



MATHS

BOOKS - R G PUBLICATION

PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

Example

1. Solve the following equations graphically

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



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2. Solve the following system of equations graphically $x+3y=6$, $2x-3y=12$ and find the value of a if $4x+3y=a$



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3. Solve the following system of by the method of substitution

(i) $x + 2y = -1$; $2x - 3y = 12$



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4. Solve the following system of by the method of substitution:(ii) $2x+3y=9$, $3x+4y=5$



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5. Solve the following system of by the method of eliminations:(i) $11x+15y+23=0$, $7x-2y-20=0$



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6. Solve the following system of by the method of eliminations: $0.4x-15y=6.5$, $0.3x+0.2y=0.9$



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7. Solve the following system of by the method of cross multiplication : $4x-7y+28=0$ $5y-7x+9=0$



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Exercise

1. Form the pair of linear equations in the following problems, and find their solution graphically. (i) 10 students of class X took part in a Mathematics quiz. If the number of girls is 4 more than the number of boys, find the number of boys and girls who took part in the quiz.



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2. On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$, find out whether the lines representing the following pairs of linear equations intersect at a point, are parallel or coincide: (i) $5x-4y+8=0$
; $7x+6y-9=0$



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3. On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$, find out whether the lines representing the following pairs of linear equations intersect at

a point, are parallel or coincide: (ii) $9x+3y+12=0$;

$$18x+6y+24=0$$



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4. On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$

, find out whether the lines representing the

following pairs of linear equations intersect at

a point, are parallel or coincide: (iii) $6x-3y+10=0$

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



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5. On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$

,find out whether the following pairs of linear equations are consistent,or inconsistent:

(i) $3x+2y=5$ $2x-3y=7$



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6. On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$

,find out whether the following pairs of linear equations are consistent,or inconsistent:(ii) $2x-$

$3y=8$ $4x-6y=9$



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7. On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$

,find out whether the following pairs of linear equations are consistent,or inconsistent:

(iii) $3/2x+5/3y=7$, $9x-10y=14$



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8. On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$

,find out whether the following pairs of linear

equations are consistent, or inconsistent: (iv)

$$5x - 3y = 11 \quad -10x + 6y = -22$$



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9. On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$

, find out whether the following pairs of linear equations are consistent, or inconsistent:

(v) $4/3x + 2y = 8$ $2x + 3y = 12$



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10. Which of the following pairs of linear equations are consistent/inconsistent? If consistent obtain the solution in such cases graphically. (i) $x+y=5$, $2x+2y=10$



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11. Which of the following pairs of linear equations are consistent/inconsistent? If consistent obtain the solution in such cases graphically. (ii) $x-y=8$, $3x-3y=16$





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12. Which of the following pairs of linear equations are consistent/inconsistent? If consistent obtain the solution in such cases graphically. (ii) $2x - 2y - 2 = 0$, $4x - 4y - 5 = 0$



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13. Half the perimeter of rectangular garden, whose length is 4 m more than its

width, is 36 m. Find the dimensions of the garden.



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14. Given the linear equation $2x+3y-8=0$, write another linear equation in two variables such that the geometrical representation of the pair so formed is: (i) intersecting lines



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15. Given the linear equation $2x+3y-8=0$, write another linear equation in two variables such that the geometrical representation of the pair so formed is: (ii) parallel lines



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16. Given the linear equation $2x+3y-8=0$, write another linear equation in two variables such that the geometrical representation of the pair so formed is: (iii) coincident lines





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17. Draw the graphs of the equations $x-y+1=0$ 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.



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18. Solve the following pair of linear equations by the substitution method: (i) $x+y=14$, $x-y=4$



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19. Solve the following pair of linear equations by the substitution method: (ii) $s-t=3$,
 $s/3+t/2=6$



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20. Solve the following pair of linear equations by the substitution method: (iii) $3x-y=3$, $9x-3y=9$



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21. Solve the following pair of linear equations by the substitution method: (iv) $0.2x + 0.3y = 1.3$
 $0.4x + 0.5y = 2.3$



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22. Solve the following pair of linear equations by the substitution method: (v)
 $\sqrt{2}x + \sqrt{3}y = 0$ $\sqrt{3}x - \sqrt{8}y = 0$



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23. Solve the following pair of linear equations

by the substitution method: (vi)

$$\frac{3x}{2} - \frac{5y}{3} = 2, \quad \frac{x}{3} + \frac{y}{2} = \frac{13}{6}$$



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



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25. Form the pair of linear equations for the following problems and find their solutions by substitution method.(i) The difference between two numbers is 26 and one number is three times the other.Find them.



