Ch-3

Lineare Equation In Two Variable

Exercise 3.1

Aftab tells his daughter:- Seven years ago,

1) Let the present age of Aftab be 'x'
And the present age of Daughter be 'y'

Seven years ago,
Age of Afab = x - 7
Age of Daughter = y - 7

According to the question,

$\Rightarrow x - 7 = 7(y - 7)$
$\Rightarrow x - 7 = 7y - 49$
$\Rightarrow x - 7y - 7 + 42$
$\Rightarrow x - 7y + 42 = 0$ ------ (i)
$\Rightarrow -42 + 7y$

After three years,
Age of Aftab = x + 3.
Age of Daughter = 3y + 3

AIQ

$\Rightarrow x + 3 = 3(y + 3)$
$\Rightarrow x + 3 = 3y + 9$
$\Rightarrow x - 3y + 3 - 9$
$\Rightarrow x - 3y - 6$ ------ (ii)
$\Rightarrow 6 + 3y$

Equation-1

x	-7	0	7
$y = -42 + 7y$	5	6	7

Equation table - 2

x	6	4	0
$y = 6 + 3y$	0	-1	-2

2) The coach of a cricket team buys 3 bats & 6 balls. Let the cost of bat x and the cost of ball y

A/Q

$$3x + 6y = 3900 \quad \text{---------- (1)}$$
$$x + 3y = 1300 \quad \text{---------- (2)}$$
$$x = \frac{3900 - 6y}{3}$$

x	300	100	700
$y = \frac{3900 - 6y}{3}$	500	600	300

For $x + 3y = 1300$

$x = 1300 - 3x$

x	400	100	700
$y = 1300 - x$	300	400	200

3) The cost of 2kg of apples and 1kg of grapes on a day was found to be Rs 160. After a month, the cost of 4kg of apples and 2kg of grapes is Rs 300. Represent the situation algebrically and geometriceelly.

Ans:- Let the cost of 1kg of apples be 'x' and the cost of 1kg of grapes be 'y'

ATQ

$2x + y = 160$

$\Rightarrow y = 160 - 2x$

x	50	60	70
y	60	40	20

And, $4x + 2y = 300$

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

x	70	80	75
y	10	-10	0

Exercise 3.2

1) (i) 10 students of class X took part in a Mathematics quiz. If the number of girls is 4 more than the number of boys, find the ~~smallest~~ number of boys and girls who take part in quiz.

Ans:- Let the number of girls be x and the number of boys be y

Ans

$\Rightarrow x+y=10$ ..... (1)

$\Rightarrow y=10-x$

x	5	4	6
$y=10-x$	5	6	4

And the number of girls is 4 more than the number of boys

$\Rightarrow x=y+4$ ..... (2)

$\Rightarrow x-y=4$

x	4	5	6
y	0	1	2

(ii) 5 pencils and 7 pens ~~and 7~~ together cost ₹50, whereas 7 pencils and 5 pens together cost ₹46. Find the cost of one pencil and that of one pen.

Ans Let the cost of pencils $= x$
and the cost of pens $= y$

ATQ

$\Rightarrow 5x+7y=50$ ..... (1)

$\Rightarrow 7y=50-5x$

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

x	3	10	-4
$y=\frac{50-5x}{7}$	5	0	10

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

$\frac{a_1}{a_2} = \frac{5}{7}$ $\frac{b_1}{b_2} = \frac{-4}{6} = \frac{-2}{3}$ $\frac{c_1}{c_2} = \frac{-4}{-3}$

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

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

$\frac{a_1}{a_2} = \frac{9}{18} = \frac{1}{2}$ $\frac{b_1}{b_2} = \frac{3}{6} = \frac{1}{2}$ $\frac{c_1}{c_2} = \frac{12}{24} = \frac{1}{2}$

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

(iii) $6x - 3y + 10 = 0$
$2x - y + 9 = 0$

$\frac{a_1}{a_2} = \frac{6}{2} = \frac{3}{1}$ $\frac{b_1}{b_2} = \frac{3}{1}$ $\frac{c_1}{c_2} = \frac{10}{9}$

$\frac{a_1}{a_2} = \frac{b_1}{b_2}$ parallel

(iii) $6x - 3y + 10 = 0$
$2x - y + 9 = 0$

$\frac{a_1}{a_2} = \frac{6}{2} = \frac{3}{1}$ $\frac{b_1}{b_2} = \frac{3}{1}$ $\frac{c_1}{c_2} = \frac{10}{9}$

