

### Class X WORKSHEET 3

1. Solve the following system of equation graphically:  $5x - y = 7$ ,  $x - y = -1$ .
2. Draw the graphs of the equations  $x - y + 1 = 0$  and  $3x + 2y = 0$ . Determine the vertices of the coordinates of the triangle formed by these lines and the x-axis, and shade the triangular region.
3. Determine graphically the coordinates of the vertices of a triangle, the equations of whose sides are:  $y = x$ ;  $y = 2x$ ;  $x + y = 6$ .
4. Find the value of  $m$  for which the pair of linear equations  $2x + 3y - 7 = 0$  and  $(m - 1)x + (m + 1)y = 3m - 1$  has infinitely many solutions.
5. Find the values of  $a$  and  $b$  for which the following pair of linear equations has infinitely many solutions.
6. For what value of  $p$  will the following pair of linear equations have infinitely many solutions?  
 $(p - 3)x + 3y = p$ ,  $px + py = 12$
7. Determine the value of  $m$  and  $n$  so that the following pair of linear equations have infinitely many solutions:  
 $(2m - 1)x + 3y = 5$ ;  $3x + (n - 1)y = 2$
8. For what values of  $p$  and  $q$  will have the following pair of linear equations has infinitely many solutions :  
 $4x + 5y = 2$ ;  $(2p + 7q)x + (p + 8q)y = 2q - p + 1$
9. Draw the graphs of  $x - y + 1 = 0$  and  $3x + 2y - 12 = 0$ . calculate the area bounded by these lines and the x-axis.
10. Solve the following system of linear equations graphically:  $5x - 6y + 30 = 0$ ;  $5x + 4y - 20 = 0$ .
11. Solve the following system of equations graphically:  
 $2x - 3y = 1$ ;  $3x - 4y = 1$   
Does the point  $(3, 2)$  lie on any of the line? Write its equation.
12. Solve the following system of equations graphically:  
 $2x - y - 4 = 0$  ;  $x + y = 1 = 0$
13. Solve the following system of equations graphically:  
 $3x + y - 11 = 0$ ,  $x - y - 1 = 0$   
Shade the region bounded by these lines and y-axis. Also, find the area of the region bounded by these lines and y - axis.
14. Draw the graphs of the equation:  $4x - y - 8 = 0$  and  $2x - 3y + 6 = 0$   
Also determine the vertices formed by the lines and x - axis.
15. Draw the graphs of the following equations:  $x + y = 5$ ;  $x - y = 5$ 
  - i. Find the solutions of the equation from the graph.
  - ii. Shade the triangular region formed by these lines and the x - axis.
16. Solve the following system of equations graphically:  $3x + y - 12 = 0$ ;  $x - 3y + 6 = 0$   
Shade the region bounded by the lines and the x - axis. Also, find the area of the shaded region.

17. Solve the following system of equation by the method of substitution:  $x - y = 0.9$ ;  $\frac{11}{2(x+y)} = 1$

18. Solve the given system of equations:  $x + y = a + b$ ,  $ax - by = a^2 - b^2$

19. Solve for  $x$  and  $y$ :  $\frac{ax}{b} - \frac{by}{a} = a + b$

20. Solve the following system of linear equations:

$$2(ax - by) + (a + 4b) = 0 \quad 2(bx + ay) + (b - 4a) = 0$$

21. Solve the following system of linear equations in  $x$  and  $y$ :

$$\frac{x}{a} + \frac{y}{b} - 2 = 0; \quad ax - by + b^2 - a^2 = 0$$

22. Solve the following system of linear equations in  $x$  and  $y$ :

i.  $(a - b)x + (a + b)y = a^2 - 2ab - b^2$  ;  $(a + b)(x + y) = a^2 + b^2$

ii.  $ax + by = 1$ ;  $bx + ay = \frac{(a+b)^2}{a^2+b^2} - 1$  or  $(bx + ay) = \frac{2ab}{a^2+b^2}$

