

One-Step Equations

Name: _____

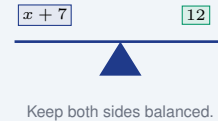
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Quick Review and Helpful Hints

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: $5x = 3$. $5x \div 5 = 3 \div 5$. 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: $3x = -4$. $3x \div 3 = -4 \div 3$. 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: $2x = -10$. $2x \div 2 = -10 \div 2$. So the final answer is $x = -5$.

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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