a_1}{a_2} = \frac{2}{a} = \frac{1}{6}$, $\frac{b_1}{b_2} = \frac{\frac{5}{3}}{-10} = \frac{-1}{6}$,

$\frac{c_1}{c_2} = \frac{7}{14} = \frac{1}{2}$

since, $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

(v) $5x - 3y = 11$

$-10x + 6y = -22$

$\frac{a_1}{a_2} = \frac{5}{-10} = \frac{-1}{2}$, $\frac{b_1}{b_2} = \frac{-3}{6} = \frac{-1}{2}$,

$\frac{c_1}{c_2} = \frac{11}{-22} = \frac{-1}{2}$

Since, $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

(v) $\frac{4}{3}x + 2y = 8$

$\Rightarrow 2x + 3y = 12$

$\frac{a_1}{a_2} = \frac{3}{2} = \frac{2}{3}, \quad \frac{b_1}{b_2} = \frac{2}{3}, \quad \frac{c_1}{c_2} = \frac{8}{12} = \frac{2}{3}$

Since, $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

(4) (i) ~~$x + y = 5$~~

$x + y = 5$

$2x + 2y = 10$

$\frac{a_1}{a_2} = \frac{1}{2}, \quad \frac{b_1}{b_2} = \frac{1}{2}, \quad \frac{c_1}{c_2} = \frac{5}{10} = \frac{1}{2}$

Since, $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

Therefore, these linear equations are coincident pair of lines and thus have infinite nos of possible solutions. Hence, the pair of linear equations is consistent.

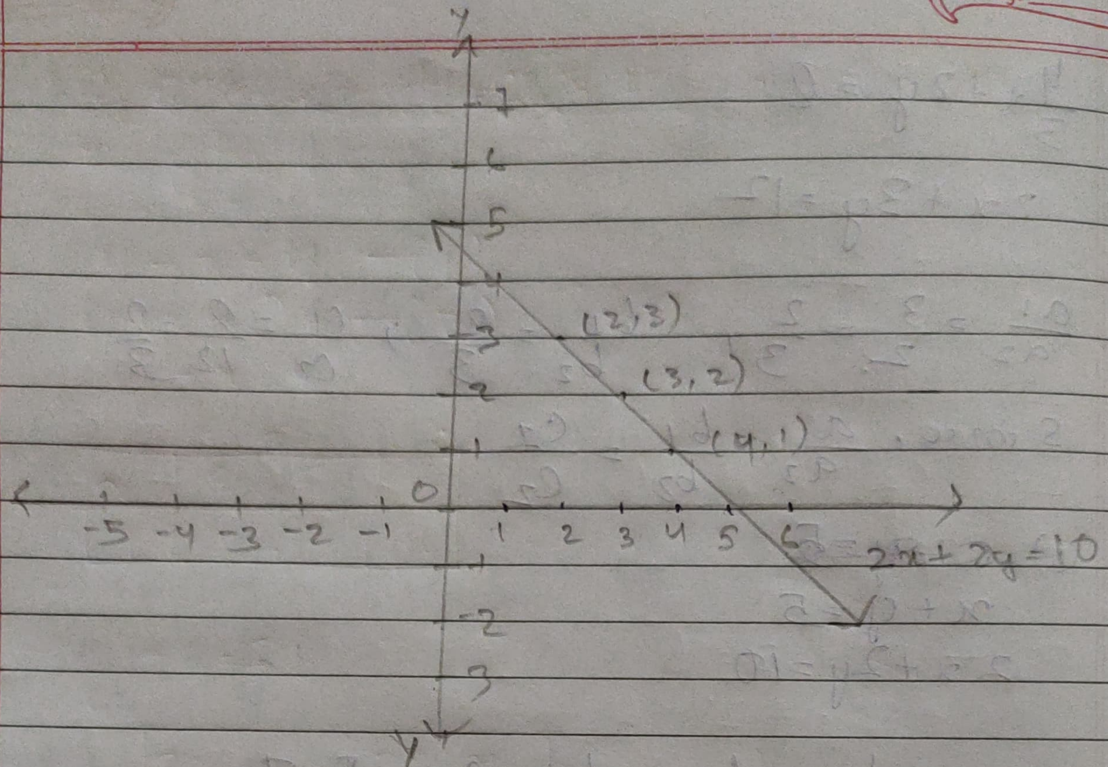
$x + y = 5, \quad x = 5 - y$

x	4	3	2
y	1	2	3

And, $2x + 2y = 10$

$x = \frac{10 - 2y}{2}$

x	4	3	2
y	1	2	3



Therefore, infinite solutions are possible for the given pair of equations.

