3. PAIR OF LINEAR EQ IN TWO VARIABLES

EXERCISE : 3.1

1 Let cunnent age of Afab be x yean

Let cunnent age of Aftab be y yean

So Age of Aftab $= x - 7$

Age of Aftab's daughten $= y - 7$

Aftab was seven times as old as Aftab's daughten.

$$(x - 7) = 7(y - 7)$$

$$\Rightarrow (x - 7) = 7y - 49$$

$$\Rightarrow x - 7 = 7y - 49$$

$$\Rightarrow x - 7y = -49 + 7$$

$$\Rightarrow x - 7y = -42$$

x	0	7	~~[illegible]~~ -7
y	6	7	~~[illegible]~~ 5

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Aftab will be 3 times as Aftab's daughter.

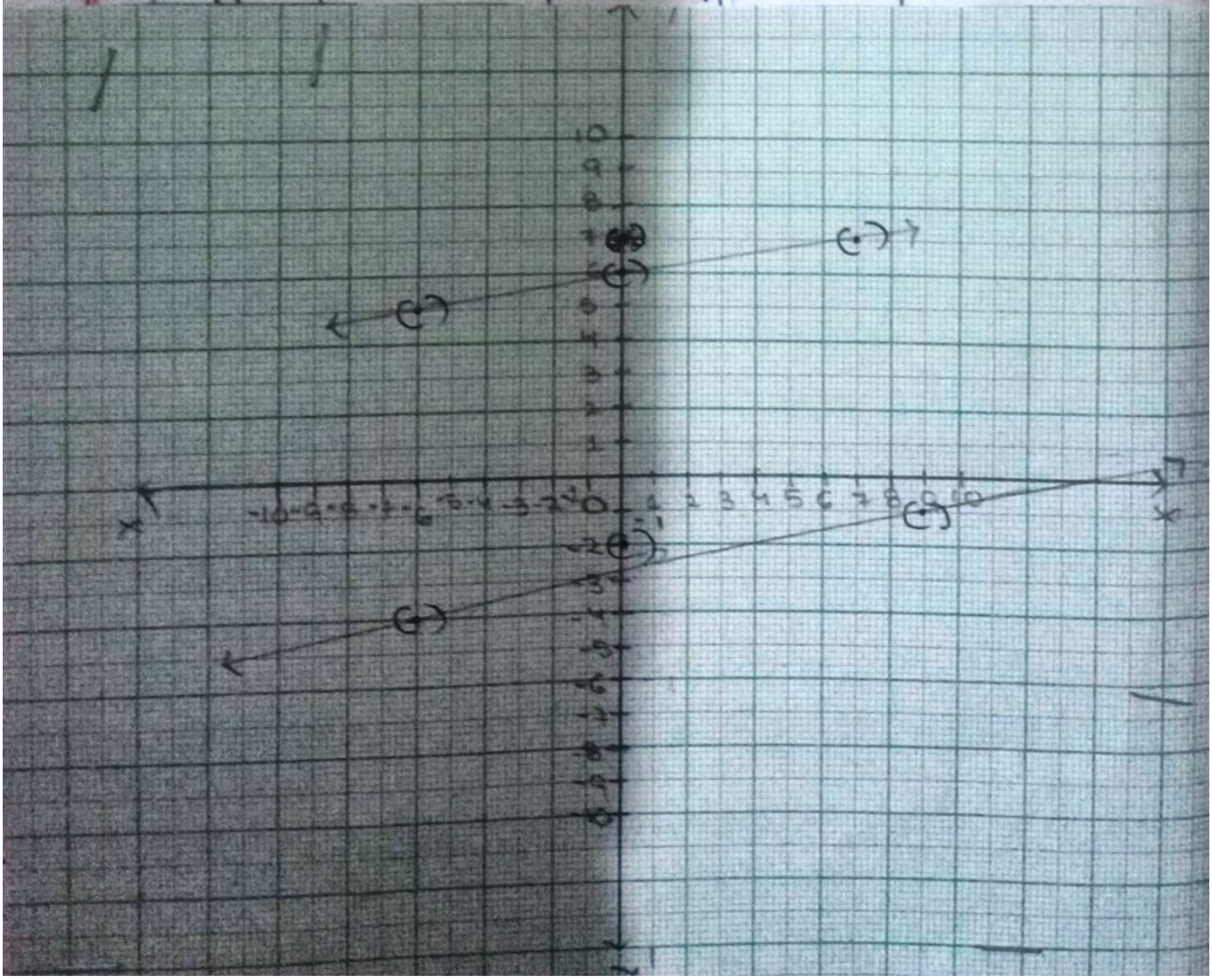
$$(x + 3) = 3(y + 3)$$

$$\Rightarrow x + 3 = 3y + 9$$

$$\Rightarrow x - 3y = 9 - 3$$

$$\Rightarrow x - 3y = 6$$

x	0	9	-6
y	-2	-1	-4



2. cost of one bat be = ₹ x

