NCERT Solutions Class 11 Maths
Chapter 5: Linear Inequalities
EXERCISE 5.1

Document Information:
Class: 11 | **Subject:** Mathematics | **Chapter:** 5 | **Exercise:** 5.1
Total Questions: 26 | **Academic Year:** 2025-26
Source: www.ncertbooks.net | **Generated:** February 21, 2026

Quick Summary: In NCERT Solutions Class 11 Maths Chapter 5 Exercise 5.1, students learn to solve linear inequalities using fundamental algebraic properties and graphical representations. This exercise covers solving single variable inequalities like ax + b < c and ax + b > c, which forms the foundation for understanding systems of inequalities essential for CBSE Class 11 examinations.

Key Takeaways:

- When multiplying or dividing an inequality by a negative number, the inequality sign reverses: if -ax > b, then x < -(b)/(a)
- Linear inequalities in one variable have solutions as intervals on the number line, expressed in interval notation like (-∞, a) or [a, ∞)
- Step-by-step algebraic manipulation follows the same rules as equations, except for the sign reversal property with negative coefficients
- Graphical representation on number lines helps visualize solution sets and is crucial for solving compound inequalities in advanced topics

Complete Solutions

Question 1

QUESTION

Solve 24x<100 when:

(i) x is a natural number.

(ii) x is an integer.

SOLUTION

This question asks us to solve the inequality under two different conditions: when is a natural number and when is an integer. We need to find all values of that satisfy the inequality in each case.

Step 1: Solve the inequality for

We start by isolating in the inequality . To do this, we divide both sides of the inequality by 24:

Simplifying the fraction:

Converting the improper fraction to a mixed number:

(i) is a natural number

Step 2: Identify natural numbers less than

Natural numbers are positive integers (1, 2, 3, ...). We need to find all natural numbers that are less than . These are 1, 2, 3, and 4.

Therefore, the solution set for when is a natural number is .

(ii) is an integer

Step 3: Identify integers less than

Integers include all positive and negative whole numbers, as well as zero (... -3, -2, -1, 0, 1, 2, 3, ...). We need to find all integers that are less than . These include all integers from 4 down to negative infinity.

Therefore, the solution set for when is an integer is .

ANSWER

(i) \1,2,3,4\

(ii) \...,-3,-2,-1,0,1,2,3,4\

Question 2

QUESTION

Solve -12x>30 when:

(i) x is a natural number.

(ii) x is an integer.

SOLUTION

This question asks us to solve the inequality under two different conditions: when is a natural number and when is an integer. This tests our understanding of solving linear inequalities and the properties of natural numbers and integers.

Step 1: Solve the inequality

To solve the inequality, we need to isolate . We can do this by dividing both sides by -12. Remember that when we divide or multiply an inequality by a negative number, we must reverse the inequality sign.

Simplifying, we get:

Further simplification gives:

(i) When is a natural number:

Step 2: Consider the condition that is a natural number

Natural numbers are positive integers (1, 2, 3, ...). We need to find natural numbers that satisfy .

Since natural numbers are always positive, there are no natural numbers less than -2.5.

Answer (i): No solution.

(ii) When is an integer:

Step 3: Consider the condition that is an integer

Integers include all positive and negative whole numbers, as well as zero (... -3, -2, -1, 0, 1, 2, 3 ...). We need to find integers that satisfy .

The integers less than -2.5 are -3, -4, -5, and so on.

Answer (ii):

ANSWER

(i) No solution.

(ii) \...,-4,-3\

Question 3

QUESTION

Solve 5x-3<7 when:

(i) x is an integer.

(ii) x is a real number.

SOLUTION

This question requires us to solve the linear inequality under two different conditions: when is an integer and when is a real number.

Step 1: Solve the inequality

Add 3 to both sides of the inequality:

Step 2: Isolate

Divide both sides by 5:

(i) When is an integer:

Step 3: Determine the integer solutions

We need to find all integers that are less than 2. These are:

So, the solution set is:

(ii) When is a real number:

Step 4: Express the solution in interval notation

Since can be any real number less than 2, the solution is all real numbers from negative infinity up to (but not including) 2.

In interval notation, this is represented as .

Final Answer:

(i)

(ii)

ANSWER

(i) \...,-2,-1,0,1\

(ii) (-∞,2)

Question 4

QUESTION

Solve 3x+8>2 when:

(i) x is an integer.