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

(v) $3x+2y=5$
$2x-3y=7$

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

$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ Intersect, Consistent

(vi) $2x-3y=8$
$4x-6y=9$

$\frac{a_1}{a_2} = \frac{2}{4} = \frac{1}{2}$ $\frac{b_1}{b_2} = \frac{3}{6} = \frac{1}{2}$ $\frac{c_1}{c_2} = \frac{8}{9}$

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

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

$9x - 10y = 14$

$\frac{a_1}{a_2} \frac{3}{2\times 9} = \frac{1}{6}$ $\frac{b_1}{b_2} \frac{5}{3\times -10} = \frac{-1}{6}$ $\frac{c_1}{c_2} = \frac{7}{14} = \frac{1}{2}$

Intersecting Consistent

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

$-10x + 6y = -22$

$\frac{a_1}{a_2} = \frac{5}{-10} = \frac{1}{-2}$ $\quad \frac{b_1}{b_2} = \frac{-3}{6} = \frac{-1}{2}$ $\quad \frac{c_1}{c_2} = \frac{11}{-22} = \frac{1}{-2}$

$\frac{a_1}{a_2} : \frac{b_1}{b_2} = \frac{c_1}{c_2}$ = parallel, Inconsistent

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

$2x + 3y = 12$

$\frac{a_1}{a_2} = \frac{4}{3\times 2} = \frac{2}{3}$ $\quad \frac{b_1}{b_2} = \frac{2}{3}$ $\quad \frac{c_1}{c_2} = \frac{8}{12} = \frac{2}{3}$

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

$2x + 2y = 10$

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

$\frac{a_1}{c_2} : \frac{b_1}{c_2} = \frac{c_1}{c_2}$ parallel Consinet

(ii) $x - y = 8$

$3x - 3y = 16$

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

$\frac{a_1}{a_2} = \frac{b_1}{b_2}$ parallel coincident

(iii) $2x + y - 6 = 0$
$4x - 2y - 4 = 0$

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

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

(iv) $2x - 2y - 2 = 0$
$4x - 4y - 5 = 0$

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

$\frac{a_1}{a_2} = \frac{b_1}{b_2}$ parallel.

5) Half the perimeter of a rectangular garden whose length is 4m more than its width, is 36m. find the dimension of the garden.

→

Ans: Let the width of the garden is x and the length of the garden is y.

ATQ

$$y - x = 4 \quad \text{---------- (1)}$$

$$y = x + 4$$

x	0	8	12
$y = x+4$	4	12	16

$$\Rightarrow y + x = 36 \quad \text{---------- (2)}$$

$$\Rightarrow y = 36 - x$$

x	0	36	36
$y = 36-x$	36	0	20

6) (i) $2x + 3y - 8 = 0$

Intersecting

$2x - 7y + 9 = 0$

(ii) Parallel lines

$6x + 9y + 9 = 0$

(iii) Coincident lines

$4x + 6y - 16$

Q) Draw the graphs of the equation $x-y+1=0$ and $3x+2y-12=0$. Determine coordinates of the vertices of the triangle formed by these lines and the x axis shade the triangular region.

Ans → Given equation are → $x-y+1=0$
$\Rightarrow 3x+2y-12=0$

$\Rightarrow x-y+1=0$
$\Rightarrow x-y=-1$
$\Rightarrow -y=-x-1$
$\Rightarrow y=x+1$

x	0	1	2
$y=x+1$	1	2	3

$\Rightarrow 3x+2y-12=0$
$\Rightarrow 2y=12-3x$
$\Rightarrow y=\frac{12-3x}{2}$

x	0	2	-2
$y=\frac{12-3x}{2}$	6	3	9

—— X ——

Exercise 3.3

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

$x+y=14$

$\Rightarrow x=14-y$

Now substitute the value of x in second equation to get

$x-y=4$

$\Rightarrow (14-y)-y=4$
$\Rightarrow 14-2y=4$
$\Rightarrow 2y=4-14$
$\Rightarrow y=5$

By the value of y, we can now find the exact value of x

$x=14-y$
$x=14-5$
$x=9$

Hence, $x=9$ and $y=5$

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

$s - t = 3$ and

$\left(\frac{s}{3}\right) + \frac{t}{2} = 6$ are the two equations

From 1st equation, we get,

$s = 3 + t$ ---------- (1)

Now substitute the value of s in second equation to get,

$(3 + t)/3 + (t/2) = 6$

$\Rightarrow (2(3+t) + 3t)/6 = 6$

$\Rightarrow (6 + 2t + 3t)/6 = 6$

$\Rightarrow 6 + 5t = 36$

$\Rightarrow 5t = 36 - 6$

$\Rightarrow 5t = 30$

$\Rightarrow t = 30/5 = 6$

Now, substitute the value of t in equation

$s = 3 + 6 = 9$

Therefore $s = 9$, $t = 6$

(iii) $3x - y = 3$
$9x - 3y = 9$

From 1st equation, we get

$x = (3+y)/3$

Now, substitute the value of x in the given second equation to get,

$9(3+y)/3 - 3y = 9$
$\Rightarrow 9 + 3y - 3y = 9$
$\Rightarrow 9 = 9$

Therefore, y has infinite values and since $x = (3+y)/3$, so x also has infinite values.

