CHAPTER
3

# Pair of Linear Equations in Two Variables

## CASE STUDY / PASSAGE BASED QUESTIONS

**Syllabus**

Pair of linear equations in two variables and graphical method of their solution, consistency/ inconsistency. Algebraic conditions for number of solutions. Solution of a pair of linear equations in two variables algebraically - by substitution, by elimination. Simple situational problems. Simple problems on equations reducible to linear equations.

**1**

### Hostel Monthly Charges

A part of monthly hostel charges in a college is fixed and the remaining depends on the number of days one has taken food in the mess. When a student Anu takes food for 25 days, she has to pay ₹ 4500 as hostel charges, whereas another student Bindu who takes food for 30 days, has to pay ₹ 5200 as hostel charges.

Considering the fixed charges per month by ₹ $x$ and the cost of food per day by ₹ $y$, then answer the following questions.

**(i)** Represent algebraically the situation faced by both Anu and Bindu.

(a) $x + 25y = 4500, x + 30y = 5200$ (b) $25x + y = 4500, 30x + y = 5200$

(c) $x - 25y = 4500, x - 30y = 5200$ (d) $25x - y = 4500, 30x - y = 5200$

**(ii)** The system of linear equations, represented by above situations has

(a) No solution (b) Unique solution

(c) Infinitely many solutions (d) None of these

**(iii)** The cost of food per day is

(a) ₹ 120 (b) ₹ 130 (c) ₹ 140 (d) ₹ 1300

**(iv)** The fixed charges per month for the hostel is

(a) ₹ 1500 (b) ₹ 1200 (c) ₹ 1000 (d) ₹ 1300

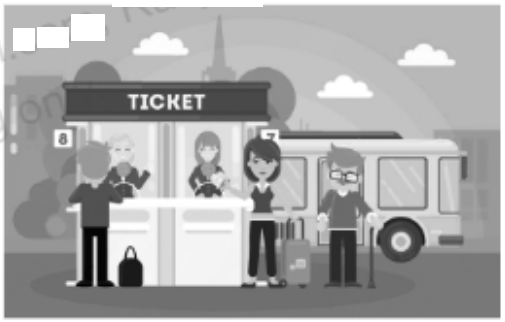
**(v)** If Bindu takes food for 20 days, then what amount she has to pay?

(a) ₹ 4000 (b) ₹ 3500 (c) ₹ 3600 (d) ₹ 3800

## 2

### Ticket Counter on Bus Stand

From Bengaluru bus stand, if Riddhima buys 2 tickets to Malleswaram and 3 tickets to Yeswanthpur, then total cost is ₹ 46; but if she buys 3 tickets to Malleswaram and 5 tickets to Yeswanthpur, then total cost is ₹ 74.




Consider the fares from Bengaluru to Malleswaram and that to Yeswanthpur as ₹ $x$ and ₹ $y$ respectively and answer the following questions.

**(i)** 1st situation can be represented algebraically as

(a) $3x - 5y = 74$ (b) $2x + 5y = 74$ (c) $2x - 3y = 46$ (d) $2x + 3y = 46$

**(ii)** 2nd situation can be represented algebraically as

(a) $5x + 3y = 74$ (b) $5x - 3y = 74$ (c) $3x + 5y = 74$ (d) $3x - 5y = 74$

**(iii)** Fare from Bengaluru to Malleswaram is

(a) ₹ 6 (b) ₹ 8 (c) ₹ 10 (d) ₹ 2

**(iv)** Fare from Bengaluru to Yeswanthpur is

(a) ₹ 10 (b) ₹ 12 (c) ₹ 14 (d) ₹ 16

**(v)** The system of linear equations represented by both situations has

(a) infinitely many solutions (b) no solution

(c) unique solution (d) none of these

## 3

### National Highway

Points $A$ and $B$ representing Chandigarh and Kurukshetra respectively are almost 90 km apart from each other on the highway. A car starts from Chandigarh and another from Kurukshetra at the same time. If these cars go in the same direction, they meet in 9 hours and if these cars go in opposite direction they meet in 9/7 hours. Let $X$ and $Y$ be two cars starting from points $A$ and $B$ respectively and their speed be $x$ km/hr and $y$ km/hr respectively.

Then, answer the following questions.

