

Solving Compound Inequalities

Name: _____ Date: _____ Score: _____ / 37

Q Quick Review

A **compound inequality** joins two simple inequalities with the word *and* (intersection) or *or* (union). An **AND** compound $a < x < b$ asks for values that satisfy *both* pieces — the solution is the overlap on the number line, an interval. An **OR** compound $x < a$ or $x > b$ asks for values that satisfy *either* piece — the solution is the union, often two rays heading in opposite directions. To solve $a < 2x + 1 < 7$ (an AND in compact form), do every operation to all three parts at once: subtract 1, then divide by 2. Keep the chain valid by aiming the inequalities all the same way (and remember to flip both symbols if you divide by a negative). On the number line: open dots for strict $<$ or $>$, closed dots for \leq or \geq ; intersect for AND, union for OR. Watch out: $x < 2$ AND $x > 5$ has no solution (the two pieces don't overlap), while $x < 5$ OR $x > 2$ covers everything.

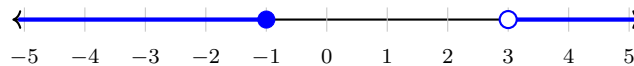
PRACTICE

Solve. Write the solution in interval notation or graph as directed.

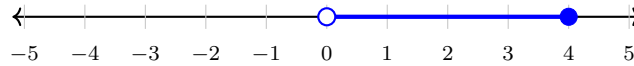
1. $-3 < 2x + 1 \leq 9$ _____
2. $x < -1$ or $x \geq 3$ _____
3. $5 \leq 3x - 4 < 14$ _____
4. $2x + 3 > 7$ and $x - 1 < 5$ _____
5. $x + 2 < 1$ or $3x \geq 12$ _____
6. $-1 \leq \frac{x - 3}{2} < 4$ _____
7. $4x - 1 \geq 7$ and $2x + 5 \leq 11$ _____
8. $x - 2 > 4$ or $x + 1 \leq -3$ _____
9. $-2 < 1 - x \leq 5$ _____
10. $3x + 1 > 10$ and $5 - x > 0$ _____
11. $x \geq 2$ and $x < 2$ _____
12. $x < 5$ or $x \geq 1$ _____
13. Graph $-3 \leq x < 2$ on the number line below. _____



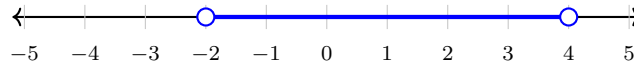
14. Graph $x \leq -1$ or $x > 3$. _____



15. Graph $0 < x \leq 4$. _____



16. Graph the solution of $|x - 1| < 3$ (i.e. $-2 < x < 4$). _____



17. Interval for $-5 \leq 2x - 1 \leq 7$ _____

18. Interval for $x \geq -3$ and $x < 5$. _____

19. Interval for $x < 0$ or $x > 4$. _____

20. $3 - 2x > 5$ or $2x + 1 \geq 9$ _____

◆ Word Problems

21. To ride a roller coaster, you must be at least 48 inches tall but no more than 80 inches. Write a compound inequality for the allowed heights h , and give the interval. _____

22. A drug's effective body temperature range is greater than 96°F and less than 102°F . Write the compound inequality for T and the interval notation. _____

23. A car's safe operating temperature range outside an acceptable engine range is $T < 32^\circ\text{F}$ or $T > 220^\circ\text{F}$. Write the solution in interval notation. _____

24. A landscaper budgets between \$200 and \$500 (inclusive) on plants. If each plant costs \$15, how many plants p can be bought? _____

