MATHS

BOOKS - NAVNEET PUBLICATION

LINEAR EQUATIONS IN TWO VARIABLES

Solved

1. Complete the following activity to solve the simultaneous equations:

$5x + 3y = 9$ ... (1) $\quad 2x - 3y = 12$ ... (2)

Adding equations (1) and (2),

$$\begin{array}{rrrl} & 5x + & 3y = & 9 \quad \text{... (1)} \\ + & 2x - & 3y = & 12 \quad \text{... (2)} \\ \hline & \square & = \square & \end{array} \qquad \therefore x = \square$$

Substituting this value of x in equation (1),

$5 \times 3 + 3y = \square \qquad \therefore 3y = \square \qquad \therefore y = \square$

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2. Solve the following simultaneous equations.

$3a + 5b = 26, a + 5b = 22.$

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3. Solve the following simultaneous equations.

$x + 7y = 10, 3x - 2y = 7.$

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4. Solve the following simultaneous equations.

$2x - 3y = 9, 2x + 9y = 13.$

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5. Solve the following simultaneous equations.

$5m - 3n = 19, m - 6n = -7.$

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6. Solve the following simultaneous equations.

$5x + 2y = -3, x + 5y = 4.$

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7. Solve the following simultaneous equations. $\frac{1}{3}x + y = \frac{10}{3}, 2x + \frac{1}{4}y = \frac{11}{4}.$

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8. Solve the following simultaneous equations. $99x + 101y = 499, 101x + 99y = 501.$

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9. Solve the following simultaneous equations. $49x - 57y = 172, 57x - 49y = 252.$

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10. Complete the following table to draw the graph of the equations

x+y=3,x-y=4

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11. Solve the following simultaneous equations graphically.$x + y = 6, x - y = 4.$

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12. Solve the following simultaneous equations graphically,$x + y = 5, x - y = 3.$

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13. Solve the following simultaneous equations graphically,$x + y = 0, 2x - y = 9.$

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14. Solve the following simultaneous equations graphically,$3x - y = 2, 2x - y = 3.$

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15. Solve the following simultaneous equations graphically,$3x - 4y = -7, 5x - 2y = 0.$

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16. Solve the following simultaneous equations graphically,$2x - 3y = 4, 3y - x = 4.$

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17. To solve simultaneous equation $x + 2y = 4, 3x + 6y = 12$.graphically,following are the ordered pairs.Plotting the above pairs,graph is drawn.Observe it and find answers of the following

questions:(i)Are the graphs of both the equations different or same?

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18. To solve simultaneous equation $x + 2y = 4, 3x + 6y = 12$.graphically,following are the ordered pairs.Plotting the above pairs,graph is drawn.Observe it and find answers of the following questions:(ii)What are the solutions of the two equations $x + 2y = 4$ and $3x + 6y = 12$?How many solutions are possible?

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19. To solve simultaneous equation $x + 2y = 4, 3x + 6y = 12$.graphically,following are the ordered pairs.Plotting the above pairs,graph is drawn.Observe it and find answers of the following questions:(iii)What are the relations between coeffecients of x,coeffecients of y and constant terms in both the equations?

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20. To solve simultaneous equation $x + 2y = 4, 3x + 6y = 12$.graphically,following are the ordered pairs.Plotting the above pairs,graph is drawn.Observe it and find answers of the following

questions:(iv)What conclusion can you draw when two equations are given but the graph is only one line?

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21. Draw graphs of `x-2y=4,2x-4y=12 on the same co-ordinate plane.Observe it.Think of the solutions of the given equations.

