3.1

1. Let the present age of Aftab be 'x'

Let the present age of his daughter = 'y'

Seven years ago

Age of Aftab = $x-7$

Age of his daughter = $y-7$

A.T.Q

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

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

$\Rightarrow x-7y = -42$ ——— (i)

After 3 years

Age of Aftab = $x+3$

Age of daughter = $y+3$

A.T.Q

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

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

$\Rightarrow x-3y = 6$ ——— (ii)

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

$\Rightarrow -3y+7y = 6+42$

$\Rightarrow 4y = 48$

$\Rightarrow y = 12$

The algebraic equation is represented by

$x-7y = -42$

$x-3y = 6$

2

Ans- Let's ~~take~~ take the cost of a bat = ₹x

cost of a ball = ₹y

A.T.Q

$3x+6y = 3900$

$x+3y = 1300$

$3x+6y = 3900$

$x = \frac{3900-6y}{3}$

3

Let the cost of 1kg apples = x

Cost of 1kg grapes = 'y'

A.T.Q

~~Ans~~

$2x+y = 160$

$4x+2y = 300$

~~For 2x+~~ For $2x+y=160$.

or $y = 160-2x$

x	50	60	70
y	60	40	20

For $4x+2y = 300$ or $y = \frac{(300-4x)}{2}$

x	70	80	75
y	10	-10	0

Exercise 3.2

1.

