Pair of Linear Equation in Two Variables

Previous Years' CBSE Board Questions

Pair of Linear Equations in Two Variables

MCQ

1. The pair of linear equations $2x = 5y + 6$ and $15y = 6x - 18$ represents two lines which are
   (a) intersecting
   (b) parallel
   (c) coincident
   (d) either intersecting or parallel *(2023)*

2. The pair of linear equations
   $\frac{3x}{2}+\frac{5y}{3}=7$ and $9x + 10y = 14$ is
   (a) consistent (b) inconsistent
   (c) consistent with one solution
   (d) consistent with many solutions *(2020)* R

SA I (2 marks)

3. Find whether the lines representing the following pair of linear equations intersect at a point, are parallel or coincident :
   $3x + y = 7, 6x + 2y = 8$ *(Board Term I, 2017)* R

4. Find whether the lines representing the following pair of linear equations intersect at a point, are parallel or coincident :
   $\frac{3}{2}x+\frac{5}{3}y=7$ and $\frac{3}{2}x+\frac{2}{3}y=6$ *(Board Term I, 2017)* R

5. Find whether the lines representing the following pair of linear equations intersect at a point, are parallel or coincident :
   $2x + y + 3 = 0, 4x + 2y + 6 = 0$ *(Board Term I, 2017)*

3.2 Graphical Method of Solution of a Pair of Linear Equations

MCQ

6. The pair of lines represented by the linear equations $3x + 2y = 7$ and $4x + 8y - 11 = 0$ are
   (a) perpendicular (b) parallel
   (c) intersecting (d) coincident
   (Term I, 2021-22) U

7. The pair of equations $y = 2$ and $y = -3$ has
   (a) one solution (b) two solutions
   (c) infinitely many solutions
   (d) no solution *(Term I, 2021-22)* U

8. The pair of equations $x = 5$ and $y = 5$ has
   (a) no solution (b) unique solution
   (c) many solutions (d) only solution (0, 0)
   (2020 C)

9. The pair of equations $x = a$ and $y = b$ graphically represent lines which are
   (a) Intersecting at (a, b) (b) Intersecting at (b, a)
   (c) Coincident (d) Parallel *(2020 C)*

SA I (2 marks)

10. Solve the pair of equations $x = 5$ and $y = 7$ graphically. *(2023)*

11. Using graphical method, find whether pair of equations $x = 0$ and $y = -3$, is consistent or not. *(2023)*

SA II (3 marks)

12. 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 $y - 2x = 1$. *(2020)*

13. Solve the equations $x + 2y = 6$ and $2x - 5y = 12$ graphically. *(2020 C)* Ap

14. Draw the graph of the equations $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Using this graph, find the values of x and y which satisfy both the equations. *(2019)*

LA (4/5/6 marks)

15. For Uttarakhand flood victims two sections A and B of class X contributed ₹ 1500. If the contribution of X A was ₹ 100 less than that of X B, find graphically the amounts contributed by both the sections. *(Board Term I, 2017)*

16. Three lines $3x + 5y = 15$, $6x - 5y = 30$ and $x = 0$ are enclosing a beautiful triangular park. Find the points of intersection of the lines graphically and the area of the park if all measurements are in km.
    What type of behaviour should be expected by public in this type of park? *(Board Term I, 2017)* Ap

17. Solve the following pair of linear equations graphically $6x - y + 4 = 0$ and $2x - 5y = 8$. Shade the region bounded by the lines and y-axis. *(Board Term I, 2017)* Ev

18. Find the graphically solution of
    $x - 2y = 0$ and $3x + 4y = 20$. *(Board Term I, 2017)*

19. Solve graphically the following pair of linear equations :
    $2y - 3x = 14$, $2x + 3y = 8$
    Hence, shade the region enclosed by these lines and y-axis. *(Board Term I, 2017)*

20. 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, $x = 0$, $y = 0$. *(Board Term I, 2016)* Cr

21. Solve the following pair of linear equations graphically :
$2x + y = 4$
$2x - y = 4$.
Also, find the co-ordinates of the vertices of the triangle formed by the lines with y-axis and also find the area of triangle. *(Board Term I, 2015)* Cr

3.3 Algebraic Methods of Solving a Pair of Linear Equations

MCQ

22. The value of k for which the pair of equations $kx = y + 2$ and $6x = 2y + 3$ has infinitely many solutions.
(a) is $k = 3$ (b) does not exist
(c) is $k = -3$ (d) is $k = 4$ *(2023)*

23. A father is three times as old as his son. In 12 years time, he will be twice as old as his son. The sum of the present ages of the father and the son is
(a) 36 years (b) 48 years
(c) 60 years (d) 42 years
(Term I, 2021-22)

24. If $17x - 19y = 53$ and $19x - 17y = 55$, then the value of $(x + y)$ is
(a) 1 (b) -1 (c) 3 (d) -3
(Term I, 2021-22)

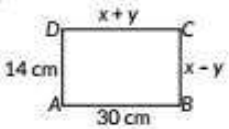
SA I (2 marks)