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22. Find the value of the following determinants:

$$\begin{bmatrix} -1 & 7 \\ 2 & 4 \end{bmatrix}$$

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23. Find the value of the following determinants:

$$\begin{bmatrix} \frac{7}{3} & \frac{5}{3} \\ \frac{3}{2} & \frac{1}{2} \end{bmatrix}$$

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24. Solve the following simultaneous equations using Cramer's rule.$3x - 4y = 10, 4x + 3y = 5.$

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25. Solve the following simultaneous equations using Cramer's rule.$4x + 3y - 4 = 0, 6x = 8 - 5y.$

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26. Solve the following simultaneous equations using Cramer's rule.$x + 2y = -1, 2x - 3y = 12.$

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27. Solve the following simultaneous equations using Cramer's rule$6x - 4y = -12, 8x - 3y = -2.$

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28. Solve the following simultaneous equations using Cramer's rule$4m + 6n = 54, 3m + 2n = 28.$

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29. Solve the following simultaneous equations using Cramer's rule$2x + 3y = 2, x - \frac{y}{2} = \frac{1}{2}.$

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30. Solve the following simultaneous equations $\frac{2}{x} - \frac{3}{y} = 15, \frac{8}{x} + \frac{5}{y} = 77.$

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31. Solve the following simultaneous equations $\frac{10}{x+y} + \frac{2}{x-y} = 4, \frac{15}{x+y} - \frac{5}{x-y} = -2.$

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32. Solve the following equations.

$$\frac{27}{x-2}+\frac{31}{y+3}=85,\ \frac{31}{x-2}+\frac{27}{y+3}=89.$$

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33. Solve the following simultaneous equations

$$\frac{1}{3x+y}+\frac{1}{3x-y}=\frac{3}{4},\ \frac{1}{2(3x+y)}-\frac{1}{2(3x-y)}=-\frac{1}{8}$$

.

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34. Two numbers differ by 3.The sum of twice the smaller number and thrice the greater number is 19. Find the numbers.

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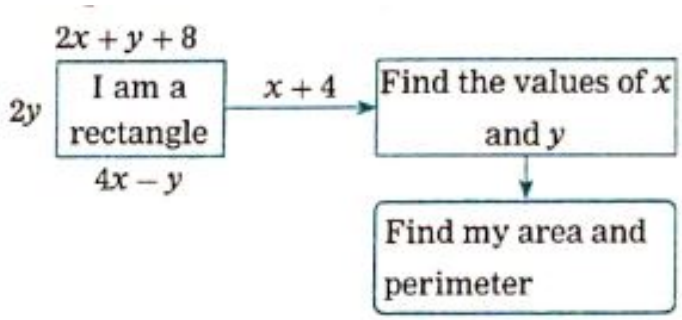
35. Complete the following



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36. The sum of father's age and twice the age of his son is 70. If we double the age of the father and add it to the age of his son the sum is 95. Find their present ages.

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37. The denominator of a fraction is 4 more than twice its numerator . If 6 is subtracted from both the numerator and the denominator , the denominator becomes 12 times the numerator. Find the fraction.

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38. Two types of boxes A and B are to be placed in a truck having capacity of 10 tons. When 150 boxes of type A and 100 boxes of type B are loaded in the truck, it weighs 10 tons. But when 260 boxes of type A are loaded in the truck, it can still accommodate 40 boxes of B so that it is fully loaded. Find the weight of each type of box.

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39. Out of 1900 km,Vishal travelled some distance by bus and some by aeroplane. Bus travels with average speed 60km/hr and the average speed of aeroplane is 700 km/hr.It takes 5 hours to complete the journey. Find the distance travelled by Vishal in bus.

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40. Choose the correct alternative for each of the following questions:

To draw the graph of $4x + 5y = 19$, find y when x=1.

A. 4

B. 3

C. 2

D. -3

Answer:

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41. Choose the correct alternative for each of the following questions:

For simultaneously equations in variables x and y, if $D_x = 49, D_y = -63$ and $D = 7$, then what is the value of X?

A. 7

B. -7

C.

D. -0.14285714285714

Answer:

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42. Choose the correct alternative for each of the following questions:

Find the value of $\begin{bmatrix} 5 & 3 \\ -7 & -4 \end{bmatrix}$

A. -1

B. -41

C. 41

D. 1

Answer:

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43. Choose the correct alternative for each of the following questions:

To solve $x + y = 3,\ 3x - 2y - 4 = 0$ by determinant method, find D.