(i) Let there are x number of girls and y number of bags

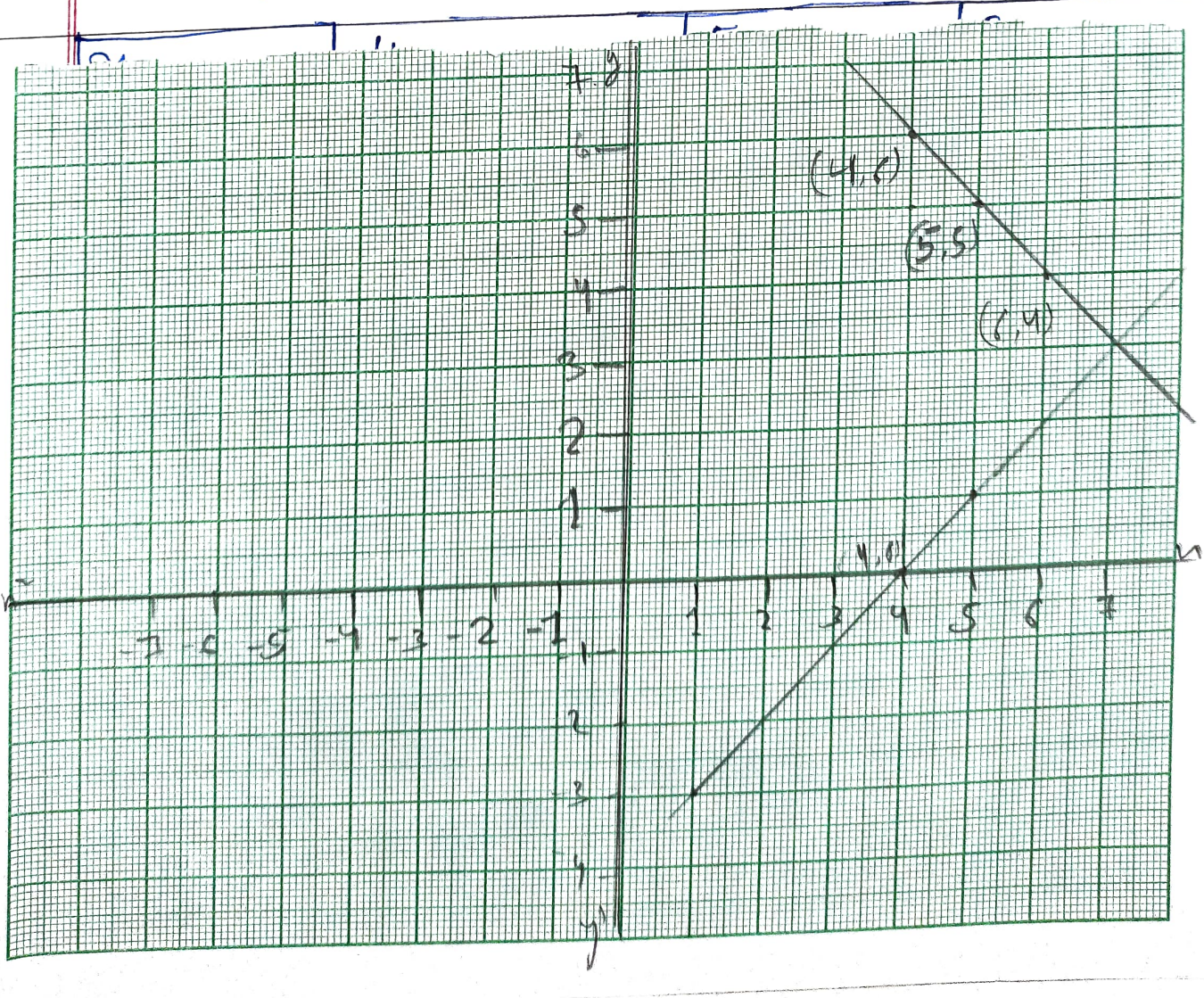
$x + y = 10$

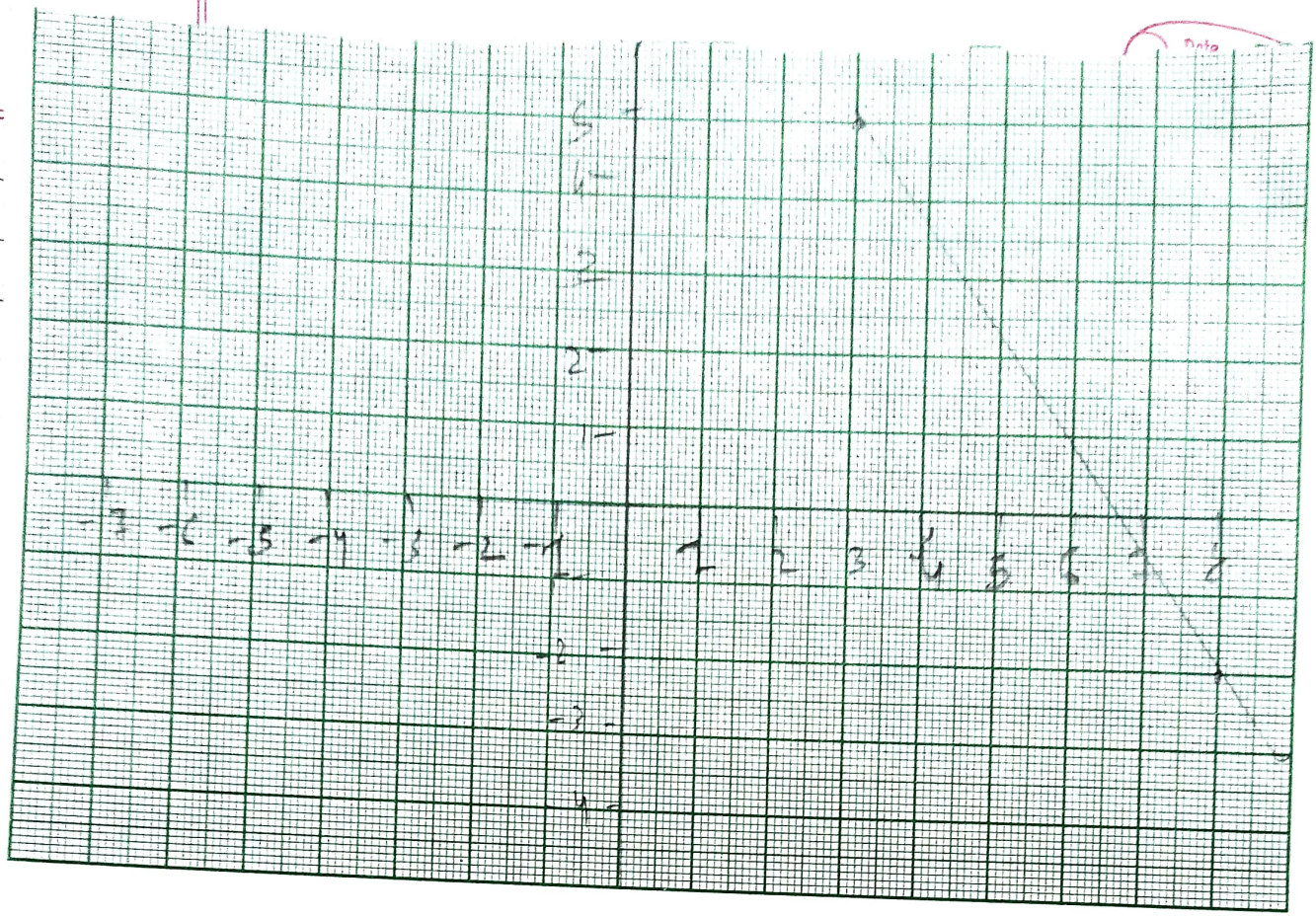
$x - y = 4$

$x + y = 10$ or $x = 10 - y$

x	5	4	6
y	5	6	4

For $x - y = 4$ or $x = 4 + y$, the table formed is





2

(7) $4x - 4y + 8 = 0$ $\quad a_1 = 5 \quad b_1 = -4 \quad c_1 =$

$7x + 6y - 9 = 0$ $\quad a_2 = 7 \quad b_2 = 6 \quad c_2 =$

$$\frac{a_1}{a_2} = \frac{5}{7}$$

$$\frac{b_1}{b_2} = \frac{-4}{6} = \frac{-2}{3}$$

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

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

(i) $9x + 3y + 12 = 0$ $\quad a_1 = 9 \quad b_1 = 3 \quad c_1 = 12$

$18x + 6y + 24 = 0$ $\quad a_2 = 18 \quad b_2 = 6 \quad c_2 = 24$

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

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

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

(Infinite solutions)

(ii) $6x - 3y + 10 = 0$ $\quad a_1 = 6 \quad b_1 = -3 \quad c_1 = 10$

$2x - y + 9 = 0$ $\quad a_2 = 2 \quad b_2 = -1, \quad c_2 = 9$

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

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

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

(Parallel)

3. (i) $3x+2y=5$

$3x+2y-5=0$

$2x-3y=7$

$2x-3y-7=0$

$a_1=3 \quad b_1=2 \quad c_1=-5$

$a_2=2 \quad b_2=-3 \quad c_2=-7$

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