Let cost of one ball be = ₹ y

Given that,

3 bats and 6 balls cost ₹ 3900

$3x + 6y = 3900$

$= 3(x + 2y) = 3 \times 1300$

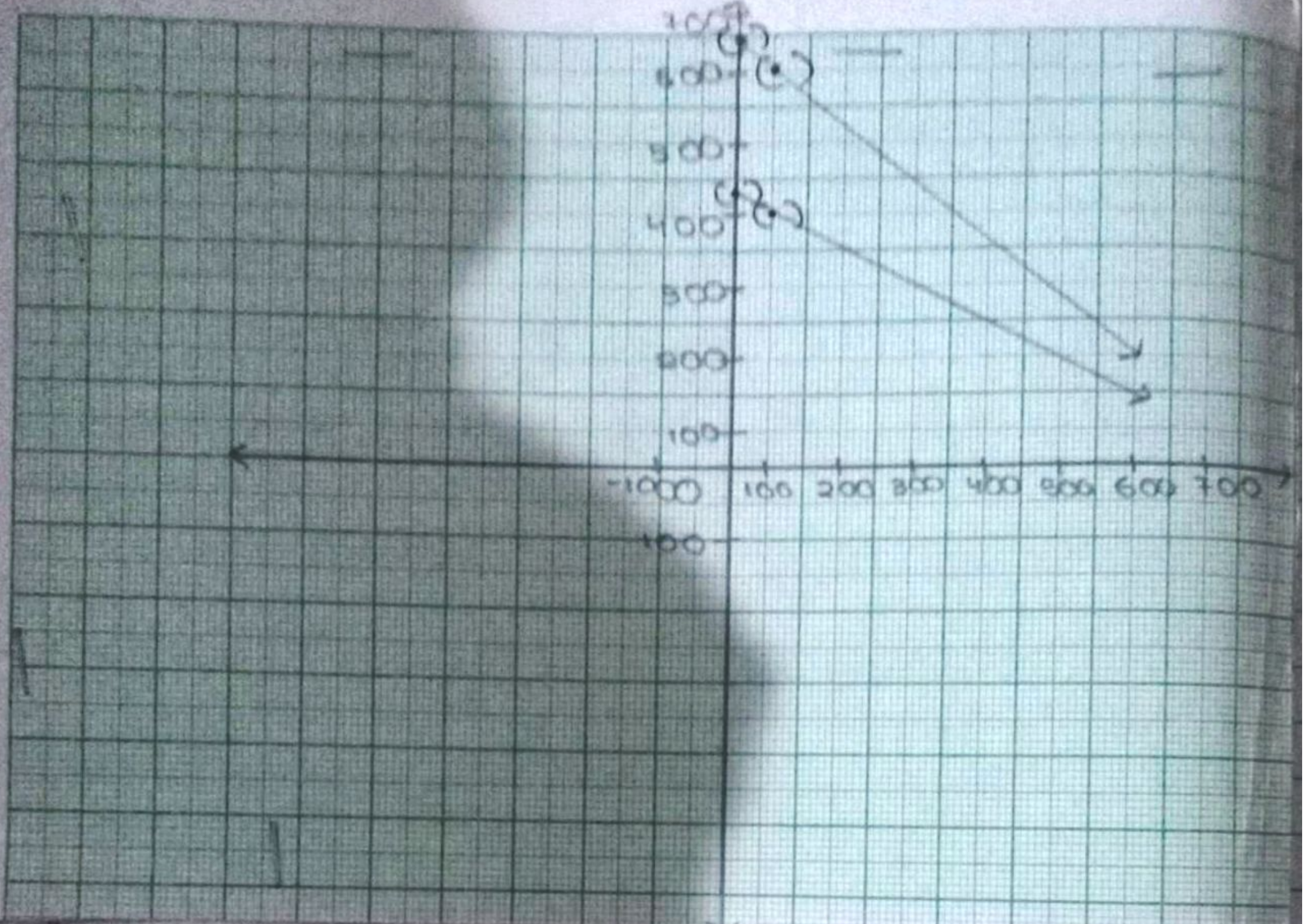
$= x + 2y = 1300$ (i)

cost of one bat + 3 × cost of one ball = 1300

$= x + 3y = 1300$ (ii)

x	0	100	~~x~~
y	650	600	~~x~~

x	0	100	~~x~~
y	433.33	400	~~x~~



3 Let cost of apples per kg = ₹x

cost of grapes per kg = ₹y

Given

2 × cost / kg of apples + 1 × cost / kg of grapes

$2x + y = 160$ (1)

x	50	60
y	50	40

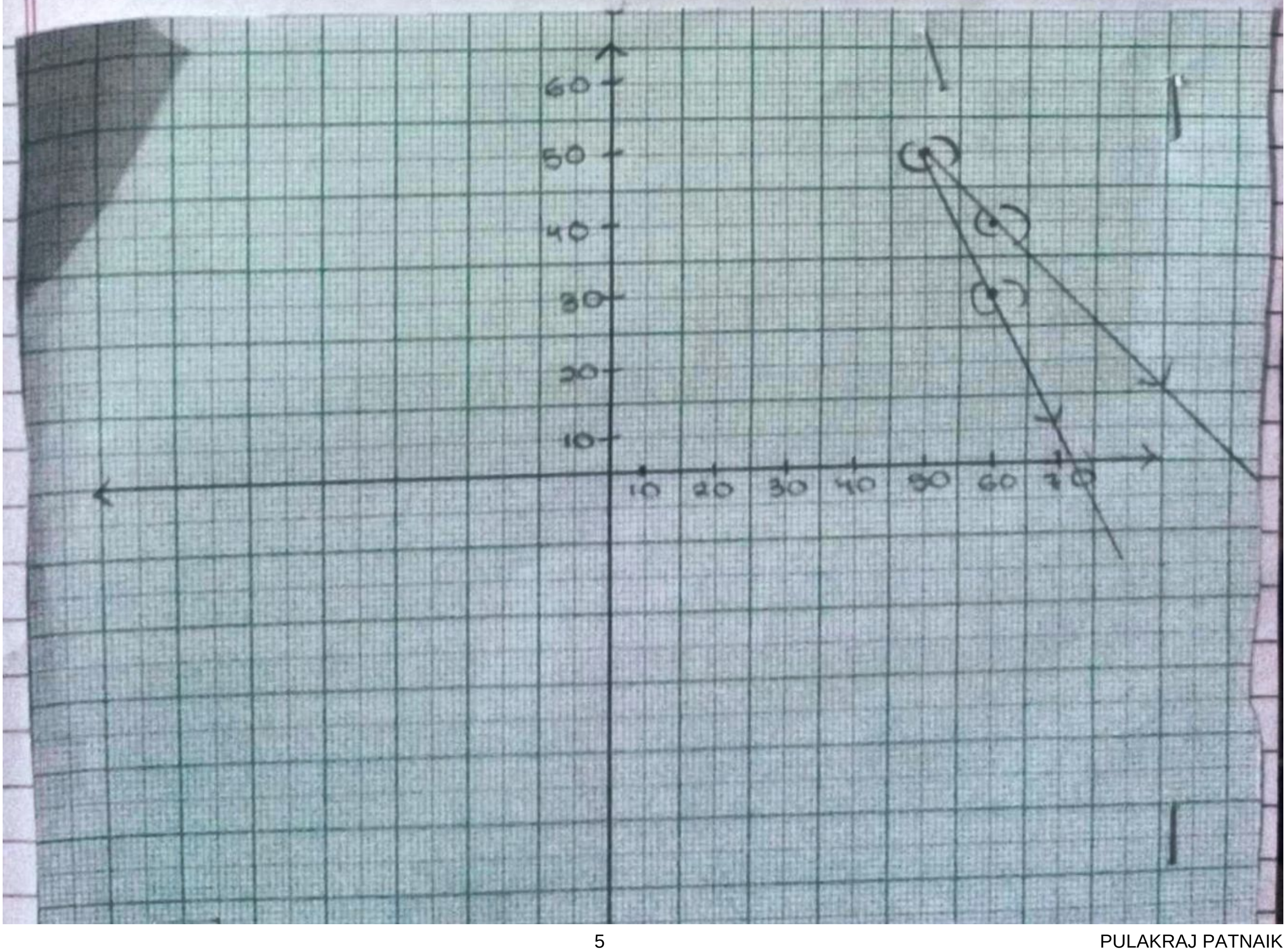
Also,

$4x + 2y = 300$

$\Rightarrow 2(2x + y) = 2 \times 150$

$\Rightarrow 2x + y = 150$ (ii)

x	50	60
y	50	30



1(i) Let the no. of girls who took in quiz be x.
and
No. of Boys who took part in quiz be y.

