

# Solving Linear Equations Procedure Summary

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## Steps to solving linear equations

### Are there any brackets?

Expand the brackets by multiplying each term inside the brackets by the number in front of the brackets.

Equation	Explanation
$3(2x + 6) = 5$ $6x + 18 = 5$	To expand the brackets, we multiply $2x$ by 3, and 6 by 3.
$-(3 - x) = 2$ $-3 + x = 2$	This is equivalent to $-1(3 - x)$ . So we multiply 3 by $-1$ , and $-x$ by $-1$ .

### Are there unknowns on both sides of the equation?

Add or subtract the unknown on one side from both sides of the equation.

Equation	Explanation
$3s + 4 = 5s - 2$ $4 = 2s - 2$	Let's move $3s$ to the RHS. $3s$ is positive, so we subtract $3s$ from both sides.
$2x + 3 = -2 - 5x$ $7x + 3 = -2$	Let's move $-5x$ to the LHS. $-5x$ is negative, so we add $5x$ to both sides.

### Are there any fractions?

Multiply both sides of the equation by the denominator of the fraction.

Equation	Explanation
$\frac{3y + 2}{3} = 4$ $3y + 2 = 12$	LHS is a fraction with denominator 3, so we multiply both sides by 3.
$5 - \frac{y}{2} = 3$ $10 - y = 6$	LHS has a fraction with denominator 2, so we multiply both sides by 2.

### Are there multiple unknowns on one side of the equation?

Collect like terms and simplify first.

Equation	Explanation
$3a + 5a = 4$ $8a = 4$	There are two terms involving $a$ on the LHS, so we collect terms.
$3b + 7 - 4b = 5$ $-b + 7 = 5$	Two terms involving $b$ on the LHS, so collect terms.

### Once we have simplified the equation, we solve for the remaining unknown.

Use addition or subtraction to cancel out any constant terms, and then multiply or divide to get an answer for the unknown value.

Equation	Explanation
$6x + 18 = 5$ $6x = -13$ $x = -\frac{13}{6}$	Constant term is 18, and is positive, so subtract 18 from both sides. $x$ is multiplied by 6 so we divide both sides by 6.
$-3 + x = 2$ $x = 5$	The constant term is $-3$ so we add 3 to both sides.
$10 - y = 6$ $-y = -4$ $y = 4$	Constant term is positive 10, so subtract 10 from both sides. $y$ is negative, so we have to multiply both sides by $-1$