$\frac{b_1}{b_2} = \frac{2}{-3}$

$\frac{c_1}{c_2} = \frac{-5}{-7} = \frac{5}{7}$

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

(consistent)

(ii) $2x-3y=8$

$4x-6y=9$

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

$a_2=4 \quad b_2=-6 \quad c_2=-9$

$\frac{a_1}{a_2} = \frac{2}{4} = \frac{1}{2}$

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

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

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

(Inconsistent)

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

$9x - 10y - 14 = 0$

$a_1 = \frac{3}{2} \quad b_1 = \frac{5}{3} \quad c_1 = -7$

$a_2 = 9 \quad b_2 = -10 \quad c_2 = -14$

$$\frac{a_1}{a_2} = \frac{3}{2 \times 9} = \frac{1}{6}$$

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

(Consistent)

(iv) $5x - 3y - 11 = 0$

$-10x + 6y = -22$

$$\frac{a_1}{a_2} = \frac{5}{+10} = \frac{-5}{10} = \frac{1}{2}$$

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

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

Consistent

(v) $a_1 = \frac{4}{3}$ $\frac{4}{3}x + 2y = 8$

$\frac{4}{3}x + 2y - 8 = 0$

$2x + 3y - 12 = 0$

$a_1 = \frac{4}{3}$ $b_1 = 2$ $c_1 = 8$

$a_2 = 2$, $b_2 = 3$, $c_2 = -12$

$\frac{a_1}{a_2} = \frac{4}{3 \times 2} = \frac{4}{6} = \frac{2}{3}$

$\frac{b_1}{b_2} = \frac{2}{3}$ $\frac{c_1}{c_2} = \frac{-8}{-12} = \frac{2}{3}$

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

Consistent

(vi)