Given,
Total 10 student took part in th

∴ No of girls + No. of boy = 10

$x + y = 10$ (i)

Also, No. of girls is 4 more than

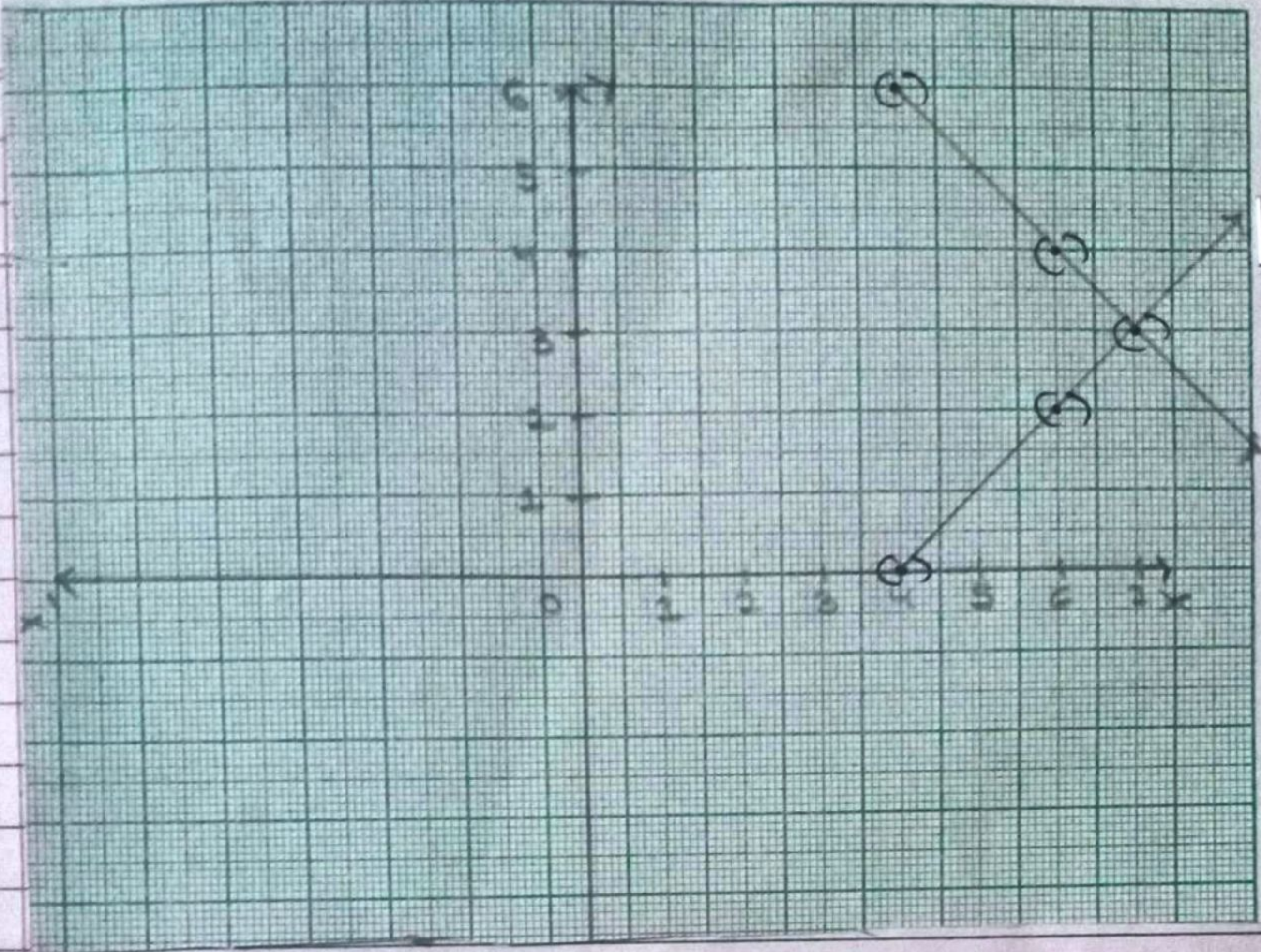
$x = 4 + y$
$= x - y = 4$ (ii)

$x + y = 10$

x	4	6
y	6	4

$x - y = 4$

x	4	6
y	0	2



(ii) Let the cost one pencil be : ₹ x.

Cost of one pencil be ₹ y.

Given

5 (cost of pencil) + 7 (cost of pen) = 50

$= 5x + 7y = 50$ (i)

