MATHS

BOOKS - NAGEEN MATHS (HINGLISH)

LINEAR EQUATIONS IN TWO VARIABLES

Solved Example

1. Solve graphically the system of linear equations

$x + y = 10$ and $x - y = 4$.

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2. Show graphically the system of linear equations

$x + 2y = 3$ and $4x + 3y = 2$.

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3. Show graphically that the system of equations

2x + 4y = 10 and 3x + 6y = 12 has no solution.

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4. Show graphically that the system of equations $3x - y = 2$ $9x - 3y = 6$ has infinitely many solutions.

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5. Draw the graphs of the equations $xy + 1 = 0$ and $3x + 2y12 = 0.$ Determine the coordinates of the vertices of the triangle formed by these lines and the xaxis, and shade the triangular region.

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6. Solve $x + y = 7$ and $3x - 2y = 11$.

A. $x = 1, y = 1$

B. $x = 5, y = 2$

C. $x = 2, y = 5$

D. $x = -5, y = -2$

Answer: B

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7. Solve $15x - 8y = 29$ and $17x + 12y = 75$.

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8. Solve $3x - 4y = 20$ and $x + 2y = 5$.

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9. Solve the following system of equations by using the method of elimination by equating the coefficients: $8x + 5y = 9, \quad 3x + 2y = 4$

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10. Solve 3x - y = 23 and $\frac{x}{3} + \frac{y}{4} = 4$.

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11. Solve: $4x + \frac{6}{y} = 15$

$6x - \frac{8}{y} = 14$

and hence find p if $y = px - 2$

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12. Solve $\frac{7}{x} + \frac{8}{y} = 2$ and $\frac{2}{x} + \frac{12}{y} = 20.$

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13. $\frac{1}{2x} - \frac{1}{y} = -1, \frac{1}{x} + \frac{1}{2y} = 8$

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14. Solve $\frac{20}{x+y} + \frac{3}{x-y} = 7$ and $\frac{8}{x-y} - \frac{15}{x+y} = 5.$

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15. (i) Solve 8x - 3y = 5xy and 6x - 5y = - 2xy. How many solutions, this system of equations has?

(ii) Solve for x and y, by reducing the following equations in a pair of linear equations :

2x + 3y = 5xy and 3x - 2y = xy.

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16. $Solve: \frac{1}{2(2x+3y)} + \frac{12}{7(3x-2y)} = \frac{1}{2} \quad \frac{7}{2x+3y} + \frac{4}{3x-2y} = 2$

where $2x + 3y \neq 0 and 3x - 2y \neq 0.$

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17. Solve 41x + 53y = 135 and 53x + 41y = 147.

A. $x = 1$ and $y = 2$

B. $x = 2$ and $y = 1$

C. $x = 2$ and $y = 2$

D. $x = 1$ and $y = 1$

Answer: B

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18. Solve for 'x' and 'y':

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

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19. Solve the equations :

$(x-4)(y-4)=16$

$(y-6)(z-6)=36$

$(z-8)(x-8)=64.$

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20. Solve the following equations for $(x-3)^2$ and $(y+2)^2$:

$2x^2+y^2-12x+4y+16=0$ and $3x^2-2y^2-18x-8y+3=0.$

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21. Solve for x and y :

$2^{y-x}(x+y)=1$ and $(x+y)^{x-y}=2$.

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22. Solve :

$(3x+2y-7)^2+(5x+7y-13)^2=0$, for real values of x and y.

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23. Solve the following system of equations by using the method of cross multiplication

2x + 3y = 7 and 6x + 5y = 11.

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24. Solve the following system of equations by cross multiplication method

3x - 5y = 20 and 7x + 2y = 17.

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25. Solve the following system of equations

bx + ay = 2ab and $ax - by = a^2 - b^2$.

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26. Solve : $a(x + y) + b(x - y) = a^2 - ab + b^2$

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

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27. Show that the following system of equations have unique solution :

(i) $7x - 2y = 3$, $22x - 3y = 16$ (ii) $3x + y = 17$, $8x + 11y = 37$ (iii) $2x + 5y = 17$, $5x + 3y = 14$

and also solve the system of equations in each case.

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28. Find the value of k for which the system of equations 2x + ky = 1 and 3x - 5y = 7 has a unique solution.

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29. For what value of k , will the system of equations $x + 2y = 5$, $3x + ky - 15 = 0$ has (i) a unique solution? (ii) no solution

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30. For what value(s) of α will the system of linear equations $\alpha x + 3y = \alpha - 3$ and $12x + \alpha y = \alpha$ has a unique solution?

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31. For the following system of equations determine the value of k for which the given system has infinitely many solutions:

$5x + 2y = k, \quad 10x + 4y = 3$

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32. Find the values of p and q for which the following system of equations has infinite number of solutions:

$2x + 3y = 7, \quad (p+q)x + (2p-q)y = 21$

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33. for what values of k will the following pairs of linear equations have infinitely many solutions $kx + 3y - (k - 3) = 0$ and $12x + ky - k = 0$

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34. When a system of linear equations said to be consistent. For what value of k will the equations 3x + 4y + 2 = 0 and 9x + 12y + k = 0 are dependent ?

