3. Pair of Linear Equations in Two Variables - Board Exam Questions

The detailed solution for all the questions can be found at pschool.in/math/ncert/g10/chap-3

1 Mark Questions (MCQ)

1) If a pair of linear equations in two variables is represented by two coincident lines, then the pair of equations has:
(a) a unique solution (b) two solutions
(c) no solution
(d) an infinite number of solutions

2) If the pair of linear equations: $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ is consistent and dependent, then
(a) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ (b) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} = \frac{c_1}{c_2}$
(c) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ (d) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

3) Equation of another line parallel to the line represented by 2x − 6y = 7 is:
(a) y = 3x − 7 (b) 2x = 9 − 6y
(c) x − 3y = 7 (d) $x = \frac{7}{2} - 3y$

4) The value of k for which the system of linear equations $\frac{x}{2} + \frac{y}{3} = 5$ and 2x + ky = 7 is inconsistent, is

5) Tarun correctly solved a pair of linear equations in two variables and found their only point of intersection as (5, −1). One of the lines was $x - y = 6$. Which of the following could have been the other line?
I: $3x - 3y = 18$
II: $2x - 3y = 13$
III: $2x - 3y = 16$
(a) I only (b) II only
(c) I and II (d) II and III

6) If x = 1 and y = 2 is a solution of the pair of linear equations $2x - 3y + a = 0$ and $2x + 3y - b = 0$, then:

(a) a = 2b (b) 2a = b
(c) a + 2b = 0 (d) 2a + b = 0

7) The line represented by the equation x − y = 0 is:
(a) parallel to x-axis (b) parallel to y-axis
(c) passing through the origin
(d) passing through the point (3, 2)

8) The value of 'k' for which the system of linear equations 6x + y = 3k and 36x + 6y = 3 have infinitely many solutions is:

9) The value of 'p' for which the equations px + 3y = p − 3, 12x + py = p has infinitely many solutions is:

10) The system of equations 2x + 1 = 0 and 3y − 5 = 0 has
(a) unique solution (b) two solutions
(c) no solution
(d) infinite number of solutions

11) If the lines given by $3x + 2ky = 2$ and $2x + 5y + 1 = 0$ are not parallel, then k has to be
(a) $\frac{15}{4}$ (b) $\neq \frac{15}{4}$
(c) any rational number
(d) any rational number having 4 as denominator

12) In the given figure, graphs of two linear equations are shown. The pair of these linear equations is:
Graph: two straight lines with slightly different slopes, drawn as segments that do not meet within the figure.
(a) consistent with unique solution
(b) consistent with infinitely many solutions
(c) inconsistent
(d) inconsistent but can be made consistent by extending these lines

13) The value of k for which the system of equations $3x - y + 8 = 0$ and $6x - ky + 16 = 0$ has infinitely many solutions, is

14) 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 solution

15) If $ax + by = a^2 - b^2$ and $bx + ay = 0$, then the value of x + y is:

16) 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) $-15x - 9y = 5$ (b) $15x + 9y = 5$
(c) $9x - 15y = 6$ (d) $-15x + 9y = 5$

17) 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

18) The value of k for which the system of equations $3x - ky = 7$ and $6x + 10y = 3$ is inconsistent, is

19) 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 $k = 4$

20) The pair of equations $x = a$ and $y = b$ graphically represents lines which are:
(a) parallel (b) intersecting at (b, a)
(c) coincident (d) intersecting at (a, b)

21) 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

22) The pair of equations $ax + 2y = 9$ and $3x + by = 18$ represent parallel lines, where a, b are integers, if:
(a) a = b (b) 3a = 2b
(c) 2a = 3b (d) ab = 6

23) The point of intersection of the line represented by $3x - y = 3$ and y-axis is given by

24) 3 chairs and 1 table cost ₹900; whereas 5 chairs and 3 tables cost ₹2,100. If the cost of 1 chair is ₹x and the cost of 1 table is ₹y, then the situation can be represented algebraically as

25) The lines representing the given pair of linear equations are non-intersecting. Which of the following statements is true?

Graph: two parallel lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$.

(a) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$ (b) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

(c) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} = \frac{c_1}{c_2}$ (d) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

26) If the system of equations $3x + y = 1$ and $(2k - 1)x + (k - 1)y = 2k + 1$ is inconsistent, then $k =$

Assertion and Reason

1) ASSERTION (A): The system of linear equations 3x − 5y + 7 = 0 and −6x + 10y + 14 = 0 is inconsistent.
REASON (R): When two linear equations don't have unique solution, they always represent parallel lines.