$x + y = 5$

$2x + 2y = 10$

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

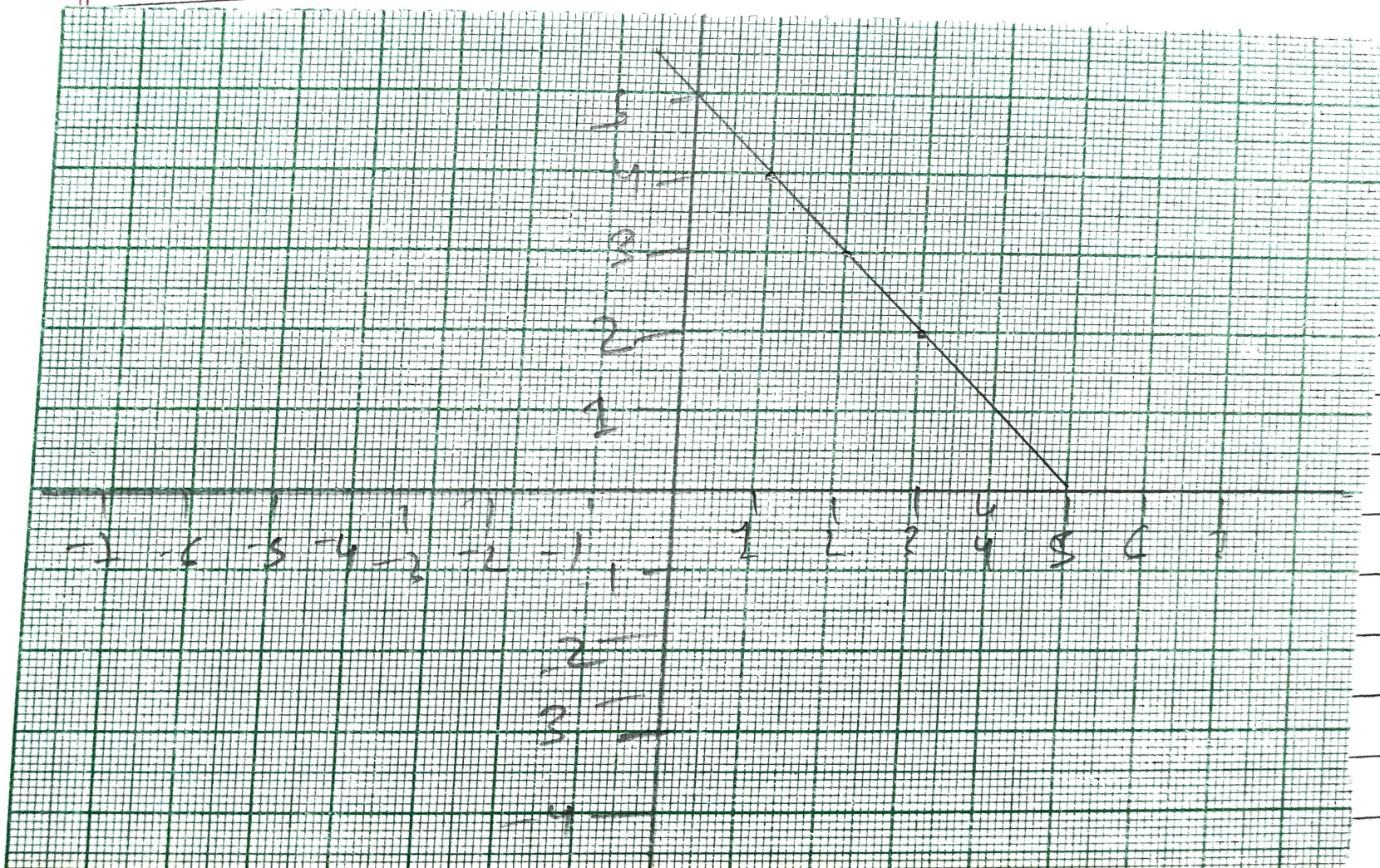
$\frac{b_1}{b_2} = \frac{1}{2}$

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

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

Consistent

x	4	3	2
y	1	2	3



(8) Given $x-y=8$ and $3x-3y=14$

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

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

$$\frac{c_1}{c_2} = \frac{8}{16} = \frac{1}{2}$$

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

∴ (consistent)

(10) $2x+y-6=0$

$4x-2y-4=0$

$$\frac{a_1}{a_2} = \frac{2}{4} = \frac{1}{2}$$

$$\frac{b_1}{b_2} = \frac{1}{-2}$$

$$\frac{c_1}{c_2} = \frac{-6}{-4} = \frac{3}{2}$$

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

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

$4x - 4y - 5 = 0$

$\frac{a_1}{a_2} = \frac{2}{4} = \frac{1}{2}$

$\frac{b_1}{b_2} = \frac{-2}{-4} = \frac{1}{2}$

$\frac{c_1}{c_2} = \frac{2}{5}$

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

5

The width of the garden $= x$

length of the garden $= y$

$y - x = 4$

and

$y + x = 36$

x	6	8	12
y	4	12	16

For $y + x = 36$, $y = 36 - x$

6

(a) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

$2x - 7y + 9 = 0$

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

$\frac{b_1}{b_2} = \frac{3}{-7}$

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

Ans)

another equation could be $6x+9y+9=0$

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

$$\frac{b_1}{b_2} = \frac{3}{9} = \frac{1}{3}$$

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

(ii) Given the linear equation $2x+3y-8=0$

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

Thus another equation could be
$4x+6y-16=0$

$$\frac{a_1}{a_2} = \frac{2}{4} = \frac{1}{2}$$

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

$$\frac{c_1}{c_2} = \frac{+8}{+16} = \frac{1}{2}$$

Exercise 3.3

Exercise 3.3

1.