23. Solve the following system of linear equations using the best suitable algebraic method:

I.  $\frac{2x-3y}{3} = 3 + \frac{3y-4x}{4}$ ;  $\frac{1}{3}(6y + 7x) = \frac{1}{5}(7x + 12y) + 4$

II.  $\sqrt{2}x - \sqrt{3}y$  ;  $\sqrt{5}x - \sqrt{2}y = 0$

24. Solve the following system of equations by elimination methods:

a.  $7(y+3)-2(x+2)=14$  ;  $4(y - 2) + 3(x - 3) = 2$

b.  $\frac{2}{\sqrt{x}} + \frac{3}{\sqrt{y}} = 2$ ;  $\frac{4}{\sqrt{x}} - \frac{9}{\sqrt{y}} = -1$

c.  $\frac{x}{a} - \frac{y}{b} = a - b$ ;  $ax + by = a^3 + b^3$

d.  $mx - ny = m^2 + n^2$ ;  $x + y = 2m$

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

f.  $2(ax - by) + (a + 4b) = 0$ ;  $2(bx + ay) + (b - 4a) = 0$

25. Solve the following system of equations :  $\frac{6}{x+y} = \frac{7}{x-y} + 3$  ;  $\frac{1}{2(x+y)} = \frac{1}{3(x-y)}$ ,  $x - y \neq 0$

26. Solve the following system of equations :  $\frac{2}{\sqrt{x}} + \frac{3}{\sqrt{y}} = 2$  ;  $\frac{4}{\sqrt{x}} - \frac{9}{\sqrt{y}} = -1$

27. Solve the following system of equations:  $\frac{1}{2(2x+3y)} + \frac{12}{7(3x-2y)} = \frac{1}{2}$

and  $\frac{7}{2x+3y} + \frac{4}{(3x-2y)} = 2$ , when  $2x + 3y \neq 0$  ,  $3x - 2y \neq 0$

28. Solve for  $x$  and  $y$  :  $\frac{xy}{x-y} = \frac{1}{2}$ ;  $\frac{xy}{x+y} = \frac{1}{5}$  where  $x + y \neq 0$ ;  $x - y \neq 0$

29. Solve :  $\frac{1}{3x+y} + \frac{1}{3x-y} = \frac{3}{4}$ ;  $\frac{1}{2(3x+y)} - \frac{1}{2(3x-y)} = -\frac{1}{8}$ ,  $3x + y \neq 0$  and  $3x - y \neq 0$

30. Solve for  $x$  and  $y$  :  $bx + ay = a + b$ ,  $ax\left(\frac{1}{a-b} - \frac{1}{a+b}\right) + by\left(\frac{1}{b-a} - \frac{1}{b+a}\right) = \frac{2a}{a+b}$