2) ASSERTION (A): The pair of linear equations px + 3y + 59 = 0 and 2x + 6y + 118 = 0 will have infinitely many solutions if p = 1.
REASON (R): If the pair of linear equations px + 3y + 19 = 0 and 2x + 6y + 157 = 0 has a unique solution, then p ≠ 1.

2 Mark Questions

1) The cost of 2 kg apples and 1 kg of grapes on a day was found to be ₹320. The cost of 4 kg apples and 2 kg grapes was found to be ₹600. If cost of 1 kg of apples and 1 kg of grapes is ₹x and ₹y respectively, represent the given situation algebraically as a system of equations and check whether the system so obtained is consistent or not.

2) Using graphical method, find whether following system of linear equations is consistent or not: $x = 0$ and $y = -7$

3) Solve the pair of equations $x = 3$ and $y = -4$ graphically.

4) Solve the following system of linear equations $7x - 2y = 5$ and $8x + 7y = 15$ and verify your answer.

5) If $2x + y = 13$ and $4x - y = 17$, find the value of (x − y).

6) Solve the following system of equations algebraically:
$30x + 44y = 10$; $40x + 55y = 13$

7) Solve for x and y: $\sqrt{2}x + \sqrt{3}y = 5$ and $\sqrt{3}x - \sqrt{8}y = -\sqrt{6}$

8) Solve the following pair of equations algebraically:

$101x + 102y = 304$; $102x + 101y = 305$

9) If $49x + 51y = 499$, $51x + 49y = 501$, then find the value of x and y.

10) Sum of two numbers is 105 and their difference is 45. Find the numbers.

11) In a pair of supplementary angles, the greater angle exceeds the smaller by 50°. Express the given situation as a system of linear equations in two variables and hence obtain the measure of each angle.

3 Mark Questions

1) Solve the linear equations $3x + y = 14$ and $y = 2$ graphically.

2) Solve the system of linear equations: $x = 4$ and $3x - 2y = 6$ graphically.

3) Solve the following system of linear equations graphically: $x - y + 1 = 0$, $x + y = 5$

4) Check whether the following pair of equations is consistent or not. If consistent, solve graphically: $x + 3y = 6$; $3y - 2x = -12$

5) Solve the following system of equations graphically: $2x - y - 2 = 0$; $-4x + y + 4 = 0$. Also, find the absolute difference between the ordinates of the points where given lines cut y-axis.

6) Solve the following system of equations graphically: $2x + y = 6$, $2x - y - 2 = 0$. Find the area of the triangle so formed by two lines and x-axis.

7) If the system of linear equations $2x + 3y = 7$ and $2ax + (a + b)y = 28$ have infinite number of solutions, then find the values of 'a' and 'b'.

8) If $217x + 131y = 913$ and $131x + 217y = 827$, then solve the equations for the values of x and y.

9) Solve: $\frac{2}{\sqrt{x}} + \frac{3}{\sqrt{y}} = 2$; $\frac{4}{\sqrt{x}} - \frac{9}{\sqrt{y}} = -1$, $x, y > 0$.

10) 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.

11) The sum of a 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?

12) In a class test, Veer scored 6 more than twice as many marks as Kevin scored. If one of them had scored 4 more marks, their total score would have been 40. Find the marks obtained by Veer and Kevin.

13) 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?

14) Five years hence, father's age will be three times the age of son. Five years ago, father was seven times as old as his son. Find their present ages.

15) Rehana went to a bank to withdraw ₹2,000. She asked the cashier to give her ₹50 and ₹100 notes only. Rehana got 25 notes in all. Find how many notes of ₹50 and ₹100 did she receive.

16) The monthly incomes of two persons are in the ratio 9 : 7 and their monthly expenditures are in the ratio 4 : 3. If each saved ₹5,000, express the given situation algebraically as a system of linear equations in two variables. Hence, find their respective monthly incomes.

17) The monthly income of Aryan and Babban are in the ratio 3 : 4 and their monthly expenditures are in ratio 5 : 7. If each saves ₹15,000 per month, find their monthly incomes.

18) Anuj had some chocolates, and he divided them into two lots A and B. He sold the first lot at the rate of ₹2 for 3 chocolates and the second lot at the rate of ₹1 per chocolate, and got a total of ₹400. If he had sold the first lot at the rate of ₹1 per chocolate, and the second lot at the rate of ₹4 for 5 chocolates, his total collection would have been ₹460. Find the total number of chocolates he had.