(ii) x is a real number.

SOLUTION

This question asks us to solve the linear inequality for two different cases: when is an integer and when is a real number.

Step 1: Isolate in the inequality

We start with the given inequality:

Subtract 8 from both sides:

Step 2: Solve for

Divide both sides by 3:

(i) When is an integer:

Step 3: Find integer solutions

We need to find all integers greater than -2. These are:

So, the solution set is

(ii) When is a real number:

Step 4: Express the solution as an interval

Since can be any real number greater than -2, we represent this as an open interval:

This means all real numbers from -2 (exclusive) to infinity.

Final Answer:

(i)

(ii)

ANSWER

(i) $\{ -1,0,1,2,3,\ldots \}$

(ii) $(-2,\infty)$

Question 5

QUESTION

Solve the inequality for real x:

4x+3\le 5x+7.

SOLUTION

We need to solve the linear inequality for real values of .

Step 1: Isolate the x terms on one side

Subtract from both sides of the inequality:

This simplifies to:

Step 2: Isolate the constant terms on the other side

Subtract 7 from both sides of the inequality:

This simplifies to:

Step 3: Rewrite the inequality

We can rewrite as . This means that is greater than or equal to -4.

Step 4: Express the solution set

The solution set includes all real numbers greater than or equal to -4. In interval notation, this is represented as .

Step 5: Final Answer

The solution set is .

ANSWER

Solution set: (-4,∞)

Question 6

QUESTION

Solve the inequality for real x:

3x-7>5x-1.

SOLUTION

We need to solve the linear inequality for real values of .

Step 1: Group the terms on one side

Subtract from both sides of the inequality:

Step 2: Isolate the term

Add 1 to both sides of the inequality:

Step 3: Solve for

Divide both sides of the inequality by 2:

Step 4: Rewrite the inequality

We can rewrite as .

Step 5: Express the solution set

The solution set consists of all real numbers that are less than -3. In interval notation, this is represented as .

Final Answer: Solution set:

The solution set includes all real numbers less than -3, but not including -3 itself. This is why we use an open interval .

ANSWER

Solution set: (-∞,-3)

Question 7

QUESTION

Solve the inequality for real x:

3(x-1)\le 2(x-3).

SOLUTION

We need to solve the given linear inequality for real values of .

Step 1: Write down the inequality

The given inequality is:

Step 2: Expand both sides of the inequality

Distribute the constants on both sides:

Step 3: Group the terms on one side and the constants on the other side

Subtract from both sides:

Add 3 to both sides:

Step 4: Express the solution set

The solution set consists of all real numbers such that is less than or equal to -3.

In interval notation, this is represented as .

Final Answer: Solution set:

The solution means that any value of that is less than or equal to -3 will satisfy the original inequality. For example, if , then and . Since , the inequality holds.

ANSWER

Solution set: (-∞,-3]

Question 8

QUESTION

Solve the inequality for real x:

3(2-x)\ge 2(1-x).

SOLUTION

We are asked to solve the given linear inequality for real values of .

Step 1: Write down the inequality

The given inequality is:

Step 2: Expand both sides of the inequality

Expanding the left side, we get:

Expanding the right side, we get:

So the inequality becomes:

Step 3: Rearrange the inequality to isolate

Add to both sides of the inequality:

Subtract 2 from both sides of the inequality:

Step 4: Rewrite the inequality

The inequality is the same as .

Step 5: Express the solution set

The solution set consists of all real numbers such that is less than or equal to 4. In interval notation, this is represented as .

Final Answer: Solution set:

ANSWER

Solution set: (-∞,4]

Question 9

QUESTION

Solve the inequality for real x:

x+(x)/(2)+(x)/(3)<11.

SOLUTION

We need to solve the given linear inequality for real values of .

Step 1: Write down the inequality

The given inequality is:

Step 2: Find a common denominator and combine the terms on the left side

The least common denominator (LCD) of 1, 2, and 3 is 6. We rewrite each fraction with the LCD:

Now, combine the fractions:

Step 3: Isolate by multiplying both sides by 6

Multiply both sides of the inequality by 6:

Step 4: Divide both sides by 11

Divide both sides of the inequality by 11:

Step 5: Express the solution set

The solution set consists of all real numbers that are less than 6. In interval notation, this is:

Final Answer: Solution set:

ANSWER

Solution set: (-∞,6)

Question 10

QUESTION

Solve the inequality for real x:

(x)/(3)>(x)/(2)+1.