A. 5

B. 1

C. -5

D. -1

Answer:

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44. Choose the correct alternative for each of the following questions:

ax+by=c,mx+ny=d and an!= bm, then these simultanepously equations have.....

A. only one solution

B. no solution

C. infinite number of solutions

D. only two solutions

Answer:

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45. Complete the following table to draw the graph of the equations $2x - 6y = 3$:

(2 m

x	-5	
y		0
(x, y)		

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46. Solve the following simultaneous equations using graphical method.$2x + 3y = 12, x - y = 1.$

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47. Solve the following simultaneous equations using graphical method.$x - 3y = 1, 3x - 2y + 4 = 0.$

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48. Solve the following simultaneous equations using graphical method.$5x - 6y + 30 = 0, 5x + 4y - 20 = 0.$

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49. Solve the following simultaneous equations using graphical method.$3x - y - 2 = 0, 2x + y = 8.$

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50. Solve the following simultaneous equations using graphical method.$3x + y = 10, x - y = 2.$

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51. Find the values of each of the following determinants:

$$\begin{bmatrix} 4 & 3 \\ 2 & 7 \end{bmatrix}$$

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52. Find the values of each of the following determinants:

$$\begin{bmatrix} 5 & -2 \\ -3 & 1 \end{bmatrix}$$

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53. Find the values of each of the following determinants:

$$\begin{bmatrix} 3 & -1 \\ 1 & 4 \end{bmatrix}$$

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54. Solve the following simultaneous equations using Cramer's rule.$6x - 3y = -10, 3x + 5y - 8 = 0$

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55. Solve the following simultaneous equations using Cramer's rule.$4m - 2n = -4, 4m + 3n = 16.$

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56. Solve the following simultaneously equations using Cramer's rule:

$3x - 2y = \frac{5}{2}, \frac{1}{3}x + 3y = \frac{4}{3}$

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57. Solve the following simultaneous equations using Cramer's rule.$7x + 3y = 15, 12y - 5x = 39.$

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58. Solve the following simultaneous equations using Cramer's rule$\frac{x + y - 8}{2} = \frac{x + y - 14}{3} = \frac{3x - y}{4}$

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59. Solve the following simultaneous equations $\frac{2}{x}+\frac{2}{3y}=\frac{1}{6}, \frac{3}{x}+\frac{2}{y}=0.$

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60. Solve the following simultaneous equations: $\frac{7}{2x+1}+\frac{13}{y+2}=27, \frac{13}{2x+1}+\frac{7}{y+2}=33$

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61. Solve the following simultaneous equations $\frac{148}{x}+\frac{231}{y}=\frac{527}{xy}, \frac{231}{x}+\frac{148}{y}=\frac{610}{xy}$.

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62. Solve the following simultaneous equations $\frac{7x-2y}{xy}=5, \frac{8x+7y}{xy}=15$.

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63. Solve the following simultaneous equations:

$\frac{1}{2}(3x+4y)+\frac{1}{5}(2x-3y)=\frac{1}{4}$,

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64. Solve the following word problems :

The sum of a two digit number and the number obtained by interchanging the digits is 143. If the digit at the units place is 3 more than the digit at the tens place, find the original number.

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65. Kantabai bought 1.5kg tea and 5kg sugar from a shop. She paid ₹50 as fare for rickshaw. Total expense was ₹700.Then she realised that by ordering online the goods can be bought with free home delivery at the same price. So next month she placed the order online for 2 kg tea

and 7kg sugar and paid ₹880 .Find the rate of sugar and tea per kg.

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66. Solve the following word problems :

To find number of notes that Anushka had, complete the following activity.

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67. Solve the following word problems :

The sum of the present ages of Manish and Savita is 31 years. 3 years ago Manish's age was four times Savita's age at that time. Find the present ages.

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68. In a factory the ratio of salary of skilled and unskilled workers is 5:3.Total salary of one day of both of them is ₹720.Find daily wages of skilled and unskilled workers.

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69. Places A and B are 30 km apart and they are on a straight road.Hamid travels from A to B on bike. At the same time Joseph starts from B on bike and travels towards A. They meet each other after 20 minutes. If Joseph would have started from B at the same time but in the opposite direction (instead of towards A), Hamid

would have caught up with him after 3 hours. Find the speed of Hamid and Joseph.