**(i)** When both cars move in the same direction, then the situation can be represented algebraically as

(a) $x - y = 10$ (b) $x + y = 10$ (c) $x + y = 9$ (d) $x - y = 9$

**(ii)** When both cars move in opposite direction, then the situation can be represented algebraically as

(a) $x - y = 70$ (b) $x + y = 90$ (c) $x + y = 70$ (d) $x + y = 10$

**(iii)** Speed of car $X$ is

(a) 30 km/hr (b) 40 km/hr (c) 50 km/hr (d) 60 km/hr

**(iv)** Speed of car $Y$ is

(a) 50 km//hr (b) 40 km/hr (c) 30 km/hr (d) 60 km/hr

**(v)** If speed of car $X$ and car $Y$, each is increased by 10 km/hr, and cars are moving in opposite direction, then after how much time they will meet?

(a) 5 hrs (b) 4 hrs (c) 2 hrs (d) 1 hr

**4**

## Lunch Party

Mr Manoj Jindal arranged a lunch party for some of his friends. The expense of the lunch are partly constant and partly proportional to the number of guests. The expenses amount to ₹ 650 for 7 guests and ₹ 970 for 11 guests.

Denote the constant expense by ₹ $x$ and proportional expense per person by ₹ $y$ and answer the following questions.

**(i)** Represent both the situations algebraically.

(a) $x + 7y = 650, x + 11y = 970$ (b) $x - 7y = 650, x - 11y = 970$

(c) $x + 11y = 650, x + 7y = 970$ (d) $11x + 7y = 650, 11x - 7y = 970$

**(ii)** Proportional expense for each person is

(a) ₹ 50 (b) ₹ 80 (c) ₹ 90 (d) ₹ 100

**(iii)** The fixed (or constant) expense for the party is

(a) ₹ 50 (b) ₹ 80 (c) ₹ 90 (d) ₹ 100

**(iv)** If there would be 15 guests at the lunch party, then what amount Mr Jindal has to pay?

(a) ₹ 1500 (b) ₹ 1300 (c) ₹ 1200 (d) ₹ 1290

**(v)** The system of linear equations representing both the situations will have

(a) unique solution (b) no solution

(c) infinitely many solutions (d) none of these

5

## Office Work

In a office, 8 men and 12 women together can finish a piece of work in 10 days, while 6 men and 8 women together can finish it in 14 days. Let one day's work of a man be $1/x$ and one day's work of a woman be $1/y$.

Based on the above information, answer the following questions.

**(i)** 1st situation can be represented algebraically as

(a) $\frac{80}{x}-\frac{120}{y}=1$ (b) $\frac{120}{x}-\frac{80}{y}=1$ (c) $\frac{120}{x}+\frac{80}{y}=1$ (d) $\frac{80}{x}+\frac{120}{y}=1$

**(ii)** 2nd situation can be represented algebraically as

(a) $\frac{112}{x}-\frac{84}{y}=1$ (b) $\frac{84}{x}-\frac{112}{y}=1$ (c) $\frac{84}{x}+\frac{112}{y}=1$ (d) $\frac{112}{x}+\frac{84}{y}=1$

**(iii)** One woman alone can finish the work in

(a) 220 days (b) 140 days (c) 280 days (d) 160 days

**(iv)** One man alone can finish the work in

(a) 140 days (b) 220 days (c) 160 days (d) 280 days

**(v)** If 14 men and 28 women work together, then in what time, the work will be completed?

(a) 2 days (b) 3 days (c) 4 days (d) 5 days

6

## Book Store

From a shop, Sudhir bought 2 books of Mathematics and 3 books of Physics of class X for ₹ 850 and Suman bought 3 books of Mathematics and 2 books of Physics of class X for ₹ 900. Consider the price of one Mathematics book and that of one Physics book be ₹ $x$ and ₹ $y$ respectively.

Based on the above information, answer the following questions.

**(i)** Represent the situation faced by Sudhir, algebraically.

(a) $2x + 3y = 850$ (b) $3x + 2y = 850$ (c) $2x - 3y = 850$ (d) $3x - 2y = 850$

**(ii)** Represent the situation faced by Suman, algebraically.

(a) $2x + 3y = 90$ (b) $3x + 2y = 900$ (c) $2x - 3y = 900$ (d) $3x - 2y = 900$

**(iii)** The price of one Physics book is

(a) ₹ 80 (b) ₹ 100 (c) ₹ 150 (d) ₹ 200

**(iv)** The price of one Mathematics book is

(a) ₹ 80 (b) ₹ 100 (c) ₹ 150 (d) ₹ 200

**(v)** The system of linear equations represented by above situation, has

(a) unique solution (b) no solution

(c) infinitely many solutions (d) none of these

**7**

## Boating in River

A boat in the river Ganga near Rishikesh covers 24 km upstream and 36 km downstream in 6 hours while it covers 36 km upstream and 24 km downstream in $6\frac{1}{2}$ hours. Consider speed of the boat in still water be $x$ km/hr and speed of the stream be $y$ km/hr and answer the following questions.