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35. For what value(s) of k, the pair of linear equations -2x + 5y = 0 and kx + 3y = 0 has a non-zero solutions?

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36. The sum of two numbers is 80. If the larger number exceeds four times the smaller one by 5. Find the numbers.

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37. The sum of two numbers is 18. The sum of their reciprocals is . Find the numbers.

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38. The ages of two friends Ani and Biju differ by 3 years. Anis father Dharam is twice as old as Ani and Biju as twice as old as his sister Cathy. The ages of Cathy and Dharam differ by 30 years. Find the ages of Ani and Biju.

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39. Five years age a man was seven times as old as his son. Five years hence, the father will be three times as old as his son. Find their present ages.

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40. The total of the ages of father and son is 55 years. If the father was to live till his son's age equals his present age, the total of their ages would be 93 years. Find their present ages.

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41. The sum of the two-digit number is 9 The number formed by interchanging the order of the digits 27 more than the given number.Find the number.

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42. If 2 is added to the numerator of a fraction, it reduces to $1/2$ and if 1 is subtracted from the denominator, it reduces to $1/3$. Find the fraction.

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43. 5 books and 7 pens together cost Rs 79 whereas 7 books and 5 pens together cost Rs 77. Find the total cost of 1 book and 2 pens.

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44. A fruit seller has certain number of oranges. He divides them into two lots A and B. He sells the lot at 3 oranges for Rs. 2 and the lot B at 1 oranges for Rs. 1. Thus he gets Rs. 400, if he had sold the first lot at 1 oranges for Rs. 1 and the second lot B at 5 oranges for Rs. 4, he would have got Rs. 460. Find the total number of oranges.

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45. On selling a tea-set 5% loss and a lemon-set at 15% gain, a crockery seller gains Rs. 7. If he sells the tea-set at 5% gain and the lemon-set at 10% gain, he gains Rs. 13. Find the actual price of the tea-set and the lemon-set.

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46. A man sold a chair and a table together for 760 thereby making a profit of 25% on the chair and 10% on the table. By selling them together for 767.50 he would have made a profit of 10% on the chair and 25%, on the table. Find the cost price of each.

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47. In a ΔABC, $\angle C = 3\angle B = 2(\angle A + \angle B)$ find the three angles.

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48. The area of a rectangle gets reduced by 9 square 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 is increased by 67 square units. Find the length and breadth of the rectangle.

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49. A lady has 25 paise and 50 paise coins in her purse. If in all she has 40 coins and value of her money is Rs. 12.75, how many coins of each type does she have?

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50. A man when asked "how many hens and buffaloes he has ?". He replied that they have 78 eyes and 110 legs in all. Find the number of hens and buffaloes separately.

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51. 2 men and 7 boys can do a piece of work in 4 days. The same work is done in 3 days by 4 men and 4 boys. How long would it take one man and one boy to do it?

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52. Water is pouring into a tank at a constant rate. when the tank is full, 10 pumps of equal capacity empty the tank in 12 hrs, while 15 pumps of the same capacity empty the tank in 6 hrs. The time which 25 pumps of the same capacity take to empty the tank, if the tank in initially full, will be :

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53. Some students planned a picnic. The budget for food was Rs. 500. But 5 of them failed to go and thus the cost of food for each member increased by Rs. 5. How many students attended the picnic?

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54. A plane left 30 minutes late than its scheduled time and in order to reach the destination1500 km away in time, it had to increase the speed by 250 km/h from the usual speed.Find its usual speed.

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55. 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

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56. 5. After covering a distance of 30 km with a uniform speed there is some defect in train engine and therefore, its speed is reduced to 4/5 of its original speed. Consequently, train reaches its destination late by 45

minutes. Had it happened after covering 18 km more, reached 9 minutes earlier. Find the speed of the train and the distance of covered.

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57. A boat goes 30 km 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.

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58. A boat which travels at the rate of 10.5 km/hr downstream takes 3 times as long time to go to a certain distance up a river as to go the same distance down. Find the rate at which stream flows.

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59. Half the perimeter of a rectangular garden, whose length is 4 m more than its width, is 36 m. Find the dimensions of the garden by graphical method.

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60. Solve $2x + 3y = 11$ and $2x - 4y = -24$ and hence find the value of 'm' for which $y = mx + 3$.

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61. (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?

