MATHS

NCERT - NCERT MATHEMATICS(TELUGU)

LINEAR INEQUALITIES

Example

1. Solve $30x < 200$ when

(i) x is a natural number.

(ii) x is an integer.

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2. Solve $5x - 3 < 3x + 1$ when

(i) x is an integer

(ii) x is a real number.

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3. Solve $4x + 3 < 6x + 7$.

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

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5. Solve $7x + 3 < 5x + 9$. Show the graph of the solutions on number line.

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6. Solve $\frac{3x-4}{2} \geq \frac{x+1}{4} - 1$. Show the graph of the solutions on number line.

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7. The marks obtained by a student of Class XI in first and second terminal examination are 62 and 48, respectively. Find the minimum marks he should get in the annual examination to have an average of at least 60 marks.

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8. Find all pairs of consecutive odd natural numbers, both of which are larger than 10, such that their sum is less than 40.

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9. Solve $3x + 2y > 6$ graphically.

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10. Solve $3x - 6 = 0$ graphically in two dimensional plane.

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11. Solve $y < 2$ graphically.

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12. Solve the following system of linear inequalities graphically.

$x + y \geq 5 \quad \ldots(1)$

$x - y \leq 3 \quad \ldots(2)$

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13. Solve the following system of inequalities graphically

$5x + 4y \leq 40 \quad \ldots(1)$

$x \geq 2 \quad \ldots(2)$

$y \geq 3 \quad \ldots(3)$

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14. Solve the following system of inequalities

$8x + 3y \leq 100 \quad \ldots(1)$

$x \geq 0 \quad \ldots(2)$

$y \geq 0 \quad \ldots(3)$

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15. Solve the following system of inequalities graphically

$x + 2y \leq 8 \quad \ldots(1)$

$2x + y \leq 8 \quad \ldots(2)$

$x \geq 0 \qquad \ldots(3)$

$y \geq 0 \qquad \ldots(4)$

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16. Solve $-8 \leq 5x - 3 < 7$.

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17. Solve $-5 \leq \frac{5 - 3x}{2} \leq 8$.

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18. Solve the system of inequalities:

$3x - 7 < 5 + x \qquad \ldots(1)$

$11 - 5x \leq 1 \qquad \ldots(2)$

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19. In an experiment, a solution of hydrochloric acid is to be kept between 30° and 35° Celsius. What is the range of temperature in degree Fahrenheit if conversion formula is given by $C = \frac{5}{9}(F - 32)$, where C and F represent

temperature in degree Celsius and degree Fahrenheit, respectively.

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20. A manufacturer has 600 litres of a 12% solution of acid. How many litres of a 30% acid solution must be added to it so that acid content in the resulting mixture will be more than 15% but less than 18%?

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Exercise 6 1

1. Solve $24x < 100$, when

(i) x is a natural number,

(ii) x is an integer.

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2. Solve $-12x > 30$, when

(i) x is a natural number.

(ii) x is an integer.

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3. Solve $5x - 3 < 7$, when

(i) x is an integer.

(ii) x is a real number.

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4. Solve $3x + 8 > 2$, when

(i) x is an integer.

(ii) x is a real number.

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Exercise 6 1 Solve The Inequalities In Exercises 5 To 16 For Real X

1. $4x + 3 < 5x + 7$

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2. $3x - 7 > 5x - 1$

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3. $3(x-1) \leq 2(x-3)$

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4. $3(2-x) \geq 2(1-x)$

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5. $x + \frac{x}{2} + \frac{x}{3} < 11$

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6. solve the given inequality for real x:

$$\frac{x}{3} > \frac{x}{2} + 1$$

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7. solve the given inequality for real x:

$$\frac{3(x-2)}{5} \leq \frac{5(2-x)}{3}$$

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8. solve the given inequality for real x:

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

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9. solve the inequality for real x:

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

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10. solve the inequality for real x:

$37-(3x+5)\geq 9x-8(x-3)$

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11. solve the given inequality for real x:

$$\frac{x}{4} < \frac{(5x-2)}{3} - \frac{(7x-3)}{5}$$

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12. solve the given inequality for real x:

$$\frac{(2x-1)}{3} \geq \frac{(3x-2)}{4} - \frac{(2-x)}{5}$$

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Exercise 6 1 Solve The Inequalities In Exercises 17 To 20 And Show The Graph Of The Solution In