**(i)** Represent the 1st situation algebraically.

(a) $\frac{24}{x-y}+\frac{36}{x+y}=6$ (b) $\frac{24}{x+y}+\frac{36}{x-y}=6$ (c) $24x + 36y = 6$ (d) $24x - 36y = 6$

**(ii)** Represent the 2nd situation algebraically.

(a) $\frac{36}{x+y}+\frac{24}{x-y}=\frac{13}{2}$ (b) $\frac{36}{x-y}+\frac{24}{x+y}=\frac{13}{2}$ (c) $36x-24y=\frac{13}{2}$ (d) $36x+24y=\frac{13}{2}$

**(iii)** If $u=\frac{1}{x-y}$ and $v=\frac{1}{x+y}$, then $u =$

(a) $\frac{1}{4}$ (b) $\frac{1}{12}$ (c) $\frac{1}{8}$ (d) $\frac{1}{6}$

**(iv)** Speed of boat in still water is

(a) 4 km/hr (b) 6 km/hr (c) 8 km/hr (d) 10 km/hr

**(v)** Speed of stream is

(a) 3 km/hr (b) 4 km/hr (c) 2 km/hr (d) 5 km/hr

## 8

### Profit and Loss

Piyush sells a saree at 8% profit and a sweater at 10% discount, thereby, getting a sum of ₹ 1008. If he had sold the saree at 10% profit and the sweater at 8% discount, he would have got ₹ 1028.

Denote the cost price of the saree and the list price (price before discount) of the sweater by ₹ $x$ and ₹ $y$ respectively and answer the following questions.

**(i)** The 1st situation can be represented algebraically as

(a) $2.08x + 1.9y = 2008$ (b) $1.08x + 0.9y = 1008$ (c) $10x + 8y = 1008$ (d) $8x + 10y = 1008$

**(ii)** The 2nd situation can be represented algebraically as

(a) $10x + 8y = 1028$ (b) $2.1x + 1.92y = 1028$ (c) $1.1x + 0.92y = 1028$ (d) $8x + 10y = 1028$

**(iii)** Linear equation represented by 1st situation intersect the $x$-axis at

(a) (2800, 0) (b) (2500, 0) (c) $\left(\frac{2500}{3}, 0\right)$ (d) $\left(\frac{2800}{3}, 0\right)$

**(iv)** Linear equation represented by 2nd situation intersect the $y$-axis at

(a) $\left(0, \frac{25700}{23}\right)$ (b) (0, 25700) (c) $\left(0, \frac{25800}{23}\right)$ (d) (0, 26800)

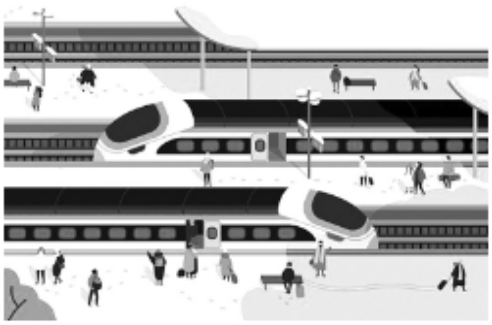
**(v)** Both linear equations represented by situation 1st and 2nd intersect each other at

(a) (400, 600) (b) (600, 400) (c) (200, 200) (d) (800, 600)

## 9

### Metro Track

Puneet went for shopping in the evening by metro with his father who is an expert in mathematics. He told Puneet that path of metro $A$ is given by the equation $2x + 4y = 8$ and path of metro $B$ is given by the equation $3x + 6y = 18$. His father put some questions to Puneet.
Help Puneet to solve the questions.