Also

7 (cost of pencil) + 5 (cost of pen) = 46

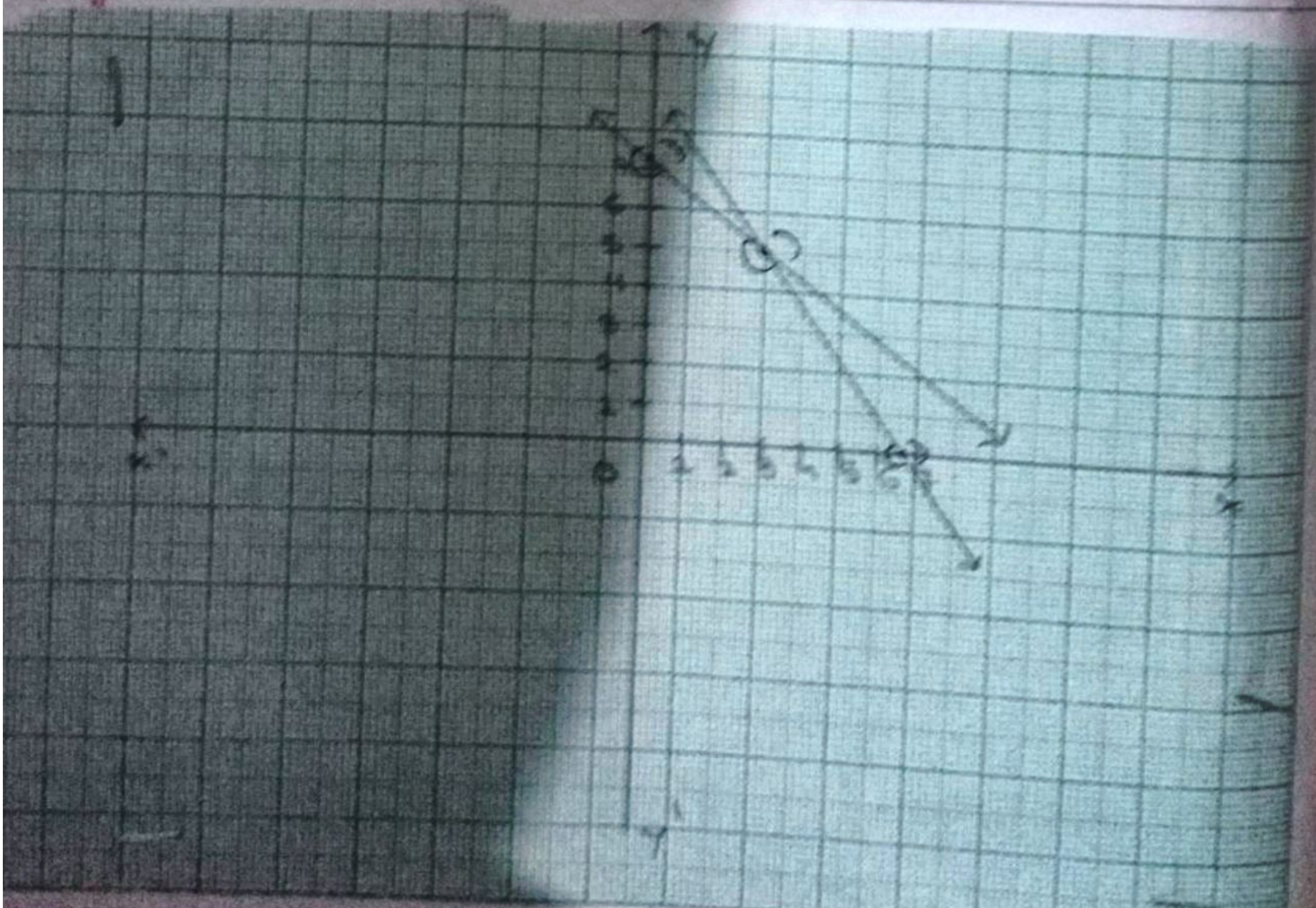
$= 7x + 5y = 46$ (ii)

$5x + 7x = 50$

x	3	0
y	5	7.14

$7x + 5y = 46$

x	6.57	3
y	0	5



2. (i) $5x - 4y + 8 = 0$ | $7x + 6y - 9 = 0$

$a_1 = 5 \quad b_1 = -4 \quad c_1 = 8$ | $a_2 = 7, \; b_2 = 6, \; c_2 = -9$

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

$= \frac{5}{7}, \frac{-4}{6} = \frac{-2}{3}, \frac{-8}{9}$

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

So the linear equations intersect.

(ii) $9x + 3y + 12 = 0$ | $18x + 6y + 24 = 0$

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

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

$= \cancel{\frac{9}{18}} \frac{1}{2}, \cancel{\frac{3}{6}} \frac{1}{2}, \cancel{\frac{12}{24}} \frac{1}{2}$

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

So linear equations are coincident.

(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

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

$$= \frac{6}{2}, \frac{+3}{+1}, \frac{10}{9}$$

$$= \frac{3}{1}, \frac{3}{1}, \frac{10}{9}$$

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

so the linear equation are parallel.

3 $3x + 2y - 5 = 0$ (i)

$2x - 3y - 7 = 0$ (ii)

$3x + 2y - 5 = 0$ | $2x - 3y - 7 = 0$

$a_1 = 3$, $b_1 = 2$, $c_1 = -5$ | $a_2 = 2$, $b_2 = -3$, $c_2 = -7$

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

$$= \frac{3}{2}, \frac{-2}{3}, \frac{+5}{+7} = \frac{5}{7}$$

since $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ a unique solution.

(ii) $2x - 3y - 8 = 0$ | $4x - 6y - 9 = 0$

$= a_1 = 2, b_1 = -3, c = -8$ | $a_2 = 4, b_2 = -6, c_2 = -9$

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

$= \frac{\cancel{2}}{\cancel{4}}\frac{1}{2}, \frac{-3}{-6_2} = \frac{1}{2}, \frac{-8}{-9}$

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

So this have no solution.

(iii) $\frac{3}{2}x + \frac{5}{3}y - 7 = 0$ (i)

$9x - 10y - 14 = 0$ (ii)

$\frac{3}{2}x + \frac{5}{3}y - 7 = 0$ | $9x - 10y - 14 = 0$

$= a_1 = \frac{3}{2}$ $b_1 = \frac{5}{3}$ $c_1 = -7$ | $= a_2 = 9$ $b_2 = -10$ $c_2 = -14$

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

$= \frac{3}{3 \times 9}, \frac{5}{3 \times 10}, \frac{-7}{-14_2}$

$= \frac{1}{6}, \frac{-1}{6}, \frac{1}{2}$

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

So it is a unique solution.

(iv) $5x - 3y - 11 = 0$ | $-10x + 6y + 22 = 0$

$a_1 = 5 \quad b_1 = -3 \quad c_1 = -11$ | $a_2 = -10 \quad b_2 = 6 \quad c_2 = 22$

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

$$= \frac{-5}{10}, \frac{-3}{6}, \frac{-11}{22}$$

$$= \frac{-1}{2}, -\frac{1}{2}, \frac{-1}{2}$$

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

it is infinity many solution.