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Exercise

1. Draw the graph of x+y=6 which intersects the X-axis and Y-axis at A and B respectively. On the same graph paper, draw the graph of 2x-y=3 which intersects the X-axis and Y-axis at C and D respectively. E is the point of intersection of both the graphs. Find the areas of

/_\ ECA

/_\ EBD.

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2. Find the values of a and b for which the simultaneous linear equations $x + 2y = 1$ and $(a - b)x + (a + b)y = a + b - 2$ have infinitely many solutions.

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3. Choose the correct alternative from those given below each question:

For drawing the graph of 5x+2y=16, if x=2, what is the value of y?

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4. Choose the correct alternative from those given below each question:

For drawing the graph of $3x+7y=27$, if $y=3$, what is the value of x?

A. 2

B. 20/3

C. 9

D. 13/3

Answer:

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5. Choose the correct alternative from those given below each question:

Which of the following is not the solution of $3x+6y=12$?

A. (-4,4)

B. (0,2)

C. (8,-2)

D. (3,1)

Answer:

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6. Choose the correct alternative from those given below each question:

What is the degree of the determinant $\begin{vmatrix} a & b \\ c & d \end{vmatrix}$?

A. 1

B. 3

C. 4

D. 2

Answer:

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7. Choose the correct alternative from those given below each question:

What is the value of D_x for the simultaneous equations $3x+2y+11=0$ and $7x-4y=9$?

A. 26

B. -26

C. 62

D. -62

Answer:

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8. Choose the correct alternative from those given below each question:

What is the value of D_y for the simultaneous equations 3x+y=1 and 2x-11y=3?

A. -14

B. 14

C. -7

D. 7

Answer:

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9. Choose the correct alternative from those given below each question:

For simultaneous equations in x and y, if $D_x=39, D_y=26$ and $D=13$, then what is the value of X ?

A. 3

B.

C. 2

D.

Answer:

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10. Choose the correct alternative from those given below each question:

For simultaneous equations in x and y , if D=30, D_x=-18, D_y=-12, then what is the value of y?

A. -0.6

B.

C.

D.

Answer:

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11. Choose the correct alternative from those given below each question:

What is the value of k, for which the simultaneous equations $2x+3y=8$ and $6x-ky=24$ have infinitely many solutions?

A. 6

B. -6

C. 9

D. -9

Answer:

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12. Choose the correct alternative from those given below each question:

The solution of the equations x-y =10 and x+y =70 is.....?

A. (40,30)

B. 30,40

C. 10,60

D. 60,10

Answer:

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13. Choose the correct alternative from those given below each question:

The simultaneous equations $-3x+4y=7$, $9/2x-6y=-21/2$ have.....

A. infinite solutions

B. no solution

C. a unique solution

D. two solutions

Answer:

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14. Choose the correct alternative from those given below each question:

The simultaneous equations in x and y , if D_X=25 , D_y =50 ,D =5 , then what is the value of x?

A. -5

B. -0.2

C. 10

D. 5

Answer:

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15. Write one solution of the equation

$2x - y + 1 = 0.$

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16. Write one solution of the equation

x+3y=11

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17. Find the value of

x, if 4x+3y=23 and y=5

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18. Find the value of

x, if $3x+y=15$ and $y=4$

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19. Find the value of

x, if $2x+y=7$ and $y=-3$

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20. Find the value of$(x+y)$ if

$15x+17y=21,17x+15y=11$.

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21. Find the value of (x+y) ,if

3x+5y=9,5x+3y=7

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22. Find the value of (x+y),if

$5x - 2y = 10, x + 8y = 26$

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23. Find the value of (x-y) , if

5x+4y=14,4x+5y=13

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24. Find the value of (x-y) , if 3x+4y=11,4x+3y=10

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25. Find the value of (x-y), if 2x-5y=5,5x-8y=14

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26. Find the value of the determinant

$$\begin{bmatrix} 5 & 0 \\ 0 & 4 \end{bmatrix}$$

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27. Find the value of the determinant

$$\begin{bmatrix} 0 & -5 \\ 0 & 4 \end{bmatrix}$$

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28. For certain simultaneous equations in x and y, if

$D_x = 2$ and $D = 4, D_Y = 12,$ Find the value of x and y.

