

# Linear Equations in two variables

## 1 Mark

1. Is the pair of linear equations consistent:  $x + y = 3$ ;  $3x - 2y = 4$ .
2. Find out whether the lines representing the following pair of linear equations are parallel or coincide:-  $6x - 3y + 10 = 0$ ;  $2x - y + 9 = 0$ .
3. Write the value of k for which the following pair of linear equations has no solution:-  
 $x + ky + 6 = 0$ ;  $2x + 3y + 8 = 0$
4. Write the value of k for which of the following pair of linear equations has no solution:-  
 $4x + y = 11$ ;  $kx + 3y = 5$
5. Write the value of k for which the system of equations have infinite solutions:-  
 $2x - 3y + 10 = 0$ ;  $3x - ky + 15 = 0$
6. Does (2, -3) lie on the linear equation  $3x - 2y + 5 = 0$ .
7. For what value of k, the pair of linear equations  $2x + ky = 1$ ,  $x - 3y = -3$  has unique solution.
8. Is the following pair of linear equations consistent?  $8x + 5y = 9$ ;  $16x + 10y = 15$
9. Write the value of k for which the pair of linear equations  $5x + 2y = k$ ;  $10x + 4y = 3$  has infinite many solutions.
10. Does (-1, 2) lies on the linear equation  $2x + y = 0$

## 2 Marks

11. Solve for x and y:-  $3x - 5y + 1 = 0$ ;  $x - y + 1 = 0$
12. For what value of m the system of equations  $mx + 3y = m - 3$ ,  $12x + my = m$  will have no solution.
13. Find the value of k for which the following system of equations have infinitely many solutions:-  
 $x + (k + 1)y = 4$ ;  $(k + 1)x + 9y = 5k + 2$
14. Sum of two numbers is 35. If their difference is 13, find the numbers.
15. Obtain the condition of the following system of linear equations to have unique solutions:-  
 $ax + by + c = 0$ ;  $lx + my + n = 0$
16. The sum of two numbers is 8. If their sum is four times their difference, find the numbers.
17. Find the value of k for which the following system of equations have infinitely many solution:-  
 $2x + 3y = k$ ,  $(k - 1)x + (k + 2)y = 3k$
18. For what value of k, the system of linear equations  $x + 2y = 5$ ,  $3x + ky + 15 = 0$  has  
(i) a unique solution (ii) no solution
19. Solve for x and y:-  $2x - y = 2$ ,  $3y - 4x + 2 = 0$
20. A father is three times as old as his son. After 12 years, he will be twice as old as his son. Find the present ages of the father and the son.

### 3 Marks

21. Show graphically that the system of linear equations  $5x - y = 14$ ;  $x - 2y = 1$  has a unique solution. Write the coordinates where line  $x - 2y = 1$  intersect the x-axis.
22. Solve the following system of linear equations graphically:-  $2x - y = 4$ ;  $x + y + 1 = 0$   
Find the points where the lines meet x-axis.
23. Show graphically that system of equations  $3x - y = 2$ ;  $6x - 2y = 4$  has infinite many solutions.
24. Solve for x and y:-  $\frac{1}{2x} - \frac{1}{y} = -1$ ;  $\frac{1}{x} + \frac{1}{2y} = 8$  where  $x, y \neq 0$ .
25. Solve for x and y:-  $\frac{6}{x+y} - \frac{7}{x-y} = 3$ ;  $\frac{1}{2(x+y)} = \frac{1}{3(x-y)}$ , where  $x + y \neq 0$  and  $x - y \neq 0$ .
26. Solve for x and y:-  $\frac{x}{a} + \frac{y}{b} = 2$ ;  $ax - by = a^2 - b^2$ .
27. Find the values of p and q for which the following system of equations has infinitely many solutions:-  $2x + 3y = 7$ ;  $(p + q)x + (2p - q)y = 21$
28. Amit and Sumit have certain number of oranges. Amit says to Sumit, "If you give me 10 of your oranges, I will have twice the number of oranges left with you". "Sumit replies, "if you give me 10 of your oranges, I will have the same number of oranges as left with you." Find the number of oranges with Amit and Sumit separately.
29. The sum of digits of a two digit number is 15. The number obtained by reversing the order of digits of given number exceeds the given number by 9. Find the given number.
30. If 2 is added to the numerator of a fraction, it reduces to  $\frac{1}{2}$  and if 1 is subtracted from the denominator it reduces to  $\frac{1}{3}$ . Find the fraction.
31. I am three times as old as my son. Five year later, I shall be two and half times as old as my son. How old am I and how did is my son?
32. A part of monthly hostel charges in a college are fixed and the remaining depend of the number of days one has taken food in the mess. When a student 'A' takes food for 20 days he has to pay Rs. 1300 as hostel charges whereas a student 'B' who takes for 25 days pays Rs. 1500 as hostel charges. Find the fixed charges and the cost of food per day.
33. The sum of a two digit number and the number formed by inter changing its digits is 110. If 20 is subtracted from the original number, the new number is 4 more than 4 times the sum of the digits in the original number. Find the original number.
34. Solve the following system of equations in x and y:  
$$(a - b)x + (a + b)y = a^2 - 2ab - b^2 ; (a + b)(x + y) = a^2 + b^2$$
35. 8 men and 12 women can finish a piece of work in 10 days while 6 men and 8 women can finish it in 14 days. Find the time taken by one man alone and that by one woman alone to finish the work.
36. Draw the graphs of the equations:-  $x + 3y = 6$ ;  $2x - 3y = 12$  and hence find the value of a if  $3x + 2y = 3 + a$ . Find the area of the triangle formed by these lines with y-axis.

## Answers

1. Yes
2. Parallel lines
3.  $k \neq \frac{3}{2}$  (all real numbers except  $\frac{3}{2}$ )
4.  $k = 12$
5.  $k = \frac{-9}{2}$
6. No
7.  $k \neq -6$  (all real numbers except -6)
8. No
9.  $k = \frac{3}{2}$
10. Yes
11.  $x = -2, y = -1$
12.  $m = -6$
13.  $k = 2$
14. 24 & 11
15.  $am \neq bl$
16. 5 and 3
17.  $k = 7$
18. (i)  $k \neq 6$  (ii)  $k = 6$
19.  $x=2, y=2$
20. 36 years, 12 years
21. (3,1), x-axis (1,0)
22. (1, -2) points (-1, 0) & (2, 0)
23. coincident
24.  $x = \frac{1}{6}, y = \frac{1}{4}$
25.  $x = -\frac{5}{4}, y = -\frac{1}{4}$
26.  $x = a, y = b$
27.  $p = 5, q = 1$
28. Amit has 70 oranges and Sumit has 50 oranges
29. 78
30.  $\frac{3}{10}$
31. 45 year and 15 years
32. Fixed charges = Rs500, Cost of food per day=RS.40
33. 64
34.  $x = a + b, y = -\frac{2ab}{a+b}$
35. Man = 140 days, Woman = 280 days
36.  $a = 15$  area = 18 sq. units

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