19) Two people are 16 km apart on a straight road. They start walking at the same time. If they walk towards each other with different speeds, they will meet in 2 hours. Had they walked in the same direction with same speeds as before, they would have met in 8 hours. Find their walking speeds.

20) 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.

4 Mark Questions

1) A school is organizing a grand cultural event to show the talent of its students. To accommodate the guests, the school plans to rent chairs and tables from a local supplier. It finds that rent for each chair is ₹50 and for each table is ₹200. The school spends ₹30,000 for renting the chairs and tables. Also, the total number of items (chairs and tables) rented are 300.
If the school rents x chairs and y tables, answer the following questions:
(i) Write down the pair of linear equations representing the given information. (1)
(ii) (a) Find the number of chairs and number of tables rented by the school. (2)
OR (b) If the school wants to spend a maximum of ₹27,000 on 300 items (tables and chairs), then find the number of chairs and tables it can rent.
(iii) What is maximum number of tables that can be rented in ₹30,000 if no chairs are rented? (1)

2) Essel World is one of 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 ₹150 per child and ₹250 per adult. On a day, the cashier of the park found that 300 tickets were sold and an amount of ₹55,000 was collected.
(i) If the number of children visited be x and the number of adults visited be y, then write the given situation algebraically. (1)
(ii) (a) How many children visited the amusement park that

day? (2)
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? (1)

3) 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.
(i) Represent the following information algebraically (in terms of x and y). (1)
(ii) (a) What is the prize amount for hockey? (2)
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? (1)

4) 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 ₹9000 and from batch II is ₹26,000. Assume that each poor child pays ₹x per month and each rich child pays ₹y per month.
(i) Represent the information given above in terms of x and y. (1)
(ii) Find the monthly fee paid by a poor child. (2)
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? (1)

5) A student entrepreneur started a company that manufactures sanitizers in two sizes – small and large. The cost of a small bottle of sanitizer is ₹10 and that of a large bottle is ₹15. In June, the company sold 1000 bottles and recorded a total sale of ₹12,750. Seeing the increased demand, the company decided to increase the price of both sanitizer bottles by ₹2 each. In the next month, the company sold 2500 bottles and recorded a total

sale of ₹34,250.
Let the number of small bottles and large bottles be x and y respectively.
(i) Form a linear equation in two variables representing the sale for June. (1)
(ii) Form a linear equation in two variables representing the sale for July. (1)
(iii) How many sanitizer bottles of each type were actually sold in June? (2)
OR How many sanitizer bottles of each type were sold in July?

5 Mark Questions

1) Solve the following system of equations graphically: $x - 2y = 3$, $3x - 8y = 7$
2) Using graphical method, solve the following system of equations: $3x + y + 4 = 0$ and $3x - y + 2 = 0$
3) Solve the following system of linear equations graphically: $x + 2y = 3$, $2x - 3y + 8 = 0$
4) Aarush bought 2 pencils and 3 chocolates for ₹11 and Tanish bought 1 pencil and 2 chocolates for ₹7 from the same shop. Represent this situation in the form of a pair of linear equations. Find the price of 1 pencil and 1 chocolate, graphically.
5) Determine graphically, the coordinates of vertices of a triangle whose equations are $2x - 3y + 6 = 0$; $2x + 3y - 18 = 0$ and $x = 0$. Also, find the area of this triangle.
6) Five years ago, Adil was thrice as old as Bharat. Ten years later Adil shall be twice as old as Bharat. To know the present ages of Adil and Bharat: (i) form the linear equations representing the above information. (ii) show that the system of equations is consistent with unique solution. (iii) find the present ages of Adil and Bharat.
7) 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.

8) Vijay invested certain amounts of money in two schemes A and B, which offer interest at the rate of 8% per annum and 9% per annum, respectively. He received ₹1,860 as the total annual interest. However, had he interchanged the amounts of investments in the two schemes, he would have received ₹20 more as annual interest. How much money did he invest in each scheme?

9) The perimeter of an isosceles triangle is 32 cm. If each equal side is $\frac{5}{6}$th of the base, find the area of the triangle.

10) Places A and B are 180 km apart on a highway. One car starts from A and another from B at the same time. If the car travels in the same direction at different speeds, they meet in 9 hours. If they travel towards each other with the same speeds as before, they meet in an hour. What are the speeds of the two cars?