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29. For certain simultaneous equations in x and y, if

$D_x = 18$ and $D = -3, D_Y = -12,$ Find the value of x and y.

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30. Express the following information in mathematical form using variables x and y:

The perimeter of a rectangle is 36 cm

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31. Express the following information in mathematical form using variables x and y:

The ratio of two number is 3:8.

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32. Express the following information in mathematical form using variables x and y:

One number is 5 more than seven times the other number.

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33. Express the following information in mathematical form using variables x and y:

The cost of two tables and five chairs is Rs 6600.

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34. Decide whether (0,2) is the solution of the equation $5x+3y=6$ or not.

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35. If $D_x = 24$, $x=-3$, find the value of D.

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36. Write the equation $a/4+b/3=4$ in the standard form.

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37. Find the values of the following determinants:

$$\begin{bmatrix} -3 & 8 \\ 6 & 0 \end{bmatrix}$$

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38. Find the values of the following determinants:

$$\begin{bmatrix} \frac{1}{2} & \frac{3}{2} \\ \frac{1}{5} & 2 \end{bmatrix}$$

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39. Find the values of the following determinants:

$$\begin{bmatrix} \sqrt{2} & -2\sqrt{3} \\ 3\sqrt{2} & \sqrt{3} \end{bmatrix}$$

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40. Find the values of the following determinants:

$$\begin{bmatrix} 3 & 8 \\ -4 & -10 \end{bmatrix}$$

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41. For certain simultaneous equations in variables x and y, if

$D_x = 12, D = 4$, find the value of x.

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42. For certain simultaneous equations in variables x and y, if

$D_y = 6, D = -3,$ find the value of y.

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43. For certain simultaneous equations in variables x and y, if

$D_x = 25, D_y = 40, D = 5$ find the value of x.

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44. Express the following information in mathematical form using variables x and y.

The perimeter of a rectangle is 40 cm.

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45. Express the following information in mathematical form using variables x and y.

The ratio of two numbers is 5:3

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46. Express the following information in mathematical form using variables x and y.

The sum of the ages of a father and son is 73 years.

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47. Express the following information in mathematical form using variables x and y.

The cost of 2 tables and 3 chairs isRs 5400.

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48. Write one solution of the equation

$2x - y + 1 = 0.$

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49. Find the value of y in the equation

$2x + y = 7$, if $x = 2$. Find x if $y = -1.$

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50. Solve the simultaneous equations

$4x + 3y = 11, 3x + 4y = 10$

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51. If $\left|\begin{bmatrix} 4 & 5 \\ m & 3 \end{bmatrix}\right| = 22$ then find the value of m.

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52. Find the values of D_x and D_y to solve the simultaneous equations

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

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53. Find the value of K, if kx+3y=k-3 and 12 x +ky=k represent coincidents lines.

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54. Solve the simultaneous equations

$101x + 99y = 501, 99x + 101y = 499$

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55. Complete the following activity to find the value of determinant:

$$\begin{vmatrix} 3 & -2 \\ 4 & 4 \end{vmatrix} = 3 \times \square - \square \times 4 = \square + 8 = \square.$$

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56. If (2,-5) is the solution of the equation2x-ky=14, then find the value of k.

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57. Complete the following table to draw the graph of the equation x-y=1: `

x	0	
y		0
(x, y)		

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58. Two numbers differ by 3. The sum of the greater number and twice the smaller number is 15. Find the smaller numbers.

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59. The sum of two numbers is 7 and their difference is 5. Find the numbers.

