

PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

1. A two digit number is such that the product of its digits is 35. When 18 is added to the number, the digits interchange their places. Find the number. (CBSE 2005-06, 3 marks)
2. Solve for x and y:
 $47x + 31y = 63$
 $31x + 47y = 15$ (CBSE 2005-06, 3 marks)
3. Solve for x and y
 $\frac{ax}{b} + \frac{by}{a} = a + b$
 $ax - by = 2ab$ (CBSE 2005-06, 3 marks)
4. Draw the graphs of the equations: $4x - y - 8 = 0$ and $2x - 3y + 6 = 0$. Also determine the vertices of the triangle formed by the lines and the x - axis. (CBSE 2005-06, 4 marks)
5. Solve for x and y: $\frac{2x}{a} + \frac{y}{b} = 2, \frac{x}{a} - \frac{y}{b} = 4$ (CBSE 2006-07, 2 marks)
6. Solve for x and y: $31x + 29y - 33, 29x + 31y = 27$ (CBSE 2006-07, 2 marks)
7. Solve the following system of equations graphically:
 $2x + y = 8; x + 1 = 2y$ (CBSE 2006-07, 3 marks)
8. Find the value(s) of k for which the pair of linear equation $kx + 3y = k - 2$ and $12x + ky = k$ has no solution. (CBSE 2007-08, 2 marks)
9. Represent the following pair of equations graphically and write the coordinates of points where the lines intersect y - axis:
 $x + 3y = 6$
 $2x - 3y = 12$ (CBSE 2007-08, 3 marks)
10. The difference of two numbers is 4. If the difference of their reciprocals is $\frac{4}{21}$, find the two numbers. (CBSE 2007-08, 6 marks)
11. Solve the following pair of equations:
 $\frac{5}{x-1} + \frac{1}{y-2} = 2, \frac{6}{x-1} - \frac{3}{y-2} = 1$ (CBSE 2008-09, 3 marks)
12. The value of k for which the pair of linear equations $4x + 6y - 1 = 0$ and $2x + ky - 7 = 0$ represents parallel lines is
 (A) $k = 3$ (B) $k = 2$
 (C) $k = 4$ (D) $k = -2$ (CBSE 2009-10, 1 mark)
13. Solve for x and y
 $4x + \frac{y}{3} = \frac{8}{3}; \frac{x}{2} + \frac{3y}{4} = \frac{5}{2}$ (CBSE 2009-10, 3 marks)
14. The sum of the numerator and the denominator of a fraction is 8. If 3 is added to both the numerator and the denominator become $\frac{3}{4}$. Find the fraction. (CBSE 2009-10, 3 marks)