31. Solve:  $mx - ny = m^2 + n^2$ ;  $x + y = 2m$

32. Solve :  $\frac{44}{(x+y)} + \frac{30}{(x-y)} = 10$ ;  $\frac{55}{x+y} + \frac{40}{x-y} = 13$

33. Solve :  $\frac{7x-2y}{xy} = 5$ ;  $\frac{8x+7y}{xy} = 5$
34. 2 women and 5 men can together finish an embroidery work in 4 days, while 3 women and 6 men can finish it in 3 day. Find the time taken by 1 woman alone and also find time taken by 1 man alone.
35. A part of monthly hostel charges are fixed and 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.
36. A part of monthly hostel charges are fixed and remaining depends on the number of days one has taken food in the mess. When a student A takes food for 22 days she has to pay Rs. 1380 as hostel charges; whereas a student B, who takes food for 28 days, pays Rs. 1680 as hostel charges. Find the fixed charges and the cost of food per day.
37. A railway half-ticket costs half the full fare but the reservation charges are the same on a half-ticket as on a full-ticket. One reserved full first class ticket from station A to station B costs Rs. 2125. Also, one reserved a full first class ticket and a half first class ticket from station A to B costs Rs. 3200. Find the full fare from station A to B and also the reservation charges for a ticket.
38. In a  $\Delta ABC$ ,  $\angle C = 3\angle B = 2(\angle A + \angle B)$ , find the angles.
39. Base of an isosceles triangle is  $\frac{2}{3}$  times its congruent sides. Perimeter of the triangle 32cm. Find the length of each side of that triangle.
40. When 6 new boys were admitted and 26 girls were left from the class, the percentage of boys in the class increased from 60 % to 75 %. Find the original number of boys and girls in the class.
41. A person invested some amount at 12% simple interest and some other amount at the rate of 10 % simple interest. He received yearly interest of Rs. 130. But if he had interchanged the amounts invested, he would have received Rs. 4 more as interest. How much amount did he invest at different rates?
42. A man travels 370 km partially by train and partly by car. If he covers 250km by train and the rest by car, it takes him 4 hours. But if he travels 130km by train and the rest by the car, he takes 18 minutes longer. Find the speed of the train and that of the car.
43. Places A and B are 80 km apart from each other on a highway. A car starts from A and another from B at the same time. If they move in same direction they meet in 8 hours and if they move in opposite directions they meet in 1 hr 20 minutes. Find the speeds of the cars.
44. A boat goes 30km upstream and 44 km downstream in 10 hours. In 13 hours, it can go 40 km upstream and 55 km downstream. Determine the speed of the stream and that of the boat in still water.
45. A says to B, "Give me Rs. 900 and I shall be twice as rich as you". B replies, "If you give me Rs. 100, I shall be thrice as rich as you." How much money each one of them have?
46. 2 men and 5 boys can do a piece of work in 4 days, while 4 men and 4 boys can do it in 3 days. How long will it take one man alone to do it and how many days would it take one boy alone to do it?

47. A number consists of three digits whose sum is 17. The middle digit exceeds the sum of the other two by 1. If the digits are reversed, the number is diminished by 396, find the number.
48. After covering a distance of 30 km at a uniform speed, there is some defect in a train engine and, therefore; its speed is reduced to  $\frac{4}{5}$  of its original speed. Consequently, the train reaches its destination late by 45 minutes earlier than it did. Find the speed of the train and the length of the journey.
49. 3 bags and 4 pens together cost Rs. 257; whereas 4 bags and 3 pens together cost Rs. 324. Find the total cost of 1 bag and 10 pens.
50. 8 men and 12 boys can finish a piece of work in 10 days, while 6 men and 8 boys can finish it in 14 days. Find the time taken by one man alone and that taken by one boy alone to finish the work.
51. The sum of two numbers  $a$  and  $b$  is 15 and the sum of their reciprocals is  $\frac{3}{10}$ . Find the numbers  $a$  and  $b$ .
52.  $\angle$  children more, each would get a rupee less. But if there were 15 children less each would get Rs. 3 more. Find the sum of money distributed and also the number of children.
53. Children were fallen in for a drill. If each row contained 4 children less, 10 more rows would have been made. But if 5 more children were fallen in each row, the number of rows would have reduced by 5. Find out the number of children in the school.
54. The sum of digits of a 2 digit number and the number formed by interchanging its digit is 132. If 12 is added to the number exceeds that number by 63. Find the number.
55. A fraction is such that if the numerator is multiplied by 2 and the denominator is increased by 2, we get  $\frac{5}{4}$ . But if the numerator is increased by 1 and the denominator is doubled, we get  $\frac{1}{2}$ . Find the fraction.
56. A fraction becomes  $\frac{9}{11}$  if 2 is added to both its numerator and denominator. If 3 is added to both its numerator and the denominator, it becomes  $\frac{5}{6}$ . Find the fraction.
57. Six years hence a man's age will be three times as his son's age and three years ago he was nine times as old as his son. Find their present ages.
58. Five year hence, father's age will be three times as old as his son. Two years later, his age will be 8 more than three times age of the son. Find the present ages of father and the son.
59. Father's age is 3 times the sum of the ages of his two children. After 5 years, his age will be twice the sum of ages of two children. Find the age of father.
60. In a cyclic quadrilateral ABCD,  $\angle A = (2x-1)^\circ$ ,  $\angle B = (y+5)^\circ$ ,  $\angle C = (2y+15)^\circ$  and  $\angle D = (4x-7)^\circ$ . Find all the four angles of the quadrilateral.
61. The area of a rectangle gets reduced by 9 sq. units if its length is reduced by 5 units and the breadth is increased by 3 units. If we increase the length by 3 units and breadth by 2 units, the area increases by 67 units. Find the dimensions of the rectangle.
62. A man covers a distance of 15km in 3 hours partly by walking and partly by running. If he walks at 3 km/hr and runs at 9km/hr, find the distance he covers by running.