$3x + y = 1$

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

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62. Formulate the following problems as a pair of equations, and hence find their solutions: (i) Ritu can row downstream 20 km in 2 hours, and upstream 4 km in 2 hours. Find her speed of rowing in still water and the speed of the current. (ii) 2 wome

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63. One says, "Give me a hundred, friend ! I shall then become twice as rich as you". The other replies. 'If you give me ten, I shall be six times as rich as you". Tell me what is the amount of their (respective) capital? [From the Bijaganita of B

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64. The students of a class are made to stand in rows. If 3 students are extra in a row, there would be 1 row less. If 3 students are less in a row there would be 2 rows more. Find the number of students in the class.

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65. Two straight paths are represented by the equations $x - 3y = 2$ and $-2x + 6y = 5$. Check whether the paths cross each other or not.

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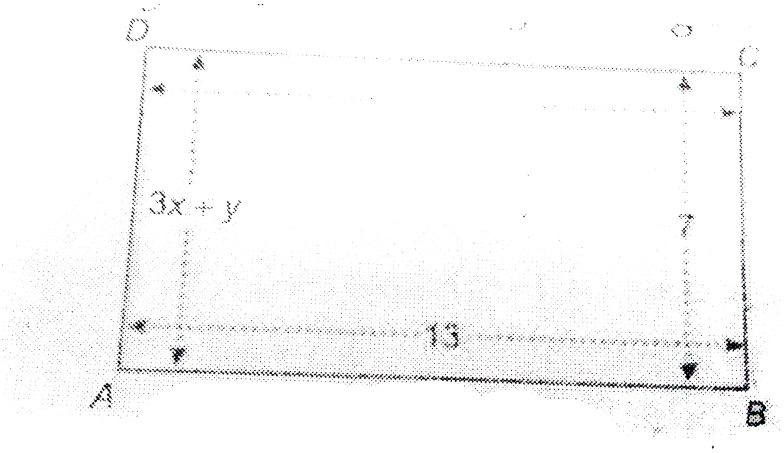
66. Find the values of x and y in the following rectangle :



We know that the opposite sides of a rectangle are equal

$\therefore$ 3x + y = 7 ...(1)

x + 3y = 13 ...(2)

9x + 3y = 21 [from (1)]

$$\begin{array}{r} x + 3y = 13 \\ - \quad - \quad - \\ \hline \end{array}$$

On subtracting, $8x = 8$

x = 1

Now, from (1), 3 (1) + y = 7

implies y = 7 - 3

implies y = 4

Hence, the required values of x and y are 1 and 4 respectively.

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67. The age of the father is twice the sum of the ages of his two children. After 20 yr, his age will be equal to the sum of the ages of his children. Find the age of the father.

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68. Two numbers are in the ratio 5 : 6. If 8 is subtracted from each of the numbers, the ratio becomes 4 : 5, then find the numbers.

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69. A shopkeeper gives books on rent for reading. She takes a fixed charge for the first two days and an additional charge for each day thereafter. Latika paid Rs. 22 for a book kept for six days, while Anand

paid Rs. 16 for the book kept for four days. Find the fixed charges and the charge for each extra day.

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70. In a competitive examination, 1 mark is awarded for each correct answer while 1/2 mark is deducted for every wrong answer. Jayanti answered 120 questions and got 90 marks. How many questions did she answer correctly?

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71. A shopkeeper sells a saree at 8% profit and a sweater at 10% discount, thereby, getting a sum Rs 1008. If she had sold the saree at 10% profit and the sweater at 8% discount, she would have got Rs 1028 then find the cost of the saree and the list price (price before discount) of the sweater.

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72. The pair of equations y = 0 and y = 7 has :

(a) one solution (b) two solutions

(c) infinitely many solutions (d) no solution

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73. If x = a and y = b is the solution of the equations x - y =2 and x + y = 4 , then the values of a and b are, respectively

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74. For the pair of equations $\lambda x + 3y + 7 = 0$ and $2x + 6y - 14 = 0$. To have infinitely many solutions, the value of λ should be 1 . Is the statement true ? Give reasons.

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75. For which values of a and b will the following pair of linear equations has infinitely many solutions ?

$x + 2y = 1$

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

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76. If (x+1) is a factor of $2x^3 + ax^2 + 2bx + 1$, then find the value of a and b given that 2a-3b=4.

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77. A person can row a boat at the rate of 5 km/hour in still water. He takes thrice as much time in going 40 km upstream as in going 40 km downstream. Find the speed of the stream.

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Exercise 3 A

1. $3x - y - 2 - 0$
$2x + y - 8 = 0$

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2. $2x + y = 23$
$4x - y = 19$

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3. $x + y = 6$
$x - y = 2$

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4. $2x + 3y = 4$
$x - y = -3$

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5. $2x + 3y + 5 = 0$
$3x - 2y - 12 = 0$

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6. $2x - 5y + 4 = 0$
$2x + y - 8 = 0$

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7. $2x - 3y = -13$
$3x - 2y = -12$

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8. $x - 2y = -2$
$2x + y = 16$

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9. $3x + 5y = 12$
$3x - 5y = -18$

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10. $3x - 2y = 4$
$5x - 2y = 0$

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11. Show graphically that following system of equations has infinitely many solutions: $x - 2y + 11 = 0; \quad 3x - 6y + 33 = 0$

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12. Find graphically the vertices of the triangle whose sides have the equations 2y - x = 8, 5y - x = 14 and y = 2x = 1, respectively.