(i) Equation $2x + 4y = 8$ intersects the $x$-axis and $y$-axis respectively at

(a) (4, 0), (0, 2) (b) (0, 4), (2, 0) (c) (4, 0), (2, 0) (d) (0, 4), (0, 2)

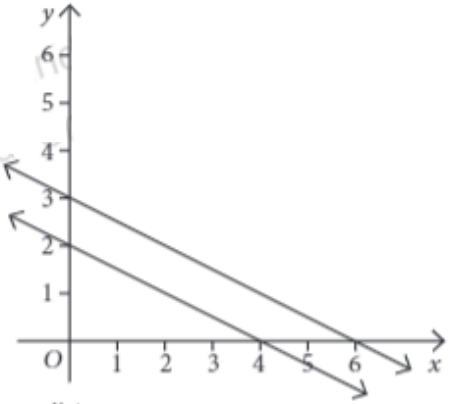
(ii) Equation $3x + 6y = 18$ intersects the $x$-axis and $y$-axis respectively at

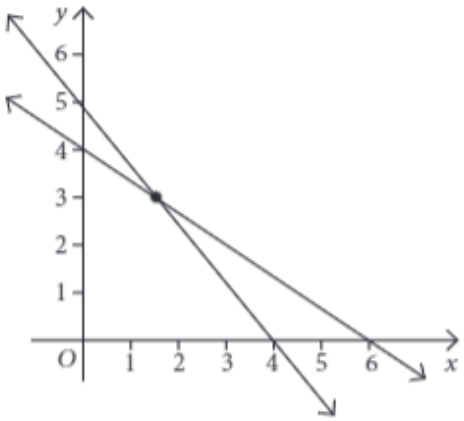
(a) (6, 0), (0, 8) (b) (0, 6), (0, 8) (c) (6, 0), (0, 3) (d) (0, 6), (0, 3)

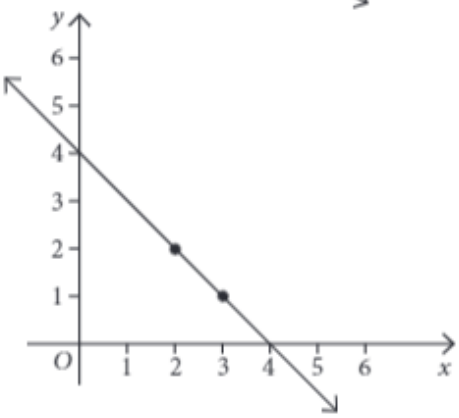
(iii) Coordinates of point of intersection of two given equations are

(a) (1, 2) (b) (2, 4) (c) (3, 7) (d) does not exist

(iv) Represent the equations, $2x + 4y = 8$ and $3x + 6y = 18$ graphically.

(a) 


(b) 


(c) 


(d) None of these

(v) System of linear equations represented by two given lines is

(a) inconsistent (b) having infinitely many solutions

(c) consistent (d) overlapping each other

10

## Dry Fruit Shop

Raman usually go to a dry fruit shop with his mother. He observes the following two situations.

On 1st day : The cost of 2 kg of almonds and 1 kg of cashew was ₹ 1600.

On 2nd day : The cost of 4 kg of almonds and 2 kg of cashew was ₹ 3000.

Denoting the cost of 1 kg almonds by ₹ $x$ and cost of 1 kg cashew by ₹ $y$, answer the following questions.

(i) Represent algebraically the situation of day-I.

(a) $x + 2y = 1000$ (b) $2x + y = 1600$ (c) $x - 2y = 1000$ (d) $2x - y = 1000$

**(ii)** Represent algebraically the situation of day-II.

(a) $2x + y = 1500$ (b) $2x - y = 1500$ (c) $x + 2y = 1500$ (d) $2x + y = 750$

**(iii)** The linear equation represented by day-I, intersect the $x$ axis at

(a) (0, 800) (b) (0, –800) (c) (800, 0) (d) (–800, 0)

**(iv)** The linear equation represented by day-II, intersect the $y$-axis at

(a) (1500, 0) (b) (0, –1500) (c) (–1500, 0) (d) (0, 1500)

**(v)** Linear equations represented by day-I and day -II situations, are

(a) non parallel (b) parallel

(c) intersect at one point (d) overlapping each other.

## HINTS & EXPLANATIONS

**1. (i) (a):** For student Anu:

Fixed charge + cost of food for 25 days = ₹ 4500

*i.e.*, $x + 25y = 4500$

For student Bindu:

Fixed charges + cost of food for 30 days = ₹ 5200

*i.e.*, $x + 30y = 5200$

**(ii) (b):** From above, we have $a_1 = 1, b_1 = 25$, $c_1 = -4500$ and $a_2 = 1, b_2 = 30, c_2 = -5200$

$$\therefore \frac{a_1}{a_2} = 1, \frac{b_1}{b_2} = \frac{25}{30} = \frac{5}{6}, \frac{c_1}{c_2} = \frac{-4500}{-5200} = \frac{45}{52}$$

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

Thus, system of linear equations has unique solution.