(iv) $0.2x + 0.3y = 1.3$
$0.4x + 0.5y = 2.3$

From 1st equation, we get,

$x = (1.3 - 0.3y)/0.2$ ---- (1)

Now, substitute the value of x in the given second equation to get,

$\Rightarrow 0.4(1.3 - 0.3y)/0.2 + 0.5y = 2.3$
$\Rightarrow 2(1.3 - 0.3y) + 0.5y = 2.3$
$\Rightarrow 2.6 - 0.6y + 0.5y = 2.3$
$\Rightarrow 2.6 - 0.1y = 2.3$
$\Rightarrow 0.1y = 0.3$
$y = 3$

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

$$x = (1.3 - 0.3(3))/2$$
$$= 1.3 - 0.9/0.2$$
$$= 0.4/0.2$$
$$= 2$$

Therefore $x = 2$ and $y = 3$

(v) $\sqrt{2}x + \sqrt{3} = 0$
$\sqrt{3}x - \sqrt{8}y = 0$

From 1st equation we get,

$$x = (-\sqrt{3}/\sqrt{2})y \quad \text{-----(1)}$$

Putting the value of x in the given second equation to get

$$\sqrt{3}(-\sqrt{3}/\sqrt{2})y - \sqrt{8}y = 0$$
$$\Rightarrow (-3\sqrt{2}y) - \sqrt{8}$$
$$y = 0$$

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

$$x = 0$$

Therefore $x = 0$ and $y = 0$.

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

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

From 1st equation we get,

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

$\Rightarrow x = 2(-6+5y)/9$

$= (-12+10y)/9$ ------ (i)

Putting the value of x in the given second equation to get

$((-12+10y)/9)/3 + y/2 = 13/6$

$\Rightarrow y/2 = 13/6 - ((-12+10y)/27 + y/2$

$= 13/6$

$y = 3$

Now substitute the values of y in equation

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

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

$\Rightarrow x = 2$

Therefore, $x = 2$ and $y = 3$

Q. Solve $2x+3y=11$ and $2x-4y=-24$ and hence find the value of 'm' for which $y=mx+3$.

Ans→ $2x+3y=11$ ..... (i)

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

From equation (ii) we get,

$x=(11-3y)/2$ ..... (iii)

Substituting the value of x in equation (ii)

$\Rightarrow 2(11-3y)/2-4y=24$

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

$\Rightarrow -7y=-35$

$\Rightarrow y=5$ ..... (iv)

Putting the value of y in equation (iii) we get,

$x=(11-3\times5)/5$

$=-4/2$

$=-2$

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

Also, $y=mx+3$

$5=-2m+3$

$-2m=2$

$m=-1$

Therefore the value of m is (-1).

3) (i) The difference between two numbers is 26 and one number is three times the other. Find them.

Let the two numbers be x and y

AIQ

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

$y - 3x = 26$ ------- (2)

Substituting the value of (1) and (2) we get,

$3x - x = 26$

$x = 13$ ------- (3)

(ii) The larger of two supplementary angles exceeds the smaller by 18 degrees. Find them

Ans> Let the larger angle be x° and the smaller angle by y°

We know that the sum of two supplementary pair of angles is always 180°

AIQ

$x + y = 180^\circ$ ------- (1)

$x - y = 18^\circ$ ------- (2)

From (1), we get $x = 180^\circ - y$ ------- (3)

Substituting (3) in (2), we get

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

$162^\circ = 2y$

$y = 81$ ------- (4)

Using the value of y in (3) we get,

$x = 180^\circ - 81^\circ = 99^\circ$

(iii) The coach of a cricket teams. buys 7 bats and 6 balls for ₹3800. later, she buys 3 bats and 5 balls for ₹1750. Find the cost of each bat and each ball.

Ans→ Let the cost a bat be x
and the cost of a ball be y.