15. One equation of a pair of dependent linear equation is $-5x + 7y = 2$, the second equation can be:
(A) $10x + 14y + 4 = 0$ (B) $-10x - 14y + 4 = 0$
(C) $-10x + 14y + 4 = 0$ (D) $10x - 14y = -4$
(CBSE 2010-11, 1 mark)
16. For what values of p will the following system of equations have no solution.
 $(2p + 1)x + (p - 1)y = 2p + 1$; $y + 3x - 1 = 0$
(CBSE 2010-11, 2 marks)
17. Solve the following system of linear equation by cross multiplication method.
 $2(ax - by) + (a + 4b) = 0$
 $2(bx + ay) + (b - 4a) = 0$
(CBSE 2010-11, 3 marks)
18. Draw the graph of $2x + y = 6$ and $2x - y + 2 = 0$. Shade the region bounded by the lines with x axis. Find the area of the shaded region.
(CBSE 2010-11, 4 marks)
19. The sum of reciprocals of a child's age (in years) 3 years ago and 5 years hence from now is $\frac{1}{3}$.
Find his present age.
(CBSE 2011-12, 3 marks)
20. 360 bricks are stacked in the following manner: 30 bricks in the bottom row, 29 in the next row, 28 in the row next to it and so on. In how many rows are the 360 bricks placed and how many bricks are there in the top row?
(CBSE 2011-12, 4 marks)
21. A two digit number is such that the product of its digits is 18. When 63 is subtracted from the number, the digits interchange their places. Find the number.
(CBSE 2011-12, 4 marks)
22. Solve the following for x : $\frac{1}{2a + b + 2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$.
(CBSE 2012-13, 4 marks)
23. Solve the following pair of equations for x and y : $\frac{4}{x} + 5y = 7$; $\frac{3}{x} + 4y = 5$
(CBSE 2013-14, 3 marks)
24. Solve the following pair of linear equations by the elimination method.
 $2x + 3y = 7$; $3x - 2y = 3$
(CBSE 2013-14, 3 marks)
25. A man has certain note of denomination 20 and 5 which amount to 380. If the number of notes of each kind are interchanged, they amount to 60 less than before. Find the number of notes of each denomination.
(CBSE 2014-15, 3 marks)
26. Show graphically the following pair of linear equations if inconsistent:
 $2x - 2y - 2 = 0$; $3x - 3y + 5 = 0$
(CBSE 2014-15, 3 marks)
27. The numerator of a fraction is 3 less than its denominator. If 2 is added to both the numerator and the denominator, then the sum of the new fraction and original fraction is $\frac{29}{20}$. Find the original fraction.
(CBSE 2014-15, 4 marks)
28. Ramkali required Rs. 2500 after 12 weeks to send her daughter to school. She saved Rs. 100 in the first week and increased her weekly saving by Rs. 20 every week. Find whether she will be able to send her daughter to school after 12 weeks. What value is generated in the above situation.
(CBSE 2014-15, 4 marks)

29. Solve for x: $\frac{2}{x+1} + \frac{3}{2(x-2)} = \frac{23}{5x}$, $x \neq 0, -1, 2$ (CBSE 2014-15, 4 marks)
30. Solve for x: $\frac{3}{x+1} + \frac{4}{x-1} = \frac{29}{4x-1}$; $x \neq 1, -1, \frac{1}{4}$ (CBSE 2014-15, 4 marks)
31. Draw the graph of the following pair of linear equations:
 $x + 3y = 6$ and $2x + 3y = 12$
 Find the ratio of the areas of the two triangles formed by first line, $x = 0$, $y = 0$ and second line $x = 0$, $y = 0$ (CBSE 2014-15, 4 marks)
32. Mr. Sharma and Mr. Arora are family friends and they decided to go for a trip with family. For the trip they reserved their rail tickets. Mr. Arora has not taken a half ticket for his child who is 6 years old where as Mr. Sharma has taken half tickets for his two children who are 6 years and 8 years old. A railway half ticket costs half of the full fare but the reservation charges are the same as in a full ticket. Mr. and Mrs. Arora paid 1700, while Mr. and Mrs. Sharma paid 2700. Find the full fare of one ticket and the reservation charges per ticket what difference you find in their behavior and which one you will choose for you self? (CBSE 2014-15, 4 marks)
33. Solve for x:
 $\frac{2x}{x-3} + \frac{1}{2x+3} + \frac{3x+9}{(x-3)(2x+3)} = 0$, $x \neq 3, \frac{-3}{2}$ (CBSE 2015-16, 3 marks)
34. Solve for x:
 $\frac{x+1}{x-1} + \frac{x-2}{x+2} = 4 - \frac{2x+3}{x-2}$; $x \neq 1, -2, 2$ (CBSE 2015-16, 3 marks)
35. Find x in terms of a, b and c:
 $\frac{a}{x-a} + \frac{b}{x-b} = \frac{2c}{x-c}$, $x \neq a, b, c$ (CBSE 2015-16, 4 marks)
36. Find the value of k for which the following pair of linear equations have infinitely many solutions
 $2x + 3y = 7$, $(k+1)x + (2k-1)y = 4k+1$. (CBSE 2018-19, 2 marks)
37. Find c if the system of equations $cx + 3y + (3-c) = 0$; $12x + cy - c = 0$ has infinitely many solutions? (CBSE 2018-19, 2 marks)
38. A father's age is three times the sum of the ages of his two children. After 5 years his age will be two times the sum of their ages. Find the present age of the father.
 OR
 A fraction becomes $\frac{1}{3}$ when 2 is subtracted from the numerator and it becomes $\frac{1}{2}$ when 1 is subtracted from the denominator. Find the fraction. (CBSE 2018-19, 3 marks)
39. Two water taps together can fill a tank in $1\frac{7}{8}$ hours. The tap with longer diameter takes 2 hours less than the tap with smaller one fill the tank separately. Find the time in which each tap can fill the tank separately.
 OR
 A boat goes 30 km upstream and 44 km downstream in 10 hours. In 13 hours, it can go 40 km upstream and 55 km downstream. Determine the speed of the stream and that of the boat in still water. (CBSE 2018-19, 4 marks)