4(i) $x + y = 5$

$= x + y - 5 = 0$ | $2x + 2y = 10$

$= a_1 = 1, b_1 = 1, c_1 = -5$ | $a_2 = 2, b_2 = 2, c_2 = -10$

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

$$= \frac{1}{2}, \frac{1}{2}, \frac{\cancel{+5}}{\cancel{+10}} = \frac{1}{2}$$

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

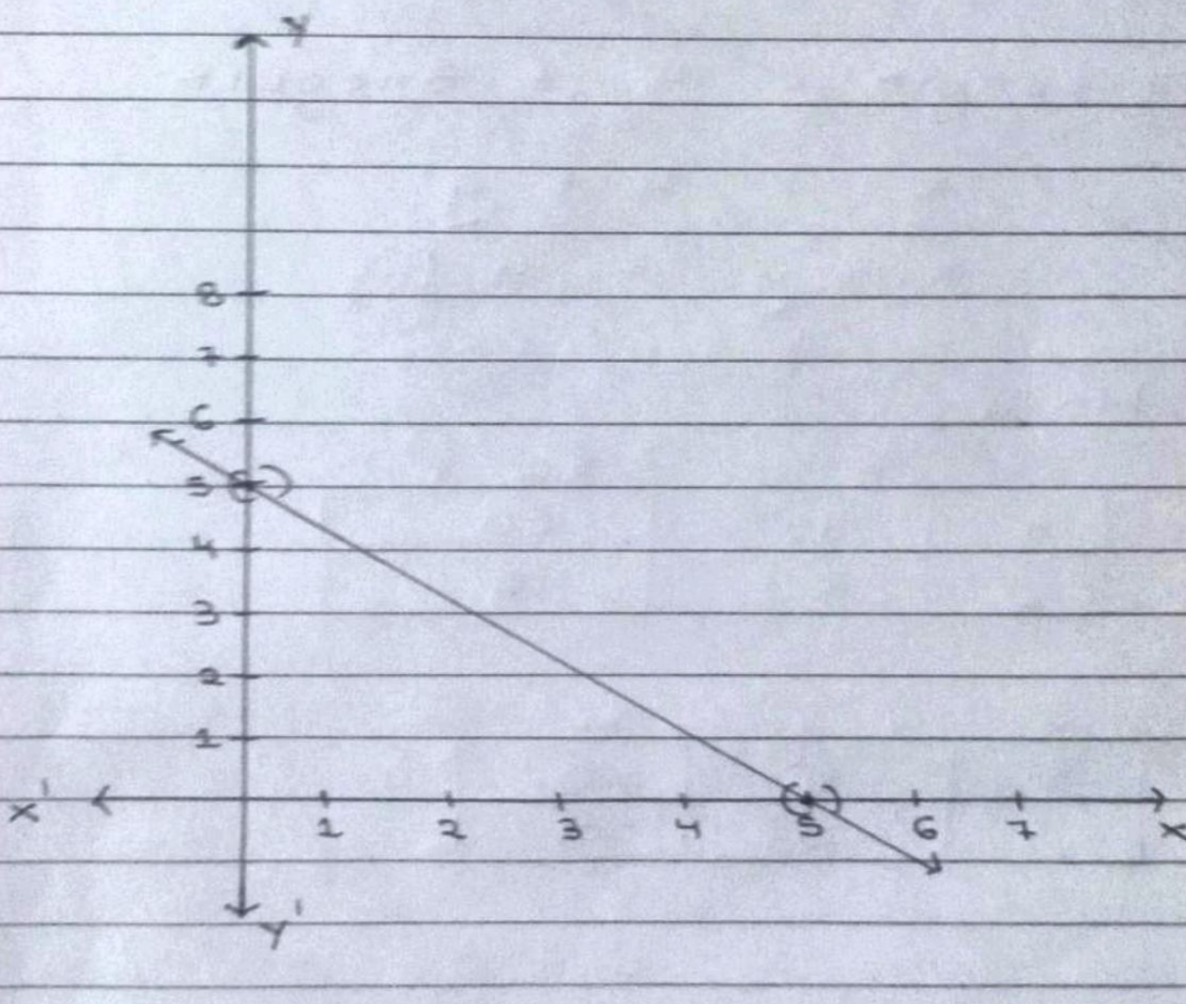
so it have infinity many solutions.

$x + y = 5$

x	0	5
y	5	0

$2x + 2y = 10$

x	0	5
y	5	0



5 Let Length of rectangular garden be $= x$ yrd.

Let Breadth of ▭ garden $= y$ yrd.

