## Solution of a Pair of Linear Equations in Two Variables
## Word Problems (Use Elimination Method)

### Exercise 3.4

(i)   If we add 1 to the numerator and subtract 1 from the denominator, a fraction reduces to 1. It becomes 1/2 if we only add 1 to the denominator. What is the fraction?

(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?

(iii)  The sum of the digits of a two-digit number is 9. Also, nine times this number is twice the number obtained by reversing the order of the digits. Find the number.

(iv)  Meena went to bank to withdraw Rs 2000. She asked the cashier to give her Rs 50 and Rs 100 notes only. Meena got 25 notes in all. Find how many notes of Rs 50 and Rs 100 she received.

(v)  A lending library has a fixed charge for the first three days and an additional charge for each day thereafter. Saritha paid Rs 27 for a book kept for seven days, while Susy paid Rs 21 for the book she kept for five days. Find the fixed charge and the charge for each extra day.

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

According to the question,

$x + 4y = 27$ .......................................... **(i)**

$x + 2y = 21$ ......................................... **(ii)**

Subtracting equation **(ii)** from equation **(i)**, we get

$2y = 6$

$y = 3$ ... **(iii)**

Putting in equation **(i)**, we get

$x + 12 = 27$

$x = 15$

Hence, fixed charge = Rs 15 and Charge per day = Rs 3.

### Exercise 3.5

(i)   A part of monthly hostel charges is fixed and the remaining depends on the number of days one has taken food in the mess. When a student A takes food for 20 days she has to pay Rs 1000 as hostel charges whereas a student B, who takes food for 26 days, pays Rs 1180 as hostel charges. Find the fixed charges and the cost of food per day.

Ans. Let x be the fixed charge of the food and y be the charge for food per day.

According to the question,

x + 20y = 1000 ... **(i)**

x + 26y = 1180 ... **(ii)**

Subtracting equation **(i)** from equation **(ii)**, we get

6y = 180

y = 180/6 = 30

Putting this value in equation **(i)**, we get

x + 20 × 30 = 1000

x = 1000 – 600

x = 400

Hence, fixed charge = Rs 400 and charge per day = Rs 30

*(ii)  A fraction becomes 1/3 when 1 is subtracted from the numerator and it becomes 1/4 when 8 is added to its denominator. Find the fraction..*

*(iii) Yash scored 40 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each incorrect answer, then Yash would have scored 50 marks. How many questions were there in the test?*

*(iv) Places A and B are 100 km apart on a highway. One car starts from A and another from B at the same time. If the cars travel in the same direction at different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hour. What are the speeds of the two cars?*

Ans. Let the speed of 1st car and 2nd car be u km/h and v km/h.

Respective speed of both cars while they are travelling in same direction = (u – v) km/h

Respective speed of both cars while they are travelling in opposite directions i.e.,

travelling towards each other = (u + v) km/h

According to the question,

5(u – v) = 100

⇒ u – v = 20 ... **(i)**

1(u + v) = 100 ... **(ii)**

Adding both the equations, we get

2u = 120

u = 60 km/h ... **(iii)**

Putting this value in equation **(ii)**, we obtain

v = 40 km/h

Hence, speed of one car = 60 km/h and speed of other car = 40 km/h

*(v)  The area of a rectangle gets reduced by 9 square units, if its length is reduced by 5 units and breadth is increased by 3 units. If we increase the length by 3 units and the breadth by 2 units, the area increases by 67 square units. Find the dimensions of the rectangle.*