MATHS

NCERT - NCERT Maths(Tamil)

PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

Example

1. Check whether the given pair of equations represent intersecting, parallel or coincident lines. Find the solution if the equations are consistent.

$2x + y - 5 = 0$

$3x - 2y - 4 = 0$

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2. Check whether (5,-1) is a solution of the simultaneous equations $x-2y=7$ and $2x+3y=7$.

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3. Check whether the equations $2x - 3y = 5$ and $4x - 6y = 15$ are consistent. Also verify by graphical representation.

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4. In a garden there are some bees and flowers, if one bee sits on each flower then on e bee wil be left. IF two bes sit on each flower, on flower we be left. Find the number of bees and number of flowers.

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5. The perimeter of a rectangular plot is 32 m. If the increased by 2 m and the breadth is decreased by 1 m, the area of the plot remains the same. Find the length and breadth fo the plot .

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6. Solve the given pair of equations using subtitution method.

2x-y=5

3x+2y=11

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7. Solve the following pair of linear equation using elimination method.

3x + 2y = 11

2x + 3y = 4

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8. Rubina went to abank to withdraw Rs2000. She asked the cashier to give the cash in Rs.50 and Rs.100 notes only. She got 25 notes in all. Can you tell how many notes each of Rs.50 and Rs.100 she received?

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9. In a competitive exam, 3 marks are awarded for every correct answer and for every wrong answer, I mark will be deducted. Madhu scored 40 marks in this exam. Had 4 marks been awarded for each correct answer and 2 marks deducted for each incorrect answer, Madhu would have scored 50 marks. If Madhu has attempted all questions, how many questions were there in the test?

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10. Mary told her daugher, "seven years ago, I was seven times as old as you were then. Also, three years from now, I shall be three times as old as you will be."Find the present age of Mary and her daughter.

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11. A pubisher is planning to produce a new textbook. The fixed costs (reviewing. Editing. Typesetting and so on) are Rs 320000. Besides that , he also spends another Rs. 31.25 in producing the book. The wholesale price (the amount recevied by the publisher) is Rs 43.75 per book. How many books must the publisher sell to break even, i.e. so that the cost of production will equal revenues?

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12. Solve the following pair of equations. $\frac{2}{x}+\frac{3}{y}=13$

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13. Kavitha thought of constructing 2 more rooms in her house. She enquired about the labour. She came to know that's 6 men and 8 women could finish this work in 14 days. But she wishes to complete that work in only 10 days. When she enquired, she was told that 8 men and 12 women could finish the work in 10 days. Find out how much time would be taken to finish the work if one man or one woman worked alone.

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14. A man travels 370km partky by train and partly by car. If he covers 250 km by train and the rest by car, it takes him 4 hours, but

if he travels 130 km by train and the rest by car, it takes 18 minutes more. Find the speed of the train and that of the car.

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Try This

1. Which of the following equations is not a linear equation?

A. 5 + 4x =y + 3

B. x+2y = y-x

C. 3-x=y^2 +4

D. x + y = 0

Answer:

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2. Which of the following is a linear equation in one variable ?

A. 2x + 1 = y - 3

B. 2t - 1 = 2t + 5

C. 2x - 1 = x^2

D. x^2 - x + 1 = 0

Answer:

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3. Which of the following numbers is a solution for the equation 2(x + 3) = 18?

A. 5

B. 6

C. 13

D. 21

Answer:

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4. The value of x which satisfies the equation 2x - (4-x) = 5 - x is

A. 4.5

B. 3

C. 2.25

D. 0.5

Answer:

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5. The equation $x - 4y = 5$ has

A. no solution

B. unique solution

C. two solutions

D. infinitely many solutions

Answer:

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6. In the example given can you find the cost of each bat and ball ?

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7. for what value of 'p' the following pair of equations has a unique solution. $2x + py = -5$ and $3x + 3y = -6$

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8. Find the value of 'k' for which the pair of equations $2x - ky + 3 = 0$. $4x + 6y - 5 = 0$ represent parallel lines.

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9. For what value of 'k'. The pair of equations $3x + 4y + 2 = 0$ and $9x + 12y + k = 0$ represents coincident lines.

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10. For what positive values of 'p'. The following pair of linear equations have infinitely many solutions ?

px + 3y - (p-3) = 0

12x + py - p = 0

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11. Solve the given pair of linear equations

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

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12. Solve:

$$(a-b)x+(a+b)y=a^2-2ab-b^2 \text{ and } (a+b)(x+y)=a^2+b^2$$

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Do This

1. Solve the following systems of equations :

(i) $x - 2y = 0$

$3x + 4y = 20$

(ii) $x + y = 2$

$2x + 2y = 4$

(iii) $2x - y = 4$

$4x - 2y = 6$

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2. Represent the following pair of linear equations graphically.

$x + 2y - 4 = 0$ and $2x + 4y - 12 = 0$. Represent this situation graphically.

