



# MATHS

## BOOKS - RD SHARMA MATHS

### (HINGLISH)

# PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

Others

1. 37 pens and 53 pencils together cost Rs. 320, while 53 pens and 37 pencils together cost Rs. 400. Find the cost of a pen and that of a pencil.



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2.  $A$  and  $B$  each have certain number of oranges.  $A$  says to  $B$ , if you give me 10 of your oranges, I will have twice the number of oranges left with you.  $B$  replies, if you give me 10 of your oranges, I will have the same number

of oranges as left with you. Find the number of oranges with A and B separately.



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3. Prove that there is a value of  $c$  ( $\neq 0$ ) for which the system  $6x + 3y = c - 3$   
 $12x + cy = c$  has infinitely many solutions.  
Find this value.



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4. Find the values of  $k$  for which the system  $2x + ky = 1$   $3x - 5y = 7$  will have (i) a unique solution, and (ii) no solution. Is there is a value of  $k$  for which the system has infinitely many solutions?



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5. For what value of  $\alpha$ , the system of equations  $\alpha x + 3y = \alpha - 3$   $12x + \alpha y = \alpha$  will have no solution?



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6. Find the value of  $k$  for which the system  $kx + 2y = 5$   $3x + y = 1$  has (i) a unique solution, and (ii) no solution.



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



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8. Determine the values of  $m$  and  $n$  so that the following system of linear equations have infinite number of solutions:

$$(2m - 1)x + 3y - 5 = 0$$

$$3x + (n - 1)y - 2 = 0$$



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9. Find the value(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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**10.** For what value of  $k$  will the equations  $x + 2y + 7 = 0$ ,  $2x + ky + 14 = 0$  represent coincident lines?

(A). 2

(B). 6

(C). 4

(D). 5



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11. In each of the following systems of equations determine whether the system has a unique solution, no solution or infinitely many solutions. In case there is a unique solution, find it.

$$\begin{aligned} 2x + 3y &= 7 \\ 6x + 5y &= 11 \end{aligned}$$


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



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14.  $\frac{4}{x} + 5y = 7$  and  $\frac{3}{x} + 4y = 5$



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15. Solve the following system of equations in

$x$  and  $y$

$$ax + by = 1$$

$$bx + ay = \frac{(a + b)^2}{a^2 + b^2} - 1 \text{ or } , bx + ay = \frac{2ab}{a^2 + b^2}$$



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16. Solve:  $x + y = a + b$   $ax - by = a^2 - b^2$



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$$17. \frac{xy}{x + y} = \frac{6}{5} \frac{xy}{y - x} = 6$$



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18.  $3x - \frac{y + 7}{11} + 2 = 10$  and

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



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19.  $x - y + z = 4,$   $x + y + z = 2,$

$$2x + y - 3z = 0$$



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20.

$$\frac{44}{x+y} + \frac{30}{x-y} = 10$$

$$\frac{55}{x+y} + \frac{40}{x-y} = 13$$



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21. Solve:  $x + 2y + z = 7$ ,  $x + 3z = 11$ ,

$$2x - 3y = 1$$



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22. Solve for x and y

$$\frac{6}{x+y} = \frac{7}{x-y} + 3,$$

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



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**23.** Determine graphically the vertices of a trapezium, the equations of whose sides are  $x = 0$ ,  $y = 0$ ,  $y = 4$  and  $2x + y = 6$ . Also, determine its area.



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24. Determine, graphically whether the system of equations  $x - 2y = 2$ ,  $4x - 2y = 5$  is consistent or in-consistent.



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25. Solve the following system of equations by using the method of elimination by equating

the coefficients:  $\frac{x}{10} + \frac{y}{5} + 1 = 15$

$$\frac{x}{8} + \frac{y}{6} = 15$$



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**26.** Solve the following system of equations:

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

$$\frac{1}{x} + \frac{1}{2y} = 9, \text{ where } x \neq 0, y \neq 0.$$



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**27.** Solve:  $4x + \frac{6}{y} = 15$     $6x - \frac{8}{y} = 14$  and

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



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28. Solve:  $3(2u + v) = 7uv, 3(u + 3v) = 11uv$



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

$\frac{7}{2x + 3y} + \frac{4}{3x - 2y} = 2$  where

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



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30. Solve:  $217x + 131y = 913$

$$131x + 217y = 827$$



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31. The area of the triangle formed by the lines  $2x + 3y = 12$ ,  $x - y - 1 = 0$  and  $x = 0$  (as shown in Figure), is 7sq. units (b) 7.5 sq. units (c) 6.5 sq. units (d) 6 sq. units



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**32.** 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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**33.** A wizard having powers of mystic incantations and magical medicines seeing a cock, fight going on, spoke privately to both the owners of cocks. To one he said: your bird wins,

than you give me your stake-money, but if you do not win, I shall give you two third of that'. Going to the other, he promised in the same way to three fourths. From both of them his gain would be only 12 gold coins. Find the stake of money each of the cock-owners have.