(ii) $x - y = 8$

$3x - 3y = 16$

$\frac{a_1}{a_2} = \frac{1}{3}$, $\frac{b_1}{b_2} = \frac{1}{3}$, $\frac{c_1}{c_2} = \frac{8}{16} = \frac{1}{2}$

Since, $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

(iii) $2x + y - 6 = 0$

$4x - 2y - 4 = 0$

$\frac{a_1}{a_2} = \frac{2}{4} = \frac{1}{2}$, $\frac{c_1}{c_2} = \frac{-6}{-4} = \frac{3}{2}$

Since, $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

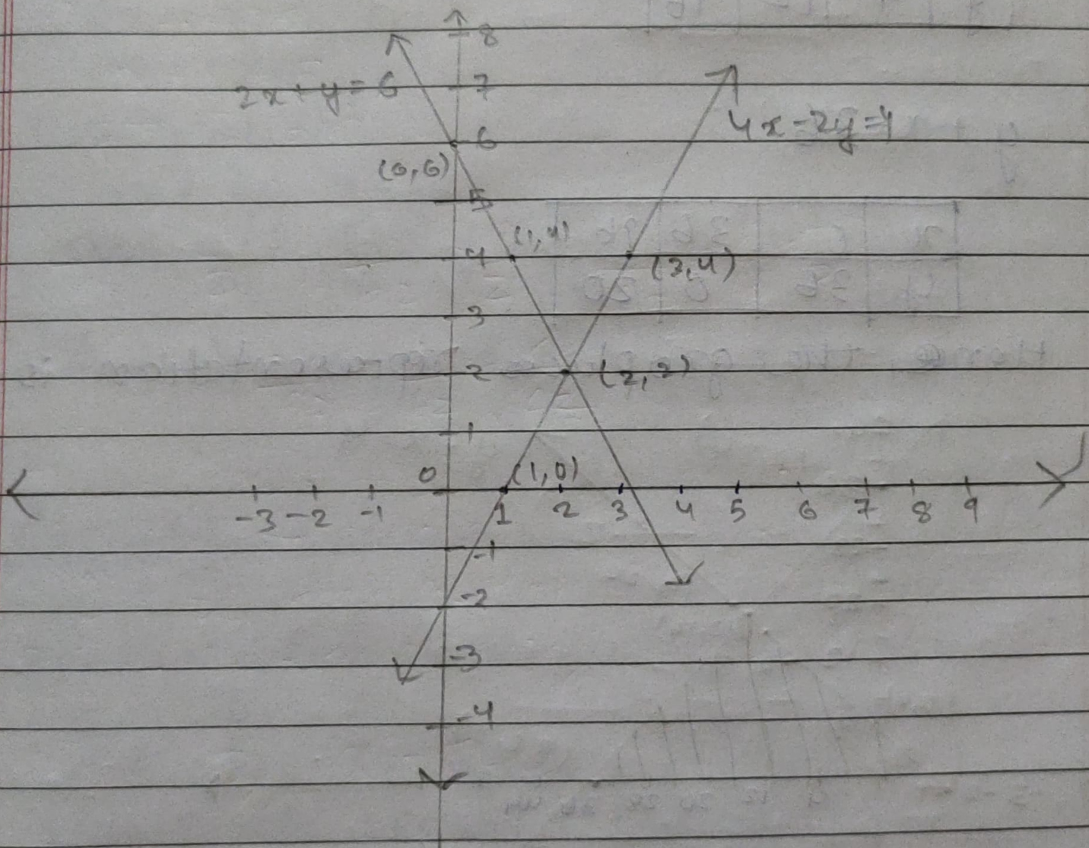
$2x + y - 6 = 0$, $y = 6 - 2x$

x	0	1	2
y	6	4	2

And, $4x - 2y - 4 = 0$

$$y = \frac{4x - 4}{2}$$

x	1	2	3
y	0	2	4



(2, 2)