40. The value of k for which the system of equations $x + y - 4 = 0$ and $2x + ky = 3$ has no solution, is
(A) -2 (B) $\neq 2$
(C) 3 (D) 2
(CBSE 2019-20, 1 mark)
41. Determine graphically the coordinates of the vertices of a triangle, the equations of whose sides are given by $2y - x = 8$, $5y - x = 14$ and $y - 2x = 1$.
(CBSE 2019-20, 3 marks)
42. The values of x and y satisfying the two equations $32x + 33y = 34$, $33x + 32y = 31$ respectively are:
(A) $-1, 2$ (B) $-1, 4$
(C) $1, -2$ (D) $-1, -4$
(CBSE 2021-22, TERM-I, 1 mark)
43. Two lines are given to be parallel. The equation of one of the lines is $3x - 2y = 5$. The equation of the second line can be
(A) $9x + 8y = 7$ (B) $-12x - 8y = 7$
(C) $-12x + 8y = 7$ (D) $12x + 8y = 7$
(CBSE 2021-22, TERM-I, 1 mark)
44. If a $\triangle ABC$, $\angle A = x^\circ$, $\angle B = (3x - 2)^\circ$, $\angle C = y^\circ$. Also $\angle C - \angle B = 9^\circ$. The sum of the greatest and the smallest angles of this triangle is
(A) 107° (B) 135°
(C) 155° (D) 145°
(CBSE 2021-22, TERM-I, 1 mark)
- 45-49. **Case Study – I:** A book store shopkeeper gives books on rent for reading. He has variety of books in his store related to fiction, stories and quizzes etc. He takes a fixed charge for the first two days and an additional charge for subsequent day. Amrita paid Rs. 22 for a book and kept for 6 days; while Radhika paid Rs. 16 for keeping the book for 4 days.



Assume that the fixed charge be Rs x and additional charge (per day) be Rs. y .

Based on the above information, answer any four of the following questions:

45. The situation of amount paid by Radhika, is algebraically represented by (CBSE 2021-22, TERM-I, 1 mark)
- (A) $x - 4y = 16$
(B) $x + 4y = 16$
(C) $x - 2y = 16$
(D) $x + 2y = 16$
46. The situation of amount paid by Amruta, is algebraically represented by (CBSE 2021-22, TERM-I, 1 mark)
- (A) $x - 2y = 11$
(B) $x - 2y = 22$
(C) $x + 4y = 22$
(D) $x - 4y = 11$
47. What are the fixed charges for a book? (CBSE 2021-22, TERM-I, 1 mark)
- (A) Rs. 9
(B) Rs. 10
(C) Rs. 13
(D) Rs. 15
48. What are the additional charges for each subsequent day for a book? (CBSE 2021-22, TERM-I, 1 mark)
- (A) Rs. 6
(B) Rs. 5
(C) Rs. 4
(D) Rs. 3
49. What is the total amount paid by both, if both of them have kept the book for 2 more days? (CBSE 2021-22, TERM-I, 1 mark)
- (A) Rs. 35
(B) Rs. 52
(C) Rs. 50
(D) Rs. 58
50. 3 chairs and 1 table cost Rs. 900; whereas 5 chairs and 3 tables cost Rs. 2,100. If the cost of 1 chair is Rs. x and the cost of 1 table is Rs. y , then the situation can be represented algebraically as: (CBSE 2022-23, 1 mark)
- (A) $3x + y = 900, 3x + 5y = 2100$
(B) $x + 3y = 900, 3x + 5y = 2100$
(C) $3x + y = 900, 5x + 3y = 2100$
(D) $x + 3y = 900, 5x + 3y = 2100$
51. The value of k for which the pair of equations $kx = y + 2$ and $6x + 2y = 3$ has infinitely many solutions, (CBSE 2022-23, 1 mark)
- (A) is $k = 3$
(B) does not exist
(C) is $k = -3$
(D) is $k = 4$
52. The pair of linear equations $2x = 5y + 6$ and $15y = 6x - 18$ represents two lines which are: (CBSE 2022-23, 1 mark)
- (A) intersecting
(B) parallel
(C) coincident
(D) either intersecting or parallel
53. The pair of linear equations $x + 2y - 5 = 0$ and $2x - 4y + 6 = 0$ (CBSE 2022-23, 1 mark)
- (A) is inconsistent
(B) is consistent with many solutions
(C) is consistent with a unique solution
(D) is consistent with two solutions
54. Solve the pair of equations $x = 5$ and $y = 7$ graphically. (CBSE 2022-23, 2 marks)
55. Using graphical method, find whether pair of equations $x = 0$ and $y = -3$, is consistent or not. (CBSE 2022-23, 2 marks)
56. Half of the difference between two numbers is 2. The sum of the greater number and twice the smaller number is 13. Find the numbers. (CBSE 2022-23, 3 marks)