**(iii) (c):** We have, $x + 25y = 4500$ ...(i)

and $x + 30y = 5200$ ...(ii)

Subtracting (i) from (ii), we get

$5y = 700 \Rightarrow y = 140$

$\therefore$ Cost of food per day is ₹ 140

**(iv) (c):** We have, $x + 25y = 4500$

$\Rightarrow x = 4500 - 25 \times 140$

$\Rightarrow x = 4500 - 3500 = 1000$

$\therefore$ Fixed charges per month for the hostel is ₹ 1000

**(v) (d):** We have, $x = 1000$, $y = 140$ and Bindu takes food for 20 days.

$\therefore$ Amount that Bindu has to pay

$= ₹ (1000 + 20 \times 140) = ₹ 3800$

**2. (i) (d):** 1st situation can be represented algebraically as

$2x + 3y = 46$

**(ii) (c):** 2nd situation can be represented algebraically as $3x + 5y = 74$

**(iii) (b):** We have, $2x + 3y = 46$ ... (i)

$3x + 5y = 74$ ... (ii)

Multiplying (i) by 5 and (ii) by 3 and then subtracting, we get

$10x - 9x = 230 - 222 \Rightarrow x = 8$

$\therefore$ Fare from Bengaluru to Malleswaram is ₹ 8.

**(iv) (a):** Putting the value of $x$ in equation (i), we get

$3y = 46 - 2 \times 8 = 30 \Rightarrow y = 10$

$\therefore$ Fare from Bengaluru to Yeswanthpur is ₹ 10.

**(v) (c):** We have, $a_1 = 2, b_1 = 3, c_1 = -46$ and $a_2 = 3, b_2 = 5, c_2 = -74$

$$\therefore \frac{a_1}{a_2} = \frac{2}{3}, \frac{b_1}{b_2} = \frac{3}{5}, \frac{c_1}{c_2} = \frac{-46}{-74} = \frac{23}{37} \Rightarrow \frac{a_1}{a_2} \neq \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

Thus system of linear equations has unique solution.

**3. (i) (a) :** Suppose two cars meet at point $Q$. Then,

Distance travelled by car $X = AQ$,

Distance travelled by car $Y = BQ$.

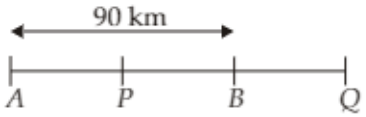
It is given that two cars meet in 9 hours.

$\therefore$ Distance travelled by car $X$ in 9 hours = $9x$ km

$\Rightarrow AQ = 9x$

Distance travelled by car $Y$ in 9 hours = $9y$ km

$\Rightarrow BQ = 9y$




Clearly, $AQ - BQ = AB$

$\Rightarrow 9x - 9y = 90$

$\Rightarrow x - y = 10$

**(ii)** **(c)** : Suppose two cars meet at point $P$. Then
Distance travelled by car $X = AP$ and
Distance travelled by car $Y = BP$.
In this case, two cars meet in 9/7 hours.

$\therefore$ Distance travelled by car $X$ in 9/7 hours $= \frac{9}{7}x$ km

$\Rightarrow AP = \frac{9}{7}x$

Distance travelled by car $Y$ in 9/7 hours $= \frac{9}{7}y$ km

$\Rightarrow BP = \frac{9}{7}y$

Clearly, $AP + BP = AB$

$\Rightarrow \frac{9}{7}x + \frac{9}{7}y = 90 \Rightarrow \frac{9}{7}(x + y) = 90 \Rightarrow x + y = 70$

**(iii)** **(b)**: We have $x - y = 10$ ...(i)

$\Rightarrow x + y = 70$ ...(ii)

Adding equations (i) and (ii), we get

$2x = 80 \Rightarrow x = 40$

Hence, speed of car $X$ is 40 km/hr.