(iv) $2x - 2y - 2 = 0$

$4x - 4y - 5 = 0$

$\frac{a_1}{a_2} = \frac{2}{4} = \frac{1}{2}$, $\frac{b_1}{b_2} = \frac{-2}{-4} = \frac{1}{2}$, $\frac{c_1}{c_2} = \frac{2}{5}$

Since, $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

Therefore these linear eq. are // to each other and thus have no possible solution. Hence, the pair of linear eq. is inconsistent.

5) Let the width of the garden be x and length be y.

$y - x = 4$ —(1)

$y + x = 36$ —(2)

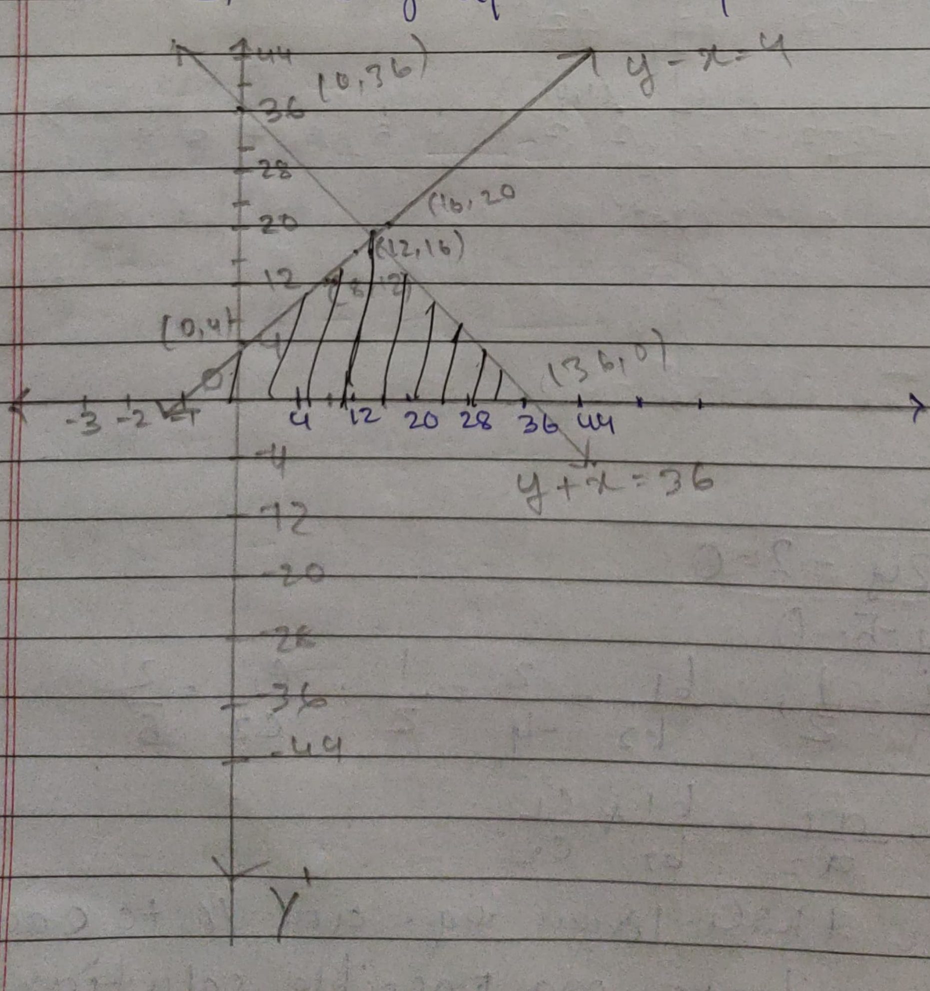
$y - x = 4$

x	0	8	12
y	4	12	16

$y + x = 36$

x	0	36	16
y	36	0	20

Hence, the graphical representation is as follows



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(6) (i) Intersecting lines -

