

# 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.

- |   |   |
|---|---|
| <p>1. <math>x + 3 &gt; 7</math> _____</p> <p>2. <math>x - 2 &lt; 5</math> _____</p> <p>3. <math>4x \geq 12</math> _____</p> <p>4. <math>\frac{x}{2} \leq 4</math> _____</p> <p>5. <math>x + 5 \leq 2</math> _____</p> <p>6. <math>3x &gt; 9</math> _____</p> <p>7. <math>x - 6 \geq -1</math> _____</p> | <p>8. <math>-2x &lt; 8</math> _____</p> <p>9. <math>\frac{x}{3} &gt; 2</math> _____</p> <p>10. <math>5x \leq -15</math> _____</p> <p>11. <math>x + 7 &lt; 7</math> _____</p> <p>12. <math>-x &gt; 3</math> _____</p> <p>13. <math>2x \geq -8</math> _____</p> <p>14. <math>x - 4 &gt; -4</math> _____</p> |
|---|---|

### ◆ 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.  $x > 4$

2.  $x < 7$

3.  $x \geq 3$

4.  $x \leq 8$

5.  $x \leq -3$

6.  $x > 3$

7.  $x \geq 5$

8.  $x > -4$

9.  $x > 6$

10.  $x \leq -3$

11.  $x < 0$

12.  $x < -3$

13.  $x \geq -4$

14.  $x > 0$

15.  $x \leq 7$

16.  $x < 5$

17.  $x \geq 7$

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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