**(iv)** **(c)** : We have $x - y = 10$

$\Rightarrow 40 - y = 10 \Rightarrow y = 30$

Hence, speed of car $y$ is 30 km/hr

**(v)** **(d)**

**4.** **(i)** **(a)** : 1st situation can be represented as

$x + 7y = 650$ ...(i)

and 2nd situation can be represented as

$x + 11y = 970$ ...(ii)

**(ii)** **(b)**: Subtracting equations (i) from (ii), we get

$4y = 320 \Rightarrow y = 80$

$\therefore$ Proportional expense for each person is ₹ 80.

**(iii)** **(c)** : Putting $y = 80$ in equation (i), we get

$x + 7 \times 80 = 650 \Rightarrow x = 650 - 560 = 90$

$\therefore$ Fixed expense for the party is ₹ 90

**(iv)** **(d)**: If there will be 15 guests, then amount that Mr Jindal has to pay = ₹ $(90 + 15 \times 80)$ = ₹ 1290

**(v)** **(a)** : We have $a_1 = 1, b_1 = 7, c_1 = -650$ and $a_2 = 1, b_2 = 11, c_2 = -970$

$\therefore \frac{a_1}{a_2} = 1, \frac{b_1}{b_2} = \frac{7}{11}, \frac{c_1}{c_2} = \frac{-650}{-970} = \frac{65}{97}$

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

Thus, system of linear equations has unique solution.

**5.** **(i)** **(d)**: Since 8 men and 12 women can finish the work in 10 days.

$\therefore \left(\frac{8}{x} + \frac{12}{y}\right) = \frac{1}{10} \Rightarrow \frac{80}{x} + \frac{120}{y} = 1$

**(ii)** **(c)** : Since 6 men and 8 women can finish a piece of work in 14 days.

$\therefore \left(\frac{6}{x} + \frac{8}{y}\right) = \frac{1}{14} \Rightarrow \frac{84}{x} + \frac{112}{y} = 1$

**(iii)** **(c)** : Let $\frac{1}{x} = u, \frac{1}{y} = v$

Thus, we have

$80u + 120v = 1$ and $84u + 112v = 1$

Solving above two equations, we get

$v = \frac{1}{280} \Rightarrow \frac{1}{y} = \frac{1}{280} \Rightarrow y = 280$

Thus one woman alone can finish the work in 280 days.

**(iv)** **(a)** : We have $\frac{80}{x} + \frac{120}{y} = 1 \Rightarrow \frac{80}{x} + \frac{120}{280} = 1$

$\Rightarrow \frac{80}{x} = 1 - \frac{3}{7} \Rightarrow \frac{80}{x} = \frac{4}{7} = \Rightarrow x = 140$

Thus one man alone can finish the work in 140 days.

**(v)** **(d)**: We have, $x = 140$ and $y = 280$

One day's work of 14 men and 28 women

$= \frac{14}{140} + \frac{28}{280} = \frac{1}{10} + \frac{1}{10} = \frac{2}{10} = \frac{1}{5}$

Thus, work will be finished in 5 days.

**6.** **(i)** **(a)**: Situation faced by Sudhir can be represented algebraically as

$2x + 3y = 850$

**(ii)** **(b)**: Situation faced by Suman can be represented algebraically as

$3x + 2y = 900$

**(iii)** **(c)** : We have

$2x + 3y = 850$ ...(i)

and $3x + 2y = 900$ ...(ii)

Multiplying (i) by 3 and (ii) by 2 and subtracting, we get

$5y = 750 \Rightarrow y = 150$

Thus, price of one Physics book is ₹ 150.

**(iv)** **(d)**: From equation (i) we have, $2x + 3 \times 150 = 850$

$\Rightarrow 2x = 850 - 450 = 400 \Rightarrow x = 200$

Hence, cost of one Mathematics book = ₹ 200

**(v)** **(a)** : From above, we have

$a_1 = 2, b_1 = 3, c_1 = -850$

and $a_2 = 3, b_2 = 2, c_2 = -900$

$\therefore \quad \frac{a_1}{a_2}=\frac{2}{3}, \frac{b_1}{b_2}=\frac{3}{2}, \frac{c_1}{c_2}=\frac{-850}{-900}=\frac{17}{18} \Rightarrow \frac{a_1}{a_2} \neq \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

Thus system of linear equations has unique solution.