$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

The second line

$2x+4y-6=0$ as $\frac{a_1}{a_2}=\frac{2}{2}=1,\ \frac{b_1}{b_2}=\frac{3}{4}$ & $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

(ii) Parallel lines -

$\frac{a_1}{a_2}=\frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

The second line

$4x+6y-8=0$

as $\frac{a_1}{a_2}=\frac{2}{4}=\frac{1}{2},\ \frac{b_1}{b_2}=\frac{3}{6}=\frac{1}{2},\ \frac{c_1}{c_2}=\frac{-8}{-8}=1$

allows And clearly, $\frac{a_1}{a_2}=\frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

(iii)

Coincident lines -

For coincident lines,

$\frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{c_1}{c_2}$

Hence, the second line can be

$6x+9y-24=0$

as $\frac{a_1}{a_2}=\frac{2}{6}=\frac{1}{3}$; $\frac{c_1}{c_2}=\frac{-8}{-24}=\frac{1}{3}$

And clearly, $\frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{c_1}{c_2}$

EXERCISE-3.3

(1)(i) $x + y = 14$ —(1)
$x - y = 4$ —(2)

From (1), we obtain $x = 14 - y$ (3)

Substituting this value in eq. (2), we obtain
$\Rightarrow (14 - y) - y = 4$
$\Rightarrow 14 - 2y = 4$
$\Rightarrow 10 = 2y$
$\Rightarrow y = 5$ —(4)

Substituting this in eq. (3), we obtain.
$x = 9$
$\therefore x = 9; y = 5$

(ii) $s - t = 3$ —(1)
$\frac{s}{3} + \frac{t}{2} = 6$ —(2)

From (1), we obtain
$s = t + 3$ —(3)
Substituting this value in eq. (2), we obtain
$\Rightarrow \frac{t + 3}{3} + \frac{t}{2} = 6$
$\Rightarrow 2t + 6 + 3t = 36$
$\Rightarrow 5t = 30$
$\Rightarrow t = 6$ —(4)
Substituting eq. (3), we obtain; $s = 9$

$\therefore s = 9, t = 6$

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(iii) $3x - y = 3 - (1)$
$9x - 3y = 9 - (2)$ from (1), we obtain
$y = 3x - 3 —— (3)$

Substituting this value in eq - (2),
$9x - 3(3x - 3 = 9$
$9x - 9x + 9 = 9$
$9 = 9$.

(iv) $0.2x + 0.3y = 1.3 —— (1)$
$\Rightarrow 0.4 + 0.5y = 2.3 —— (2)$
From eq. (1), we obtain
$x = \frac{1.3 - 0.3y}{0.2} —— (3)$

Substituting this value in eq. (2), we obtain
$\Rightarrow 0.4\left(\frac{1.3 - 0.3y}{0.2}\right) + 0.5y = 2.3$
$\Rightarrow 2.6 - 0.6y + 0.5y = 2.3$
$\Rightarrow 2.6 - 2.3 = 0.1y$
$\Rightarrow 0.3 = 0.1y$
$\Rightarrow y = 3 —— (4)$
Substituting this value in eq. (3), we obtain.

$x = \frac{1.3 - 0.3 \times 3}{0.2}$
$= \frac{1.3 - 0.9}{0.2} = \frac{0.4}{0.2} = 2$

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

(v) $\sqrt{2}x + \sqrt{3}y = 0$ —— (1)

$\sqrt{3}x - \sqrt{8}y = 0$ —— (2)

From eq. (1), we obtain

$x = -\frac{\sqrt{3}y}{\sqrt{2}}$ —— (3)

Substituting this value in eq. (2), we obtain

$\Rightarrow \sqrt{3}\left(-\frac{\sqrt{3}y}{\sqrt{2}}\right) - \sqrt{8}y = 0$

$\Rightarrow -\frac{3x}{\sqrt{2}} - 2\sqrt{2}y = 0$

$\Rightarrow y\left(\frac{-3}{2} - 2\sqrt{2}\right) = 0$

$\Rightarrow y = 0$ —— (4)

Substituting this value in eq. (3) we obtain

$x = 0$

$\therefore x = 0, y = 0$

(vi) $\frac{3}{2}x - \frac{5}{3}y = -2$ —— (1)

