

Maxrap. Chapter wise Series Class 10th – Mathematics

Class : 10th

Topic : Linear Equation

Max. Marks : 50

Duration : 2 Hrs

Sections: A (MCQs), B (Short Answer-I), C (Short Answer-II), D (Long Answer), E (Case-Based).

General Instructions:

- (i). All questions are compulsory.
- (ii). This question paper contains 23 questions divided into five Sections A, B, C, D and E.
- (iii). Section A comprises of 10 MCQs of 1 mark each. Section B comprises of 5 questions of 2 marks each. Section C comprises of 4 questions of 3 marks each. Section D comprises of 2 question of 5 marks each and Section E comprises of 2 Case Study Based Questions of 4 marks each.
- (iv). There is no overall choice.
- (v). Use of Calculators is not permitted.

Section A

1. 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) $15x + 9y = 5$

2. If $2x - 3y = 7$ and $(a + b)x - (a + b - 3)y = 4a + b$ represent coincident lines, then a and b satisfy the equation

- a) $a + 5b = 0$ b) $5a + b = 0$ c) $a - 5b = 0$ d) $5a - b = 0$

3. In a given fraction, if 1 is subtracted from the numerator and 2 is added to the denominator, it becomes $\frac{1}{2}$. If 7 is subtracted from the numerator and 2 is subtracted from the denominator, it becomes $\frac{1}{3}$. The fraction is

- a) $\frac{15}{26}$ b) $\frac{13}{24}$ c) $\frac{16}{21}$ d) $\frac{16}{27}$

4. Graphically, the pair of equations $-6x - 2y = 21$ and $2x - 3y + 7 = 0$ represents two lines which are:

- a) intersecting exactly at two points b) intersecting exactly at one point
c) coincident d) parallel

5. The pair of linear equations $\frac{3x}{2} + \frac{5y}{3} = 7$ and $9x + 10y = 14$ is:

- a) consistent with one solution b) consistent with many solutions
c) consistent d) inconsistent

6. 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

- a) $3x + y = 900, 3x + 5y = 2100$ b) $3x + y = 900, 5x + 3y = 2100$
c) $x + 3y = 900, 3x + 5y = 2100$ d) $x + 3y = 900, 5x + 3y = 2100$

7. 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) $a^2 + b^2$

8. The graph of a pair of linear equations $a_1 x + b_1 y = c_1$ and $a_2 x + b_2 y = c_2$ in two variables x and y represents parallel lines, if

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

Assertion(A)/Reason(R) Based (9-10): In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

- a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

9. Assertion (A): The lines $2x - 5y = 7$ and $6x - 15y = 8$ are parallel lines.

Reason (R): The system of linear equations $a_1 x + b_1 y + c_1 = 0$ and $a_2 x + b_2 y + c_2 = 0$ have infinitely many solutions if $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

10. Assertion (A): $x + y - 4 = 0$ and $2x + ky - 3 = 0$ has no solution if $k = 2$.

Reason (B): $a_1 x + b_1 y + c_1 = 0$ and $a_2 x + b_2 y + c_2 = 0$ are consistent if $\frac{a_1}{a_2} \neq \frac{k_1}{k_2}$.

SECTION – B

Questions 11 to 15 carry 2 marks each

11. Solve the following pair of linear equations by substitution method: $3x + 2y - 7 = 0$
 $4x + y - 6 = 0$

12. Taxi charges in a city consist of fixed charges and the remaining depending upon the distance travelled in kilometres. If a man travels 80 km, he pays ₹ 1330, and travelling 90 km, he pays ₹ 1490. Find the fixed charges and rate per km.

13. Solve: $ax + by = a - b$; $bx - ay = a + b$

14. Solve algebraically the following pair of linear equations for x and y
 $148x + 231y = 610$, $231x + 148y = 527$.

15. The sum of the digits of a two –digit number is 12. The number obtained by interchanging its digits exceeds the given number by 18. Find the number.

SECTION – C

Questions 16 to 19 carry 3 marks each

16. The angles of a cyclic quadrilateral ABCD are $\angle A = (6x + 10)^\circ$, $\angle B = (5x)^\circ$, $\angle C = (x + y)^\circ$, $\angle D = (3y - 10)^\circ$

Find x and y , and hence the values of the four angles.

17. 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 ₹ 2000 per month, then find their monthly incomes.

18. Solve for x and y using elimination method: $10x + 3y = 75$, $6x - 5y = 11$.

19. Solve $2x + 3y = 11$ and $2x - 4y = -24$ and hence find the value of 'm' for which $y = mx + 3$.

SECTION – D

Questions 20 to 21 carry 5 marks each

20. Solve graphically the system of linear equation: $4x - 3y + 4 = 0$; $4x + 3y - 20 = 0$

Find the area bounded by these lines and x - axis.

21. The area of a rectangle gets reduced by 9 square units, if its length is reduced by 5 units and the breadth is increased by 3 units. The area is increased by 67 square units if length is increased by 3 units and breadth is increased by 2 units. Find the perimeter of the rectangle.

SECTION – E (Case Study Based Questions)

Questions 22 & 23 carry 4 marks each

22. Read the following text carefully and answer the questions that follow:

Mahesh, a production manager in Mumbai, hires a taxi everyday to go to his office. The taxi charges in Mumbai consists of a fixed charges together with the charges for the distance covered. His office is at a distance of 10 km from his home. For a distance of 10 km to his office, Mahesh paid ₹ 105. While coming back home, he took another route. He covered a distance of 15 km and the charges paid by him were ₹ 155.



- a) What are the fixed charges? (1)
- b) What are the charges per km? (1)

- c) If fixed charges are ₹ 20 and charges per km are ₹ 10, then how much Lokesh have to pay for travelling a distance of 10 km? (2)

OR

Find the total amount paid by Mahesh for travelling 10 km from home to office and 25 km from office to home. [Fixed charges and charges per km are as in (i) & (ii). (2)

23. Read the following text carefully and answer the questions that follow:

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.



- d) Represent the following information algebraically (in terms of x and y). (1)
e) What is the prize amount for hockey? (1)
f) Prize amount on which game is more and by how much? (2)

OR

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

Linear Equation Paper Details – Analysis		
Objective Questions		
MCQ	1 marks x 8 question = 8	
Assertion Reason	1 marks x 2 question = 2	
Subjective		
Short type I	2 marks x 5 question = 10	
Short type II	3 marks x 4 question = 12	
Long Type	5 marks x 2 question = 10	
Case Studies Based		
Case 1	4 marks	
Case 2	4 marks	

Total = 50 marks Your Score =