Given,

Half perimeter of ▭ garden is 36

$$\frac{1}{2} \times 2(\text{Length} + \text{Breadth}) = 36$$

$$= x + y = 36 \quad (i)$$

Also,

$$\text{Length} = 4 + \text{Breadth}$$

$$x = 4 + y$$

$$x - y = 4 \quad (ii)$$

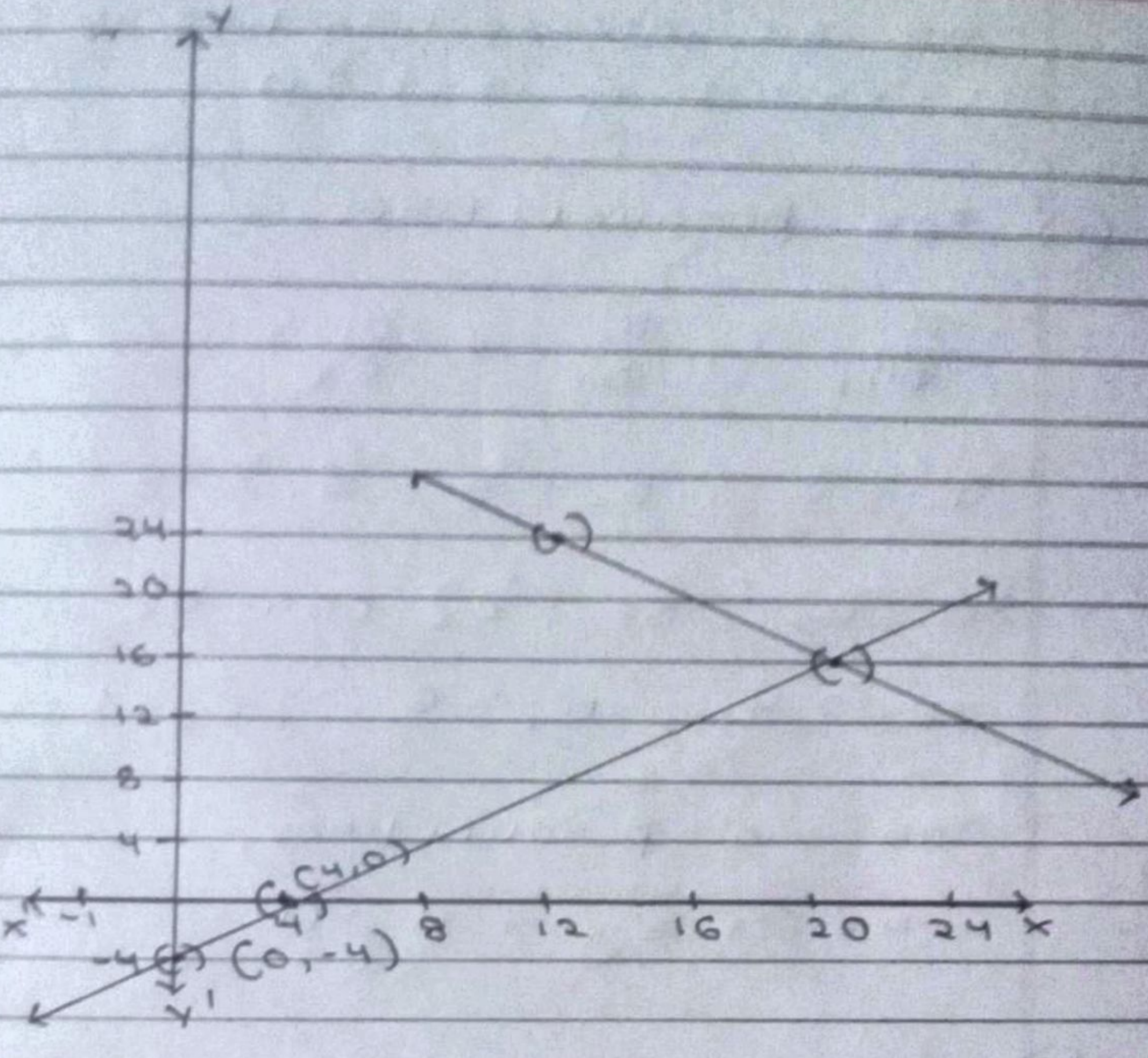
Now,

$$x + y = 36$$

x	12	20
y	24	16

$$x - y = 4$$

x	4	0
y	0	-4



So l of garden $= x = 20cm$

b of garden $= y = 16cm$

6 $2x + 3y - 8 = 0$

$a_1 = 2$, $b_1 = 3$, $c_1 = -8$

(i) For intersecting

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

So a_2, b_2, c_2 can be -

$a_2 = 1$, $b_2 = 1$, $c_2 = 1$

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So an intersecting line is -

$x + y + 1 = 0$

(ii) For parallel lines

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

$a_1 = 2$ $b_1 = 3$ $c_1 = -8$

So a_2, b_2, c_2 can be

$a_2 = 4$, $b_2 = 6$, $c_2 = 1$

Thus a parallel lines,

$4x + 6y + 1 = 0$

(iii) For coincident lines

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

$a_1 = 2$ $b_1 = 3$ $c_1 = -8$

So a_2, b_2, c_2 can be

$a_2 = 4$ $b_2 = 6$ $c_2 = -16$

1. $x - y = -1$ (i)

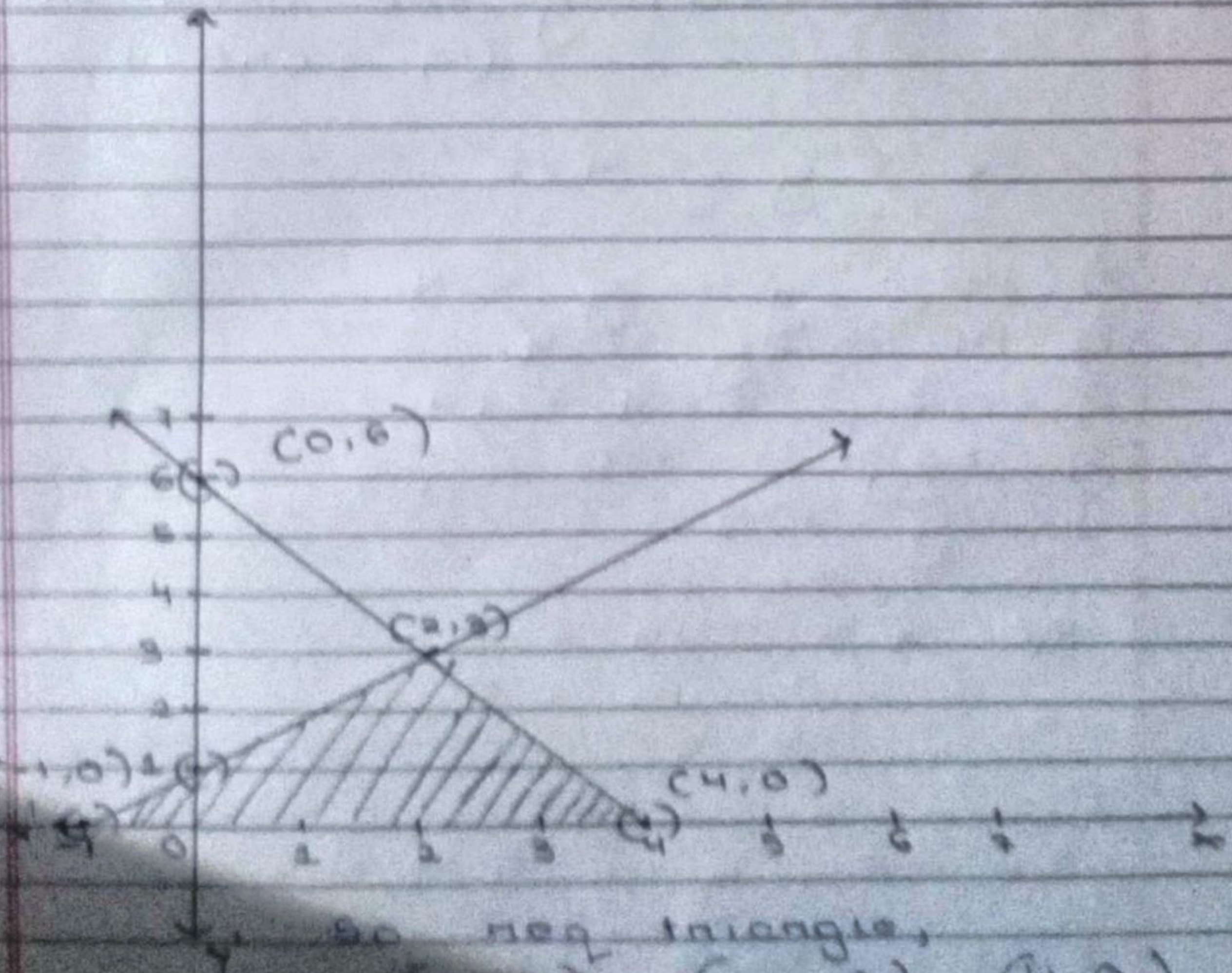
$3x + 2y = 12$ (ii)

$x - y = -1$

x	0	-1
y	1	0

$3x + 2y = 12$

x	0	4
y	6	0



So req triangle,
(2,3), (-1,0), (4,0)

EXERCISE 3.3 :

1 (i) $x + y = 14$

$x - y = 4$

$x + y = 14$ (i)

$x - y = 4$ (ii)

From eq (i)

$x + y = 14$

$\Rightarrow x = 14 - y$

So substituting the value from (i) and (ii)

$x - y = 4$

$\Rightarrow 14 - y - y = 4$

$\Rightarrow 14 - 2y = 4$

$\Rightarrow -2y = 4 - 14$

$\Rightarrow +2y = +10$

$\Rightarrow y = 5$

So $x = 14 - y$

$= 14 - 5$

$= 9$

So $x, y = 9, 5$

2. $2x + 3y = 11$

$\Rightarrow x = \dfrac{11 - 3y}{2}$ (i)