ATQ

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

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

From (I) we get,

$y = (3800-7x)/6$ ------ (iii)

Substituting (III) in (II) we get,

$3x+5(3800-7x)/6 = 1750$

$\Rightarrow 3x + 9500/3 - 35x/6 = 1750$

$\Rightarrow 3x - 35x/6 = 1750 - 9500/3$

$\Rightarrow (18x-35x)/6 = (5250-9500)/3$

$\Rightarrow -17x/6 = -4250/3$

$\Rightarrow -17x = -8500$

$x = 500$ ------ (iv)

Substuting the value of x in (III) we get

$$y = \frac{3800-7\times500}{6}$$

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

(iv) The taxi charges in a city consist of a fixed charge together with the charge for the distance covered. For a distance of 10km, the charge paid is Rs 105 and for a journey of 15km, the charge paid is 155. How much does a person have to pay for travelling a distance of 25 km.

Ans → Let the fixed charge be Rs x
Per Capital charge be Rs y

AIQ

$$x+10y = 105 \quad \text{------ (1)}$$
$$x+15y = 155 \quad \text{------ (2)}$$

From (1) we get $x = 105-10y$ ------ (3)

Substituting the value of x in (2) we get,

$$105-10y+15y = 155$$
$$5y = 50$$
$$y = 50/5$$
$$y = 10 \quad \text{----------} \quad (4)$$

Putting the value of y in (3) we get,

$$x = 105-10\times10$$
$$= 5.$$

(v) A Fraction becomes 9/11, if 2 is added to both the numerator and the denominator. If 3, is added to both the numerator and den becomes 5/6. Find the fraction.

Ans: Let the fraction be x/y

ATQ

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

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

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

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

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

From (1) we get x:

$$\frac{(-4+9y)}{11} \quad \text{-------(3)}$$

Substuting the value of x in (2) we get,

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

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

$$\Rightarrow -y = -9$$

$$\Rightarrow y = 9 \quad \text{-------(4)}$$

Substuting the value of y in (3) we get

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

Hence the fraction is 7/9.

Exercise 3.4

1. Solve the following pairs of linear equations by the elimination method and the substitution method:

(i) $x+y=5$ and $2x-3y=4$

By method of Elimination

$x+y=5$ ---------- (i)

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

When the equation (i) is multiplied by 2 we get,

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

$5y=6$

$y=6/5$

$x=19/5$, $y=6/5$

(ii) $3x+4y=10$ and $2x-2y=2$

By the method of elimination

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

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

When the equation (i) and (ii) is multiplied by 2; we get

$4x-4=4$ ---------- (iii)

Hence $x=2$ and $y=1$

(iii) $3x - 5y - 4 = 0$ and $9x = 2y + 7$

By the method of elimination:

$3x - 5y - 4 = 0$ ..... (i)

$9x - 2y - 7 = 0$ ..... (ii)

$\therefore x = 9/13$ and $y = -5/13$

(iv) $\frac{x}{2} + \frac{2y}{3} = -1$ and $x - \frac{y}{3} = 3$

By the method of elimination.

$3x + 4y = -6$ ..... (i)

$3x - y = 9$ ..... (ii)

When the equation (iii) is substituted in (i) we ge

Hence $x = 2$, $y = 3$.

2) (i) If we add 1 to the numerator and subtract 1 from the denominator, a fraction reduces to 1. It becomes $\frac{1}{2}$ If we only add 1 t the denominator. What is the fraction.

Ans: Let the fraction be a/b

ATQ $(a+1)/(b-1) = 1$

$\therefore 3 - b = -2 \Rightarrow -b = -5$

$b = 5$

(ii) Five years ago Nuri was thrice as old as Sonu. Ten years later, Nuri will be twice as old as Sonu. How old are Nuri and Sonu?

Ans: Let us assume present age of Nuri is x and present age of Sonu = y

ATQ

$$x - 5 = 3(y - 5)$$
$$\Rightarrow x - 3y = -10 \quad \text{---------- (i)}$$

Now, $x + 10 = 2(y + 10)$
$$\Rightarrow x - 2y = 10 \quad \text{---------- (ii)}$$

Age of Nuri is 50 years
Age of Sonu is 20 years.

Exercise 3.5

1 (i) $x - 3y - 3 = 0$
$3x - 9y - 2 = 0$

Parallel

(ii) $2x + y = 5$
$3x + 2y = 8$

Intersect

(iii) $3x - 5y = 20$
$6x - 10y = 40$

Infinite Number.

(iv) $x - 3y - 7 = 0$
$3x - 3y - 15 = 0$

Intersecting

2) (i) $2x + 3y = 7$

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

(i) $(a+b)y + (a-b)y - (3a+b-2) = 0$

$a_1/a_2 = 2(a-b)$ $b_1/b_2 = 3(a+b)$

Thus at $a = 5$ $b = 1$

(a)
3) Solve the following pair of linear equat

$8x + 5y = 9$ ------ (i)
$3x + 2y = 4$ ------ (ii)

$x = (4-2y)/3$ ------ (iii)
$8(4-2y)/3 + 5y = 9$
$y = -5$
$y = 5$
$x = -2$ and $y = 5$.