$\frac{x}{3} + \frac{y}{2} = \frac{13}{6}$ —— (2)

From eq. (1), we obtain

$\Rightarrow 9x - 10y = -12$

$\Rightarrow x = \frac{-12 + 10y}{9}$ —— (3)

Substituting this value in eq. (2), we obtain.

$$\Rightarrow \frac{-12+10y}{\frac{9}{3}} + \frac{y}{2} = \frac{13}{6}$$

$$\Rightarrow \frac{-12+10y}{27} + \frac{y}{2} = \frac{13}{6}$$

$$\Rightarrow \frac{-24+20y+27y}{54} = \frac{13}{6}$$

$\Rightarrow 47y = 117 + 24$

$\Rightarrow 47y = 141$

$\Rightarrow y = 3$ —— (4)

Substituting this value in eq. (3), we obtain

$$x = \frac{-12+10\times 3}{9} = \frac{18}{9} = 2$$

Hence, $x = 2, y = 3$

(2) $2x + 3y = 11$ —— (1)

$2x - 4y = -24$ —— (2)

From eq. (1), we obtain

$x = \frac{11-3y}{2}$ —— (3)

Substituting this value in eq. (2), we obtain

$$\Rightarrow 2\left(\frac{11-3y}{2}\right) - 4y = -24$$

$\Rightarrow 11 - 3y - 4y = -24$

$\Rightarrow 11 - 3y - 4y = -24$

$\Rightarrow -7y = -35$

$\Rightarrow y = 5$ —— (4)

Putting this value in eq. (3), we obtain

$$x = \frac{11 - 3 \times 5}{2} = \frac{-4}{2} = (-2)$$

Hence, $x = (-2)$, $y = 5$

Also,

$$y = mx + 3$$
$$5 = -2m + 3$$
$$-2m = 2$$
$$m = (-1)$$

(3) (i) Let the first no. be x and other no. be y such that $y > x$.

According to the given information,

$$y = 3x \text{ --- } (1)$$
$$y - x = 26 \text{ --- } (2)$$

$$3x - x = 26$$
$$x = 13 \text{ --- } (3)$$

Substituting, this in eq. (1), we obtain
$y = 39$.

Hence, the no.s are 13 and 39.

(ii) Let the larger angle be x and smaller angle be y.

$$x + y = 180° \text{ --- } (1)$$
$$x - y = 18° \text{ --- } (2)$$

from (1), we obtain $x = 180° - y$ --- (3)

Substituting the in eq. (2), we obtain,

$\Rightarrow 180° - y - y = 18°$
$\Rightarrow 162° = 2y$
$\Rightarrow 81° = y$ —— (4)

Putting this in eq. (3), we obtain x
~~$x = 180° - y - y = 18°$~~
$= 180° - 81°$
$= 99°$
Hence, the angles are 99° and 81°.

(xi) Let the cost of a bat and a ball be x & y respectively.

$7x + 6y = 3800$ —— (1)
$3x + 5y = 1750$ —— (2)

From (1), we obtain
$y = \frac{3800 - 7x}{6}$ —— (3)

$\Rightarrow 3x + 5\left(\frac{3800 - 7x}{6}\right) = 1750$

$\Rightarrow 3x + \frac{9500}{3} - \frac{35x}{6} = 1750$

$\Rightarrow 3x - \frac{35x}{6} = 1750 - \frac{9500}{3}$

$\Rightarrow \frac{18x - 35x}{6} = \frac{5250 - 9500}{3}$

$\Rightarrow \frac{-17x}{6} = \frac{-4250}{3}$

$\Rightarrow -17x = -8500$

$\Rightarrow x = 500$ —— (4)

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Substituting this in eq. (3), we obtain

$$y = \frac{3800 - 7 \times 500}{6}$$

$$= \frac{300}{6} = 50$$

(vi) Let the age of Jacob be x and the age of his son be y.

