

# Solving One-Step Equations

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

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## Q Quick Review

To solve a one-step equation, do the **opposite** of whatever's happening to the variable, and do it to *both sides*. If something's being added, subtract it. If it's being subtracted, add. If it's being multiplied, divide. If it's being divided, multiply. That's the whole game. The technical name is the **Properties of Equality** — as long as you do the same thing to both sides of the equals sign, the equation stays balanced. After you find your answer, **check it**: substitute the value back into the original equation. If both sides come out the same, you nailed it.

## PRACTICE

Solve each equation.

1.  $x + 5 = 12$  \_\_\_\_\_

2.  $n - 3 = 10$  \_\_\_\_\_

3.  $y + 9 = -2$  \_\_\_\_\_

4.  $a - 7 = -1$  \_\_\_\_\_

5.  $3x = 21$  \_\_\_\_\_

6.  $-5m = 35$  \_\_\_\_\_

7.  $\frac{x}{4} = 6$  \_\_\_\_\_

8.  $\frac{n}{-3} = 9$  \_\_\_\_\_

9.  $8p = -56$  \_\_\_\_\_

10.  $x + 2.5 = 7$  \_\_\_\_\_

11.  $\frac{y}{5} = -4$  \_\_\_\_\_

12.  $w - 1.8 = 3.2$  \_\_\_\_\_

13.  $-12 + x = 4$  \_\_\_\_\_

14.  $-y = 15$  \_\_\_\_\_

15.  $\frac{3}{4}x = 12$  \_\_\_\_\_

16.  $x - \frac{1}{2} = \frac{3}{4}$  \_\_\_\_\_

17.  $-7 = k + 3$  \_\_\_\_\_

18.  $\frac{n}{2} = -9$  \_\_\_\_\_

19.  $6 = \frac{x}{-4}$  \_\_\_\_\_

20.  $0.2x = 3$  \_\_\_\_\_

## ◆ Word Problems

21. Liam had some money in his wallet. After spending \$12 on lunch, he has \$23 left. Write and solve an equation to find how much he started with.

\_\_\_\_\_

22. A recipe needs 5 equal cups of flour, totaling 20 ounces. How many ounces are in each cup?

\_\_\_\_\_

23. A pizza costs the same as 4 ice cream cones. If a pizza costs \$18, how much does each ice cream cone cost?

\_\_\_\_\_

24. Sara's age plus 14 equals her uncle's age. If her uncle is 43, how old is Sara?

\_\_\_\_\_



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## Answer Keys

- |               |                        |
|---------------|------------------------|
| 1. $x = 7$    | 13. $x = 16$           |
| 2. $n = 13$   | 14. $y = -15$          |
| 3. $y = -11$  | 15. $x = 16$           |
| 4. $a = 6$    | 16. $x = \frac{5}{4}$  |
| 5. $x = 7$    | 17. $k = -10$          |
| 6. $m = -7$   | 18. $n = -18$          |
| 7. $x = 24$   | 19. $x = -24$          |
| 8. $n = -27$  | 20. $x = 15$           |
| 9. $p = -7$   | 21. $x = \$35$         |
| 10. $x = 4.5$ | 22. $c = 4 \text{ OZ}$ |
| 11. $y = -20$ | 23. $c = \$4.50$       |
| 12. $w = 5$   | 24. $s = 29$           |