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3. Check each of the given systems of equations to see if it has a unique solution, infinitely many solutions or no solution. Solve them graphically.

(i) $2x + 3y = 1$

$3x - y = 7$

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4. Check each of the given systems of equations to see if it has a unique solution, infinitely many solutions or no solution. Solve them graphically.

(ii) $x + 2y = 6$

$2x + 4y = 12$

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5. Check each of the given systems of equations to see if it has a unique solution, infinitely many solutions or no solution. Solve them graphically.

(iii) $3x + 2y = 6$

$6x + 4y = 18$

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6. Solve following pair of equations by using the substitution method.

(1) $3x - 5y = -1$

$x - y = -1$

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7. Solve following pair of equations by using the substitution method.

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

$2x - 3y = 12$

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8. Solve following pair of equations by using the substitution method.

(3) $2x + 3y = 9$

$3x + 4y = 5$

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9. Solve following pair of equations by using the substitution method.

(4) $x = \frac{6}{y} = 6$

$3x - \frac{8}{y} = 5$

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10. Solve following pair of equations by using the substitution method.

(5) $0.2x + 0.3y = 13$

$0.4 = 0.5y = 2.3$

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11. Solve following pair of equations by using the substitution method.

(6) $\sqrt{2}x + \sqrt{3}y = 0$

$\sqrt{3}x - \sqrt{8}y = 0$

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12. Solve each of the following pair of equations by the elimination method.

(1) $8x + 5y = 9$

$3x + 2y = 4$

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13. Solve each of the following pair of equations by the elimination method.

(2) $2x + 3y = 8$

$4x + 6y = 7$

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14. Solve each of the following pair of equations by the elimination method.

(3) $3x + 4y = 25$

$5x - 6y = -9$

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Think Discuess

1. The coach of a cricket team of M.K. Nagar High school buys 3 bats and 6 balls for Rs. 3900. Later he buys one more bat and 2 balls for Rs. 1300.

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2. Is a dependent pair of linear equations always consistant . Why or why not ?

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Exercise 4 1

1. By comparing the ratios a_1/a_2, b_1/bunderset2, cunderset1$/c_2$, state whether the lines represented by the following pairs of linear equations intersect at a poit, are parllel or are coincident.

(a) 5x - 4y + 8 = 0

7x + 6y - 9 = 0

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2. By comparing the ratios a_1/a_2, b_1/bunderset2, cunderset1$/c_2$, state whether the lines represented by the following pairs of linear equations intersect at a poit, are parllel or are coincident.

(b) 9x + 3y +12 = 0

18x + 6y + 24 = 0

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3. By comparing the ratios a_1/a_2, b_1/bunderset2, cunderset1$/c_2$, state whether the lines represented by the following pairs of linear equations intersect at a poit, are parllel or are coincident.

(c) 6x - 3y + 10 = 0

2x - y + 9 = 0

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4. Check whether the following equations are consistent or inconsistent. Solve them graphically.

(a) $3x + 2y = 5$

$2x - 3y = 7$

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5. Check whether the following equations are consistent or inconsistent. Solve them graphically.

(b) $2x - 3y = 8$

$4x - 6y = 9$

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6. Check whether the following equations are consistent or inconsistent. Solve them graphically.

(c) $\frac{3}{2}x + \frac{5}{3}y = 7$

9x - 10y = 12

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7. Check whether the following equations are consistent or inconsistent. Solve them graphically.

(d) 5x - 3y = 11

-10x + 6y = -22

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8. Check whether the following equations are consistent or inconsistent. Solve them graphically.

(e) $\frac{4}{3}x + 2y = 8$

2x + 3y = 12

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9. Check whether the following equations are consistent or inconsistent. Solve them graphically.

(f) $x + y = 5$

$2x + 2y = 10$

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10. Solve following pair of equations by using the substitution method

$x - y = 8$

$3x + 3y = 16$

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11. Check whether the following equations are consistent or inconsistent. Solve them graphically.

(h) $2x + y-6 = 0$

$4x - 2y - 4 = 0$

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12. Check whether the following equations are consistent or inconsistent. Solve them graphically.

(i) $2x - 2y - 2 = 0$

$4x -4y - 5 = 0$

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13. Neha went to a 'sale' to purchase some pants and skirts. When her friend asked her how many of each she had bought, she

answered, 'the number of skirts are two less then twice the number of pants purchesed and the number of skirts is four less than four times the number of pants purchased."

Help her friend to find how many pants and skirts Neha bought.

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14. 10 students of class-X took part in a mathematics quiz. If the number of girls is 4 more than the number of noys then, find the number of boys and the number of girls who took part in the quiz.

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15. 5 pencils and 7 pens together cost Rs.50 whereas 7 pencils and 5 pens together cost rs.46 Find the cost of one pencil and that of one pen.