SOLUTION

We are asked to solve the linear inequality for real values of .

Step 1: Eliminate fractions by multiplying both sides by the least common multiple (LCM) of the denominators.

The denominators are 3 and 2, so their LCM is 6. Multiplying both sides of the inequality by 6:

Step 2: Simplify the inequality.

Step 3: Isolate the variable on one side of the inequality.

Subtract from both sides:

Step 4: Multiply both sides by -1 to solve for . Remember to reverse the inequality sign when multiplying or dividing by a negative number.

Step 5: Express the solution set in interval notation.

The solution means all real numbers less than -6. In interval notation, this is represented as .

Final Answer: Solution set:

Conclusion: The solution set includes all real numbers strictly less than -6. We multiplied by the LCM to remove fractions and reversed the inequality sign when multiplying by -1, which are crucial steps in solving linear inequalities.

ANSWER

Solution set: (-∞,-6)

Question 11

QUESTION

Solve the inequality for real x:

(3(x-2))/(5)\le (5(2-x))/(3).

SOLUTION

We need to solve the given linear inequality for real values of .

Step 1: Write down the inequality

The given inequality is:

Step 2: Clear the fractions

Multiply both sides of the inequality by the least common multiple (LCM) of the denominators, which is . This will eliminate the fractions.

Simplifying, we get:

Step 3: Expand the brackets

Expand both sides of the inequality:

Step 4: Group the terms on one side and constants on the other

Add to both sides:

Add to both sides:

Step 5: Isolate

Divide both sides by :

Step 6: Express the solution set

The solution set consists of all real numbers such that . In interval notation, this is .

Solution set:

ANSWER

Solution set: (-∞,2]

Question 12

QUESTION

Solve the inequality for real x:

$\frac{1}{2}\left(\frac{3x}{5}+4\right)\ge \frac{1}{3}(x-6)$.

SOLUTION

We need to solve the given linear inequality for real values of :

Step 1: Simplify both sides of the inequality.

First, distribute the constants on both sides:

This simplifies to:

Step 2: Eliminate fractions by multiplying both sides by the least common multiple (LCM) of the denominators.

The denominators are 10 and 3. The LCM of 10 and 3 is 30.

Multiply both sides of the inequality by 30:

Distribute the 30 on both sides:

Simplify:

Step 3: Isolate on one side of the inequality.

Subtract from both sides:

Add 60 to both sides:

This can also be written as:

Step 4: Express the solution set.

The solution set includes all real numbers that are less than or equal to 120.

In interval notation, this is:

Solution set:

ANSWER

Solution set: $(-\infty,120]$

Question 13

QUESTION

Solve the inequality for real x:

$2(2x+3)-10<6(x-2)$.

SOLUTION

We need to solve the given linear inequality for real values of .

Step 1: Write down the inequality

The given inequality is:

Step 2: Expand both sides of the inequality

Expanding the left side:

Expanding the right side:

So the inequality becomes:

Step 3: Rearrange the inequality to isolate terms on one side

Subtract from both sides:

Add 12 to both sides:

Step 4: Solve for

Divide both sides by 2:

This can also be written as:

Step 5: Express the solution set

The solution set includes all real numbers greater than 4. In interval notation, this is represented as .

Final Answer: Solution set:

ANSWER

Solution set: $(4,\infty)$

Question 14

QUESTION

Solve the inequality for real x:

37-(3x+5)\ge 9x-8(x-3).

SOLUTION

We need to solve the given linear inequality for real values of : .

Step 1: Simplify both sides of the inequality.

First, distribute the negative sign on the left side and the -8 on the right side:

Combine like terms on both sides:

Step 2: Isolate the variable on one side.

Add to both sides of the inequality:

Subtract 24 from both sides:

Step 3: Solve for .

Divide both sides by 4:

This can also be written as .

Step 4: Express the solution set.

The solution set includes all real numbers that are less than or equal to 2. In interval notation, this is represented as .

Final Answer: Solution set:

ANSWER

Solution set: (-∞,2]

Question 15

QUESTION

Solve the inequality for real x:

(x)/(4)<(5x-2)/(3)-(7x-3)/(5).