$2x - 4y = -24$ (ii)

Substituting the value from (i) and (ii)

So $2x - 4y = -24$

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

$\Rightarrow \dfrac{22 - 6y}{2} - 4y = -24$

$\Rightarrow \dfrac{22 - 6y - 8y}{2} = -24$

$\Rightarrow 22 - 14y = -48$

$\Rightarrow -14y = -48 - 22$

$\Rightarrow +14y = +70$

$\Rightarrow y = \dfrac{70}{14}$

$\Rightarrow y = 5$

$y = 5$ putting in (i)

$2x + 3y = 11$

$x = \dfrac{11 - 15}{2} = \dfrac{-4}{2} = -2$

$3 = m(-2) + 3$

$= m = \dfrac{2}{-2} = -1$

9(i) Let larger no. be x
Let breadth no. be y

Given that
diff bet two no = 26

$x - y = 26$ (i)

Also one no. is 3 times other

$x = 3y$ (ii)

Putting (ii) in (i)

$x - y = 26$

$= (3y) - y = 26$

$\Rightarrow 2y = 26$

$\Rightarrow y = 13$

Putting $y = 13$ in (ii)

$x = 3y$

$\Rightarrow x = 3(13$

$\Rightarrow x = 39$

Hence $x = 39$ and $y = 13$ is solution

So numbers are 39 and 13

(i) Let larger angle be x

and smaller angle be x

Given that

Larger angle exceed smaller angle by 18°

$x - y = 18$ (i)

sum of both angles = 180

$x + y = 180$ (ii)

Thus, our eq

$x - y = 18$ (i)

$x + y = 180$

substituting x in (ii)

$x + y = 180$

$(18 + y) + y = 180$

$18 + y + y = 180$

$18 + 2y = 180$

$y = 81$

Putting $y = 81$

$x - y = 18$

$\Rightarrow x - 81 = 18$

$\Rightarrow x = \cancel{18}\ 99$

Hence $x = 99$ and $y = 81$

Larger angle $= x = 99^\circ$

Smaller angle $= y = 81^\circ$

(iii) Let cost of one bat $=$ ₹ x

Cost of one ball $=$ ₹ y

Given that

$7(x) + 6(y) = 3800$ (i)

$3(x) + 5(y) = 1750$ (ii)

Thus our eq.

$7x + 6y = 3800$ (i)

$3x + 5y = 1750$ (ii)

From (i)

$7x + 6y = 3800$

$\Rightarrow 7x = 3800 - 6y$

$\Rightarrow x = \left(\frac{3800 - 6y}{7}\right)$

Putting x in (ii)

$3x + 5y = 1750$

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

Multiplying both side,

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

$\Rightarrow \cancel{3(3800 - 6y) + 35y = 12250}$

$\Rightarrow 11400 - 18y + 35y = 12250$

$\Rightarrow -18y + 35y = 12250 - 11400$

$\Rightarrow 17y = 850$

$\Rightarrow y = \frac{850}{17}$

$\Rightarrow y = 50$

Putting $y = 50$ in (1)

$7x + 6y = 3800$

$\Rightarrow 7x + 6(50) = 3800$

$\Rightarrow 7x + 300 = 3800$

$\Rightarrow 7x = 3800 - 300$

$\Rightarrow 7x = 3500$

$\Rightarrow x = 500$

$x, y = 500, 50.$

(c) Let numerator be x

and denominator be y.

So fraction is $\frac{x}{y}$

Given that

$$\frac{\text{Numerator} + 2}{\text{Denominator} + 2} = \frac{9}{11}$$

$$\frac{x + 2}{y + 2} = \frac{9}{11}$$

$\Rightarrow 11(x + 2) = 9(y + 2)$

$\Rightarrow 11x + 22 = 9y + 2$

$\Rightarrow 11x - 9y = 18 - 22$

$\Rightarrow 11x - 9y = 4 \quad (1)$

Also,

$$\frac{\text{Numerator} + 3}{\text{Denominator} + 3} = \frac{5}{6}$$

$$\Rightarrow \frac{x + 3}{y + 3} = \frac{5}{6}$$

$\Rightarrow 6(x + 3) = 5(y + 3)$

$\Rightarrow 6x + 18 = 5y + 15$

$\Rightarrow 6x - 5y = 15 - 18$

$\Rightarrow 6x - 5y = -3$

From (1)

$11x - 9y = -4$

$11x = 9y - 4$

Putting $y = 9$ in (1)

$11x - 9y = -4$

$\Rightarrow 11x - 9(9) = -4$

$\Rightarrow 11x - 81 = -4$

$\Rightarrow x = 7$

EXERCISE 3.4

1 $x + y = 5$ (i)

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

Multiplying eq

$2(x + y) = 2 \times 5$

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

so $\cancel{2x} - 3y = 4$

$\underline{\ominus\cancel{2x} \; {}_{\ominus}^{+} 2y = {}_{\ominus}10}$

$-5y = -6$

$\Rightarrow +5y = +6$

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

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

$x + y = 5$

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

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

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

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

$\Rightarrow x = \frac{19}{5}$

(ii) $3x + 4y = 10$ (i)

$2x - 2y = 2$ (ii)

we multiply eq (ii) by 2

$2(2x - 2y) = 2 \times 2$

$\Rightarrow 4x - 4y = 4$

$\Rightarrow -2y = 2 - 4$

$\Rightarrow -2y = -2$

$\Rightarrow y = \frac{+2}{+2}$

$\Rightarrow y = 1$

$x, y = 2, 1$

(iii) $3x - 5y - 4 = 0$

$\Rightarrow 3x - 5y = 4$

Also,

$9x = 2y + 7$

$9x - 2y = 7$ (ii)

Now, we multiply first eq.