Additional Practice

25. Solve $3x - 7 \leq 11$. _____

26. Solve $-2x + 5 > 13$. _____

27. Solve $4(x - 3) \geq 2x + 6$. _____

28. Solve $-5 \leq 2x + 1 < 9$. _____

29. Write the boundary line for $y < -3x + 4$. _____

30. For $y \geq 2x - 5$, is the boundary solid or dashed? _____

31. For $y < -x + 6$, shade above or below the line? _____

32. Test $(0, 0)$ in $y > 4x - 3$. _____

33. Solve $7 - 3x \leq -8$. _____

34. Solve $2x + 5 > 1$ and $x - 4 \leq 3$. _____

35. Graph $x \leq -2$: vertical or horizontal boundary? _____



36. Graph $y > 5$: vertical or horizontal boundary? _____

37. Is $(-1, 4)$ a solution of $y \leq -2x + 1$? _____



Answer Keys

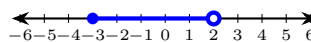
<ol style="list-style-type: none"> 1. $-2 < x \leq 4$ 2. $(-\infty, -1) \cup [3, \infty)$ 3. $3 \leq x < 6$ 4. $2 < x < 6$ 5. $x < -1$ or $x \geq 4$ 6. $1 \leq x < 11$ 7. $2 \leq x \leq 3$ 8. $x > 6$ or $x \leq -4$ 9. $-4 \leq x < 3$ 10. $3 < x < 5$ 11. \emptyset 12. \mathbb{R} <p>Additional Practice Answers</p> <ol style="list-style-type: none"> 25. $x \leq 6$ 26. $x < -4$ 27. $x \geq 9$ 28. $-3 \leq x < 4$ 29. $y = -3x + 4$ 30. solid 31. below 	<ol style="list-style-type: none"> 13. $[-3, 2)$ 14. $(-\infty, -1] \cup (3, \infty)$ 15. $(0, 4]$ 16. $(-2, 4)$ 17. $[-2, 4]$ 18. $[-3, 5)$ 19. $(-\infty, 0) \cup (4, \infty)$ 20. $x < -1$ or $x \geq 4$ 21. $48 \leq h \leq 80$; $[48, 80]$ 22. $96 < T < 102$; $(96, 102)$ 23. $(-\infty, 32) \cup (220, \infty)$ 24. $14 \leq p \leq 33$ <ol style="list-style-type: none"> 32. true 33. $x \geq 5$ 34. $-2 < x \leq 7$ 35. vertical 36. horizontal 37. no
--	---

Additional Practice: Answers for all numbered items, including the added practice, are shown in the grid above.

Step-by-Step Explanations

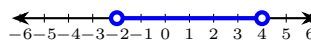
1. Subtract 1 from all three parts: $-4 < 2x \leq 8$. Divide all three by 2: $-2 < x \leq 4$. (Or in interval: $(-2, 4]$.)
2. This is already an OR statement, so just translate to interval notation. $x < -1$ is the ray $(-\infty, -1)$ (open dot, strict), and $x \geq 3$ is $[3, \infty)$ (closed dot). Join them with \cup for the union.
3. One steady path is: Add 4 everywhere: $9 \leq 3x < 18$. Divide by 3: $3 \leq x < 6$. Interval: $[3, 6)$. That gives a quick check on the answer.
4. Start with the key idea: First piece: $2x > 4 \Rightarrow x > 2$. Second: $x < 6$. Overlap: $2 < x < 6$. This is the part to check before moving on, because it keeps the answer tied to the original question.
5. A careful way to see it: First: $x < -1$. Second: $x \geq 4$. Union: $(-\infty, -1) \cup [4, \infty)$. This is the part to check before moving on, because it keeps the answer tied to the original question.
6. Keep the rule visible: Multiply all three by 2: $-2 \leq x - 3 < 8$. Add 3: $1 \leq x < 11$. This is the part to check before moving on, because it keeps the answer tied to the original question.
7. One steady path is: First: $4x \geq 8 \Rightarrow x \geq 2$. Second: $2x \leq 6 \Rightarrow x \leq 3$. Overlap: $2 \leq x \leq 3$. Interval: $[2, 3]$. That gives a quick check on the answer.
8. Start with the key idea: First: $x > 6$. Second: $x \leq -4$. Union: $(-\infty, -4] \cup (6, \infty)$. This is the part to check before moving on, because it keeps the answer tied to the original question.
9. A careful way to see it: Subtract 1: $-3 < -x \leq 4$. Multiply by -1 and flip both: $3 > x \geq -4$, i.e. $-4 \leq x < 3$. That gives a quick check on the answer.
10. Keep the rule visible: First: $3x > 9 \Rightarrow x > 3$. Second: $-x > -5 \Rightarrow x < 5$. Overlap: $3 < x < 5$. This is the part to check before moving on, because it keeps the answer tied to the original question.
11. One steady path is: There's no number both at-or-above 2 and strictly less than 2. Empty set. That gives a quick check on the answer.
12. The two pieces overlap and together leave no gaps: any number below 5 satisfies the first, and anything 1 or larger satisfies the second. Between them they catch every real number, so the union is all of \mathbb{R} .
13. A careful way to see it: Closed dot at -3 (included), open dot at 2 (excluded), shade between them. That gives a quick check on the answer.

