

Maxprap. Chapter wise Series Class 11th - Linear Inequalities

Class : 11th

Subject: Mathematics

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

Questions 1 to 10 carry 1 mark each

1. Solve the system of inequalities $2x + 5 \leq 0$, $x - 3 \leq 0$.

- a) $x \geq \frac{5}{2}$ b) $x \geq -\frac{5}{2}$ c) $x \leq -\frac{5}{2}$ d) $x \leq \frac{5}{2}$

2. Solve the system of inequalities: $-15 < \frac{3(x-2)}{5} \leq 0$

- a) $-23 < x < 23$ b) $-23 < x \leq 2$ c) $-13 < x < 13$ d) $-13 < x < 2$

3. The solution set for $|x| > 7$

- a) $(-\infty, -7) \cup (7, \infty)$ b) $(-7, \infty)$ c) $(-\infty, -7) \cap (7, \infty)$ d) $(7, \infty)$

4. If x is a real number and $|x| < 3$, then

- a) $x \geq 3$ b) $-3 \leq x \leq 3$ c) $-3 < x < 3$ d) $x \geq -3$

5. The solution set for $(x + 3) + 4 > -2x + 5$:

- a) $(2, \infty)$ b) $(-\infty, 2)$ c) $(-\infty, -2)$ d) $\left(\frac{-2}{3}, \infty\right)$

6. Solve system of inequalities $(x + 5) - 7(x - 2) \geq 4x + 9$, $2(x - 3) - 7(x + 5) \leq 3x - 9$

- a) $-4 \leq x \leq 1$ b) $-4 \leq x \leq 4$ c) $\frac{-9}{4} \leq x \leq 1$ d) $-1 \leq x \leq 1$

7. Solve: $3x + 5 < x - 7$, when x is a real number

- a) $x > -12$ b) $x > -6$ c) $x < -6$ d) $x < -12$

8. Solve the system of inequalities: $\frac{x+7}{x-8} > 2$, $\frac{2x+1}{7x-1} > 5$

- a) $(2, 5)$ b) $(4, 8)$ c) no solution d) $(3, 6)$

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): If $a < b$, $c < 0$, then $\frac{a}{c} < \frac{b}{c}$.

Reason (R): If both sides are divided by the same negative quantity, then the inequality is reversed.

10. Assertion (A): $|3x - 5| > 9 \Rightarrow x \in \left(-\infty, \frac{-4}{3}\right) \cup \left(\frac{14}{3}, \infty\right)$.

Reason (R): The region containing all the solutions of an inequality is called the solution region.

SECTION – B

Questions 11 to 15 carry 2 marks each

11. Solve the given inequation : $\frac{3(x-2)}{5} \geq \frac{5(2-x)}{3}$.

12. Solve $\frac{5-2x}{3} \leq \frac{x}{6} - 5$.

13. Write the number of integral solutions of $\frac{x+2}{x^2+1} \geq \frac{1}{2}$.

14. Solve the given system of equations in R. $\left|x + \frac{1}{3}\right| > \frac{8}{3}$.

15. Solve inequation and represent the solution set on the number line: $\frac{(2x-1)}{3} \geq \frac{(3x-2)}{4} - \frac{(2-x)}{5}$ where $x \in R$

SECTION – C

Questions 16 to 19 carry 3 marks each

16. The longest side of a triangle is 3 times the shortest side and the third side is 2 cm shorter than the longest side. If the perimeter of the triangle is at least 61 cm. Find the minimum length of the shortest side.

17. Find all pairs of consecutive even positive integers, both of which are larger than 5 such that their sum is less than 23.

18. Solve the system of inequation : $\frac{6x}{4x-1} < \frac{1}{2}$, $\frac{x}{2x+1} \geq \frac{1}{4}$

19. To receive grade A in a course one must obtain an average of 90 marks or more in five papers, each of 100 marks. If Tanvy scored 89, 93, 95 and 91 marks in first four papers, find the minimum marks that she must score in the last paper to get grade A in the course.

SECTION – D

Questions 20 to 21 carry 5 marks each

20. Solve the following system of linear inequalities $\frac{4x}{3} - \frac{9}{4} < x + \frac{3}{4}$ and $\frac{7x-1}{3} - \frac{7x+2}{6} > x$.

21. Solve the following system of linear inequalities.

$$2(2x + 3) - 10 < 6(x - 2) \quad ; \quad \text{and} \quad \frac{2x-3}{4} + 6 \geq 2 + \frac{4x}{3}$$

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:

In science practical class, students used to perform experiments, one - day group A of class 11th have the following experiment results: A solution of 10% boric acid is to be diluted by adding a 4% boric acid solution to it. The resulting mixture is to be more than 5% but less than 8% boric acid.



If we have 750 litres of the 10% solution, then:

- a) Find the quantity of the 4% solution that has to be added will lie between. (1)

- b) In an experiment, a solution of hydrochloric acid is to be kept between 30 and 35 degrees Celsius. What is the range of temperature in degree Fahrenheit if the conversion formula is given by, $C = \frac{5}{9}(F - 32)$ where C and F represent the temperature in degree celsius and degree Fahrenheit, respectively. (1)
- c) Solve for x: $-8x + 3 \geq 27$ and $-13x + 5 \geq 57$ (2)

OR

Show the inequality on the number line: $x \leq -42$ (2)

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

A company produces certain items. The manager in the company used to make a data record on daily basis about the cost and revenue of these items separately. The cost and revenue functions of a product are given by $C(x) = 20x + 4000$ and $R(x) = 60x + 2000$, respectively, where x is the number of items produced and sold.

The company manager wants to know:



- a) How many items must be sold to realize some profit? (1)
- b) Solve for x: $12x + 7 < -11$ (1)
- c) Solve the x: $5x - 8 > 40$ (2)

OR

Graph the $x > 27$ inequality on the number line. (2)

Linear Inequalities 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 =