$3(3x - 5y) = 3 \times 4$

$\Rightarrow 9x - 15y = 12$ (iii)

$$\cancel{9x} - 2y = 7$$

$$\underset{(-)}{\cancel{9x}} \; \underset{(+)}{15y} = \underset{(-)}{12}$$

$$13y = -5$$

$$13y = -5$$

$$y = \frac{-5}{13}$$

Putting $y = \frac{-5}{13}$ in eq (ii)

$$9x - 2y = 7$$

$$\Rightarrow 9x - 2 \times \left(\frac{-5}{13}\right) = 7$$

$$\Rightarrow 9x = \frac{7 \times 13 - 10}{13}$$

$$\Rightarrow 9x = \frac{91 - 10}{13}$$

$$\Rightarrow 9x = \frac{81}{13}$$

$$\Rightarrow x = \frac{81}{13} \times \frac{1}{9}$$

$$\Rightarrow x = \frac{9}{13}$$

So $x = \frac{9}{13}$

$$y = \frac{-5}{13}$$

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2(i) Let numerator be x

and denominator be y

Given that

$$\frac{\text{Numerator} + 1}{\text{Denominator} - 1} = 1$$

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

$$(x + 1) = (y - 1)$$

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

$\Rightarrow x - y = -2$ (i)

Also if,

$$\frac{\text{Numerator}}{\text{Denominator} + 1} = \frac{1}{2}$$

$\Rightarrow \frac{x}{y + 1} = \frac{1}{2}$

$\Rightarrow 2x - y = 1$ (ii)

So by elimination

$$\begin{array}{rcrcr} x & - & y & = & 2 \\ 2x & - & y & = & 1 \\ (-) & & (+) & & (-) \\ \hline -x & & & = & +3 \end{array}$$

$\Rightarrow x = 3$

So original fraction is $\frac{3}{5}$

(ii) Let no. of ₹50 notes $= x$
no. of ₹100 notes $= y$

Total notes $= 25$

$x + y = 25$ (i)

Also given that
Total amount withdrawn $=$ ₹2000

₹50 notes	₹100 notes	Total amount
1	1	$50 \times 1 + 100 \times 1$ $= 150$
2	3	$50 \times 2 + 100 \times 3$ $= 400$
x	y	$50 \times x + 100 \times y$ $= 50x + 100y$

So $50x + 100y = 2000$

$\Rightarrow 50(x + 2y) = 2000$

$\Rightarrow x + 2y = \frac{2000}{50}$

$\Rightarrow x + 2y = 40$ (ii)

Using elimination,

$$x + y = 25$$
$$\underline{(-)x + (-)2y = (-)40}$$
$$-y = -15$$

$$-y = -15$$
$$y = 15$$

Putting $y = 15$ in eq

$$x + \underset{(15)}{y} = 25$$
$$\Rightarrow x = 10$$

Therefore of ₹ 50 notes = x = 10

Number of ₹ 100 notes = y = 15

EXERCISE : 3.5

1 (i) $x - 3y - 3 = 0$

$3x - 9y - 2 = 0$

$x - 3y - 3 = 0$	$3x - 9y - 2 = 0$
$a_1 = 1$	$a_2 = 3$
$b_1 = -3$	$b_2 = -9$
$c_1 = -3$	$c_2 = -2$

$\frac{a_1}{a_2}$	$\frac{b_1}{b_2}$	$\frac{c_1}{c_2}$
$\frac{1}{3}$	$= \frac{-3}{-9} = \frac{1}{3}$	$= \frac{-3}{2}$

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

We have no solution

(iii) $2x + y = 5$ | $3x + 2y = 8$

$2x + y - 5 = 0$ | $3x + 2y - 8 = 0$

$a_1 = 2$ | $a_2 = 3$
$b_1 = 1$ | $b_2 = 2$
$c_1 = -5$ | $c_2 = -8$

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

$\frac{2}{3} \neq \frac{1}{2} \neq \frac{-5}{-8}$

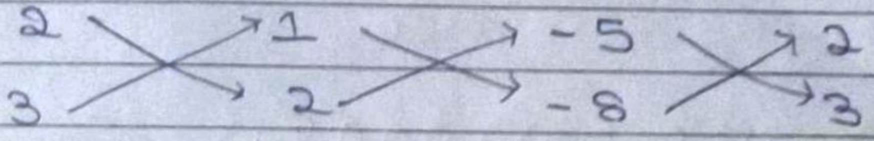
Since $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

We have unique solution

solving

$2x + y = 5 \quad (1)$

$3x + 2y = 8 \quad (2)$



So $\dfrac{x}{2} = \dfrac{y}{1} = \dfrac{1}{1}$

Now $\dfrac{x}{2} = \dfrac{1}{1}$ | $\dfrac{y}{1} = \dfrac{1}{1}$

$x = 2 \times 1$ | $y = 1 \times 1$

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

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

$(a-b)x + (a+b)y = 3a + b - 2 \quad (2)$

$2x + 3y = 7$ | $(a-b)x + (a+b)y = 3a + b - 2$

$= 2x + 3y - 7 = 0$

$a_1 = 2$ | $a_2 = (a-b)$

$b_1 = 3$ | $b_2 = (a+b)$

$c_1 = -7$ | $c_2 = -(3a + b - 2)$

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

$= \frac{2}{a-b} = \frac{3}{a+b} = \frac{7}{(3a+b-2)}$

comparing (iii) and (iv)

$5b = 9b - 4$

$4 = 9b - 5b$

$4 = 4b$

$4b = 4$

$b = \frac{4}{4} = 1$

Putting $b = 1$ in (iii)

$a = 5b$

$a = 5(1)$

$a = 5$

$a = 5 \quad b = 1$

EXERCISE : 3.6

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

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

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

$\frac{1}{y} = v$

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

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

$= 3u + 2v = 12$ (iii)

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

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

$= 2u + 3v = 13$ (v)

Our eq are -

$3u + 2v = 12$ (iii)

$2u + 3v = 13$ (v)

From (iii)

$3u + 2v = 12$

$3u = 12 - 2v$

$u = \frac{12 - 2v}{3}$

Putting value of u in (iv)

$2u + 3v = 13$

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

Multiplying both side -

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

$\Rightarrow 2(12 - 2v) + 9v = 39$

$\Rightarrow -4v + 9v = 39 - 24$

$\Rightarrow 5v = 15$

$\Rightarrow v = 3$

Putting $v = 3$ in (iii)

$3u + 2v = 12$

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

$\Rightarrow 3u + 6 = 12$

$\Rightarrow 3u = 12 - 6$

$\Rightarrow 3u = \underline{6}$

$\Rightarrow u = 2$

$v = 3, u = 2$

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

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

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

$4u - 9v = -1$ (iv)

Our equations,

$2u + 3v = 2$

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

Putting value,

$4u - 9v = -1$

$= 4\left(\frac{2 - 3v}{2}\right) - 9v$

$= 2(2 - 3v) - 9v = -1$

$4 - 6v - 9v = -1$

$-6v - 9v = -1 - 4$

$\Rightarrow v = \frac{-5}{-15}$

$\Rightarrow v = \frac{1}{3}$

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

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

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

$\Rightarrow \sqrt{x} = 2$

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

$\Rightarrow x = 4$

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

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

$\Rightarrow \sqrt{y} = 3$

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

$\Rightarrow y = 9$

—— x ——