

Solving equations with more than one variable uses the same process as solving an equation with one variable. The only difference is that instead of the answer always being a number, it may be an expression that includes numbers and variables. The usual steps may include: removing parentheses, simplifying by combining like terms, removing the same thing from both sides of the equation, moving the desired variables to one side of the equation and the rest of the variables to the other side, and possibly division or multiplication.

**Example 1**

Solve for $y$	$3x - 2y = 6$
Subtract $3x$	$-2y = -3x + 6$
Divide by $-2$	$y = \frac{-3x+6}{-2}$
Simplify	$y = \frac{3}{2}x - 3$

**Example 2**

Solve for $y$	$7 + 2(x + y) = 11$
Subtract 7	$2(x + y) = 4$
Distribute the 2	$2x + 2y = 4$
Subtract $2x$	$2y = -2x + 4$
Divide by 2	$y = \frac{-2x+4}{2}$
Simplify	$y = -x + 2$

**Example 3**

Solve for $x$	$y = 3x - 4$
Add 4	$y + 4 = 3x$
Divide by 3	$\frac{y+4}{3} = x$

**Example 4**

Solve for $t$	$I = prt$
Divide by $pr$	$\frac{I}{pr} = t$

**Problems**

Solve each equation for the specified variable.

- |                                |                                  |                                |
|--------------------------------|----------------------------------|--------------------------------|
| 1. $y$ in $5x + 3y = 15$       | 2. $x$ in $5x + 3y = 15$         | 3. $w$ in $2l + 2w = P$        |
| 4. $m$ in $4n = 3m - 1$        | 5. $a$ in $2a + b = c$           | 6. $a$ in $b - 2a = c$         |
| 7. $p$ in $6 - 2(q - 3p) = 4p$ | 8. $x$ in $y = \frac{1}{4}x + 1$ | 9. $r$ in $4(r - 3s) = r - 5s$ |

**Answers** (Other equivalent forms are possible.)

1.  $y = -\frac{5}{3}x + 5$

2.  $x = -\frac{3}{5}y + 3$

3.  $w = -l + \frac{P}{2}$

4.  $m = \frac{4n+1}{3}$

5.  $a = \frac{c-b}{2}$

6.  $a = \frac{c-b}{-2}$  or  $\frac{b-c}{2}$

7.  $p = q - 3$

8.  $x = 4y - 4$

9.  $r = \frac{7s}{3}$