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13. Solve the following system of linear equations graphically: $3x + y - 11 = 0, \quad x - y - 1 = 0$. Shade the region bounded by these lines and y-axis. Also, find the area of the region bounded by these lines and y-axis.

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14.
$$4x - 3y + 4 = 0$$
$$4x + 3y - 20 = 0$$

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15.
$$x - y = -1$$
$$3x + 2y = 12$$

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16. Draw the graphs of the following equations: $2x - 3y + 6 = 0, \quad 2x + 3y - 18 = 0, \quad y - 2 = 0$ Find the vertices of

the triangle so obtained. Also, find the area of the triangle.

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17. Express y in terms of x from the following equation.

3x - 2y + 6 = 0

and check whether $\left(-\frac{5}{2}, -\frac{3}{4}\right)$ is a point on the given line.

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18. Draw the graphs of the following equations on the same graph paper

:

3x - 2y = 9, 4y - 6x + 12 = 0

Find the area of trapezium formed by these two lines and the axes.

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Exercise 3 B

1. $x + y = 17$
$x - y = 1$

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2. $3x + 2y = 4$
$2x - 3y = 7$

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3. $3x - 4y = 10, 4x + 3y = 5$

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4. $x - y = 0.9; \frac{11}{2(x + y)} = 10.5$

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5. $3x - 2y = 6$
$\frac{x}{3} - \frac{y}{6} = \frac{1}{2}$

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6. $x = 2y - 1$
$y = 5 - 3x$

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7. $0.4x + 0.3y = 1.7$
$0.7x - 0.2y = 0.8$

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8. $0.04x + 0.02y = 5$
$0.5(x - 2) - 0.4y = 29$

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9. $y = 2x - 6$
$y = 0$

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10. $\sqrt{5}x - \sqrt{7}y = 0$
$\sqrt{7}x - \sqrt{3}y = 0$

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11. $\frac{x}{2} + y = 0.8$
$\frac{7}{x + \frac{y}{2}} = 10$

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12. $\frac{15}{x} + \frac{2}{y} = 17$
$\frac{1}{x} + \frac{1}{y} = \frac{36}{5}$

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13. $\frac{1}{16}x+\frac{1}{15}y=\frac{9}{20};\frac{1}{20}x-\frac{1}{27}y=\frac{4}{45}$

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14. $\frac{10}{x+y}-\frac{4}{x-y}=-2$
$\frac{15}{x+y}+\frac{7}{x-y}=10$

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15. $2x+y=\frac{7xy}{3}$
$x+3y=\frac{11xy}{3}$

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16. $\frac{1}{2(x+2y)}+\frac{5}{3(3x-2y)}=\frac{-3}{2}$
$\frac{5}{4(x+2y)}-\frac{3}{5(3x-2y)}=\frac{61}{60}$

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17. $\frac{4}{x} + 3y = 14$
$\frac{3}{x} - 4y = 23$

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18. $\frac{5}{x-1} + \frac{1}{y-2} = 2$
$\frac{6}{x-1} - \frac{3}{y-2} = 1$

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

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20. Solve the following system of equations:

$2(3u - v) = 5uv, \quad 2(u + 3v) = 5uv$

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21.
$$65x - 33y = 97$$
$$33x - 65y = 1$$

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22.
$$13x + 11y = 70$$
$$11x + 13y = 74$$

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23.
$$217x + 131y = 913$$
$$131x + 217y = 827$$

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24.
$$152x - 378y = -74$$
$$-378x + 152y = -604$$

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25. $x + y = a + b$
$ax - by = a^2 - b^2$

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26. Solve: $\frac{x}{a} + \frac{y}{b} = a + b \frac{x}{a^2} + \frac{y}{b^2} = 2$

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27. Solve the following system of linear equations (with rational denominator) by using the method of elimination :

$\sqrt{3}x - \sqrt{2}y = \sqrt{3}$ and sqrt(5)x + sqrt(3)y = sqrt(2)`.

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28. $4x + \frac{6}{y} = 15$ and $6x - \frac{8}{y} = 14$, and hence, find p if y = px - 2.

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29. Solve the following system of equations:

$$\frac{7x-2y}{xy}=5, \quad \frac{8x+7y}{xy}=15$$

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30. Solve for $(x-1)^2$ and $(y+3)^2$,

$2x^2-5y^2-x-27y-26=3(x+y+5)$

and $4x^2-3y^2-2xy+2x-32y-16=(x-y+4)^2$.