25. The sum of the numerator and the denominator of a fraction is 18. If the denominator is increased by 2, the fraction reduces to $\frac{1}{3}$. Find the fraction. *(2021C)*

26. The larger of two supplementary angles exceeds the smaller by 18°. Find the angles. *(2019)* Ap

27. Solve the following pair of linear equations :
$3x - 5y = 4$, $2y + 7 = 9x$ *(2019)*

28. In figure, $ABCD$ is a rectangle. Find the values of x and y.



(2018) Ev

SA II (3 marks)

29. 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. *(2023)*

30. 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. *(2020)* AP

31. The present age of a father is three years more than three times the age of his son. Three years hence the father's age will be 10 years more than twice the age of the son. Determine their present ages. *(2020)* Ev

32. 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. *(Delhi 2019)* AP

33. 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. *(Delhi 2019)*

34. A part of monthly hostel charges in a college hostel are fixed and the remaining depends on the number of days one has taken food in the mess. When a student A takes food for 25 days, he has to pay ₹ 4,500, whereas a student B who takes food for 30 days, has to pay ₹ 5,200. Find the fixed charges per month and the cost of food per day. *(AI 2019)* Cr

35. Solve by elimination $3x = y + 5$ and $5x - y = 11$.
(Board Term I, 2017)

36. Two chairs and three tables cost ₹ 5650 whereas three chairs and two tables cost ₹ 7100. Find the cost of a chair and a table separately.
(Board Term I, 2016) Cr

LA (4/5/6 marks)

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

Based on the given information, answer the following questions.
(i) Represent the following information algebraically (in terms of x and y).
(ii) (a) What is the prize amount for 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 from two games? *(2023)*

38. The ratio of income of two persons is 9 : 7 and the ratio of their expenditure is 4 : 3, if each of them manage to save ₹ 2000/month. Find their monthly incomes. *(Board Term I, 2017)*

39. The sum of the digits of two digit number is 9. Also 9 times the number is twice the number obtain by reversing the order of digits. Find the numbers. *(Board Term I, 2017)*

40. While teaching about the Indian National flag, teacher asked the students that how many lines are there in Blue colour wheel? One student replies that it is 8 times the number of colours in the flag. While other says that the sum of the number of colours in the flag and number of lines in the wheel of the flag is 27. Convert the statements given by the students into Linear Equation of two variables. Find the number of lines in the wheel. What does the wheel signifies in the flag? *(Board Term I, 2016)* Cr

41. Points *A* and *B* are 100 km apart on a highway. One car starts from *A* and another from *B* at the same time. If they travel in same direction at different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hour. What are the speeds of the two cars?

    What steps do you suggest to save petrol?

    (Board Term I, 2015) Ev

Solution of Pair of Linear Equations

MCQ

42. 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 *(2020)* R

SA I (2 marks)

43. Find the value of k for which the system of equations $x + 2y = 5$ and $3x + ky + 15 = 0$ has no solution. *(2021 C)*

44. Find the value(s) of k so that the pair of equations $x + 2y = 5$ and $3x + ky + 15 = 0$ has a unique solution. *(2019)*

45. Find the relation between p and q if $x = 3$ and $y = 1$ is the solution of the pair of equations $x - 4y + p = 0$ and $2x + y - q - 2 = 0$. *(2019 C)*

46. Find c if the system of equations $cx + 3y + (3 - c) = 0$; $12x + cy - c = 0$ has infinitely many solutions? *(2019 C)*

47. Find the value of k for which the following pair of linear equations have infinitely many solutions.
    $2x + 3y = 7, (k + 1)x + (2k - 1)y = 4k + 1$ *(Delhi 2019)*

48. For what value of k, does the system of linear equations
    $2x + 3y = 7, (k - 1)x + (k + 2)y = 3k$
    have an infinite number of solutions? *(AI 2019)*

49. Find the value(s) of k for which the pair of equations $\begin{cases} kx + 2y = 3 \\ 3x + 6y = 10 \end{cases}$ has a unique solution. *(2019)*

50. Find k so that the following pair of linear equations has no solution.
    $3x + y = 1$
    $(2k - 1)x + (k - 1)y = 2k + 1$. *(Board Term I, 2015)* Ap

LA (4/5/6 marks)

51. Case study based question is compulsory. Attempt any 4 sub-part from the question. Each sub-part carries 1 mark.

    The residents of a housing society, on the occasion of environment day, decided to build two straight paths in the central park of the society and also plant trees along the boundary lines of each path.

    Taking one corner of the park as origin and the two mutually perpendicular lines as the x-axis and y-axis, the paths were represented by the two linear equations $2x - 3y = 5$ and $-6x + 9y = 7$.