(a) $x + y = 14$

$x - y = 4$

$x = 14 - y$

$(14 - y) - y = 4$

$14 - 2y = 4$

$2y = 10$

$y = 5$

$\therefore x = 14 - y$

$x = 14 - 5$

$x = 9$

$x = 9$ and $y = 5$

(b) $s - t = 3$ and $\frac{s}{3} + \frac{t}{2} = 6$

are two equations.

$s = 3 + t$ ——— (1)

Now substituting the value of s in second equation

$\frac{(3+t)}{3} + \frac{t}{2} = 6$

$\Rightarrow \frac{2(3+t) + 3t}{6} = 6$

$\Rightarrow \frac{6 + 2t + 3t}{6} = 6$

$= \frac{(6+2t+3t)}{6} = 6$

$= (6+5t) = 36$

$= 5t = 30$

$\therefore t = 6$

$s = 3 + 6 = 9$

$s = 9$ and $t = 6$

(c) $3x - y = 3$ and $9x - 3y = 9$

From 1st equation

$9(3+y)\ x = \frac{3+y}{3}$

Substitute the value of x in the second equation

$9\left(\frac{3+y}{3}\right) - 3y = 9$

$= 9 + 3y - 3y = 9$

$= 9 = 9$

y gives infinite values

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

(iv) $0.2x + 0.3x = 1.3$

$0.4x + 0.5y = 2.3$

From equation 1 we get,

$$x = \frac{(1.3 - 0.3y)}{0.2} \quad \text{---------- (1)}$$

Now substituting the value of x in the second equation

$$0.4 \frac{(1.3 - 0.3y)}{0.2 + 0.5y} = 2.3$$

$$\Rightarrow 2(1.3 - 0.3y) + 0.5y = 2.3$$

$$\Rightarrow 2.6 - 0.6y + 0.5y = 2.3$$

$$\Rightarrow 2.6 - 0.1y = 2.3$$

$$\Rightarrow 0.1y = 0.3$$

$$\Rightarrow y = 3$$

Now substitute the value of y in equation (1) we get,

$$x = \frac{(1.3 - 0.3(3))}{0.2}$$

$$= \frac{(1.3 - 0.9)}{0.2}$$

$$= \frac{0.4}{0.2} = 2$$

$x = 2$ and $y = 3$

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

$\sqrt{3}x - \sqrt{8}y = 0$

From 1st eq

$x = -\left(\frac{\sqrt{3}}{\sqrt{2}}\right) y$ ——— (1)

Putting the value of x in second eq.

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

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

$= y = 0$

Substituting the value of y in eq 1

$x = 0$

Therefore $x = 0 \quad y = 0$

(vi) $\left(\frac{3x}{2}\right) - \left(\frac{5y}{3}\right) = -2$

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

From eq 1

$\left(\frac{3}{2}\right) x = -2 + \left(\frac{5y}{3}\right)$

$x = 2\left(\frac{-6 + 5y}{9}\right)$

$= \frac{-12 + 10y}{9}$ ——— (1)

Putting the value of x in the second eq..

$\left(\frac{3}{2}\right)x - \frac{5y}{3} = -2$

$\Rightarrow x = \frac{2(-6+5y)}{9} = \frac{(-12+10y)}{9}$ ——— (1)

$\left(\frac{(-12+10y)}{9}\right)\left(\frac{1}{3}\right) + \frac{y}{2} = \frac{13}{6}$

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

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

$\Rightarrow \frac{y}{2} = \frac{117}{54} - \frac{24+20y}{54}$

$\Rightarrow \frac{y}{2} = \frac{117+24-20y}{54}$

$\Rightarrow y = 3$

putting the value of y in eq(1)