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**34.** 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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**35.** There are two examination rooms A and B. If 10 candidates are sent A and B, the number of students in each room is same. If 20 candidates are sent from B to A, the number of students in A is double the number of students in B. Find the number of students in each room.



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**36.** In a rectangle, if the length is creased by 3 metres and breadth is decreased by 4 meters, the rea of the rectangle is reduced by 67 square meters. If length is reduced by 1 metre and breadth is increased by 4 metres, the area is increased by 89 sq. metres. Find the dimensions of the rectangle.



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**37.** 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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**38.** Draw the graphs of  $2x + y = 6$  and  $x - y + 2 = 0$ . Shade the region bounded by these lines and x-axis. Find the area of the shaded region.



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**39.** Solve the following system of linear equations graphically.  $2x - y - 4 = 0$ ,  
 $x + y + 1 = 0$

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

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



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42. Show graphically that the system of equations

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



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**43.** Solve graphically the system of equations:

$$x + y = 3 \quad 3x - 2y = 4$$



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**44.** Ten students of class X took part in Mathematics quiz. If the number of girls is 4 more than the number of boys. Represent this situation algebraically and graphically.



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**45.** Draw the graphs of the following equations:

$$2x - y - 2 = 0 \quad , \quad 4x + 3y - 24 = 0 \quad \text{and}$$

$$y + 4 = 0$$
 Obtain the vertices of the triangle

so obtained. Also, determine its area.



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**46.** Solve the following system of linear equations graphically:  $x - y = 1$

$$2x + y = 8$$



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**47.** After covering a distance of 30km with a uniform speed there is some defect in a train engine and therefore, its speed is reduced to  $\frac{4}{5}$  of its original speed. Consequently, the train reaches its destination late by 45 minutes. Had it happened after covering 18 kilometres more, the train would have reached 9 minutes earlier. Find the speed of the train and the distance of journey.



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**48.** A man travels 600 km partly by train and partly by car. If he covers 400 km by train and the rest by car, it takes him 6 hours and 30 minutes. But, if he travels 200 km by train and the rest by car, he takes half an hour longer. Find the speed of the train and that of the car.



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**49.** A boat covers 32km upstream and 36 km downstream in 7 hours. Also, it covers 40 km upstream and 48km downstream in 9 hours.

Find the speed of the boat in still water and that of the stream.



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50. X takes 3 hours more than Y to walk 30km.

But, if X double his pace, he is ahead of Y by

$\frac{1}{12}$  hours . Find their speed of walking.



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**51.** The total expenditure per month of a household consists of a fixed rent of the house and mess charges depending upon the number of people sharing the house. The total monthly expenditure is Rs. 3900 for 2 people and Rs. 7500 for 5 people. Find the rent of the house and the mess charges per head per month.



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**52.** A man starts his job with a certain monthly salary and earns a fixed increment every year. If

his salary was Rs. 1500 after 4 year of service and Rs. 1800 after 10 years of service, what was his starting salary and what is the annual increment?



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**53.** places A and B are 80 km apart from each other on a highway. A car starts from A and other from B at the same time. If they move in the same direction, they meet in 8 hours and if they move in opposite directions, they meet in

1 hour and 20 minutes. Find the speed of the cars.



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**54.** Abdul traveled 300km by train and 200km by taxi, it took him 5 hours 30minutes But if he travel 260 km by train and 240 km by bus he takes 6 minutes longer Find the speed of the train and of the taxi



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**55.** A person invested some amount at the rate of 12% simple interest and a certain amount at the rate of 10% simple interest. He received yearly interest of Rs 130. But if he had interchanged the amounts invested, he would have received Rs 4 more as interest. How much did he invest at 12% simple interest? (a) Rs 400 (b) Rs 500 (c) Rs 700 (d) Rs 800



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**56.** Students of a class are made to stand in rows. If one student is extra in a row, there would be 2 rows less. If one student is less in a row there would be 3 rows more. Find the number of students in the class.



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**57.** If the numerator of a fraction is multiplied by 2 and the denominator is reduced by 5 the fraction becomes  $\frac{6}{5}$ . And, if the denominator

is doubled and the numerator is increased by 8, the fraction becomes  $\frac{2}{5}$ . Find the fraction.