$(x+5) = 3(y+5)$
$x - 3y = 10$ — (1)

$(x-5) = 7(y-5)$
$x - 7y = -30$ — (2)

From (1), we obtain
$x = 3y + 10$ — (3)

Substituting this value in eq. (2), we obtain
$\Rightarrow 3y + 10 - 7y = -30$
$\Rightarrow -4y = -40$
$\Rightarrow y = 10$ — (4)
Substituting this value in eq. (3), we obtain

$x = 3 \times 10 + 10$
$= 40$

Hence, the present age of Jacob is 40 yrs whereas the present age of his son is 10 years.

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EXERCISE - 3.4

(1) (i) $x + y = 5$ — (i)
$2x - 3y = 4$ — (ii)
Multiplying eq.
$2(x + y) = 2 \times 5$
$= 2x + 2y = 10$ — (iii)

So, $2/x - 3y = 4$
$\Rightarrow \underset{(-)}{2x} + \underset{(-)}{2y} = \underset{(-)}{10}$

$\Rightarrow -5y = (-6)$

$\Rightarrow +5y = +6$
$\Rightarrow y = \frac{6}{5}$

Putting $y = \frac{6}{5}$ in (i)

$x + y = 5$
$\Rightarrow x + \frac{6}{5} = 5$

$\Rightarrow x = 5 - \frac{6}{5} \Rightarrow x = \frac{5 \times 5 - 6}{5}$

$\Rightarrow x = \frac{25 - 6}{5} = \frac{19}{5}$

(ii) $3x + 4y = 10$ — (i)
$2x - 2y = 2$ (ii)
We multiply eq. (ii) by 2

$2(2x - 2y) = 2 \times 2$
$\Rightarrow 4 - 4y = 4$
$\Rightarrow 2y = -2$
$\Rightarrow y = 1$
$x, y = 2, 1$

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(iii) $3x - 5y - 4 = 0$
$\Rightarrow 3x - 5y = 4$
Also,
$9x = 2y + 7$
$9x - 2y = 7$ — (ii)

Now we multiply first eq.

$\Rightarrow 3(3x - 2y) = 3 \times 4$
$\Rightarrow 9x - 15y = 12$ — (iii)
$\Rightarrow 13 = -5$
$y = \frac{-5}{13}$

Putting $y = \frac{-5}{13}$ in eq. (ii)
$\Rightarrow 9x - 2 \times \left(\frac{-5}{13}\right) = 7$
$\Rightarrow 9x = \frac{7 \times 13 - 10}{13}$
$\Rightarrow 9x = \frac{91 - 10}{13}$
$\Rightarrow 9x = \frac{81}{13}$
$\Rightarrow x = \frac{81}{13} \times \frac{1}{9}$
$\Rightarrow x = \frac{81}{13} \times \frac{1}{9} = \frac{9}{3}$
So, $x = \frac{9}{13}$ & $y = \frac{-5}{13}$

(2) (i) Let the fraction be x/y
$\frac{x+1}{y-1} = 1 \Rightarrow x - y = (-2)$ — (i)

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

Subtracting eq. (1) & (2), we obtain.

$\Rightarrow 3 - y = (-2)$

$\Rightarrow -y = -5$

$\Rightarrow y = 5$

Hence, the fraction is 3/5.

(ii) Let present age of Nuri $= x$ & Sonu be y

$(x-5) = 3(y-5)$

$x - 3y = -10$ — (1)

$(x+10)$ $(2(y+10)$

$x - 2y = 10$ — (2)

Substituting it in eq. (1), we obtain

$\Rightarrow x - 60 = -10$

$\Rightarrow x = 50$

Hence, age of Nuri = 50 yrs.

Ans, age of Sonu = 20 yrs.

(iii) Let the unit digit and tens digits of the no. be x and y respectively.

Then, no. $= 10y + x$

$x + y = 9$ — (1)

$9(10y + x) = 2(10x + y)$

$88y - 11x = 0$

$-x + 8y = 0$ — (2)

Adding eq. (1) and (2)

$9y = 9y$

$= 1$ (3)

Substituting the value in eq. (1), we obtain $x = 8$ (1)
Hence, the no. is $10y + x = 10 \times 1 + 8 = 18$

(iv) Let the no. of ₹50 notes and ₹100 notes be x and y respectively.