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

$\Rightarrow \frac{3x}{2} - 5 = -2$

$\Rightarrow x = 2$

$x = 2$ and $y = 3$

Date
Page

1702 $2x + 3y = 11$ ——— (1)

$2x - 4y = -24$ ——— (2)

from eq. (2)

$x = \frac{11 - 3y}{2}$ ——— (3)

Substituting value of x in eq. (2)

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

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

$-7y = -35$

$y = 5$

putting value of y in eq (3)

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

$x = -2$

$y = mx + 3$

$5 = -2m + 3$

$-2m = 2$

$m = -1$

Q03 (i) Let the two numbers be x and y respectively such that $y > x$

Then $y = 3x$ —— (1)

$y - x = 26$ —— (2)

Substituting the value of (1) in (2)

$3x - x = 26$

$x = 13$

Substituting the value of x in eq

$y = 3 \times 13 = 39$

So $x = 13$, $y = 39$

(ii) Let the larger angle be x°
Smaller angle be y°

Sum of two supplementary pairs of angles is always 180°.

$x + y = 180^\circ$ —— (1)

$x - y = 18^\circ$ —— (2)

from eq. (1) $x = 180^\circ - y$ —— (3)

Substituting eq(3) in eq(2)

$180^\circ - y - y = 18^\circ$

$\Rightarrow 2y = 162^\circ \Rightarrow y = 81^\circ$.

using value of y in eq. 3)

$x = 180° - 81°$

$\Rightarrow x = 99°$

(iii) Let cost of bat is x
cost of ball is y

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

from eq. (1)

$6y = 3800 - 7x$

$\Rightarrow y = \frac{3800 - 7x}{6}$

Substituting value of y in eq. (2)

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

$\Rightarrow 3x + \frac{19000}{36} - \frac{35x}{6} = 1750$

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

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

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

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

$\Rightarrow -17x = -8500$

$\Rightarrow x = 500$

Substituting value of x in eq (2)

$y = 3800 - 7 \times 500$

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

(iv) Let fixed charge be x and per km charge be y

$x + 10y = 105$ ——— (1)

$x + 15y = 155$ ——— (2)

from eq (1) we get $x = 105 - 10y$

Substituting the value of x in (2)

$105 - 10y + 15y = 155$

$\Rightarrow 5y = 50$

$\Rightarrow y = 10$

putting value of y

$x = 105 - 10 \times 10 = 5$

Hence

Charge for 25 Km $= x + 25y =$
$5 + 250 = 255.$

(v) Let the fraction be x/y

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

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

$$\Rightarrow 11x - 9y = -4 \quad \text{——— (1)}$$

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

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

$$\Rightarrow 6x - 5y = -3 \quad \text{——— (2)}$$

from (1)

$$x = \frac{(-4+9y)}{11}$$

putting the value of x in (2)

$$\frac{6(-4+9y)}{11} - 5y = -3$$

$$-24 + 54y - 55y = -33$$

$$\Rightarrow -y = -9 \Rightarrow y = 9$$

Substituting value of y

$$x = \frac{(-4+9\times 9)}{11} = 7$$

So fraction is $\frac{7}{9}$

(vi) Let age of jacob and his son be x and y respectively

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

$$x - 3y = 10 \quad \text{——— (1)}$$

$$(x-5) = 7(y-5)$$

$$\Rightarrow x - 7y = -30 \quad \text{——— (2)}$$

from eq. 1 we get

$$x = 3y + 10 \quad \text{——— (3)}$$

Substituting the value of x in 2

$$3y + 10 - 7y = -30$$

$$-4y = -40$$

$$y = 10 \quad \text{——— (4)}$$

Putting y in eq. 3

$$x = 3 * 10 + 10 = 40$$

Exercise — 3.4

1(i) $x + y = 5$ ——— (1)

$2x - 3y = 4$ ——— (2)

By elimination method

Multiplying eq. (1) by 2

$2x + 2y = 10$ ——— (3)

No subtracting eq. (2) from (3)

$$\begin{array}{r} 2x + 2y = 10 \\ 2x - 3y = 4 \\ - \quad + \quad - \\ \hline 5y = 6 \end{array}$$

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

Substituting value of y in eq. 1

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

$$\Rightarrow x = \frac{19}{5}, \quad y = \frac{6}{5}$$

By substitution method

from eq. (1)

$$x = 5 - y \quad \text{——— (4)}$$

putting the value of x in eq (ii)

$$2(5 - y) - 3y = 4$$

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