SOLUTION

We need to solve the given linear inequality for real values of .

Step 1: Write down the inequality

The given inequality is:

Step 2: Find the Least Common Multiple (LCM) of the denominators

The denominators are 4, 3, and 5. Their LCM is .

Step 3: Multiply both sides of the inequality by the LCM

Multiplying both sides by 60, we get:

Simplifying, we have:

Step 4: Expand the terms

Expanding the terms on the right side, we get:

Step 5: Combine like terms

Combining the terms on the right side, we have:

Step 6: Isolate x

Subtracting from both sides:

Multiplying both sides by -1 (and flipping the inequality sign because we are multiplying by a negative number):

Step 7: Express the solution set

The solution set is all real numbers such that . In interval notation, this is .

Solution set:

ANSWER

Solution set: (4,∞)

Question 16

QUESTION

Solve the inequality for real x:

(2x-1)/(3)\ge (3x-2)/(4)-(2-x)/(5).

SOLUTION

We need to solve the given linear inequality for real values of .

Step 1: Write down the inequality

The given inequality is:

Step 2: Find the Least Common Multiple (LCM) of the denominators

The denominators are 3, 4, and 5. Their LCM is 60.

Step 3: Multiply both sides of the inequality by the LCM

Multiplying both sides by 60, we get:

Simplifying, we have:

Step 4: Expand the terms

Expanding the terms, we get:

Step 5: Combine like terms

Combining the terms on the right side, we have:

Step 6: Rearrange the inequality

Subtract from both sides:

Add 54 to both sides:

Step 7: Solve for

Divide both sides by 17:

Which simplifies to:

This can also be written as:

Step 8: Express the solution set

The solution set is all real numbers such that is less than or equal to 2. In interval notation, this is .

Solution set:

ANSWER

Solution set: (-∞,2]

Question 17

QUESTION

Solve the inequality 3x-2<2x+1 and represent the solution on the number line.

SOLUTION

This question asks us to solve a linear inequality and represent the solution set on the number line. The key is to isolate on one side of the inequality.

Step 1: Write down the given inequality

We have:

Step 2: Isolate the terms on one side

Subtract from both sides of the inequality:

This simplifies to:

Step 3: Isolate

Add 2 to both sides of the inequality:

This simplifies to:

Step 4: Represent the solution on the number line

The solution means all real numbers less than 3. On the number line, this is represented by an open interval extending from negative infinity up to, but not including, 3. We use an open circle at 3 to indicate that 3 is not included in the solution.

Step 5: Express the solution set

The solution set can be written in interval notation as .

Final Answer: Solution set:

The solution includes all numbers less than 3. A common mistake is to include 3 in the solution set, but the inequality is strictly less than, not less than or equal to.

ANSWER

Solution set: (-∞,3)

Question 18

QUESTION

Solve the inequality 5x-3\ge 3x-5 and represent the solution on the number line.

SOLUTION

We are asked to solve the linear inequality and represent the solution on the number line.

Step 1: Isolate the x terms on one side of the inequality.

Subtract from both sides of the inequality:

Step 2: Isolate the constant terms on the other side of the inequality.

Add 3 to both sides of the inequality:

Step 3: Solve for x.

Divide both sides of the inequality by 2:

Step 4: Represent the solution on the number line.

The solution means that can be any number greater than or equal to -1. On the number line, this is represented by a closed (filled) circle at -1, and a line extending to the right, indicating all values greater than -1.

Step 5: Express the solution set in interval notation.

The solution set is all real numbers greater than or equal to -1. In interval notation, this is written as .

Final Answer: Solution set:

ANSWER

Solution set: [-1,∞)

Question 19

QUESTION

Solve the inequality $3(1-x)<2(x+4)$ and represent the solution on the number line.

SOLUTION

We need to solve the given linear inequality and represent its solution on the number line.

Step 1: Expand both sides of the inequality

Distribute the constants on both sides:

Step 2: Group the x terms on one side and constants on the other side

Add to both sides:

Subtract 8 from both sides:

Step 3: Isolate x

Divide both sides by 5:

Step 4: Express the solution set

The inequality means that is greater than -1. In interval notation, this is written as .

Step 5: Represent the solution on the number line

Draw a number line. Place an open circle at -1 to indicate that -1 is not included in the solution set. Shade the region to the right of -1 to represent all numbers greater than -1.

