

Chapter 7 Lesson 1: Equations

Equations: A mathematical sentence showing two expressions are equal. $5 + y = 13$

Expressions: A combination of numbers and operations which might contain variables. (DOES NOT HAVE AN EQUAL SIGN) $5 + y - 16$

Solve Addition and Subtraction Equations Mentally

When you replace a variable with a value that results in a true sentence, you **solve** the equation. That value for the variable is the **solution** of the equation.

$$\begin{aligned} 2 + x &= 9 \\ 2 + 7 &= 9 \\ 9 &= 9 \end{aligned}$$

The value for the variable that results in a true sentence is 7. So, 7 is the solution.

This sentence is true.

Is 3, 4, or 5 the solution of the equation $a + 7 = 11$?

| Value of a | $a + 7 \stackrel{?}{=} 11$ | Are Both Sides Equal? |
|--------------|--|-----------------------|
| 3 | $3 + 7 \stackrel{?}{=} 11$ $10 \neq 11$ | no |
| 4 | $4 + 7 \stackrel{?}{=} 11$ $11 = 11$ | yes ✓ |
| 5 | $5 + 7 \stackrel{?}{=} 11$ $12 \neq 11$ | no |

Guess, Check and Revise Strategy

The total cost of a pair of skates and kneepads is \$63. The skates cost \$45. Use the *guess, check, and revise* strategy to solve the equation $45 + k = 63$ to find k , the cost of the kneepads.

Use the *guess, check, and revise* strategy.

Try 14.

$$45 + k = 63$$

$$45 + 14 \stackrel{?}{=} 63$$

$$59 \neq 63$$

Try 16.

$$45 + k = 63$$

$$45 + 16 \stackrel{?}{=} 63$$

$$61 \neq 63$$

Try 18.

$$45 + k = 63$$

$$45 + 18 \stackrel{?}{=} 63$$

$$63 = 63 \quad \checkmark$$

So, the kneepads cost \$18.

Solve Multiplication and Division Equations Mentally

Multiplication and division equations are solved in a similar way to addition and subtraction equations.

Is 3, 4, or 5 the solution of the equation $18 = 6z$?

| Value of z | $18 \stackrel{?}{=} 6z$ | Are Both Sides Equal? |
|--------------|--|-----------------------|
| 3 | $18 \stackrel{?}{=} 6 \cdot 3$ $18 = 18$ | yes ✓ |
| 4 | $18 \stackrel{?}{=} 6 \cdot 4$ $18 \neq 24$ | no |
| 5 | $18 \stackrel{?}{=} 6 \cdot 5$ $18 \neq 30$ | no |

Solve $16 \div s = 8$ mentally.

$16 \div s = 8$ Think 16 divided by what number equals 8?

$16 \div 2 = 8$ You know that $16 \div 2 = 8$.

$8 = 8$

Examples:

5. $m + 4 = 17$

$m = 13$

6. $12 = 24 - y$

$12 = y$

7. $15 - b = 12$

$b = 3$

8. $10t = 90$

$t = 9$

9. $22 \div y = 2$

$y = 11$

10. $54 = 6b$

$9 = b$