Case Study

57. A coaching institute of Mathematics conducts classes in two batches I and II and fees for rich and poor children are different. In batch I, there are 20 poor and 5 rich children, whereas in batch II, there are 5 poor and 25 rich children. The total monthly collection of fees from batch I is Rs. 9000 and from batch II is Rs. 26,000. Assume that each poor child pays Rs. x per month and each rich child pays Rs. y per month.

(CBSE 2022-23, 4 marks)



Based on the above information, answer the following questions:

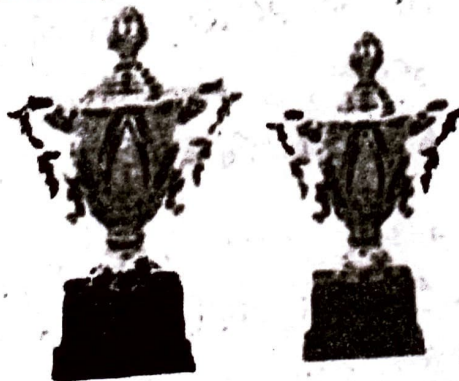
- (i) Represent the information given above in terms of x and y .
- (ii) Find the monthly fee paid by a poor child.

OR

Find the difference in the monthly fee paid by a poor child and a rich child.

- (iii) If there are 10 poor and 20 rich children in batch II, what is the total monthly collection of fees from batch II?

58. Two schools 'P' and 'Q' decided to award prizes to their students for two games of Hockey Rs. x per student and Cricket Rs. y per student. School 'P' decided to award a total of Rs.9,500 for the two games to 5 and 4 students respectively; while school 'Q' decided to award Rs.7,370 for the two games to 4 and 3 students respectively



Based on the above information, answer the following questions :

- (i) Represent the following information algebraically (in terms of x and y).
- (ii) (a) What is the price amount of Hockey?

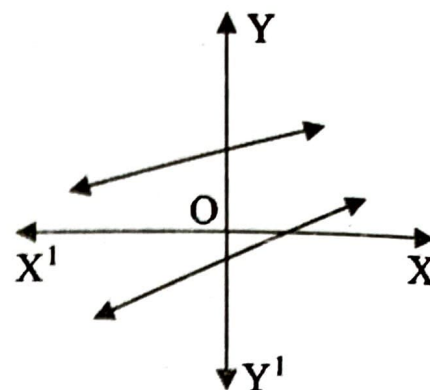
OR

(b) Prize amount on which game is more and by how much?

- (iii) What will be the total prize amount if there are 2 students each for two games?