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Exercise 3 C

1.

$$x+8y=19$$
$$2x+11y=28$$

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2. $8x + 13y - 29 = 0$
$12x - 7y - 17 = 0$

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3. $3y + 2x = 0$
$4y + 3x = 5$

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4. $\frac{x}{3} + \frac{y}{15} = 4$
$\frac{x}{3} - \frac{y}{12} = \frac{19}{4}$

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5. Solve the following system of equations by method of cross-multiplication: $\frac{2}{x} + \frac{3}{y} = 13, \quad \frac{5}{x} - \frac{4}{y} = -2$, where $x \neq 0$ and $y \neq 0$

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6. $\frac{5}{x-1}+\frac{1}{y-2}=2\ \frac{6}{x-1}-\frac{3}{y-2}=1$

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7. $x+y=a+b, ax-by=a^2-b^2$

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8. $ax-by=a^2+b^2$
$x+y=2a$

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9. $2(ax-by)+(a+4b)=0, 2(bx+ay)+(b-4a)=0$

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10. Solve: $ax + by = c, \quad bx + ay = 1 + c$

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11. $\frac{x}{a} - \frac{y}{b} = 0, ax + by = a^2 + b^2$

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12. $\frac{a^2}{x} - \frac{b^2}{y} = 0$

$\frac{a^2 b}{x} + \frac{b^2 a}{y} = \text{a} + \text{b}$, where x, y $\neq 0$.

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13. $(a - b)x + (a + b)y = a^2 - 2ab - b^2 \ , \ (a + b)(x + y) = a^2 + b^2$

find x and y

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

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15. By solving equations 3x + 4y = 23 and 5x + 12y = 39 with the help of cross multiplication method, we obtain $\frac{x}{a} = \frac{y}{b} = \frac{1}{c}$, then find $\frac{a+4b}{5c}$

.

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Exercise 3 D

1. $2x - 3y = 17$
$4x + y = 13$

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2. $5x + 2y = 16$
$3x + \frac{6}{5}y = 2$

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3. $3x - y = 2$
$6x + 2y = 4$

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4. $\frac{x}{3} + \frac{y}{2} = 3$
$x - 2y = 2$

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5. $x - 3y = 3$
$3x - 9y = 2$

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6. $x - 2y = 8$
$5x - 10y = 10$

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7. $kx + 2y = 5$
$3x + y = 1$

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8. $2x - 3y = 1$
$kx + 5y = 7$

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9. $2x - 3y - 5 = 0$
$kx - 6y - 8 = 0$

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10. $x - ky = 2$
$3x + 2y = -5$

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11. $8x + 5y = 9$
$kx + 10y = 18$

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12. $2x + 3y = 2$
$(k + 2)x + (2k + 1)y = 2(k - 1)$

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13. $2x + (k - 2)y = k$
$6x + (2k - 1)y = 2k + 5$

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14. $(k-3)x+3y=k$
$kx+ky=12$

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15. $kx+3y=3$
$12x+ky=6$

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16. $kx+3y=k-3$
$12x+ky=k$

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17. $8x+5y=9$
$kx+10y=8$

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18. For what value of k, the system of equations $4x + 6y = 11$ and $2x + ky = 7$ will be inconsistent?

A. $k = 3$

B. $k = 4$

C. no value of k is possible

D. k can have any real value

Answer: A

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19. For what value of k, the system of equations $3x + 4y = 6$ and $6x + 8y = k$ represents coincident lines?

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20. Find k, such that the system 3x + 5y = 0 and kx + 10y = 0 has a non-zero solution.

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21. Obtain the condition for the following system of linear equations to has a unique solution

$px + qy = r$ and $lx + my = n.$

A. pm = ql

B. pm - ql = 0

C. pm $\neq$ ql

D. none of these

Answer: C

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22. $(2a-1)x+3y-5=0$
$3x+(b-1)y-2=0$

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23. $2x+3y=9$
$(p+q)x+(2p-q)y=3(p+q+1)$

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24. $2x+3y=7$
$(a-1)x+(a+2)y=3a$

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25. $2x-3y=k$
$4x+5y=3$

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26. $2x - 4y = 3$
$5x - ky = 7.5$

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27. $2x - 4y = k$
$5x - 10y = 7.5$

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28. For what value of k, the system of equations 5x - ky = 3 and 10x - 3y = 6 is independent?

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29. For what value of k, the system of equations 3x - 2y = 5 and 6x - ky = 8 has no unique solution?

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30. For what value of k, the equations 2x - 3y = 4 and 3x - ky = 5 meet at exactly one point i.e., unique point whose abscissa is -1?

A. $k = -4$

B. k = 4

C. k = 2

D. none of these

Answer: B

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31. For what value of k, the two lines $3x - 5y = 4$ and $6x - ky = 8$ are parallel to each other?

A. $k = 1$ only

B. $k = 0$ only

C. k can have any real value

D. No value of k is possible

Answer: D

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32. For what value of k, the two lines 2x - 4y = 6 and 3x - 6y = k are parallel forever?

