



Attempt all questions before checking the answer key. Solve over $\mathbb{R}$ unless an integer or natural-number domain is specified. Show answers on number lines.

A. Very short answers - 1 mark each

1. Solve $3x - 5 > 7$.
2. Solve $-2x \geq 8$ and explain the reversal of sign.
3. Express $-3 \leq x < 4$ in interval notation.
4. Is $x = 2$ a solution of $5x - 1 < 8$? Justify.

B. Short answers / practice - 2 marks each

5. Solve $2(x - 3) \leq 3(x + 1)$.
6. Solve $(x - 1)/3 > (x + 2)/4$.
7. Solve $2 < 3x - 1 \leq 11$.
8. Find all integers x satisfying $-5 < 2x + 1 \leq 9$.
9. Solve $5x + 2 \leq 17$.
10. Solve $7 - 3x < 1$.
11. Solve $-2 \leq x + 1 \leq 5$.
12. Find natural numbers satisfying $2x < 9$.
13. Solve $x/2 + x/3 \geq 5$.
14. Solve $4(x - 1) > 2x + 6$.
15. Solve $x > 2$ and $x < 1$ simultaneously.
16. Solve $-1 \leq 2x - 3 < 7$.
17. A pen costs ₹12. How many can be bought for at most ₹100?
18. Solve $3 - x \geq 2x + 9$.
19. Is it valid to square both sides of any inequality without checking signs?
20. Find integers satisfying $0 \leq 3x + 2 \leq 11$.
21. A triangle has sides 5, 7, x . State possible x .
22. Solve $(x + 2)/4 \leq (x - 1)/3$.

C. Short answers - 3 marks each

23. Solve $(2x - 1)/3 \geq (3x - 2)/4 - (2 - x)/5$ and represent the result.

24. Solve simultaneously $3x + 2 > 8$ and $5 - 2x \geq -3$.
25. A student scored 68 and 74 in two tests. Find the minimum integer score in a third test for an average of at least 75.
26. A taxi charges ₹50 plus ₹18 per kilometre. With ₹320 available, find the maximum distance affordable and state the meaningful domain.

D. Long answers - 5 marks each

27. Solve the system $(x - 2)/3 < (2x + 1)/5$ and $4x - 7 \leq 9$. Show both separate solution sets and their intersection, then list all integer solutions.
28. A rectangular garden has width x m and length $(x + 5)$ m. Its perimeter must be at least 30 m and at most 50 m. Find all possible positive widths and corresponding length range.
29. A shop buys notebooks for ₹35 each, sells them for ₹50 each and pays ₹600 fixed transport cost. Find the least number required for a profit of at least ₹900; formulate and solve the inequality.
30. A 40 L mixture contains 20% acid. Pure acid is added to make concentration at least 30% but no more than 40%. Form the inequalities, solve for the added volume and interpret both endpoints.

ANSWER KEY - Numerical / short answers

- 1) $x > 4$. 2) $x \leq -4$. 3) $[-3, 4)$. 4) No; $9 < 8$ is false. 5) $x \geq -9$. 6) $x > 10$. 7) $1 < x \leq 4$. 8) $-2, -1, 0, 1, 2, 3, 4$. 9) $x \leq 3$. 10) $x > 2$. 11) $-3 \leq x \leq 4$. 12) 1, 2, 3, 4. 13) $x \geq 6$. 14) $x > 5$. 15) No solution. 16) $1 \leq x < 5$. 17) At most 8. 18) $x \leq -2$. 19) No; order need not be preserved for negative values. 20) 0, 1, 2, 3. 21) $2 < x < 12$. 22) $x \geq 10$. 23) $x \leq 34/17 = 2$. 24) $2 < x \leq 4$. 25) 83. 26) 15 km; $0 \leq d \leq 15$. 27) $-13 < x \leq 4$; integers -12 through 4. 28) $5 \leq x \leq 10$; length 10 to 15 m. 29) 100 notebooks. 30) $40/7 \leq \text{added acid} \leq 40/3$ L.