

Tarun Classes of Mathematics

IIT-JEE Mains | CBSE | PU-CET | NDA

CLASS 11 – CBSE | MATHEMATICS

LINEAR INEQUALITIES

SECTION - A (Multiple choice questions)

- Minimum value of $|x - 3| + |x + 1| + |x - 5|$ is:
(a) 6 (b) 7 (c) 8 (d) 5
- Solve: $||x - 1| - 2| < 1$
(a) $(-2, 0) \cup (2, 4)$ (b) $(0, 4)$ (c) $(-2, 4)$ (d) $(0, 2)$
- Solve: $(x - 1)(x - 3)(x - 5) < 0$
(a) $(-\infty, 1) \cup (3, 5)$ (b) $(1, 3) \cup (5, \infty)$ (c) $(1, 5)$ (d) $x < 5$
- Solve: $x^2(x - 2)(x + 3) > 0$
(a) $(-3, 0) \cup (0, 2)$ (b) $(-3, 2)$ (c) $(2, \infty)$ (d) $x \neq 0, (-\infty, -3) \cup (2, \infty)$
- Solve: $(x + 2)^2(x - 4) \leq 0$
(a) $x \leq 4$ (b) $(-\infty, 4]$ (c) $\{-2\} \cup (-\infty, 4]$ (d) $(-\infty, 4]$
- Solve: $(x - 1)^3(x - 2)^2(x + 1) > 0$
(a) $(-\infty, -1) \cup (1, 2) \cup (2, \infty)$ (b) $(1, \infty)$ (c) $(-1, 1) \cup (2, \infty)$ (d) $x > 1, x \neq 2$
- Number of integral solutions of $(x - 2)(x - 4)(x - 6)(x - 8) < 0$:
(a) 4 (b) 5 (c) 6 (d) 2
- Solve: $\frac{2x + 3}{x - 4} \leq 0$
(a) $[-3/2, 4)$ (b) $(-3/2, 4)$ (c) $x \leq -3/2$ or $x > 4$ (d) $(4, \infty)$
- The set of x such that $x^2 - |x| - 2 < 0$ is:
(a) $(-2, 2)$ (b) $(-2, -1) \cup (1, 2)$ (c) $(-1, 2)$ (d) no solution
- Solve: $|x - 1| + |x - 4| > 5$
(a) $x < 0$ or $x > 5$ (b) $x < -1$ or $x > 4$ (c) $x < 1$ or $x > 4$ (d) no solution
- Number of integral solutions of $|x - 2| + |x + 3| < 7$:

- (a) 3 (b) 4 (c) 5 (d) 6
12. Solve: $|2x - 1| + |x + 3| < 8$
- (a) $(-10/3, 4)$ (b) $(-4, 10/3)$ (c) $(-3, 4)$ (d) $(-4, 3)$
13. Number of integers satisfying $\log_{\frac{1}{2}}(3 + 2x - x^2) \geq -2$:
- (a) 3 (b) 4 (c) 5 (d) 6
14. The number of integer solutions of $|x - 3| < 5$ is:
- (a) 8 (b) 9 (c) 10 (d) 11

SECTION – B

15. Solve : i) $\frac{x^2-4}{x-1} > 0$ ii) $\frac{x^2-x-2}{x^2+x+1} < 0$ iii) $\frac{x-1}{x^2-4} > 0$ iv) $\frac{(x-1)(x+2)}{[(x-3)(x+4)]} \geq 0$
16. Find the number of real solutions of $|x - 2| = x^2 - 4$.
17. Least integer satisfying: $\frac{x-3}{x+1} < -2$.
18. Solve : i) $-4 \leq 2 - 3x \leq 17$ ii) $1 \leq |x - 2| \leq 3$ iii) $\frac{x^2+6x-7}{x^2+1} \leq 2$ iv) $\frac{2x+4}{x-1} \geq 5$
 v) $(x-1)(2-x)(x+2)^2 > 0$ vi) $-12 < 4 - \frac{3x}{-5} \leq 2$
19. Solve the system of inequalities: i) $3x - 7 < 5 + x$ & $11 - 5x \leq 1$ ii) $\frac{2x-1}{3} \geq \frac{3x-2}{4} - \frac{2-x}{5}$
20. Find all pairs of consecutive odd natural numbers, both of which are larger than 10, such that their sum is less than 40.
21. 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 ?
22. The water acidity in a pool is considered normal when the average pH reading of three daily measurements is between 8.2 and 8.5. If the first two pH readings are 8.48 and 8.35, find the range of pH value for the third reading that will result in the acidity level being normal.
23. 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 & third length is to be twice as long as the shortest . what are possible lengths for the shortest board if third piece is to be at least 5 cm longer than the second ?
24. In drilling world's deepest hole it was found that the temperature T in degree celcius, x km below the earth's surface was given by $T = 30 + 25(x - 3)$, $3 \leq x \leq 15$. At what depth will the temperature be between 155°C and 205°C ?

25. A solution of 9% acid is to be diluted by adding 3% acid solution to it. The resulting mixture is to be more than 5% but less than 7% acid. If there is 460 litres of the 9% solution, how many litres of 3% solution will have to be added?
26. Find all pairs of consecutive even positive integers, both of which are larger than 5 such that their sum is less than 23.
27. 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.



Tarun Classes of Mathematics

IIT-JEE Mains | CBSE | PU-CET | NDA

CLASS 11 – CBSE | MATHEMATICS LINEAR INEQUALITIES-ANSWER KEY

SECTION – A

1. (a) 6
2. (a) $(-2, 0) \cup (2, 4)$
3. (a) $(-\infty, 1) \cup (3, 5)$
4. (d) $x \neq 0, (-\infty, -3) \cup (2, \infty)$
5. (d) $(-\infty, 4]$
6. (a) $(-\infty, -1) \cup (1, 2) \cup (2, \infty)$
7. (d) 2
8. (a) $[-3/2, 4)$
9. (a) $(-2, 2)$
10. (a) $x < 0$ or $x > 5$
11. (d) 6
12. (a) $(-10/3, 4)$
13. (a) 3
14. (c) 10

SECTION – B

15. i) $(-2, 1) \cup (2, \infty)$ ii) $(-1, 2)$
16. 2 ($x = 2, x = -3$)
17. 0 (since solution set is $(-1, 1/3)$)
18. i) $[-5, 2]$ ii) $[-1, 1] \cup [3, 5]$ iii) $x \in \mathbb{R}$ (always true) iv) $(1, 3]$ v) $(1, 2)$ vi) $(-80/3, -10/3]$
19. i) $[2, 6)$ ii) $(-\infty, 2]$
20. $(11, 13), (13, 15), (15, 17), (17, 19)$
21. More than 562.5 L and less than 900 L of water
22. $7.77 < (\text{PH}_3) < 8.67$
23. $8 \text{ cm} \leq \text{shortest length} \leq 22 \text{ cm}$
24. Between 8 km and 10 km
25. More than 230 L and less than 920 L of 3% solution

26. (6, 8), (8, 10), (10, 12)

27. $9.6 \leq MA \leq 16.8$ years