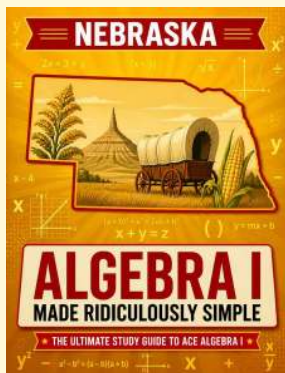
### Step-by-Step Tutor Notes

1. Move carefully through the arithmetic; one clean operation usually unlocks the next one. 5 is added to  $x$ . Subtract 5 from both sides:  $x = 12 - 5 = 7$ . After simplifying, the answer is  $x = 7$ .
2. Keep the order of operations in view, then simplify without skipping the sign check. 3 is subtracted, so add 3 to both sides:  $n = 10 + 3 = 13$ . After simplifying, the answer is  $n = 13$ .
3. Subtract 9 from both sides:  $y = -2 - 9 = -11$ . (Subtracting a positive from a negative pushes you further negative.)
4. Keep the order of operations in view, then simplify without skipping the sign check. Add 7 to both sides:  $a = -1 + 7 = 6$ . After simplifying, the answer is  $a = 6$ .
5. Keep the order of operations in view, then simplify without skipping the sign check.  $x$  is being multiplied by 3. Divide both sides by 3:  $x = 21 \div 3 = 7$ . After simplifying, the answer is  $x = 7$ .
6. Divide both sides by  $-5$ :  $m = 35 \div (-5) = -7$ . Dividing a positive by a negative gives a negative.
7.  $x$  is being divided by 4. Do the opposite — multiply both sides by 4:  $x = 6 \cdot 4 = 24$ .
8. Move carefully through the arithmetic; one clean operation usually unlocks the next one. Multiply both sides by  $-3$ :  $n = 9 \cdot (-3) = -27$ . After simplifying, the answer is  $n = -27$ .
9. Work one inverse operation at a time and keep both sides balanced. Divide both sides by 8:  $p = -56 \div 8 = -7$ . After simplifying, the answer is  $p = -7$ .
10. Subtract 2.5 from both sides:  $x = 7 - 2.5 = 4.5$ . Decimals follow the same rules as whole numbers.
11. Keep the order of operations in view, then simplify without skipping the sign check. Multiply both sides by 5:  $y = -4 \cdot 5 = -20$ . After simplifying, the answer is  $y = -20$ .
12. Add 1.8 to both sides:  $w = 3.2 + 1.8 = 5$ . Notice the decimal answer came out clean — that's a good sanity-check signal.
13.  $-12$  is added (or 12 subtracted, same thing). Add 12 to both sides:  $x = 4 + 12 = 16$ .
14. Move carefully through the arithmetic; one clean operation usually unlocks the next one.  $-y$  means  $-1 \cdot y$ . Divide both sides by  $-1$  (or just flip signs):  $y = -15$ . After simplifying, the answer is  $y = -15$ .
15. Multiply both sides by the reciprocal  $\frac{4}{3}$ :  $x = 12 \cdot \frac{4}{3} = 16$ . (Multiplying by a reciprocal is the slick way to undo a fractional coefficient.)
16. Add  $\frac{1}{2}$  to both sides. Find a common denominator:  $x = \frac{3}{4} + \frac{2}{4} = \frac{5}{4}$ .
17. Variable's on the right — doesn't matter, same rule. Subtract 3 from both sides:  $-7 - 3 = k$ , so  $k = -10$ .
18. Keep the order of operations in view, then simplify without skipping the sign check. Multiply both sides by 2:  $n = -9 \cdot 2 = -18$ . After simplifying, the answer is  $n = -18$ .
19. Keep the order of operations in view, then simplify without skipping the sign check. Multiply both sides by  $-4$ :  $x = 6 \cdot (-4) = -24$ . After simplifying, the answer is  $x = -24$ .
20. Divide both sides by 0.2:  $x = 3 \div 0.2 = 15$ . (Dividing by 0.2 is the same as multiplying by 5, which is sometimes easier mental math.)
21. Let  $x$  be what he started with. "After spending \$12" means we subtract:  $x - 12 = 23$ . Add 12 to both sides:  $x = 23 + 12 = 35$ . Liam started with \$35.
22. Let  $c$  be ounces per cup. Five cups times  $c$  ounces each gives the total:  $5c = 20$ . Divide both sides by 5:  $c = 4$  ounces per cup.
23. Let  $c$  be the cost of one cone. Four cones equal one pizza:  $4c = 18$ . Divide both sides by 4:  $c = 4.50$  dollars.
24. Let  $s$  be Sara's age. The equation is  $s + 14 = 43$ . Subtract 14 from both sides:  $s = 43 - 14 = 29$ . Sara is 29 years old.



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