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**58.** The denominator of a fraction is 4 more than twice the numerator. When both the numerator and denominator are decreased by 6, then the denominator becomes 12 times the numerator. Determine the fraction.



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**59.** I am three times as old as my son. Five years later, I shall be two and a half times as old as my son. How old am I and how old is my son?



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**60.** If twice the son's age in years is added to the father's age, the sum is 70. But if twice the other's age is added to the son's age, the sum is 95. Find the ages of father and son.



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**61.** Ten years ago, a father was twelve times as old as his son and ten years hence, he will be twice as old as his son will be then. Find their present ages.



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**62.** A and B are friends and their ages differ by 2 years. A's 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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**63.** Two years ago, a father was five times as old as his son. Two years later, his age will be 8 more than three times the age of the son. Find the present ages of father and son.



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**64.** Father's age is three times the sum of ages of his two children. After 5 years his age will be

twice the sum of ages of two children. Find the age of father.



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**65.** A man travels 370 km partly by train and partly by car. If he covers 250 km by train and the rest by car, it takes him 30 km by train and the rest by car, he takes 18 minutes longer. Find the speed of the train and that of the car.



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**66.** 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 and if they go in opposite directions they meet in  $9/7$  hours. Find their speeds.



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**67.** 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  $\frac{1}{2}$ . What is the fraction.



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**68.** A fraction is such that if the numerator is multiplied by 3 and the denominator is reduced by  $\frac{8}{11}$ , but if the numerator is increased by 8 and the denominator is doubled, we get  $\frac{2}{5}$ . Find the fraction.



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**69.** The sum of two numbers is 1000 and the difference between their squares is 256000. Find the numbers.



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**70.** A two-digit number is 3 more than 4 times the sum of its digits. If 18 is added to the number, the digits are reversed. Find the number.



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**71.** A two-digit number is such that the product of its digits is 20. If 9 is added to the number the digits interchange their places. Find the number.



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**72.** 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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**73.** The sum of a two digit number and the number formed by interchanging its digits is 1 is subtracted from the first number, the new number is 4 more than 5 times the sum of the digits in the first number. Find the first number.



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**74.** The sum of a two digit number and the number formed by interchanging the digit is 12

is added to the number, the new number becomes 5 times the sum of the digits. Find the number.



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**75.** A two digit number is obtained by either multiplying sum of digits by 8 and adding 1 or by multiplying the difference of the digits by 13 and adding 2. Find the number.



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**76.** If three times the larger of the two numbers is divided by the smaller one, we get 4 as quotient and 3 as the remainder. Also, if seven times the smaller number is divided by the larger one, we get 5 as quotient and 1 as remainder. Find the numbers.



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**77.** The sum of a two digit number and the number obtained by reversing the order of its digits is 1. Find the number.



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**78.** In a two digit number, the ten's digit is three times the unit's digit. When the number is decreased by 54, the digits are reversed. Find the number.



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**79.** 4 tables and 3 chairs, together, cost Rs. 2,250 and 3 tables and 4 chairs cost Rs. 1950. Find the cost of 2 chairs and 1 table.



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**80.** Reena has pens and pencils which together are 40 in number. If she has 5 more pencils and 5 less pens, then number of pencils would become 4 times the number of pens. Find the original number of pens and pencils.



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**81.** 7 audio cassettes and 3 video cassettes cost Rs. 1110, while 5 audio cassettes and 4 video



cassettes cost Rs. 1350. Find the cost of an audio cassette and a video cassette.



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**82.** A man has only 20 paise coins and 25 paise coins in his purse. If he has 50 coins in all totalling Rs. 11.25, how many coins of each kind does he have?



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**83.** In a two digit number, the unit's digit is twice the ten's digit. If 27 is added to the number, the digits interchange their places. Find the number.



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



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**85.** On selling a T.V. at 5% gain and a fridge at 10% gain, a shopkeeper gains Rs. 2000. But if he sells the T.V. at 10% gain and the fridge at 5% loss. he gains Rs. 1500 on the transaction. Find the actual prices of T.V. and fridge.



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**86.** A and B each have a certain number of mangoes. A says to B, “if you give 30 of your mangoes, I will have twice as many as left with you.” B replies, “if you give me 10, I will have

thrice as many as left with you.” How many mangoes does each have?



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**87.** 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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**88.** ABCD is a cyclic quadrilateral such that  $\angle A = (4y + 20)^\circ$ ,  $\angle B = (3y - 5)^\circ$ ,  $\angle C = (-4x)^\circ$  and  $\angle D = (-7x + 5)^\circ$ . Find the four angles.



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