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26. Form the pair of linear equations for the following problems and find their solutions by substitution method.(ii) The larger of two

supplementary angles exceeds the smaller by 18 degrees. Find them.



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27. Form the pair of linear equations for the following problems and find their solutions by substitution method. (iii) The coach of a cricket team buys 7 bats and 6 balls for ₹3800. Later she buys 3 bats and 5 balls for ₹1750. Find the cost of each bat and each ball.



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28. Form the pair of linear equations for the following problems and find their solutions by substitution method.

(iv) The taxi charges in a city consist of a fixed charge together with the charge for the distance covered. For a distance of 10 km, the charge paid is ₹105 and for a journey of 15 km, the charge paid is ₹155. What are the fixed charges and the charges per kilometer? How much does a person have to pay for travelling a distance of 25 km?



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29. Form the pair of linear equations for the following problems and find their solutions by substitution method.(v)A fraction becomes $\frac{9}{11}$,if 2 is added to both the numerator and the denominator.If 3 is added to both the numerator and the denominator it becomes $\frac{5}{6}$.Find the fraction.



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30. Form the pair of linear equations for the following problems and find their solutions by substitution method. (iv) Five years hence, the age of Jacob will be three times that of his son. Five years ago, Jacob's age was seven times that of his son. What are their present ages.



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31. Solve the following pair of linear equations by the elimination method and the substitution method : (i) $x+y=5$ and $2x-3y=4$



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32. Solve the following pair of linear equations by the elimination method and the substitution method :(ii) $3x+4y=10$ and $2x-2y=2$



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33. Solve the following pair of linear equations by the elimination method and the substitution method :(iii) $3x-5y-4=0$ and $9x=2y+7$



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34. Solve the following pair of linear equations

by the elimination method:(iv)

$$\frac{x}{2} + \frac{2y}{3} = -1 \text{ and } x - y/3 = 3$$



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35. Form the pair of linear equations in the following problems, and find their solutions (if they exist) by the elimination method:(i) If we

add 1 to the numerator and subtract 1 from the denominator a fraction reduces to 1. It becomes $\frac{1}{2}$ if we only add 1 to the denominator. What is the fraction?



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36. Form the pair of linear equations in the following problems, and find their solutions (if they exist) by the elimination method: (ii) Five years ago, Nuri was thrice as old as Sonu. Ten

years later, Nuri will be twice as old as Sonu. How old are Nuri and Sonu?



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37. Form the pair of linear equations in the following problems, and find their solutions (if they exist) by the elimination method: (iii) The sum of the digits of a two-digit number is 9. Also nine times this number is twice the number obtained by reversing the order of the digits. Find the number.



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38. Form the pair of linear equations in the following problems, and find their solutions (if they exist) by the elimination method:

(iv) Meena went to a bank to withdraw Rs. 2000. She asked the cashier to give her Rs. 50 and Rs. 100 notes only. Meena got 25 notes in all. Find how many notes of Rs. 50 and Rs. 100 she received.