    Based on the above, answer the following questions :

    (i) Two paths represented by the two equations here are
    (a) intersecting
    (b) overlapping
    (c) parallel
    (d) mutually perpendicular

    (ii) Which one of the following points lie on the line $2x - 3y = 5$?
    (a) $(-4, 1)$ (b) $(4, -1)$
    (c) $(4, 1)$ (d) $(-4, -1)$

    (iii) If the line $-6x + 9y = 7$ intersects the y-axis at a point, then its coordinates are
    (a) $\left(0, \frac{7}{9}\right)$ (b) $\left(\frac{7}{9}, 0\right)$
    (c) $\left(-\frac{7}{6}, 0\right)$ (d) $\left(0, -\frac{7}{6}\right)$

    (iv) If a pair of equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ has a unique solution, then
    (a) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ (b) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$
    (c) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ (d) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

    (v) If $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$, , then the two lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are
    (a) parallel
    (b) coincident
    (c) intersecting
    (d) perpendicular to each other *(2021 C)*

CBSE Sample Questions

Pair of Linear Equations in Two Variables

MCQ

1. If the system of equations $3x + y = 1$ and $(2k - 1)x + (k - 1)y = 2k + 1$ is inconsistent, then k =
(a) -1 (b) 0 (c) 1 (d) 2
(2022-23) Ap

2. The value of k for which the lines $5x + 7y = 3$ and $15x + 21y = k$ coincide is
(a) 9 (b) 5 (c) 7 (d) 18
(Term I, 2021-22) R

3. The lines $x = a$ and $y = b$, are
(a) intersecting (b) parallel
(c) overlapping (d) none of these
(Term I, 2021-22) R

4. One equation of a pair of dependent linear equations 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) $10x - 14y = -4$
(Term I, 2021-22) Ev

VSA (1 mark)

5. If 3 chairs and 1 table costs Rs. 1500 and 6 chairs and 1 table costs Rs. 2400. Form linear equations to represent this situation. *(2020-21)*

3.3 Algebraic Methods of Solving a Pair of Linear Equations

MCQ

6. If $217x + 131y = 913$, $131x + 217y = 827$, then $x + y$ is
(a) 5 (b) 6 (c) 7 (d) 8
(Term I, 2021-22)

VSA (1 mark)

7. For what value of k, the pair of linear equations $3x + y = 3$ and $6x + ky = 8$ does not have a solution?
(2020-21)

SA I (2 marks)

8. If $49x + 51y = 499$, $51x + 49y = 501$, then find the value of x and y. *(2022-23)* Ap

SA II (3 marks)

9. A train covered a certain distance at a uniform speed. If the train would have been 6 km/h faster, it would have taken 4 hours less than the scheduled time. And, if the train were slower by 6 km/hr ; it would have taken 6 hours more than the scheduled time. Find the length of the journey. *(2022-23)* Ev

Detailed SOLUTIONS

Previous Years' CBSE Board Questions

1. (c) : The given pair of linear equations is $2x = 5y + 6$ and $15y = 6x - 18$

i.e., $2x - 5y - 6 = 0$ and $6x - 15y - 18 = 0$

As $\frac{2}{6} = \frac{-5}{-15} = \frac{-6}{-18}$

i.e., $1/3 = 1/3 = 1/3$

$\therefore$ Lines are coincident.

2. (b) : The given pair of linear equations is

$\frac{3x}{2} + \frac{5y}{3} = 7$ or $\frac{3x}{2} + \frac{5y}{3} - 7 = 0$ ...(i)

and $9x + 10y = 14$ or $9x + 10y - 14 = 0$ ...(ii)

Here, $a_1 = \frac{3}{2}, b_1 = \frac{5}{3}, c_1 = -7$;

$a_2 = 9, b_2 = 10, c_2 = -14$

$\therefore$ $\frac{a_1}{a_2} = \frac{3/2}{9} = \frac{1}{6}, \frac{b_1}{b_2} = \frac{5/3}{10} = \frac{1}{6}, \frac{c_1}{c_2} = \frac{-7}{-14} = \frac{1}{2}$

$\Rightarrow$ $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$,

So, the given pair of equations is inconsistent.

3. The pair of linear equations are

$3x + y - 7 = 0$ and $6x + 2y - 8 = 0$

Here, $a_1 = 3, b_1 = 1, c_1 = -7; a_2 = 6, b_2 = 2, c_2 = -8$

$\therefore$ $\frac{a_1}{a_2} = \frac{3}{6} = \frac{1}{2}, \frac{b_1}{b_2} = \frac{1}{2}, \frac{c_1}{c_2} = \frac{-7}{-8} = \frac{7}{8}$

$\therefore$ $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

Thus, the pair of linear equations are parallel.

4. The given pair of linear equations are

$\frac{3}{2}x + \frac{5}{3}y = 7$ or $\frac{3}{2}x + \frac{5}{3}y - 7 = 0$ ...(i)