

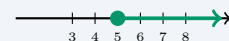
One-Step Inequalities

Name: _____ Date: _____ Score: _____ / 18

Quick Review and Helpful Hints

Solve a one-step inequality just like an equation, using inverse operations on both sides – with one special rule: if you multiply or divide both sides by a *negative* number, you must *flip* the inequality sign. The answer is a range of values.

▶ **Example:** Solve $x + 4 > 9$. **Work:** Undo the +4 by subtracting 4 from both sides: $x + 4 - 4 > 9 - 4$. No negative multiplying or dividing, so the sign stays the same. ★ **Answer:** $x > 5$



$x > 5$: open circle, shade right.

Practice Problems

Solve each inequality.

- | | | | |
|-------------------------|-------|----------------------|-------|
| 1. $x + 3 > 7$ | _____ | 8. $-2x < 8$ | _____ |
| 2. $x - 2 < 5$ | _____ | 9. $\frac{x}{3} > 2$ | _____ |
| 3. $4x \geq 12$ | _____ | 10. $5x \leq -15$ | _____ |
| 4. $\frac{x}{2} \leq 4$ | _____ | 11. $x + 7 < 7$ | _____ |
| 5. $x + 5 \leq 2$ | _____ | 12. $-x > 3$ | _____ |
| 6. $3x > 9$ | _____ | 13. $2x \geq -8$ | _____ |
| 7. $x - 6 \geq -1$ | _____ | 14. $x - 4 > -4$ | _____ |

Word Problems

15. A number increased by 5 is at most 12. Write and solve an inequality for the number. _____
16. Twice a number is less than 10. Write and solve an inequality. _____
17. Three less than a number is at least 4. Write and solve an inequality. _____
18. Half of a number is greater than 6. Write and solve an inequality. _____



Answer Keys

- | | | |
|----------------|-----------------|-----------------|
| 1. $x > 4$ | 7. $x \geq 5$ | 13. $x \geq -4$ |
| 2. $x < 7$ | 8. $x > -4$ | 14. $x > 0$ |
| 3. $x \geq 3$ | 9. $x > 6$ | 15. $x \leq 7$ |
| 4. $x \leq 8$ | 10. $x \leq -3$ | 16. $x < 5$ |
| 5. $x \leq -3$ | 11. $x < 0$ | 17. $x \geq 7$ |
| 6. $x > 3$ | 12. $x < -3$ | 18. $x > 12$ |

Step-by-Step Explanations

1. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Undo the $+3$ by subtracting 3 from both sides: $x > 7 - 3$, so $x > 4$. There is no negative dividing, so the sign stays. So the final answer is $x > 4$.
2. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Add 2 to both sides: $x < 5 + 2$, so $x < 7$. So the final answer is $x < 7$.
3. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Divide both sides by 4 (a positive number, so the sign stays): $x \geq 12 \div 4 = 3$. So the final answer is $x \geq 3$.
4. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Multiply both sides by 2: $x \leq 4 \times 2 = 8$. So the final answer is $x \leq 8$.
5. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Subtract 5 from both sides: $x \leq 2 - 5 = -3$. So the final answer is $x \leq -3$.
6. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Divide both sides by 3: $x > 9 \div 3 = 3$. So the final answer is $x > 3$.
7. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Add 6 to both sides: $x \geq -1 + 6 = 5$. So the final answer is $x \geq 5$.
8. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Divide both sides by -2 . Dividing by a negative *flips* the inequality: $x > 8 \div (-2) = -4$, so $x > -4$. So the final answer is $x > -4$.
9. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Multiply both sides by 3: $x > 2 \times 3 = 6$. So the final answer is $x > 6$.

10. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Divide both sides by 5: $x \leq -15 \div 5 = -3$. So the final answer is $x \leq -3$.
11. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Subtract 7 from both sides: $x < 7 - 7 = 0$. So the final answer is $x < 0$.
12. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Divide both sides by -1 and flip the sign: $x < -3$. So the final answer is $x < -3$.
13. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Divide both sides by 2: $x \geq -8 \div 2 = -4$. So the final answer is $x \geq -4$.
14. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Add 4 to both sides: $x > -4 + 4 = 0$. So the final answer is $x > 0$.
15. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Let x be the number. "Increased by 5 is at most 12" means $x + 5 \leq 12$. Subtract 5: $x \leq 7$. So the final answer is $x \leq 7$.
16. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is "Twice a number is less than 10" means $2x < 10$. Divide by 2: $x < 5$. So the final answer is $x < 5$.
17. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is "Three less than a number is at least 4" means $x - 3 \geq 4$. Add 3: $x \geq 7$. So the final answer is $x \geq 7$.
18. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is "Half a number is greater than 6" means $\frac{x}{2} > 6$. Multiply by 2: $x > 12$. So the final answer is $x > 12$.



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