$x + y = 25$ — (1)
$50x + 100y = 2000$ — (2)

Multiplying eq. (1) by 50,

$50x + 50y = 1250$ — (3)

Subtracting eq. (3) form (2) $\Rightarrow 50y = 750$; $y = 15$
Substituting eq. (1)
we have $x = 10$

Hence, Meena has 10 notes of ₹50 & 15 notes of ₹100.

(v) Let the fixed charge for first three days and each day charge thereafter be ₹x and ₹y respectively.

$x + 4y = 27$ — (i)
$x + 2y = 21$ — (ii)

Subtracting eq. (2) form (1), we obtain

$2y = 6$
$y = 3$ — (3)

Substituting in eq. (1), we obtain

$\Rightarrow x + 12 = 27$
$\Rightarrow x = 15$

Hence, fixed charge = ₹15
charge per day = ₹3

EXERCISE - 3.6

(1) (i) $\frac{1}{2x} + \frac{1}{3y} = 2$ —(i)

$\frac{1}{3x} + \frac{1}{2y} = \frac{13}{6}$ —(ii)

Let $\frac{1}{x} = u$, $\frac{1}{y} = v$

So, $\frac{1}{2}u + \frac{1}{3}v = 2$

$= \frac{3u}{2} + \frac{2v}{3} = 2$

$= 3u + 2v = 12$ —(iii)

$\frac{1}{3}u + \frac{1}{2}v = \frac{13}{6}$

$= \frac{2u + 3v}{2 \times 3} = \frac{13}{6}$

$= 2v + 3u = 13$ —(iv)

Our eq. aries

$3u + 2v = 12$ —(iii)

$2v + 3v = 13$ —(iv)

From eq. (ii)

$3u + 2v = 12$

Putting value of u in (iv)

$2u + 3u = 13$

$\Rightarrow 2\left(\frac{12 - 2v}{3}\right) + 3u = 13$

Multiplying both side

$3 \times 2\left(\frac{12 - 2v}{3}\right) + 3 \times 3u = 3 \times 13$

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Multiplying both side

$3 \times 2\left(\frac{12 - 2v}{3}\right) + 3 \times 3v = 3 \times 13$

$\Rightarrow 3u = 15$

$\Rightarrow u = 3$

Putting $u = 3$, in (iii)

$3u + 2v = 12$

$\Rightarrow 3u + 2(3) = 12$

$\Rightarrow 3u + 2(3) = 12$

$\Rightarrow 3u + 6 = 12$

$\Rightarrow 3u = 12 - 6$

$\Rightarrow 3u = 6$

$\Rightarrow u = 2$

$\therefore u = 3, \; v = 2$

(ii) $\frac{2}{\sqrt{x}} + \frac{3}{\sqrt{y}} = 2$ — (i)

$\frac{4}{\sqrt{x}} - \frac{9}{\sqrt{y}} = -1$ — (ii)

$2u + 3v = 2$ — (iii)

$4u - 9v = -1$ — (iv)

Our equations,

$2u + 3v = 2$ ~~(iii)~~

$\Rightarrow u = \frac{2 - 3v}{2}$

Putting value

$4u - 9v = -1$

$\Rightarrow u\left(\frac{7-3u}{2}\right) = 9v$

$\Rightarrow 2(2-3v) - 9u = -1$

$\Rightarrow 4 - 6u - 9u = (-1)$

$\Rightarrow -6u - 9u = -1 - 4$

$\Rightarrow u = \frac{-3}{-15} = \frac{1}{3}$

Hence $u = \frac{1}{2}$ and $v = \frac{1}{3}$

$u = \frac{1}{\sqrt{x}}$

$\frac{1}{2} = \frac{1}{\sqrt{x}}$

$\Rightarrow \sqrt{x} = 2$

$\Rightarrow (\sqrt{x})^2 = (2)^2$

$\Rightarrow x = 4$

$v = \frac{1}{\sqrt{5}}$

$\frac{1}{3} = \frac{1}{\sqrt{y}}$

$\Rightarrow \sqrt{y} = 3$

$\Rightarrow \sqrt{(y)}^2 = (3)^2$

$\Rightarrow y = 9$