Answer graph



14. Keep the rule visible: Closed dot at -1 shading left to $-\infty$; open dot at 3 shading right to $+\infty$. That gives a quick check on the answer.
15. One steady path is: Open dot at 0, closed dot at 4, shade between. This is the part to check before moving on, because it keeps the answer tied to the original question.
16. Start with the key idea: $|x - 1| < 3$ unpacks to $-3 < x - 1 < 3$, i.e. $-2 < x < 4$. Open dots at both ends, shade between. That gives a quick check on the answer.

Answer graph



17. A careful way to see it: Add 1: $-4 \leq 2x \leq 8$. Divide by 2: $-2 \leq x \leq 4$. This is the part to check before moving on, because it keeps the answer tied to the original question.
18. Keep the rule visible: Overlap is the included -3 up to (but not including) 5. That gives a quick check on the answer.
19. One steady path is: Two open rays. This is the part to check before moving on, because it keeps the answer tied to the original question.
20. Start with the key idea: First: $-2x > 2 \Rightarrow x < -1$. Second: $2x \geq 8 \Rightarrow x \geq 4$. Union: $(-\infty, -1) \cup [4, \infty)$. That gives a quick check on the answer.
21. At least 48 means $h \geq 48$; no more than 80 means $h \leq 80$. Combine: $48 \leq h \leq 80$. Interval $[48, 80]$.
22. Keep the rule visible: Strict on both sides $\Rightarrow 96 < T < 102$. Interval: $(96, 102)$ with open parentheses. That gives a quick check on the answer.
23. OR compound \Rightarrow union of two open rays. Both sides are strict, so both endpoints are excluded.
24. Start with the key idea: $200 \leq 15p \leq 500$. Divide all three by 15: $13.33... \leq p \leq 33.33...$. Since p must be a whole number, $14 \leq p \leq 33$. That gives a quick check on the answer.



Build Algebra Confidence From Pre-Algebra Through Algebra II



The Complete Algebra Success Bundle

Pre-Algebra, Algebra I, and Algebra II in one clear path

Friendly lessons, focused practice, and full-review support for every stage.



Scan for the Bundle

6 Books
3 Courses
1 Path

Bundle Value: Six coordinated books help students review missing skills, learn new algebra topics, and practice until the steps feel natural.

Complete Course Path

- ✓ Starts with Pre-Algebra foundations
- ✓ Moves smoothly into Algebra I skills
- ✓ Extends learning through Algebra II topics
- ✓ Great for review, tutoring, and summer study

One bundle, one steady path.

Step-by-Step Lessons

- ✓ Plain-English explanations students can follow
- ✓ Worked examples that show every important step
- ✓ Common mistakes called out before they stick
- ✓ Skill-building practice after each lesson
- ✓ Helpful for independent study or class support

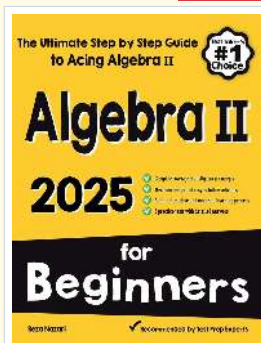
Less guessing. More understanding.

Practice That Sticks

- ✓ Matching practice workbooks for extra repetition
- ✓ Review sets to keep older skills fresh
- ✓ Answer explanations for checking thinking
- ✓ Strong support before tests and final exams
- ✓ Designed to build fluency and confidence

Practice today. Remember tomorrow.

STUDENT FAVORITE • Master Algebra II From the Ground Up



- ✓ 100% Guaranteed
- ✓ Lifetime Support
- ✓ Trusted by Teachers

Start Your Algebra Journey Today! →

Algebra II for Beginners

Written by a top math teacher & aligned with national and state Algebra II courses. From polynomial functions to logarithms, trigonometry, and rational expressions — explained the easy way.

- ✓ **Complete coverage** of every Algebra II concept — perfect companion to these worksheets
- ✓ **Step-by-step explanations** with worked examples on every topic
- ✓ **QR codes in every chapter** for free video lessons & bonus practice
- ✓ **2 full-length practice tests** with detailed answer keys

★ STUDENT'S #1 CHOICE ★

Teacher-recommended • 12,000+ Happy Students

PDF EDITION



Instant download • any device

PAPERBACK



Paperback on Amazon

Hold it in your hands

Pair these free worksheets with *Algebra II for Beginners* and you have a complete self-paced course — concept lessons, daily practice, and full exam-style reviews, all in one path. → EffortlessMath.com/product/algebra-ii-for-beginners