Each Case On Number Line

1. solve the given inequality and show the graph of the solution on number line : $3x - 2 < 2x + 1$

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2. solve the given inequality an d show the graph of the solution on the number line: $5x - 3 \geq 3x - 5$

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3. solve the given inequality and show the graph of the solution on the number line:

$3(1-x) < 2(x+4)$

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4. solve the given inequality and show the graph of the solution on number line:

$$\frac{x}{2} \geq \frac{(5x-2)}{3} - \frac{(7x-3)}{5}$$

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

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6. 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 first four examinations are 87, 92, 94

and 95, find minimum marks that Sunita must obtain in fifth examination to get grade 'A' in the course.

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

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

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9. 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.

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10. A man wants to cut three lengths from a single piece of board of length 91 cm. The second length is to be 3cm longer than the shortest and the third length is to be twice as long as the shortest.What are possible lengths of the shortest board if the third piece is to be at least 5cm longer than the second?

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Exercise 6 2 Solve The Following Inequalities Graphically In Two Dimensional Plane

1. solve the following inequalities graphically in two-dimensional plane:$x + y < 5$

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2. solve the following inequalities graphically in two-dimensional plane$2x + y \geq 6$

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3. solve the following inequalities graphically in two-dimensional plane$3x + 4y \leq 12$

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4. solve the following inequalities graphically in two-dimensional plane$y + 8 \geq 2x$

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5. solve the following inequalities graphically in two-dimensional plane$x - y \leq 2$

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6. solve the following inequalities graphically in two-dimensional plane$2x - 3y < 6$

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7. solve the following inequalities graphically in two-dimensional plane $-3x + 2y \geq -6$

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8. solve the following inequalities graphically in two-dimensional plane $3y - 5x < 30$

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9. solve the following inequalities graphically in two-dimensional plane $y < -2$

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10. solve the following inequalities graphically in two-dimensional plane $x > -3$.

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Exercise 6 3 Solve The Following System Of Inequalities Graphically

1. solve the following inequalities graphically in two-dimensional plan$x \geq 3, y \geq 2$

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Exercise Miscellaneous Exercise On Chapter 6 Solve The Inequalities In Exercises 1 To 6

1. $2 \leq 3x - 4 \leq 5$

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2. Solve the inequality for x:

$$6 \leq -3(2x-4) < 12$$

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3. Solve the inequality for x:

$$-3 \leq 4 - \frac{3x}{-5} \leq 2$$

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4. Solve the inequality for x:

$$-14 < \frac{3(x-2)}{5} \leq 0$$

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5. Solve the inequality for x:

$$-12 < 4 - \frac{3x}{-5} \leq 2$$

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6. Solve the inequality for x:

$$7 \leq \frac{(3x + 11)}{2} \leq 11.$$

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Exercise Miscellaneous Exercise On Chapter 6 Solve The Inequalities In Exercises 7 To 10 And Represent The Solution Graphically On Number

1. Solve the inequality for x:

$5x + 1 > -24, 5x - 1 < 24$

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2. Solve the inequality for x:

$2(x - 1) < x + 5, 3(x + 2) > 2 - x$

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3. Solve the inequality for x:

$3x - 7 > 2(x - 6), 6 - x > 11 - 2x$

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4. Solve the inequality for x :

$5(2x - 7) - 3(2x + 4) \leq 0, 2x + 19 \leq 6x + 47$

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Exercise Miscellaneous Exercise On Chapter 6

1. A solution is to be kept between 68° F and 77° F. What is the range in temperature in degree Celsius (C) if the Celsius / Fahrenheit (F) conversion formula is given by $F = \frac{9}{5}C + 32$?

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2. A solution of 8% boric acid is to be diluted by adding a 2% boric acid solution to it. The

resulting mixture is to be more than 4% but less than 6% boric acid. If we have 640 litres of the 8% solution, how many litres of the 2% solution will have to be added?

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3. How many litres of water will have to be added to 1125 litres of the 45% solution of acid so that the resulting mixture will contain more than 25% but less than 30% acid content?

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4. IQ of a person is given by the formula

$$IQ = \frac{MA}{CA} \times 100,$$

where MA is mental age and CA is chronological age. If $80 \leq IQ \leq 140$ for a group of 12 years old children, find the range of their mental age.

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