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16. Half the perimeter of a rectanguler garden id 36m. If the length is 4m more than its width. Find the dimensions of the garden.

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17. Hema's age is 4 times the age of Mary. Write a linear equation in two variables to represent this information.

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18. The area of a rectangle gets reduced by 8 sq units if its length is reduced by 5 units and breadth is increased by 2 units. If we increase the length by 10 units and decrease the breadth by 5 units, the area will increase by 50 sq units. Find the length and breadth of the rectangle.

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19. IN a class, if three stdents sit on each bench, one student will be left. If four students sit on each bench, one bench will be left. Find the number of students and the number of benches in that class.

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Exercise 4 2

1. The ratio of incomes of two persons is 9 : 7 and the ratio of their expenditures is 4 : 3 If each of them manages to save Rs.2000 per month, find their monthly income.

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2. The sum of two digit number and the number obtained by reversing the digits is 66. If the digits of the number differ by 2, Find the number. How many such numbers are there?

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3. The larger of two supplementary angles exceeds the smaller by 18°. Find the angles.

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4. The taxi charges in Hyderabad are fixed, along with the charge for the distance covered. Upto first 3 km you will be charged a certain minimum amount. From there onwards you have to pay additionally for every kilometer travelled. For the first 10 km. the charge paid is Rs.166. For a journey of 15 km. the charge paid is

Rs.256.

i. What are the fixed charges and charge per km?

ii. How much does a person have to pay for travelling a distance of 25 km?

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5. A fraction will be equal to $\frac{4}{5}$ if is added to both numerator and denominator. If, however, 5 is subtracted from both numerator and denominator, the fraction will be equal to $\frac{1}{2}$. What is the fraction?

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6. Places A and B are 100 km apart on a highway. One car start from A and another from B at the same time at different speeds. If the car travel in the same direction, 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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7. Two angles are complemetary. The larger angle is 3° less than twice the measure of the smaller angle. Find the measure of each angle.

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8. A dictionary has a total of 1382 pages. It is broken up into two parts. The second part of the book has 64 more than the first part. How many pages are in each part of the book?

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9. A chemist has two solutions of hydrochloric acid in stock. One is 50% solution and the other is 80% solution. How much of each should be used to obtain 100ml of a 68% solution.

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10. You have Rs.12,000/- saved amount, and wants to invest it in two schemes yielding 10% and 15% interest. How much amount should be invested in each scheme so that you should get overall 12% interest.

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Exercise 4 3

1. Solve each the following pairs of equations by reducing them to a pair of linear equations.

(i) $\frac{5}{x} - 1 + \frac{1}{y} - 2 = 2$

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

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2. Solve each the following pairs of equations by reducing them to a pair of linear equations.

(ii) $x + \frac{y}{x} y = 2$

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

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3. Solve each the following pairs of equations by reducing them to a pair of linear equations.

(iii) $\frac{2}{\sqrt{x}} + \frac{3}{\sqrt{y}} = 2$

$\frac{4}{\sqrt{x}} - \frac{9}{\sqrt{y}} = -1$

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4. Solve each the following pairs of equations by reducing them to a pair of linear equations.

(iv) 6x + 3y = 6xy

2x + 4y = 5xy

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5. Solve each the following pairs of equations by reducing them to a pair of linear equations.

(v) $\frac{5}{x} + y$ - $\frac{2}{x} - y$ =-1

$\frac{15}{x} + y$ + $\frac{7}{x} - y$ = 10

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6. Solve each the following pairs of equations by reducing them to a pair of linear equations.

(vi) $\frac{2}{x} + \frac{3}{y} = 13$

$\frac{5}{x} - \frac{4}{y} = -2$

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7. Solve each the following pairs of equations by reducing them to a pair of linear equations.

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

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

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8. Solve each the following pairs of equations by reducing them to a pair of linear equations.

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

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

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9. Formulate the following problems as a pair of equations and then find their solutions.

i. A boat goes 30km upstream and 44 km downstream in 10 hours. In 13 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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10. Formulate the following problems as a pair of equations and then find their solutions.

ii. Rahim travels 600 km to his home partly by train and partly by

car. He takes 8 hours if he tracels 120 km by train and rest by car. He takes 20 minutes more if he tracels 200km by train and rest by car. Find the speed of the train and the car.

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11. Formulate the following problems as a pair of equations and then find their solutions.

iii. 2 women and 5 men can together finish an embroidery work in 4 day while 3 women and 6 men can finish it in 3 days. Find the time to be taken by 1 woman alone and 1 man alone to finish the work.

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Optional Exercise

1. Animals in an experiment are to be kept on a strict diet. Each animal is to receive among other things 20g of protein and 6g of fat. The laboratory technicians purchased two food mixes, A and B. Mix A has 10% protein and 6% fat. Mix B has 20% protein and 2% fat. How many grams of each mix should be used?

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