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39. Which of the following pairs of linear equations has unique solution, no solution, or infinitely many solutions. In each there is a unique solution, find it by using the cross multiplication method. (i) $x - 3y - 3 = 0$ $3x - 9y - 2 = 0$



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40. Which of the following pairs of linear equations has unique solution, no solution, or infinitely many solutions. In each there is

unique solution ,find it by using cross multiplication method.(ii) $2x+y=5$ $3x+2y=8$



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41. Which of the following pairs of linear equations has unique solution, no solution, or infinitely many solutions. In each there is unique solution ,find it by using cross multiplication method.(iii) $3x-5y=20$ $6x-10y=40$



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42. Which of the following pairs of linear equations has unique solution, no solution, or infinitely many solutions. In each there is a unique solution, find it by using the cross multiplication method. (iv) $3x - 3y - 7 = 0$ $3x - 3y - 15 = 0$



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43. For which values of a and b does the following pair of linear equations have an infinite number of solutions? $2x + 3y = 7$ $(a - b)x + (a + b)y = 3a + b - 2$



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44. 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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45. Solve the following pair of linear equations by substitution and cross-multiplication methods: $8x+5y=9$ $3x+2y=4$



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46. Form the pair of linear equations in the following problems and find their solutions (if they exist) by any algebraic method:(i) 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 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.



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47. Form the pair of linear equations in the following problems and find their solutions (if they exist) by any algebraic method: A fraction becomes $\frac{1}{3}$ when 1 is subtracted from the numerator and it becomes $\frac{1}{4}$ when 8 is added to its denominator. Find the fraction.



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48. Form the pair of linear equations in the following problems and find their solutions (if they exist) by any algebraic method: Places A and B are 100km apart on a highway. One car starts from A and another from B at the same time. If the car travel in the direction at different speeds, they meet in 5 hours. If they travel toward each other, they meet in 1 hour. What are the speeds of the two cars?



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49. Form the pair of linear equations in the following problems and find their solutions (if they exist) by any algebraic method: The area of rectangle gets reduced by 9 square units, if its length is reduced by 5 units and breadth is increased by 3 units. If we increase the length by 3 units and the breadth by 2 units, the area increases by 67 square units. Find the dimensions of the rectangle.



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50. Solve the following pairs of equations by reducing them to a pair of linear equations:(i)

$$\frac{1}{2x} + \frac{1}{3y} = 2, \quad \frac{1}{3x} + \frac{1}{2y} = \frac{13}{6}$$



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51. Solve the following pairs of equations by reducing them to a pair of linear equations:(ii)

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



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52. Solve the following pairs of equations by reducing them to a pair of linear equations:

(iii) $4/x + 3y = 14$ $3/x - 4y = 23$



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53. Solve the following pairs of equations by reducing them to a pair of linear equations:(iv)

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



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54. Solve the following pairs of equations by reducing them to a pair of linear equations:(v)

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



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55. Solve the following pairs of equations by reducing them to a pair of linear equations:(v)

$$6x+3y=6xy \quad 2x+4y=5xy$$



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56. Solve the following pairs of equations by reducing them to a pair of linear equations:

$$(vii) \quad \frac{10}{x+y} + \frac{2}{x-y} = 4,$$

$$\frac{15}{x+y} + \frac{5}{x-y} = -2$$



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57. Solve the following pairs of equations by reducing them to a pair of linear equations:

$$(viii) \quad \frac{1}{3x+y} + \frac{1}{3x-y} = \frac{3}{4}$$

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



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58. Formulate the following problems as a pair of equation, 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.



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59. Formulate the following problems as a pair of equation, and hence find their solutions: (ii)

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 days. Find the time taken by 1 woman alone to finish the work, and also that taken by 1 man alone.



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60. The ages of two friends Ani and Biju differ by 3 years. Ani's father Dharman is twice as old as Ani and Biju is twice as old as his sister

Cathy. The ages of Cathy and Dharman differ by 30 years. Find the ages of Ani and Biju.



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61. One says, "Give me 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 Bhaskara 11]



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62. A train covered a certain distance at a uniform speed. If the train would have been 10 km/h faster, it would have taken 2 hours less than the scheduled time. And if the train were slower by 10 km/h, it would have taken 3 hours more than the scheduled time. Find the distance covered by the train.



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63. 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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64. In a $\triangle ABC$, $\angle C = 3\angle B = 2(\angle A + \angle B)$. Find the three angles.



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65. Draw the graphs of the equations $5x-y=5$ and $3x-y=3$. Determine the coordinates of the vertices of the triangles formed by these lines and the y-axis.



