

Solve Addition and Subtraction Equations

Objective Solve addition and subtraction equations.

Learn About It

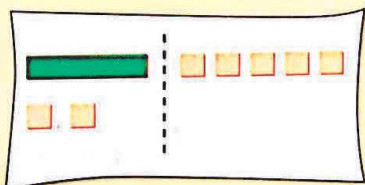
Inverse operations are operations that undo each other. Addition and subtraction are examples of inverse operations. To solve some equations, you can use inverse operations to isolate the variable on one side of the equals sign.

Try this activity to solve an addition equation by using inverse operations.

Materials: algebra tiles (Learning Tool 38), workmat

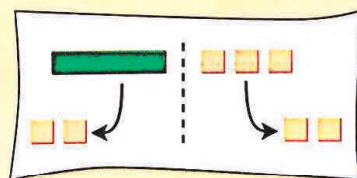
Solve the equation $x + 2 = 5$ for x .

STEP 1 Model the equation with algebra tiles.



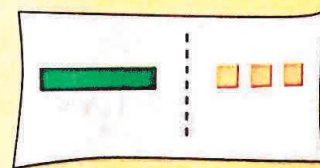
$$x + 2 = 5$$

STEP 2 Subtract two 1-tiles from each side.



$$x + 2 - 2 = 5 - 2$$

STEP 3 The solution to the equation is 3.



$$x = 3$$

▶ When you add or subtract the same number to each side of an equation, you are using a property of equality.

The Addition and Subtraction Properties of Equality

Adding or subtracting the same number from both sides of an equation results in a new equation, having the same solutions as the original.

Use properties to solve the equation $t - 5 + 2 = 11$.

STEP 1 Simplify each side of the equation.

$$\begin{aligned} t - 5 + 2 &= 11 \\ t - 3 &= 11 \end{aligned}$$

STEP 2 Use the Addition Property of Equality. Add 3 to both sides.

$$t - 3 + 3 = 11 + 3$$

STEP 3 Isolate the variable. Solve for t .

$$\begin{aligned} t &= 11 + 3 \\ t &= 14 \end{aligned}$$

Solution: 14 is a solution to the equation.

Guided Practice

Solve. State the inverse operation you used.

1. $4.56 + n = 184.72$

2. $p + 5 - 4 = 23$

3. $s - 8 = 18$

4. $y + 6 - 12 = 38$

Ask Yourself

- Did I use inverse operations to isolate the variable?
- Did I perform the same operation on both sides of the equals sign?

Explain Your Thinking ► How can you check the solution to an equation?

Practice and Problem Solving

Solve. State the inverse operation you used. Check your work.

5. $y + 5 = 14$

6. $a - 8 = 12$

7. $s + 98 - 27 = 138$

8. $c + 45.6 - 38.25 = 112.76$

9. $12 + d = 45$

10. $3 + f - 17 = 43$

11. $t + 23 - 36 + 23 = 59$

12. $j + 38 = 4 + 5 \times 3$

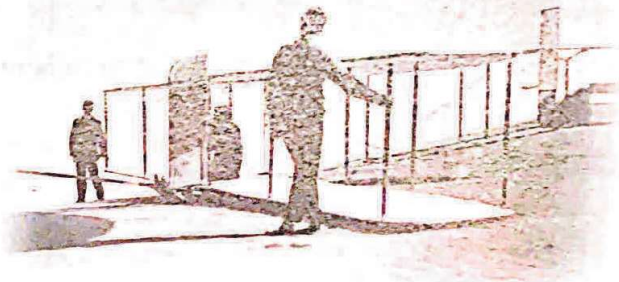
13. $55 - 56 = h - 47$

Solve.

14. In his first flight, Orville Wright flew 120 feet. His brother Wilbur Wright went on to fly a distance that was 732 feet farther. How far did Wilbur fly?

15. Wilbur's flight lasted 59 seconds. Orville's flight took 47 seconds less time. How long was Orville's flight?

16. **Reasoning** Ann has decided to make a 55-mile bike trip to Kitty Hawk in 2 days. If Ann can ride 18 miles per day now, how many more miles will she need to be able to ride in one day in order to cover half the trip each day?



The Wright brothers tried several models before their first flight took place at Kitty Hawk, North Carolina, on Thursday, December 17, 1903.

17. **Analyze** Over six trial flights, a model airplane stayed airborne for an average of 26 seconds. For the first five trials, the flight times were 28 seconds, 10 seconds, 52 seconds, 20 seconds, and 26 seconds. What was the sixth time?

Mixed Review and Test Prep

Open Response

If the number is an integer, write its opposite. If it is not, write *no*. (Ch. 11, Lesson 1)

18. $43\frac{1}{2}$

19. -34

20. -90.7

21. 146

Multiple Choice

22. Solve $s + 18 - 11 = 123$ for s .
(Ch. 12, Lesson 3)

A 94

C 130

B 152

D 116

Extra Practice See page 317, set C.

Name _____ Date _____

Solve Addition and Subtraction Equations

Solve. State the inverse operation you used. Check your work.

1. $b - 18 = 24$

2. $m + 29.6 = 50.4$

3. $t + 20 = 56$

4. $q - 8 = 3$

5. $28 = a - 32$

6. $16 = v + 9$

7. $m + 6 = 12 + 15$

8. $k + 9 - 2 = 17$

9. $s + 9 - 12 = 19$

10. $p + 6 + 4 = 47$

11. $f + 19 - 23 = 93 - 15$

12. $k + 15 + 47 = 102 - 22$



Test Prep

13. What is the solution of $x + 29 = 42$?

A $x = 3$

C $x = 23$

B $x = 13$

D $x = 71$

14. Find the solution for $x + 25 = 28 + 42$.
Explain how you found your answer.

Solve Addition and Subtraction Equations

Ask Yourself

- Did I use inverse operations to isolate the variable?
- Did I perform the same operation on both sides of the equals sign?

Solve. State the inverse operation you used. Check your work.

1. $75.9 = n - 12.5$

2. $x + 48 - 37 = 100$

3. $92 + 27 = p - 190$

4. $6 + r = 7.3 + 18.6$

5. $236 = 44 + w$

6. $5 + z = 3 \times 4 \times 8$

7. $250 \div 50 = n - 75$

8. $t - 3.5 = 1.4 + 1.3$

9. $69 + 32 = q + 37 + 5$

Problem Solving

Show Your Work

10. Ben makes \$9.50 per hour at the bookstore. Last week he worked 25 hours, paid \$9.00 in taxes, and then spent \$35 from his paycheck on groceries. How much money did he have left?
