

Solving Equations – Quick Reference

Integer Rules

Addition:

- If the signs are the same, add the numbers and keep the sign.
- If the signs are different, subtract the numbers and keep the sign of the number with the largest absolute value.

Subtraction: Add the opposite

Keep—Change—Change

- Keep the first number the same.
- Change the subtraction sign to addition.
- Change the sign of the second number to its opposite sign.

Multiplication and Division:

- If the signs are the same, the answer is positive.
- If the signs are different, the answer is negative.

Golden Rule for Solving Equations:

Whatever You Do To One Side of the Equation, You Must Do to the Other Side!

Combining Like Terms

Like terms are two or more terms that contain the same **variable**.

Example: $3x, 8x, 9x$ are like terms.
 $2y, 9y, 10y$ are like terms.

$3x, 3y$ are **NOT** like terms
↑ ↑ because they do
NOT have the
same variable!

Distributive Property Examples

$$3(x+5) = 3x + 15 \quad \text{Multiply the 3 times } x \text{ and } 5.$$

$$-2(y-5) = -2y + 10 \quad \text{Multiply } -2 \text{ times } y \text{ and } -5.$$

$$5(2x-6) = 10x - 30 \quad \text{Multiply 5 times } 2x \text{ and } -6.$$

Solving Equations Study Guide

1. Does your equation have **fractions**?
Yes—Multiply every term (on both sides) by the denominator.
No—Go to Step 2.
2. Does your equation involve the **distributive property**?
(Do you see parenthesis?)
Yes—Rewrite the equation using the distributive property.
No—Go to Step 3.
3. On either side, do you have **like terms**?
Yes—Rewrite the equation with like terms together. Then combine like terms.
(Don't forget to take the sign in front of each term!)
No—Go to Step 4.
4. Do you have **variables on both sides** of the equation?
Yes—Add or subtract the terms to get all the variables on one side and all the constants on the other side. Then go to step 6.
No—Go to Step 5.
5. At this point, you should have a basic **two-step equation**. If not go back and recheck your steps above.
- Use **Addition or Subtraction** to remove any constants from the variable side of the equation.
(Remember the Golden Rule!)
6. Use **multiplication or division** to remove any coefficients from the variable side of the equation.
(Remember the Golden Rule!)
7. **Check your answer** using substitution!

Congratulations! You are finished the problem!