Solve a Linear Equation with Variables on One Side

A linear equation has a variable whose highest power is 1. Solve it by applying the same operation to both sides, preserving equality. Inverse operations undo addition, subtraction, multiplication, and division. This example isolates x in two steps and verifies the result in the original equation.

FORMULA
General form: $ax + b = c$ ($a \neq 0$); therefore $x = (c - b) \div a$.

WORKED EXAMPLE

Solve $4x - 9 = 19$.

1. Add 9 to both sides

Adding 9 to each side preserves equality and leaves the variable term on the left.

$4x - 9 + 9 = 19 + 9$; therefore $4x = 28$

2. Divide both sides by 4

Since x is multiplied by 4, divide each side by 4 to isolate the variable.

$4x \div 4 = 28 \div 4$; therefore $x = 7$

3. State the solution set

The equation is degree one because the variable has exponent 1.

Solution set: {7}

ANSWER

$x = 7$

Adding 9 and dividing by 4 isolates x without changing the equation balance.

CHECK

Substitute $x = 7$: $4(7) - 9 = 28 - 9 = 19$. Both sides match.