63. A boat goes 12km upstream and 40 km downstream in 8 hours, it can go 16 km upstream and 32 km downstream in the same time. Find the speed of the boat in still water and the speed of the stream.
64. The boat goes 25km upstream and 33 km downstream in 8 hours. It can also go 49 km upstream and 77 km downstream in 15 hours. Find the speed of the boat in still water and the speed of the stream.
65. A boat travels for 7 hours. If it travels 4 hours downstream and 3 hours upstream, then it covers the distance of 116 km. but if it travels 3 hours downstream and 4 hours upstream, it covers the distance of 108 km. find the speed of the boat.
66. The age of the father is the twice the sum of the ages of his 2 children. After 20 years, his age will be equal to the sum of the ages of his children. Find the age of the father.
67. A number consists of two digits. When the number is divided by the sum, of its digits, the quotient is 7. If 27 are subtracted from the number, the digits interchange their places, find the number.
68. The sum of the numerator and the denominator of a fraction is 12. If 1 is added to both the numerator and denominator, the fraction becomes  $\frac{3}{4}$ . Find the fraction.
69. 4 men and 6 boys can finish a piece of work in 5 days while 3 men and 4 boys can finish it in 7 days. Find the time taken by 1 man alone or that by 1 boy along.
70. A man travels 600 km partly by train and partly by car. It takes 8 hours and 40 minutes if he travels 320 km by train and the rest by the car. It would take 30 minutes more if he travels 200 km by train and the rest by car. Find the speed of the train and the car separately.
71. Seven times a 2-digit number is equal to four times the number obtained by reversing the order of its digits. If the difference of the digits 3, determine the number.
72. The sum of a two digit number and the number obtained by interchanging its digits of the number is 99. If the digits differ by 3, find the numbers.
73. Draw the graphs of the following equations of the same graph paper:  $2x + 3y = 12$ ;  $x - y = 1$ . Find the coordinates of the vertices of the triangle formed by the two straight lines on the y- axis and also determine the area of this triangle.
74. 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 of different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hour, what is the speed of the two cars?
75. For the pair of equations  $\lambda x + 3y = -7$ ,  $2x - 6y = 14$  to have infinitely many solutions, the value of  $\lambda$  should be 1. Is the statement true? Give reason.
76. Solve the following system of linear equations by the method of cross multiplication:  $2(ax - by) + a + 4b = 0$ ;  $2(bx - ay) + b - 4a = 0$ .
77. The difference of two numbers is 4 and the difference between their reciprocals is  $\frac{4}{21}$ . Find the numbers.
78. 2 women and 5 men together can finish a piece of embroidery in 4 days, while 3 women and 6 men can finish it in 3 days. Find the time taken by 1 woman alone, and that taken by 1 man alone to finish the embroidery.
79. The sum of numerator and denominator of fraction is 3 less than twice the denominator. If each of the numerator and denominator is decreased by 1, the numerator becomes half the denominator. Find the fraction.