

SUBJECT: MATHEMATICS

CLASS: X

TOPIC: LINEAR EQUATIONS IN TWO VARIABLES

1. Solve graphically the system of linear equations: a) $x + 3y = 11$, $3x + 2y = 12$ (3, 5)
2. Draw the graph of the equation $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and the x -axis, and shade the triangular region (-1, 0), (2, 3) and (4, 0)
3. Solve:
 - a) $\frac{xy}{x+y} = \frac{1}{5}$, $\frac{xy}{x-y} = \frac{1}{7}$ (x = -1, y = 1/6)
 - b) $149x - 330y = -511$, $-330x + 149y = -32$ (x=1, y=2)
 - c) $37x + 43y = 123$, $43x + 37y = 117$ (x=1, y=2)
 - d) $(a - b)x + (a + b)y = a^2 - 2ab - b^2$, $(a + b)x + (a + b)y = a^2 + b^2$ (x = a+b, y = -2ab/a+b)
 - e) $ax - by = a^2 + b^2$, $x - y = 2b$
 - f) $\frac{10}{x+y} + \frac{2}{x-y} = 4$, $\frac{15}{x+y} - \frac{5}{x-y} = -2$ (x = 3, y = 2)
 - g) $\frac{x}{a} + \frac{y}{b} = a + b$, $\frac{x}{a^2} + \frac{y}{b^2} = 2$ (a², b²)
4. Find the value(s) of k for which the pair of linear equations $kx + 3y = k - 2$ and $12x + ky = k$ has no solution (k = ±6)
5. Find the value of k, for which the pair of equations $3x + 5y = 0$, $kx + 10y = 0$, has a non zero solution (k = 6)
6. Find the value of a and b for which the system of equation has infinitely many solutions:
 - a) $2x + 3y = 7$, $(a - b)x + (a + b)y = 3a + b - 2$ (5, 1)
7. Find the value of k, for which the given linear pair has a unique solution: $2x + 3y - 5 = 0$, $kx - 6y - 8 = 0$ (k ≠ -4)
8. 10 students of class x took part in mathematics quiz. If the number of girls is 4 more than the number of boys, find the number of boys and number of girls who took part in the quiz. (3, 7)
9. The larger of the two supplementary angles exceeds the smaller by 18 degrees. Find the angles (99°, 81°)
10. In a two digit number, the sum of the digits is 9. If the digits are reversed, the number is increased by 9. Find the Number (45)
11. A fraction becomes 4/5 if 1 is added to both the numerator and the denominator. However, if 5 is subtracted from Both the numerator and the denominator the fraction becomes 1/2. Find the fraction (7/9)
12. Two years ago, a father was five times as old as his son. Two years later, his age will be 8 more than three times the age of the son. Find the present ages of father and son (10, 42)
13. 90% and 97% pure acid solutions are mixed to obtain 21 litres of 95% pure acid solution. Find the amount of each Type of acid to be mixed to form the mixture (x=6, y=15)
14. 2 women and 5 men can together finished a piece of work in 4 days, while 3 women and 6 men can finish it in 3 days. Find the time taken by 1 woman alone to finish the work, and that taken by 1 man alone. (18, 36)
15. A boat goes 16km upstream and 24km downstream in 6hrs. It can go 12km up and 36km down in the same time. Find the speed of the boat in still water and the speed of the stream. (8, 4)
16. Students of a class are made to stand in rows. If 4 students are extra in a row, their would be 2 rows less. If 4 students are less in a row, there would be 4 more rows. Find the number of students
17. The perimeter of a rectangle is 44 cm. If its length is increased by 4 cm and its breadth is increased by 2cm, its area is increased by 72 sqcm. Find the dimensions of the rectangle.
18. The sum of two numbers is 1000 and the difference between their squares is 256000. Find the numbers (266,744)
19. If $(x + 2)$ is a factor of $x^3 + ax^2 + 4bx + 12$ and $a + b = -4$, find the values of a and b (-3, -1)
20. Two numbers are in the ratio 3: 4 and if 4 are added to each, the ratio becomes 4:5. Find the numbers (12, 16)
21. Solve by the method of cross multiplication:

$$(a - b)x + (a + b)y = a^2 - 2ab - b^2, (a + b)(x+y) = a^2 + b^2$$
 (a+b, -2ab/a+b)
22. The ratio of incomes of two persons is 9: 7 and the ratio of their expenditures is 4 : 3. If each of them saves Rs. 200 per Month, find their monthly expenditures. (Rs1800, Rs1400)
23. Sum of the areas of two squares is $468m^2$. If the difference of their perimeter is 24m, find the sides of two square
24. Rohan travels 600km from his home partly by train and partly by car. He takes eight hours if he travels 120km by train And rest by car. He takes 20min more if he travels 200km by train and rest by car. Find the speed of train and car. (60km/hr, 80km/hr)
25. A boy travels for x hrs at 8km/hr and then for y hrs at 7km/hr. If he goes 37km altogether in 5hrs, find x and y (2, 3)

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