A. $k = -9$ only

B. $k = 9$

C. All real values except 9

D. none of these

Answer: C

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33. For what value of k, the system of equations $x - 3y = 5$ and $2x - 6y = k$ has at most one solution?

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34. For what value of k, the system of equations $x - 3y = 5$ and $2x - ky = 10$ has at most one solution?

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35. For what value of k, the system of equations $x - 3y = 5$ and $2x - 5y = k$ has at most one solution?

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Exercise 3 E

1. A father is three times as old as his son. After twelve years, his age will be twice as that of his son then. Find their present ages.

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2. Five years ago, A was thrice as old as B and 10 years later, A shall be twice as old as B. What are the present ages of A and B?

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3. If twice the sons age in years is added to the fathers age, the sum is 70. But if twice the others age is added to the sons age, the sum is 95. Find the ages of father and son.

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4. A and B are friends and their ages differ by 2 years. As father D is twice as old as A and B is twice as old as his sister C. The age of D and C differ by 40 years. Find the ages of A and B.

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5. The present age of a father is equal to the sum of the ages of his 5 children. 12 years hence, the sum of the ages of his children will be twice the ages of their father. Find the present age of the father.

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6. Eight years ago Mohan's age was $\frac{3}{4}$ of Sohan's. Four years hence Mohan's age will be $\frac{6}{7}$ of Sohan's. Find their present ages.

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7. Sum of two numbers is 35 and their difference is 13. Find the numbers.

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8. Find two numbers, which differ by 7, such that twice the greater added to five times the smaller makes 42.

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9. There are two numbers. Four times the first exceeds seven times the second by 2. Sum of two times the first and three times the second in 92. Find the numbers.

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10. If 1 is added to each of the two given numbers then their ratio is 1 : 2. If 5 is subtracted from each the ratio is 5 : 11. Find the numbers.

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11. If three times the larger of the two numbers is divided by the smaller, we get the quotient 6 and remainder 6. If five times the smaller is divided by the larger, we get quotient 2 and remainder 3. Find the numbers.

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12. The sum of the digits of a two digit number is 10. If 18 is subtracted from the number, digits are reversed. Find the numbers.

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13. In a two digit number, the units digit is twice the tens digit. If 27 is added to the number, the digits interchange their places. Find the number.

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14. A two digit number is obtained by either multiplying the sum of the digits by 8 and adding 1, or by multiplying the difference of the digits by 13 and adding 2.Find the number? How many such nos are there.?

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15. Seven times a two-digit number is equal to four times the number obtained by reversing the digits. If the difference between the digits is 3. Find the number.

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16. A fraction becomes 4/5, if 1 is added to both numerator and denominator. If, however, 5 is subtracted from both numerator and denominator, the fraction becomes . What is the fraction.

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17. A fraction is such that if the numerator is multiplied by 3 and the denominator is reduced by 3, we get 18/11, but if the numerator is increased by 8 and the denominator is doubled, we get 2/5. Find the fraction.

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18. If the denominator of a fraction is added to its numerator and the numerator subtracted from its denominator, the fraction becomes $\frac{11}{3}$. Determine the fraction if its numerator is 3 less than the denominator.

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19. 4 chairs and 3 tables cost Rs 2100 and 5 chairs and 2 tables cost Rs 1750. Find the cost of a chair and a table separately.

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20. The cost of 3 oranges and 12 apples is Rs. 9.60 and the cost of 5 oranges and 7 apples is Rs. 6.90. Find the cost of apples per dozen.

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21. From Delhi station if we buy 2 tickets to station A and 3 tickets to station B, the total cost is Rs. 77, but if we buy 3 tickets to station A and 5 tickets to station B the total cost is Rs. 124. What are the fares from Delhi to station A and to station B?

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22. A railway half ticket costs half the full fare and the reservation charge is the same on the half ticket as on full ticket. One reserved first class ticket from Mumbai to Ahmedabad costs rs216 and one full and

one half reserved first class tickets cost rs 327 What is the basic first class full fare and what is the reservation charge?

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23. Point A and B are 90 km apart from each other on a highway. A car starts from A and another from B at the same time. If they go in the same direction they meet in 9 hours and if they go in opposite directions they meet in 9/7 hours. Find their speeds.

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24. in the triangle $ABC, \angle A = x^\circ, \angle B = 3x^\circ, \angle C = y^\circ$. if $3y - 5x = 30$ then prove that the triangle is right angled.

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25. In a $\Delta ABC, \angle A = x^\circ, \angle B = (3x - 2)^\circ$, also $\angle C - \angle B = 9^\circ$, find the three angles.

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26. The largest angle of a triangle is twice the sum of the other two. The smallest is one-fourth of the largest. Determine all the angles in degrees.

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27. In a cyclic quadrilateral $ABCD$, $\angle A = (2x + 4)o$, $\angle B = (y + 3)o$, $\angle C = (2y + 10)o$, $\angle D = (4x - 5)o$. Find the four angles.