4 (i) Let x be the fixed change and y be charge of food per day.

$x + 20y = 1000$ ------ (i)

$x + 26y = 1180$ ------ (ii)

Subtracting (i) from (ii) get,

$6y = 180$

$y = 30$

Using this value in equation,

$x = 1180 - 26 \times 30$

$x = Rs\ 400$

Therefore, fixed charges is Rs 400 and Charg per day is Rs 30.

(ii) Let the fraction be x/y

So as per the question given

$(x-1)/y = 1/3 \Rightarrow 3x - y = 3$ ---- (i)

$x(y+8) = 1/4 \Rightarrow 4x - y = 8$ ---- (ii)

$y = 12$,

Therefore the fraction is $5/12$

(iii) Let the number of right answer is x and number of wrong be y

$\Rightarrow 3x - y = 40$ ..... (1)

$4x - 2y = 30$

$\Rightarrow 2x - y = 25$ ..... (2)

Subtracting equations (2) from equation (1)

$x = 15$ ..... (3)

Putting this in equation (2)

$30 - y = 25$

$y = 5$.

Exercise 3.6

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

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

$m/(-26 - (-36)) = n/(-24 - (-39)) = \frac{1}{9-4}$

$m/10 = n/15 = 1/5$

$m/10 = 1/5$ and $n/5$

$x = 1/2$ and $y = 1/3$.

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

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

Ans→ $2m + 3n = 2$ ---------- (i)

$4m - 9n = -1$ ---------- (ii)

Multiplication equation

$6m + 9n = 6$ ---------- (iii)

$2 \times 1/2 + 3n = 2$

$3n = 1$

$n = 1/3$

$x = 4$, $y = 9$

Hence $n = 4$ and $y = 9$

(iii) $\frac{4}{x} + 3y = 14$

$\frac{3}{x} - 4y = 23$

Ans→ $\Rightarrow 4m + 3y - 14 = 0$ ---------- (i)

$\Rightarrow 3m - 4y - 23 = 0$ ---------- (ii)

By cross multiplication,

$m/(-69-56) = y/(-42-(-92)) = 1/(-16-9)$

$m/125 = -1/25$ and $y/50 = -1/25$

$m = 5$ and $b = (-2)$

$m = 1/n = 5$

so $n = 1/5$, $y = 2$

2) (i) Ritu can row downstream 20km in 2hrs, and upstream 4km in 2hrs. Find her speed of rowing in still water and the speed of the current.

Sol: Speed of Ritu in still water = x km/hr.

Speed of stream = y km/hr.

ATQ,

$2(x+y) = 20$

$x+y = 10$ ..... (1)

And $2(x-y) = 4$

Adding both the eq 1 and 2

$2x = 12$

$x = 6$

$y = 4$

Ritu rowing still water = 6

(11) 2 women and 5 men can together finish an embroidery work in 4 days, while 3 woman and 6 men can finish in 3 days. Find the time taken by 1 woman alone to finish work, and also that taken by 1 man alone.

Ans → Number of days = y

Work done - y

$4(2/x + 5/y) = 1$

$(2/x + 5/y) = 1/4$

And $3(3/x + 6/y) = 1$

$(3/x + 6/y) = 1/3$

Now by cross Multiplication,

$m/20 - 18 = n/(9 - 8) = 1/(180 - 144)$

$m = 1/18$

$m = 1/x = 1/18$

$x = 18$

$y = 36$

Number of days 18.

Number of days to finish 36.

(iii) Rooh travels 300 km to her home partly by train and partly by bus. She takes 4 hours if she travels 60 km by train & remaing by bus. Find the speed of the train & bus separately

Sol: Speed of train = x km/h

Speed of bus = y km/h

ATQ

$60/x + 240/y = 4$ ---------- (1)

$100/x + 200/y = 25/6$ ---------- (ii)

$\Rightarrow 60m + 240n = 4$ ---------- (iii)

$\Rightarrow 600m + 1200n = 25$ ---------- (iv)

Multiply eq. 3 by 10 to get

$60m + 3 = 4$

$m = 1/60$

$m = \frac{1}{x} = \frac{1}{60}$

$x = 60$

And $y = 1/n$

$y = 80$

Therefore, speed of train = 60km/hr

speed of bus = 80km/hr.