MATHS

BOOKS - KC SINHA MATHS (HINGLISH)

LINEAR INEQUALITIES - FOR BOARDS

Solved Examples

1. If $x\varepsilon\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, solve the inequation $2x + 6 \leq 5x - 4$.

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

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3. Solve the inequation $\frac{2}{x-3} < 0$

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4. Solve the inequation $9x\frac{5}{x+5} < 0$

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5. Solve the inequation: $-15 < \frac{39x - 2}{5} \leq 0$

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6. Solve the following system of inequation

$4x + 5 > 3x, \ -(x + 3) + 4 \leq \ -2x + 5$

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7. Solve the following system of inequation

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

$\frac{2x - 3}{4} + 6 \geq 2 + 4\frac{x}{3}$

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8. Solve the inequation $|4 - x| + 1 < 3$

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9. Solve the inequation $\left|\frac{3}{x-1}\right| > 1$

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10. Solve the inequation $2 \leq |x - 3| \leq 4$

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11. Solve the inequation $\frac{|x+1|-x}{x} < 1$

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12. Solve the inequation :

$|x-1|+|x-2|+|x-3| \leq 6$

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13. Solve the inequation $y+8 \geq 2x$ graphically

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14. Solve the inequation $x - 2y > 0$ graphically in XY-plane.

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15. Solve the following system inequations graphically.

$3x + 2y \leq 24, x + 2y \leq 16, x + y \leq 10, x \leq 0, y \geq 0$

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16. Solve the following system of inequations: $3x + 2y \geq 24, 3x + y \leq 15, x \geq 4$ graphically

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17. A plumber can be paid under two schemes as given below: I Rs. 600 and Rs 50 per hour II. Rs. 170 per hour. If the job takes n hours, for wht values of n does the scheme I gives the plumber the better wages?

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18. Rajeev needs a minimum of 360 marks in four tests in a Mathematics course to obtain an A grade. On his first three tests, he scored 88,96,79 marks. What should his score be in the fourth test so that he can make an A grade?

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19. A company manufactures cassettes and its cost eqution for a week $C = 300 + 1.5x$ and its revenue equation is $R = 2x$, where x is the number of cassettes sold in a week. How many cassettes must be sold for the company to relize a profit?

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20. The longest side of a triangle is twice the shortest side and the third side is 3 cm longer than the shortest side. If the perimeter of the triangle is at least 39 cm, find the minimum length of the longest side.

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21. Find all pairs of consecutive even positive integers, both of which are greater than 10 such that their sum is less than 50.

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22. The water acidity in a pool is considered normal when the average pH reading of three daily measurements is between 7.2 and 7.8. If the first tow pH reading are 7.48 and 7.85, find the range of pH value for the third reading that will result in the acidity level being normal.

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23. IQ of a person is given by 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 year children, find the range of their mental age.

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24. A man wants to cut three lengths from a single piece of board of length 91cm 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

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25. 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

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26. 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

1. If x is non -negative integer, solve the inequaton $2 - 3x < 5 - 4x$. Also show the solution set on number line

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2. Solve the inequation $2(x - 2) < 3x - 2, x\varepsilon\{ - 2, \ - 1, 0, 1, 2, 3, 4)$.

Also show that solution set on the number line.

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3. Solve $30x < 200$when(i) x is a natural number, (ii) x is an integer.

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4. Solve $30x < 200$when(i) x is a natural number, (ii) x is an integer.

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5. Solve the inequation (a) $3x + 5 < x - 7$ (b) $5x - 3 < 3x - 1$ when: x is an integer

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6. Solve the inequation (a) $3x + 5 < x - 7$ (b) $5x - 3 < 3x - 1$ when: x is a real number

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7. Solve the inequation: $x + 10 > 4x - 5$

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

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9. Solve the inequation: $3x - 7 > x + 3$

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10. Solve the inequation: $x + 12 < 4x - 2$

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11. Solve the inequation: $3x - 10 > 5x + 1$

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12. Solve the inequation: $3(x - 2) \leq 5x + 8$

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13. Solve the inequation: $5x - 1 > 3x + 7$

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14. Solve the inequation: $3x + 17 \leq 2(1 - x)$

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15. Solve the inequation: $2 - 3x \geq 2(x + 6)$

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16. Solve the inequation:

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

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17. Solve the inequation:

$$-(x-3)+4 > -2x+5$$

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

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19. Solve the inequation:

$$\frac{11-2x}{5} \geq \frac{9-3x}{8} + \frac{3}{4}, x \varepsilon N$$

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20. Solve the following linear inequation in R: $\frac{4+2x}{3} \geq \frac{x}{2} - 3$

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21. Solve the inequation: $\frac{3}{5}x - 2x - \frac{1}{3} > 1, x \varepsilon w$

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22. Solve the following linear inequations in R.