Final Answer: The solution set is .

ANSWER

Solution set: $(-1, \infty)$

Question 20

QUESTION

Solve the inequality (x)/(2)\ge (5x-2)/(3)-(7x-3)/(5) and represent the solution on the number line.

SOLUTION

We need to solve the given linear inequality and represent the solution set on the number line.

Step 1: Write down the inequality

The given inequality is:

Step 2: Simplify the right-hand side

To simplify the right-hand side, we first find a common denominator for the two fractions, which is 15. Then, we combine the fractions:

Step 3: Rewrite the inequality

Now, we can rewrite the original inequality as:

Step 4: Eliminate the fractions

To eliminate the fractions, we multiply both sides of the inequality by the least common multiple (LCM) of 2 and 15, which is 30:

Step 5: Simplify and solve for x

Expanding the right side, we get:

Subtracting from both sides:

Dividing both sides by 7:

Step 6: Express the solution set

The solution set is all real numbers such that is greater than or equal to . In interval notation, this is:

Final Answer: Solution set:

ANSWER

Solution set: \left[-(2)/(7),∞ \right)

Question 21

QUESTION

Ravi obtained 70 and 75 marks in the first two unit tests. Find the minimum marks he should get in the third test to have an average of at least 60 marks.

SOLUTION

This question tests the concept of averages and how to set up and solve a linear inequality. We need to find the minimum score Ravi needs on his third test to achieve an average of at least 60.

Step 1: Define the variable

Let be the marks Ravi needs to score in the third test.

Step 2: Set up the inequality

The average of the three tests is calculated as the sum of the marks divided by the number of tests (3). We want this average to be at least 60, which means it should be greater than or equal to 60. Therefore, we can write the inequality as:

Step 3: Simplify the inequality

First, add the known marks:

So the inequality becomes:

Step 4: Solve for

Multiply both sides of the inequality by 3:

Subtract 145 from both sides:

Step 5: Interpret the result

The inequality means that Ravi must score at least 35 marks in the third test to have an average of at least 60 marks.

Final answer: Minimum marks in third test: .

Conclusion: We found the minimum marks by setting up an inequality representing the average of the three test scores and solving for the unknown variable. This method works because it directly translates the problem's requirements into a mathematical statement that can be solved algebraically.

ANSWER

Minimum marks in third test: 35.

Question 22

QUESTION

To receive Grade ‘A’ in a course, one must obtain an average of 90 marks or more in five examinations, each of 100 marks. If Sunita’s marks in the first four examinations are 87, 92, 94 and 95, find the minimum marks that Sunita must obtain in the fifth examination to get Grade ‘A’ in the course.

SOLUTION

This question tests the concept of averages and how to set up and solve a linear inequality to find the minimum value needed to achieve a desired average.

Step 1: Define the variable

Let be the marks Sunita must obtain in the fifth examination.

Step 2: Set up the inequality

To receive Grade ‘A’, the average of the five examinations must be 90 or more. The average is calculated as the sum of the marks divided by the number of examinations. Therefore, we can write the inequality as:

Step 3: Simplify the inequality

First, sum the known marks:

So the inequality becomes:

Step 4: Solve for

Multiply both sides of the inequality by 5:

Subtract 368 from both sides:

Step 5: Interpret the result

The inequality means that Sunita must obtain a minimum of 82 marks in the fifth examination to get Grade ‘A’ in the course.

Final Answer: Minimum marks required in fifth examination: .

Conclusion: This method works by translating the word problem into a mathematical inequality and then solving for the unknown variable. A common mistake is to forget to multiply the average by the number of examinations when setting up the inequality.

ANSWER

Minimum marks required in fifth examination: 82.

Question 23

QUESTION

Find all pairs of consecutive odd positive integers, both of which are smaller than 10, such that their sum is more than 11.

SOLUTION

This question asks us to find pairs of consecutive odd positive integers less than 10 whose sum is greater than 11. We'll use inequalities to represent the given conditions and solve for the possible pairs.

Step 1: Define the variables

Let the first odd positive integer be . Since we are looking for consecutive odd integers, the next odd positive integer will be .

Step 2: Set up the inequalities based on the given conditions

We are given two conditions:

(i) Both integers are smaller than 10: This means and . Since implies , we can say .