7. Speed of boat in upstream = $(x - y)$km/hr and speed of boat in downstream = $(x + y)$km/hr.

**(i)** **(a)**: 1st situation can be represented algebraically as $\frac{24}{x-y}+\frac{36}{x+y}=6$

**(ii)** **(b)**: 2nd situation can be represented algebraically as $\frac{36}{x-y}+\frac{24}{x+y}=\frac{13}{2}$

**(iii)** **(c)**: Putting $\frac{1}{x-y}=u$ and $\frac{1}{x+y}=v$, we get

$24u + 36v = 6$ and $36u + 24v = 13/2$

Solving the above equations, we get $u=\frac{1}{8}, v=\frac{1}{12}$

**(iv)** **(d)**: $\because \; u=\frac{1}{8}=\frac{1}{x-y} \Rightarrow x-y=8$ ...(i)

and $v=\frac{1}{12}=\frac{1}{x+y} \Rightarrow x+y=12$ ...(ii)

Adding equations (i) from (ii), we get $2x = 20 \Rightarrow x = 10$

$\therefore$ Speed of boat in still water = 10 km/hr

**(v)** **(c)**: From equation (i), $10 - y = 8 \Rightarrow y = 2$

$\therefore$ Speed of stream = 2 km/hr

8. **(i)** **(b)**: Piyush sells a saree at 8% profit + sells a sweater at 10% discount = ₹ 1008

$\Rightarrow$ $(100 + 8)\%$ of $x + (100 - 10)\%$ of $y = 1008$

$\Rightarrow$ $108\%$ of $x + 90\%$ of $y = 1008$ ...(i)

**(ii)** **(c)**: Piyush sold the saree at 10% profit + sold the sweater at 8% discount = ₹ 1028

$\Rightarrow$ $(100 + 10)\%$ of $x + (100 - 8)\%$ of $y = 1028$

$\Rightarrow$ $110\%$ of $x + 92\%$ of $y = 1028$

$\Rightarrow$ $1.1x + 0.92y = 1028$ ...(ii)

**(iii)** **(d)**: At $x$-axis, $y = 0$

$\Rightarrow \; 1.08\, x = 1008 \Rightarrow x=\frac{1008}{1.08}=\frac{2800}{3}$

**(iv)** **(a)**: At $y$-axis, $x = 0$

$\Rightarrow \; 0.92\, y = 1028 \Rightarrow y=\frac{1028}{0.92}=\frac{25700}{23}$

**(v)** **(b)**: Solving equations (i) and (ii), we get

$x = 600$ and $y = 400$

Hence both linear equations intersect at (600, 400).

9. **(i)** **(a)**: At $x$-axis, $y = 0$

$\therefore \; 2x + 4y = 8 \Rightarrow x = 4$

At $y$-axis, $x = 0$

$\therefore \; 2x + 4y = 8 \Rightarrow y = 2$

$\therefore$ Required coordinates are (4, 0), (0, 2).

**(ii)** **(c)**: At $x$-axis, $y = 0$

$\therefore \; 3x + 6y = 18 \Rightarrow 3x = 18 \Rightarrow x = 6$

At $y$-axis, $x = 0$

$\therefore \; 3x + 6y = 18 \Rightarrow 6y = 18 \Rightarrow y = 3$

$\therefore$ Required coordinates are (6, 0), (0, 3).

**(iii)** **(d)**: Since, lines are parallel.

So, point of intersection of these lines does not exist.

**(iv)** **(a)**

**(v)** **(a)**: Since the lines are parallel.

$\therefore$ These equations have no solution *i.e.*, the given system of linear equations is inconsistent.

10. **(i)** **(b)**: Algebraic representation of situation of day-I is $2x + y = 1600$.

**(ii)** **(a)**: Algebraic representation of situation of day-II is $4x + 2y = 3000 \Rightarrow 2x + y = 1500$.

**(iii)** **(c)**: At $x$-axis, $y = 0$

$\therefore$ At $y = 0$, $2x + y = 1600$ becomes $2x = 1600$

$\Rightarrow \; x = 800$

$\therefore$ Linear equation represented by day-I intersect the $x$-axis at (800, 0).

**(iv)** **(d)**: At $y$-axis, $x = 0$

$\therefore \; 2x + y = 1500 \Rightarrow y = 1500$

$\therefore$ Linear equation represented by day-II intersect the $y$-axis at (0, 1500).

**(v)** **(b)**: We have, $2x + y = 1600$

and $2x + y = 1500$

Since $\frac{a_1}{a_2}=\frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ *i.e.*, $\frac{1}{1}=\frac{1}{1} \neq \frac{16}{15}$

$\therefore$ System of equations have no solution.

$\therefore$ Lines are parallel.