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60. Solve the following simultaneous equations using graphical methd:

$x + y = 0, 2x - y = 9$

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61. Solve the following simultaneous equations using graphical methd:

$x + y = 5, x - y = 1$

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62. Solve the following simultaneous equations using graphical methd:

$x + y = 2, x - y = 4$

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63. Solve the following simultaneous equations using cramer's rule:

$3x - y = 7, x + 4y = 11$

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64. Solve the following simultaneous equations using Cramer's rule: $4x + 3y = 4, 6x + 5y = 8$.

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65. The monthly incomes of Amit and Atul are in the ratio 6:5. The ratio of their expenditutre is 5:4. If each of them saves Rs 2500 per month, find their monthly incomes.

Use the variable x to write their monthly incomes.

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66. The monthly incomes of Amit and Atul are in the ratio 6:5. The ratio of their expenditutre is 5:4. If each of them

saves Rs 2500 per month, find their monthly incomes.

Use the variable y to write their monthly expenditure.

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67. The sum of a two digit number and the number obtained by reversing its digits in 121. Find the number, if its units place digit is greater than the tens place digit by 7.

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68. Construct any one linear equation in two variables. Obtain another equation by interchanging only the

coeffcients of the variables. Find the values of the variables.

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69. Draw the graph of x+y=6 hich intersects the X-axis and Y-axis at A and B respectively. Find the length of seg AB and the area of /_\ AOB, where point O is the origin.

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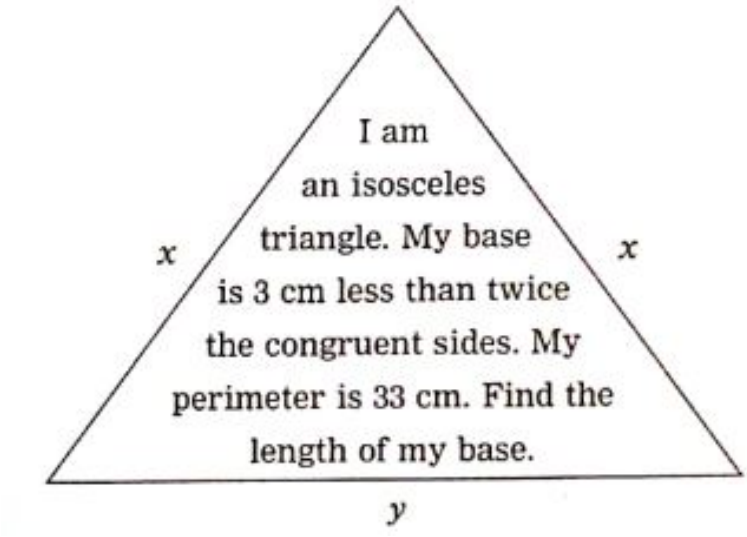
70. Complete the activity:



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71. Complete the following activity to solve the simultaneous equations:

$5x + 3y = 9$ ... (1) $\quad 2x - 3y = 12$ ... (2)

Adding equations (1) and (2),

$$\begin{array}{rrrr} & 5x + & 3y = & 9 \quad \text{... (1)} \\ + & 2x - & 3y = & 12 \quad \text{... (2)} \\ \hline & \square & = \square & \end{array} \qquad \therefore x = \square$$

Substituting this value of x in equation (1),

$5 \times 3 + 3y = \square \quad \therefore 3y = \square \quad \therefore y = \square$

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72. Complete the following activity to solve the simultaneously equations 5x+3y=-11 and x+2y=-5 using cramer,s rule.

$5x + 3y = -11$ ... (1) $\quad x + 2y = -5$ ... (2)

$D = \begin{vmatrix} \square & \square \\ \square & \square \end{vmatrix} = 7;\ D_x = \begin{vmatrix} -11 & 3 \\ -5 & 2 \end{vmatrix} = \square;$

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73. Convert the following equations into simultaneous equations and solve:

$$\sqrt{\frac{x}{y}} = 4, \frac{1}{x} + \frac{1}{y} = \frac{1}{xy}.$$

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74. The question based on the opportunity to express one's own opinion:

I think of a number 75. Write a condition showing the relation between their digits. Write a condition showing the relation between the number and the number obtained by interchanging the digits.

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75. To draw a figure as per the given information:

Draw X and Y axes on a graph paper. Take prper scale.