(ii) Their sum is more than 11: This means .

Step 3: Solve the inequality for the sum

We have:

Step 4: Find the possible values of x

Since must be an odd positive integer and and , the possible values for are 5 and 7.

Step 5: Determine the pairs of consecutive odd integers

If , then the next consecutive odd integer is . The pair is (5, 7).

If , then the next consecutive odd integer is . The pair is (7, 9).

Step 6: Check if the pairs satisfy the conditions

For (5, 7): Both are less than 10, and . This pair satisfies the conditions.

For (7, 9): Both are less than 10, and . This pair satisfies the conditions.

Final Answer: The pairs are and .

ANSWER

Pairs: (5,7) and (7,9).

Question 24

QUESTION

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

SOLUTION

This question requires us to find pairs of consecutive even positive integers that satisfy two conditions: they must both be greater than 5, and their sum must be less than 23. We will use inequalities to represent these conditions and solve for the possible integer pairs.

Step 1: Define the variables

Let the first even positive integer be . Since we are looking for consecutive even integers, the next even integer will be .

Step 2: Set up the inequalities based on the given conditions

The first condition states that both integers are larger than 5. This gives us the inequality:

The second condition states that their sum is less than 23. This gives us the inequality:

Step 3: Solve the second inequality

Combine like terms:

Subtract 2 from both sides:

Divide both sides by 2:

Step 4: Find the possible values of

We need to find even integers such that and . The even integers that satisfy these conditions are 6, 8, and 10.

Step 5: Determine the pairs of consecutive even integers

If , then . The pair is (6, 8).

If , then . The pair is (8, 10).

If , then . The pair is (10, 12).

Final Answer: The pairs of consecutive even positive integers are , and .

ANSWER

Pairs: (6,8), (8,10) and (10,12).

Question 25

QUESTION

The longest side of a triangle is three 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.

SOLUTION

This question involves setting up and solving a linear inequality based on the given conditions for the sides of a triangle and its perimeter. We need to find the minimum length of the shortest side.

Step 1: Define the variables

Let the length of the shortest side be cm.

The longest side is three times the shortest side, so its length is cm.

The third side is 2 cm shorter than the longest side, so its length is cm.

Step 2: Set up the inequality

The perimeter of the triangle is the sum of the lengths of all three sides. The problem states that the perimeter is at least 61 cm. Therefore, we can write the inequality as:

Step 3: Simplify the inequality

Combine like terms:

Step 4: Solve for

Add 2 to both sides of the inequality:

Divide both sides by 7:

Step 5: Interpret the result

The inequality means that the length of the shortest side must be greater than or equal to 9 cm.

Final Answer: The minimum length of the shortest side is .

Conclusion: We translated the word problem into a linear inequality, solved for the unknown variable, and interpreted the result to find the minimum possible length of the shortest side of the triangle. The key was to correctly represent each side's length in terms of the shortest side and then use the perimeter condition to form the inequality.

ANSWER

Minimum length of the shortest side: 9\,\textcm.

Question 26

QUESTION

A man wants to cut three lengths from a single piece of board of length 91 cm. The second length is to be 3 cm longer than the shortest and the third length is to be twice as long as the shortest.

What are the possible lengths of the shortest board if the third piece is to be at least 5 cm longer than the second?

SOLUTION

This question involves setting up and solving linear inequalities to find the possible range of lengths for the shortest piece of board.

Step 1: Define the variables

Let the length of the shortest piece be cm.

Then, the length of the second piece is cm.

And, the length of the third piece is cm.

Step 2: Set up the first inequality based on the total length

The sum of the lengths of the three pieces must be less than or equal to the total length of the board, which is 91 cm.

Therefore, we have the inequality:

Step 3: Simplify the first inequality

Combine like terms:

Subtract 3 from both sides:

Divide both sides by 4:

Step 4: Set up the second inequality based on the length condition

The third piece is to be at least 5 cm longer than the second piece. This gives us the inequality:

Step 5: Simplify the second inequality

Simplify the right side:

Subtract from both sides:

Step 6: Combine the inequalities

We have two inequalities: and

Combining these, we get:

Step 7: State the final answer

The length of the shortest board is greater than or equal to but less than or equal to .

ANSWER

The length of the shortest board is greater than or equal to 8\,\textcm but less than or equal to 22\,\textcm.

