

Linear equations in one variable

A **linear equation in one variable** has the standard form $ax + b = c$, where a is not equal to zero. The variable's highest power (exponent) is one, and it has at most **one solution**.

1

Key vocabulary and definitions

Variable

A letter (like x) representing an unknown number.

Constant

An a fixed number with no variable attached. Example: 5, -3

Coefficient

The number multiplied by a variable
(In $4x$, 4 is the coefficient)

Term

A single number, variable, or product joined by plus or minus.

Like terms

Terms with the exact same variable raised to the same power. ($5x$ and $-2x$)

Solution/root

The value of the variable that makes the equation true.

2

Expression vs Equation

Expression

Expression: A math phrase with numbers, variables and operations.
No equal sign. **Cannot be solved.** $3x + 5$.

Equation

Equations: Two expressions set equal with an **equal sign, can be solved** for the variable. Like $3x + 5 = 20$

3

Properties of equality

Addition/subtraction property

$$a = b$$

$$a + c = b + c$$

Adding or subtracting the same number from both sides keeps the equation balanced.

Multiplication/division property

$$a = b$$

$$a \times c = b \times c$$

Multiplying, dividing both sides by the same non-zero number (**c not equal to zero**) keeps it balanced.

4

Steps to solve a linear equation.

1

Collect all variable terms on one side and all constants on the other before isolating the variable.

2

Clear fractions decimals.
Multiply every term by the LCD or a power of them.

3

Distribute. Remove parentheses. $A(B + C) = AB + AC$

4

Check. Substitute your answer back into the original equation

5

Translating word problems

Phrase	Symbol
sum, more then, increased by, total	+
difference, less than, decreased by, fewer	-
product, times, of twice	$\times$
quotient, per, divide by ratio of	$\div$
equals, result in	=