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76. To draw a figure as per the given information:

Draw a line PQ parallel to X-axis and above it at a distance of 3 units . Draw a line RS parallel to Y- axis and towards the left of it at a distance of 5 units.

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77. To draw a figure as per the given information:

Write the coordinates of the point of intersection of the

lines PQ and x =0.

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78. To draw a figure as per the given information:

Write the coordinates of the point of intersection of the lines PQ and RS.

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79. The coordinates of the point of intersection of lines ax+by=9 and bx+ay =5 is (3,-1). Find the values of a and b.

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80. Solve the simultaneous equations 3x+4y+5=0,y=x+4 using graphical method:

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81. Solve the following simultaneous equations using cramer's rule:

$$3x + \frac{2y}{5} = 20, \frac{x}{3} + y = 7$$

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82. Solve the following simultaneous equations:

$$\frac{1}{x} + \frac{1}{y} = 8, \frac{4}{x} - \frac{2}{y} = 2$$

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83. Solve the following simultaneous equations:

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

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84. Solve the following simultaneous equations:

$$\frac{30}{x-y} + \frac{44}{x+4} = 10, \frac{40}{x-y} + \frac{55}{x+y} = 13$$

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85. Solve the following problems using two variables:

If the numerator of a fraction is increased by 1, Its volume

becomes 3/4 if its denominator is increased by 2. Its value become 1/2 . Find the fraction.

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86. Solve the following problems using two variables:

A boat takes 6 hours to travel 36 km downstream and 24 kmupstream . It takes 9 hours to travel 48 km downstream and 40 km upstream . Find the speed of the stream and that of boat in still water.

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87. Solve the following problems using two variables:

Two taps A and B can together filla swimming pool in 15

days . Taps A and B are kept open for 12 days and then tap B is closed. It takes another 8 days for the pool to be filled . How many days each tap require to fill the pool?

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88. The sum of the digits of a number consisting of three digits is 12. The middle digit is equal to half of the sum of the other two. If the order of the digit be reversed, the number is diminished by 198. Find the number.

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89. The sum of a two digit number and the number obtained by reversing its digits in 121. Find the number, if

its units place digit is greater than the tens place digit by 7.

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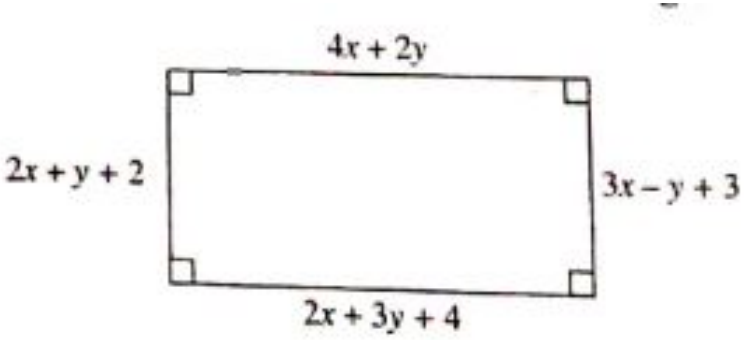
90. Solve the following problrms using two variables:

In the figure , the sided of a rectangle are given. The lengths are in cm . Find the length and breadth of the rectangle.



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91. Solve the following problrms using two variables:

The fore wheel of a tractor makes 120 revolutions more than the rear wheel in going 720 m. If the diameter of the fore wheel is doubled and the diameter of the rear wheel is increased by 1 1/2 times the present diameter, then the fore wheel makes 20 revolution more than the rear wheel in going the same distance . Find the circumference of each wheel.

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92. Solve the following problrms using two variables:

Last years the total number of students in a school was 5000. This year, the number of boys increased by 5% and

that of girls by 3% and the total number of of students increased by 202. How many boys and girls were there in the school last year?

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93. Solve the following problrms using two variables:

Out of 555 km , Vishal travelled certain distance by bus and the remaining distance by car. Bus travels with an average speed of 60 km/h and the average speed of the car is 75 km/h. He takes total 8 hours to complete the journey . Find the distance

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