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🔢 Key Formulas

Important Formulas for Exercise 5.1

Formula / Concept	Description
Definition of a Linear Inequality	Two real numbers or two algebraic expressions related by the symbols <, >, ≤, or ≥ form an inequality. Linear inequalities are inequalities that involve at least one linear algebraic expression.
Strict and Slack Inequalities	Inequalities with the symbols < or > are called strict inequalities. Inequalities with the symbols ≤ or ≥ are called slack inequalities.
Addition/Subtraction Rule	Equal numbers can be added to or subtracted from both sides of an inequality without changing the sign of inequality. If a < b, then a + c < b + c and a - c < b - c.
Multiplication/Division by a Positive Number	Both sides of an inequality can be multiplied or divided by the same positive number without changing the sign of inequality. If a < b and c > 0, then ac < bc and (a)/(c) < (b)/(c).
Multiplication/Division by a Negative Number	When both sides of an inequality are multiplied or divided by a negative number, the sign of inequality is reversed. If a < b and c < 0, then ac > bc and (a)/(c) > (b)/(c).

Formula / Concept	Description
Solution of a Linear Inequality	A value of the variable that makes the inequality a true statement is called a solution. Linear inequalities typically have infinitely many solutions.
Solution Set	The set of all possible solutions of an inequality is called its solution set.
Graphical Representation on a Number Line	The solution of a linear inequality in one variable is represented on a number line.
Open and Closed Circles	On a number line, an open circle is used for strict inequalities (<, >) to indicate that the endpoint is not included in the solution. A closed (or filled) circle is used for slack inequalities (≤, ≥) to indicate that the endpoint is included.
Shading on a Number Line	For inequalities involving > or ≥, the number line is shaded to the right of the point. For inequalities involving < or ≤, the number line is shaded to the left of the point.

Top FAQs

Q1. How many questions are in NCERT Solutions for Class 11 Maths Chapter 5 Linear Inequalities Exercise 5.1?

Exercise 5.1 of NCERT Solutions for Class 11 Maths Chapter 5 Linear Inequalities contains exactly 26 questions. These questions cover fundamental concepts of inequalities including properties of inequalities and their graphical representations. Students can access step by step solutions for all 26 questions to prepare effectively for CBSE board exam 2025-26.

Q2. Where can I download free PDF of NCERT Solutions for Class 11 Maths Chapter 5 Linear Inequalities Exercise 5.1?

You can download the free PDF of NCERT Solutions for Class 11 Maths Chapter 5 Linear Inequalities Exercise 5.1 from the official NCERT website and various educational platforms offering CBSE study materials. These PDFs include step by step solutions for all 26 questions and are updated as per the 2025-26 syllabus. The free PDF download helps students practice offline and prepare systematically for their exams.

Q3. How many marks does Linear Inequalities carry in CBSE Class 11 board exam 2025-26 for Chapter 5 Exercise 5.1?

Linear Inequalities (Chapter 5) carries approximately 5 marks in CBSE Class 11 board exam 2025-26 as part of Unit II - Algebra. The weightage is shared with other algebra topics, making Exercise 5.1 an important foundation for solving inequality problems. Students should thoroughly practice all 26 questions from Exercise 5.1 to secure full marks in this section.

Q4. Which is the most difficult question in NCERT Solutions Class 11 Maths Chapter 5 Linear Inequalities Exercise 5.1?

Questions 23-26 in NCERT Solutions for Class 11 Maths Chapter 5 Linear Inequalities Exercise 5.1 are generally considered the most difficult as they involve complex system of linear inequalities and their graphical solutions. These questions require strong understanding of properties of inequalities and coordinate geometry. Step by step solutions help students master these challenging problems for CBSE board exam 2025-26.

Q5. What is Properties of Inequalities covered in NCERT Solutions for Class 11 Maths Chapter 5 Exercise 5.1?

Properties of Inequalities in NCERT Solutions Class 11 Maths Chapter 5 Exercise 5.1 include transitive property, addition property, multiplication property, and rules for reversing inequality signs when multiplying by negative numbers. These fundamental properties form the basis for solving all 26 questions in Exercise 5.1. Understanding these properties is crucial for solving linear inequalities step by step in CBSE board exam 2025-26.

📚 More Exercises

Visit all exercises from Chapter 5:

EXERCISE 5.1 ✓ →

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