(CBSE 2022-23, 4 marks)

59. In the given figure, graphs of two linear equations are shown. The pair of these linear equations is:
- (A) consistent with unique solution
 (B) consistent with infinitely many solutions
 (C) inconsistent
 (D) inconsistent but can be made consistent by extending these lines



(CBSE 2023-24, 1 Mark)

60. The value of k for which the system of equations $3x - y + 8 = 0$ and $6x - ky + 16 = 0$ has infinitely many solutions, is
- (A) -2 (B) 2
 (C) $\frac{1}{2}$ (D) $-\frac{1}{2}$
61. The pair of linear equations $x + 2y + 5 = 0$ and $-3x = 6y = -1$ has
- (A) unique solution (B) exactly two solutions
 (C) infinitely many solutions (D) no solutions
62. If $ax + by = a^2 - b^2$ and $bx + ay = 0$, then the value of $x + y$ is:
- (A) $a^2 - b^2$ (B) $a + b$
 (C) $a - b$ (D) $a^2 + b^2$
63. Two lines are given to be parallel. The equation of one of these lines is $5x - 3y = 2$. The equation of the second line can be:
- (A) $-15x - y = 5$ (B) $15x + 9y = 5$
 (C) $9x - 15y = 6$ (D) $-15x + 9y = 5$
64. Which out of the following type of straight lines will be represented by the system of equations $3x + 4y = 5$ and $6x + 8y = 7$?
- (A) Parallel (B) Intersecting
 (C) Coincident (D) Perpendicular to each other
65. Solve the following system of linear equations $7x - 2y = 5$ and $8x + 7y = 15$ and verify your answer.
- (CBSE 2023-24, 2 Marks)
66. (a) If $2x + y = 13$ and $4x - y = 17$, find the value of $(x - y)$.
 OR
 (b) Sum of two numbers is 105 and their difference is 45. Find the numbers.
- (CBSE 2023-24, 2 Marks)
67. Three years ago, Rashmi was thrice as old as Nazma. Ten years later, Rashmi will be twice as old as Nazma. How old are Rashmi and Nazma now?
- (CBSE 2024, 3 Marks)
68. Solve the following system of linear equations graphically:
- $x - y + 1 = 0$
 $x + y = 5$
- (CBSE 2024, 3 Marks)
69. Rehana went to a bank to withdraw Rs. 2,000. She asked the cashier to give Rs. 50 and Rs. 100 notes only. Rehana got 25 notes in all. Find how many notes of Rs. 50 and Rs. 100 she received.
- (CBSE 2023-24, 3 Marks)

70. (i) Using graphical method, solve the following system of equations: **(CBSE 2023-24, 5 Marks)**
 $3x + y + 4 = 0$ and $3x - y + 2 = 0$
- OR**
- (ii) Tara scored 40 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each wrong answer, then Tara would have scored 50 marks. Assuming that Tara attempted all questions, find the total number of questions in the test.
71. (a) In a flight of 2800 km, an aircraft was slowed down due to bad weather. Its average speed is reduced by 100 km/h and by doing so, the time of flight is increased by 30 minutes. Find the original duration of the flight. **(CBSE 2023-24, 5 Marks)**
- OR**
- (b) The denominator of a fraction is one more than twice the numerator. If the sum of the fraction and its reciprocal is $2\frac{16}{21}$, find the fraction.

Case Study

72. Essel World is one of the India's largest amusement parks that offers a diverse range of thrilling rides, water attractions and entertainment options for visitors of all ages. The park is known for its iconic "Water Kingdom" section, making it a popular destination for family outings and fun-filled adventure. The ticket charges for the park are Rs. 150 per child and Rs. 250 per adult. **(CBSE 2023-24, 4 Marks)**



On a day, the cashier of the park found that 300 tickets were sold and an amount of Rs. 55,000 was collected.

Based on the above, answer the following questions:

- (i) If the number of children visited be x and the number of adults visited be y , then write the given situation algebraically.
- (ii) (a) How many children visited the amusement park that day?
- OR**
- (b) How many adults visited the amusement park that day?
- (iii) How much amount will be collected if 250 children and 100 adults visit the amusement park?