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28. If in a rectangle, the length is increased by 2 units and breadth is reduced is reduced by 2 units, the area is reduced by 28 square units. If however the length is reduced by 1 unit and breadth is increased by 2 units, the area increases by 33 square units. Find the area of the rectangle.

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29. The perimeter of a rectangle plot is 32 metres. If the length is increased by 2 metres and the breadth is decreased by 1 metre, the area of the plot remains unchanged. Find the dimensions of the plot.

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30. The area of a rectangle remains the same if the length is increased by 7 metres and the breadth is decreased by 3 metres. The area remains

unaffected if the length is decreased by 7 metres and breadth is increased by 5 metres. Find the dimensions of the rectangle.

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31. A man went to a Bank with Rs. 1000. He asked the cashier to give him Rs. 5 and Rs. 10 notes only in return. The man got 175 notes in all. Find how many notes of Rs. 5 and Rs. 10 did he receive.

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32. Post cards costing 15 paise each and inland letters costing 75 paise each were purchased for Rs. 33. Total number of post cards and inland letters purchased was 60. If the number of post cards and inland letters are interchanged, find the cost.

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33. 2 men and 5 boys together can finish a piece of work in 4 days, while 3 men and 6 boys can finish it in 3 days. Find the time taken by 1 man alone to finish the work and than taken by 1 boy alone.

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34. A and B together can do a piece of work in 15 days. If 1 day's work of A be $1\frac{1}{2}$ times one day's work of B. Find in how many days each alone will do the work.

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35. A takes 3 hours more than B to walk a distance of 30 km. But, if A doubles his pace (speed) he is ahead of B by $1\frac{1}{2}$ hours. Find the speeds of A and B .

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36. The boat goes 25 km upstream and 33 km downstream in 8 hours. It can also go 40 km upstream and 77 km downstream in 15 hours. Find the speed of the stream and that of boat in still water.

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37. A boat travels for 7 hours. If it travels 4 hours downstream and 3 hours upstream than it covers the distance of 116 km. But if it travels 3 hours downstream and 4 hours upstream, it covers a distance of 108 km. Find the speed of a boat.

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38. A sailor goes 8 km downstream in 40 minutes and returns in 1 hours. Determine the speed of the sailor in still water and the speed of the current.

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39. Anshula walks 35 km partly at the rate 4 km/hour and Partly at 5 km/hour, if she had walked at 5 km/hour. When she walked at 4 km/hour and vice versa. She would have covered 2 km more in the same time. Find the time she was walking.

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40. A bucket when filled $\frac{5}{7}$ with water weights 12 kg and filled $\frac{3}{4}$ of it with water weight 12.5 kg. What is the weight of the empty bucket?

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41. Acids with 25% and 40% concentrations are mixed to get 60 litres of 30% concentration. How many litres of each kind is needed?

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42. A person, invested some amount at the rate of 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 amount invested, he would have received Rs. 4 more as interest. How much did he invest at different rates?

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43. rates?43. A milkman buys 15 litres milk partly at the rate of 12 per litre and remaining at the rate of 14 perlitre. By selling the whole milk at the rate of xx 15 per litre he has gained 12 %. Find the separate

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44. Ved travels 600 km to his home partly by train and partly by car. He takes 8 hours if he travels 120 km by train and the rest by car. He takes

20 minutes longer if he travels 200 km by train and the rest by car. Find the speed of the train and the car.

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45. Students of a class are preparing for a drill and are made to stand in rows. If 4 students are extra in a row, then there would be 2 rows less. But there would be 4 more rows if 4 students are less in a row. The number of students in the class is (a) 56 (b) 65 (c) 69 (d) 96

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46. 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 who takes B food for 26 days, pays 1180 as hostel charges. Find the fixed charges and the cost of food per day.

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47. The ratio of incomes of A and B is 9 : 7 and the ratio of their expenditures is 4 : 3. If each of them saves Rs. 4000 per month, then find their monthly incomes. Also, if each of them donates 9% of his income to a charity working for old age destitutes, then find the resulting savings of each. What value is indicated from this action?

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48. Mr. Mohit has decided to walk on a treadmill for a fixed distance. First day, he walks at a certain speed. Next day, he increases the speed of the treadmill by 1 km/h, he takes 6 min less and if he reduces the speed by 1 km/h, then he takes 9 min more. What is the distance that he decided to walk everyday?

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49. It takes 12 hours to fill a swimming pool using two pipes . If the pipes of larger diameter is used for 4 hours and the pipe of smaller diameter is used for 9 hours , only half of the pool is filled. How long would it take for each pipe to fill the pool separately?

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50. A number consists of three digits whose sum is 17. The middle one exceeds the sum of other by 1. If the digits are reversed, the number is diminished by 396. Find the number.

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51. In an examination, the number of those that passed and the number of those were failed are in the ratio 3 : 1, Had 8 more appeared and 6 less passed, the ratio of passes to the failure would have been 2 : 1. Find how many appeared.

