EXERCISE 3.5

1. Which of the following pairs of linear equations has unique solution, no solution, or infinitely many solutions. In case there is a unique solution, find it by using cross multiplication method.

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

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

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

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

2. (i) For which values of a and b does the following pair of linear equations have an infinite number of solutions?

   $2x + 3y = 7$

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

   (ii) For which value of k will the following pair of linear equations have no solution?

   $3x + y = 1$

   $(2k - 1)x + (k - 1)y = 2k + 1$

3. Solve the following pair of linear equations by the substitution and cross-multiplication methods :

   $8x + 5y = 9$

   $3x + 2y = 4$

4. Form the pair of linear equations in the following problems and find their solutions (if they exist) by any algebraic method :

(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 ₹ 1000 as hostel charges whereas a student B, who takes food for 26 days, pays ₹ 1180 as hostel charges. Find the fixed charges and the cost of food per day.

(ii) A fraction becomes $\frac{1}{3}$ when 1 is subtracted from the numerator and it becomes $\frac{1}{4}$ 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?

(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.