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66. Solve the following pair of linear equations: (i) $px+qy=p-q$ $qx-py=p+q$



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67. Solve the following pair of linear equations:

(ii) $ax+by=c$, $bx+ay=1+c$



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68. Slove the following pair of linear

equations:(iii) $x/a-y/b=0$ $ax + by = a^2 + b^2$



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69. Solve the following pair of linear equations:(iv)

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

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



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70. Solve the following pair of linear equations:(v) $152x - 378y = -74$ $-378x + 152y = -604$



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71. The pair of linear equations $kx+2y=5$ and $3x+y=1$ has unique solution if

a) $k=0$ b) $k \neq 6$ c) $k=2$ d) $k=3$

A. $k=0$

B. $k \neq 0$

C. $k=2$

D. $k=3$

Answer:



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72. The pair of linear equations $-5x+2y=8$ and $2x-5y-3=0$ have a)one solution b)two solution c)many solution d)no solution

A. one solution

B. two solution

C. many solution

D. no solution

Answer:



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73. The pair of linear equations $2x+3y=5$ and

$4x+ky=10$ has infinite solutions if

a) $k=0$ b) $k=1$ c) $k=3$ d) $k=6$

A. $k=0$

B. $k=1$

C. $k=3$

D. $k=6$

Answer:



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74. The pair of equations $2x-5y+4=0$ and $2x+y-8=0$ has

- A. a unique solution
- B. exactly many solution
- C. infinitely many solution
- D. no solution

Answer:



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75. The pair of equations $y=0$ and $y=-7$ has

a)one solution b)two solution c)infinitely many solution d)no solution

A. one solution

B. two solution

C. infinitely many solution

D. no solution

Answer:



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76. If the pair of equations $2x+3y=11$ and $(a+b)x+(2a-b)y=33$ has infinitely many solution then

a) $a=-1, b=5$ b) $a=1, b=5$ c) $a=5, b=1$ d) $a=5, b=-1$

A. $a=-1, b=5$

B. $a=1, b=5$

C. $a=5, b=1$

D. $a=5, b=-1$

Answer:



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77. The pair of equations $3x+y=1$ $(2k-1)x+(k-1)y=2k+1$ is consistent for what value of k ?



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78. If the lines given by $3x+2ky=2$ and $2x+5y+1=0$ are parallel then the value of k is

a) $\frac{3}{2}$ b) $-\frac{5}{4}$ c) $\frac{15}{4}$ d) $\frac{2}{5}$

A. $\frac{3}{2}$

B. $-\frac{5}{4}$

C. $\frac{15}{4}$

D. $\frac{2}{5}$

Answer:



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79. If a pair of linear equations is consistent then the lines will be

- a) parallel
- b) intersecting
- c) always coincident
- d) always intersecting

A. parallel

B. intersecting or coincident

C. always coincident

D. always intersecting

Answer:



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

respectively,

a)3 and 1 b)-1 and -3 c)6 and 4 d)5 and 3

A. 3 and 1

B. -1 and -3

C. 6 and 4

D. 5 and 3

Answer:



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81. If $am \neq bl$ then the pair of equations

$$ax+by=c, lx+my=n$$

a)has a unique solution b)has no solution

c)has infinitely many d)may or may not have a

solution

A. has a unique solution

B. has no solution

C. has infinitely many

D. may or may not have a solution

Answer:



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82. The area of the triangle formed by the line $x/a + y/b = 1$ with the Co-ordinate axes is

a) ab b) $2ab$ c) $1/2ab$ d) $1/4ab$

A. ab

B. $2ab$

C. $1/2ab$

D. $1/4ab$

Answer:



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83. The area of the triangle formed by $y=x$, $x=6$ and $y=0$ is

a) 9 sq.units b) 18sq.units c) 36 sq.units d) 72 sq.units

A. 9 sq,units

B. 18sq,units

C. 36 sq,units

D. 72 sq,units

Answer:



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84. on solving $2/x + 3/y = 3$, $3/x + 6/y = 5$ we get,

A. $x=1, y=3$

B. $x=2, y=6$

C. $x=2, y=3$

D. $x=1/2, y=1/3$

Answer:



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