$\frac{5x}{2} + \frac{3x}{4} \geq \frac{39}{4}$

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23. Solve the inequation: $\frac{3}{x-2} < 0$

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24. Solve the inequation: $-\frac{1}{x+2} > 0$

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25. Solve the inequation: $\frac{x-3}{x+5} > 0$

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26. Solve the inequation: $\frac{x-3}{x-5} > 0$

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27. Solve the inequation: $\frac{x-1}{x-3} < 1$

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28. Solve the inequation: $\frac{x+1}{x-7} \geq 2$

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29. Solve the inequation : $-2 \leq 6x - 1 < 2$

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30. Solve the inequation : $-3 \leq 4 - 7x < 18$

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31. Solve the inequation : $0 < \frac{x}{3} < 1$

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32. Solve the inequation : $-7 < 2x - 3 < 7$

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33. Solve the inequation : $6 \leq -3(2x - 4) < 12$

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34. Solve the inequation : $-2 < x - 3 < 7$

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35. Solve the inequation : $-3 \leq \frac{4-7x}{2} \leq 18$

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36. Solve the inequation : $-12 \leq \frac{4-3x}{-5x+2}$

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37. Find the range of values of x which satisfy the inequlaity $-\frac{1}{5} < \frac{3x}{10} + 1 < \frac{2}{5}, x \varepsilon R.$

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38. Find the values of x which satisfy the inequation: $-2 \leq \frac{1}{2} - 2x \leq 1\frac{5}{6}, x \varepsilon N$

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39. Solve the system of inequation:

$2x + 5 \leq 0, x - 3 \leq 0$

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40. Solve the system of inequation:

$x - 2 > 0, 3x < 18$

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41. Solve the system of inequation:

$x + 3 > 0, 2x < 14$

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42. Solve the system of inequation:

$x + 2 > 11, 2x \leq 20$

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43. Solve each of the following system of equation in $R: 5x - 1\langle 24,\ 5x + 1\rangle - 24$

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44. Solve each of the following system of equation in $R: 3x - 1 \geq 5,\ x + 2 \succ 1$

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45. Solve the system of inequation: $2x - 7 < 11, 3x + 4 < 5$

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46. Solve the system of inequation: $4x - 5 < 0$, $-3x - 4 \geq 8$

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47. Solve the system of inequation: $4 - 5x > -11,\ 4x + 11 \leq -13$

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48. Solve the system of inequation:

$-4x + 1 \geq 0, 3 - 4x < 0$

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49. Solve the system of inequation:

$x + 2 \leq 5, 3x - 4 > -2 + x$

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50. Solve the system of inequation:

$4x + 3 \geq 2x + 17, 3x - 5 < 2$

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51. Solve the system of inequation:

$7x - 8 < 4x + 7, -\frac{x}{2} > 4$

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52. Solve the system of inequation:

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

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53. Solve each of the following system of equation in $R: 2x - 7 > 5 - x,\ 11 - 5x \leq 1$

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54. $\frac{4x}{3} - \frac{9}{4} < x + \frac{3}{4}; \frac{7x - 1}{3} - \frac{7x + 2}{6} > x$

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55. Solve the inequation: $|x| \leq 5$

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56. Solve the inequation: $|x| > 5$

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57. Solve the inequation: $|x - 2| \leq 5$

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58. Solve the inequation: $|x + 1| \geq 3$

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59. Solve the inequation: $|3x - 2| \leq \frac{1}{2}$

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60. Solve the inequation: $1 \leq |x + 1| \leq 2$

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61. Solve the inequation: $\frac{|x + 3| + x}{x + 2} > 1$

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62. Solve the inequation: $|x-1|+|x-2| \geq 3$

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63. Solve the inequations graphically in XY-plane:

$x < -3$

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64. Solve the inequation graphically in XY-plane:

$3x - 4y < 12$

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65. Solve the inequations graphically in XY-plane:

$-3x + 2y \geq 6$

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66. Solve the inequations graphically in XY-plane:

$x \leq 8 - 4y$

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67. Solve the inequations graphically in XY-plane:

$x - 2y + 4 \leq 0$

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68. Solve the inequation graphically in XY-plane :

$x - 2y \leq -1$

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69. Solve the system of inequations graphically:

$x \geq 1, y \leq 4$

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70. Solve the system of inequations graphically:

$2x + y - 3 \geq 0, x - 2y + 1 \leq 0, x \geq 0, y \geq 0$

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71. Solve the system of inequalities graphically :

$2x - y > 1, x - 2y < -1$

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72. Solve the system of inequations graphically:

$x + 3y \leq 12, 3x + y \leq 12, x \geq 0, y \geq 0$

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73. Solve the system of inequalities graphically :

$2x + y \geq 4, x + y \leq 3, 2x - 3y \leq 6.$

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74. Solve the system of inequations graphically:

$x + 2y \leq 3, 3x + 4y \geq 12, x \geq 0, y \geq 1$

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75. An electrician can be paid under two schemes as given below: I: Rs. 500 and Rs. 70 per hour. II: Rs. 120 per hour. If the job takes x hours, for what values of x does the i. Scheme I ii. Scheme II give the electrician the better wages.

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

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77. the marks obtained by a student of class 12 in first terminal and second terminal are 62 and 48 respectively. Find the number of minimum marks he should get in the annual examination to have an average of ast least 60 marks.

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78. 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 m fifth examin

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79. In the first four examinations, each of 100 marks, Hamid got 94,72,72,84 marks. If a final average greater than or equal to 80 and less than 90 is needed to obtain a final grade B in a course, what range of marks on the fifth (last) examination will result Hamid in receiving grade B in course?

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80. 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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81. 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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82. 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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83. 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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84. 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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