

# One-Step Equations

Name: \_\_\_\_\_

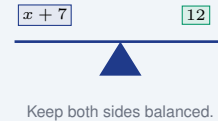
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## Quick Review and Helpful Hints

To solve a one-step equation, undo the operation attached to the variable using its *inverse*: add to undo subtraction, subtract to undo addition, multiply to undo division, divide to undo multiplication. Whatever you do to one side, do to the *other* side to keep the equation balanced.

▷ **Example:** Solve  $x + 7 = 12$ . **Work:** The 7 is added to  $x$ , so undo it by subtracting 7 from both sides:  $x + 7 - 7 = 12 - 7$ . ★ **Answer:**  $x = 5$



## ◆ Practice Problems

Solve each equation for the variable.

1.  $x + 5 = 9$

\_\_\_\_\_

2.  $x - 3 = 8$

\_\_\_\_\_

3.  $4x = 20$

\_\_\_\_\_

4.  $\frac{x}{2} = 6$

\_\_\_\_\_

5.  $x + 10 = 4$

\_\_\_\_\_

6.  $3x = 18$

\_\_\_\_\_

7.  $x - 7 = -2$

\_\_\_\_\_

8.  $\frac{x}{5} = 3$

\_\_\_\_\_

9.  $6x = -24$

\_\_\_\_\_

10.  $x + 2 = 2$

\_\_\_\_\_

11.  $x - 9 = 0$

\_\_\_\_\_

12.  $7x = 49$

\_\_\_\_\_

13.  $\frac{x}{3} = -4$

\_\_\_\_\_

14.  $2x = -10$

\_\_\_\_\_

## ◆ Word Problems

15. After spending \$8, you have \$15 left. How much did you start with?

\_\_\_\_\_

16. Five equal boxes weigh 35 pounds in all. How much does each box weigh?

\_\_\_\_\_

17. A number tripled equals 21. What is the number?

\_\_\_\_\_

18. After adding 6 to a number, the result is 2. What is the number?

\_\_\_\_\_



## Answer Keys

- |             |             |               |
|-------------|-------------|---------------|
| 1. $x = 4$  | 7. $x = 5$  | 13. $x = -12$ |
| 2. $x = 11$ | 8. $x = 15$ | 14. $x = -5$  |
| 3. $x = 5$  | 9. $x = -4$ | 15. \$23      |
| 4. $x = 12$ | 10. $x = 0$ | 16. 7 lb      |
| 5. $x = -6$ | 11. $x = 9$ | 17. 7         |
| 6. $x = 6$  | 12. $x = 7$ | 18. -4        |

### 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 The 5 is added to  $x$ , so undo it by subtracting 5 from both sides:  $x + 5 = 9$ .  $x + 5 - 5 = 9 - 5$ . 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 The 3 is subtracted, so undo it by adding 3 to both sides:  $x - 3 = 8$ .  $x - 3 + 3 = 8 + 3$ . So the final answer is  $x = 11$ .

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  $x$  is multiplied by 4, so divide both sides by 4:  $4x = 20$ .  $4x \div 4 = 20 \div 4$ . So the final answer is  $x = 5$ .

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  $x$  is divided by 2, so multiply both sides by 2:  $x \div 2 = 6$ .  $x \div 2 \times 2 = 6 \times 2$ . So the final answer is  $x = 12$ .

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 10 from both sides:  $x - 10 = 4$ .  $x - 10 + 10 = 4 + 10$ . So the final answer is  $x = 14$ .

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:  $3x = 18$ .  $3x \div 3 = 18 \div 3$ . So the final answer is  $x = 6$ .

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 7 to both sides:  $x + 7 = -2$ .  $x + 7 - 7 = -2 - 7$ . So the final answer is  $x = -9$ .

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 Multiply both sides by 5:  $x \times 5 = 3$ .  $x \times 5 \div 5 = 3 \div 5$ . So the final answer is  $x = \frac{3}{5}$ .

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 Divide both sides by 6:  $6x = -24$ .  $6x \div 6 = -24 \div 6$ . So the final answer is  $x = -4$ .

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 Subtract 2 from both sides:  $x - 2 = 2$ .  $x - 2 + 2 = 2 + 2$ . So the final answer is  $x = 4$ .

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 Add 9 to both sides:  $x + 9 = 0$ .  $x + 9 - 9 = 0 - 9$ . So the final answer is  $x = -9$ .

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 7:  $7x = 49$ .  $7x \div 7 = 49 \div 7$ . So the final answer is  $x = 7$ .

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 Multiply both sides by 3:  $x \times 3 = -4$ .  $x \times 3 \div 3 = -4 \div 3$ . So the final answer is  $x = -\frac{4}{3}$ .

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 Divide both sides by 2:  $x \div 2 = -10$ .  $x \div 2 \times 2 = -10 \times 2$ . So the final answer is  $x = -20$ .

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 starting amount. Spending \$8 leaves \$15:  $x - 8 = 15$ . Add 8:  $x = 23$ . So the final answer is \$23.

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 Five equal boxes weigh 35:  $5x = 35$ . Divide by 5:  $x = 7$  lb each. So the final answer is 7 lb.

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 Tripled means  $3x = 21$ . Divide by 3:  $x = 7$ . So the final answer is 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 Adding 6 gives 2:  $x + 6 = 2$ . Subtract 6:  $x = -4$ . So the final answer is -4.



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