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52. Ratio between the girls one long 11 class of 40 students is 2:3 five, new students joined the class how many of them must be boys so that the both between girls and boys became 4:5?

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53. A certain amount is charged for 1 km for a scooter fare and lesser amount for each additional km. If one day Aliya paid Rs. 24 for 5 km and on another day she paid Rs. 35.40 for 8 km. Find the fare for the 1^{st} km and for the additional kms.

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54. If 3 taps are open together, a cistern is filled in 3 hrs. One of the taps alone can fill it in 10 hrs and another in 15 hrs. In how many hours does the third tap fill it?

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55. When the numerator of a fraction is increased by 4, the fraction increases by $\frac{2}{3}$. What is the denominator of the fraction?

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56. Solve for a and b :

$2^a + 3^b = 17$ and $2^{a+2} - 3^{b+1} = 5$

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Revision Exercise Very Short Answer Questions

1. For what value of k the two simultaneous equation x + y = 2 and x - ky = 1 will have no solution?

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2. For the following system of equations determine the value of k for which the given system has infinitely many solutions: $kx + 3y = k - 3, \quad 12x + ky = k$

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3. Find the values(s) of k for which the system of equations $kx - y = 2$ $6x - 2y = 3$ has (i) a unique solution (ii) no solution. Is there a value of k for which the system has infinitely many solutions?

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4. Write the number of solutions of the following pair of linear equations: $x + 2y - 8 = 0, \quad 2x + 4y = 16$

A. 0

B. 1

C. Infinite

D. none of these

Answer: C

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5. For what value of k will the following system of linear equations has no solution? $3x + y = 1, \quad (2k - 1)x + (k - 1)y = 2k + 1$

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6. Solve x + y = 10 and x - y = 4.

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7. For what value of k, the following system of equations will represent the coincident lines?

3x - 2y = 5 and 12x - ky = 20

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8. Sum of two numbers is 35 and their difference is 13. Find the numbers.

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9. If the lines given by $3x + 2ky = 2$ and $2x + 5y = 1$ are parallel, then the value of k is

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Revision Exercise Short Answer Questions

1. Solve 3x + 2y = 11 and 2x + 3y = 4.

A. x = 5, y = -2

B. x = 5, y = 2

C. x = -5, y = -2

D. none of these

Answer: A

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2. Solve:

$3(2u + v) = 7uv$

$3(u + 3v) = 11uv$

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3. Solve the following system of equations: $\frac{x}{7}+\frac{y}{3}=5, \quad \frac{x}{2}-\frac{y}{9}=6$

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4. Solve the following system of equations: $\sqrt{2}x-\sqrt{3}y=0, \quad \sqrt{3}x-\sqrt{8}y=0$

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5. Determine the values of $aandb$ for which the following system of linear equations has infinite solutions: $2x-(a-4)y=2b+1$

$4x-(a-1)y=5b-1$

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6. Find the value of k for which the following system of linear equations has infinite solutions: $x+(k+1)y=5, \quad (k+1)x+9y=8k-1$

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7. Determine the values of $mandn$ so that the following system of linear equations have infinite number of solutions: . $3x + (n-1)y - 2 = 0$

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8. 5 pens and 6 pencils together cost Rs 9 and 3 pens and 2 pencils cost Rs 5. Find the cost of 1 pen and 1 pencil.

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9. A father is three times as old as his son. After twelve years, his age will be twice as that of his son then. Find their present ages.

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10. $\frac{ax}{b} - \frac{by}{a} = a + b, ax - by = 2ab$

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Revision Exercise Long Answer Questions

1. Solve for x and y, px + qy = 1 and $qx + py = \frac{(p-q)^2}{p^2+q^2} - 1.$

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2. Solve $\frac{x+ab}{2} = \frac{y+ab}{2}$ and $ax + by = a^2 + b^2.$

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3. Solve $\frac{x}{b} + \frac{y}{b} = 1$ and $a(x-a) - b(y+b) = 2a^2 + b^2.$

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4. Acid with 25% and 40% concentration are mixed to get 60 litres of 30% concentration. How many litres of each kind is needed?

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5. A trader purchases 4 bags of rice and 10 bags of wheat for Rs. 3600. He sells rice at 10% gain and wheat at 2% loss and thus he gained Rs. 120. Find the C.P. of one bag of rice and one bag of wheat.

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6. A jeweller has bars of 18 carat gold and 12 carat gold. How much of each must be melted together to obtain a bar of 16 carat gold, weighing 120g (Given pure gold is of 24 carat.)?

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7. Divide c into two parts such that a times the larger part shall be equal to b times the smaller part.

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8. I bought 5 pens, 7 pencils and 4 erasers. Rajan bought 6 pens, 8 erasers and 14 pencils for an amount which was half more than what I had paid. The percentage of total amount spent on pens by me is :

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