Equations: Solving For a Variable—Explanation & Practice

To solve an equation for one particular variable when the equation has more than 1 variable, the procedure is the same as solving an equation with one variable—that is, isolate the variable you are solving for.

Example 1—one variable

$2x - 3 = 19$
$\quad +\mathbf{3} \quad +\mathbf{3}$ add **3** to both sides
$2x \quad = 22$

$\frac{2x}{\mathbf{2}} = \frac{22}{\mathbf{2}}$ divide both sides by **2**

$x = 11$

Example 1—more variables

$mx - p = w$ (solve for x)
$\quad + \mathbf{p} \quad +\mathbf{p}$ add **p** to both sides
$mx \quad = w + p$

$\frac{mx}{\mathbf{m}} = \frac{w + p}{\mathbf{m}}$ divide both sides by **m**

$x = \frac{w+p}{m}$

Example 2—one variable

$\frac{7b + 9}{5} = 6$

$\mathbf{5}\left(\frac{7b+9}{5}\right) = 6 \cdot \mathbf{5}$ multiply both sides by LCD **5**

$7b + 9 = 30$
$\quad - \mathbf{9} \quad -\mathbf{9}$ subtract **9** from both sides
$7b = 21$

$\frac{7b}{\mathbf{7}} = \frac{21}{\mathbf{7}}$ divide both sides by **7**

$b = 3$

Example 2—more variables

$\frac{mb + t}{k} = r$ (solve for b)

$\mathbf{k}\left(\frac{mb+t}{k}\right) = r(\mathbf{k})$ multiply both sides by LCD **k**

$mb + t = rk$
$\quad - \mathbf{t} \quad - \mathbf{t}$ subtract **t** from both sides
$mb = rk - t$

$\frac{mb}{\mathbf{m}} = \frac{rk - t}{\mathbf{m}}$ divide both sides by **m**

$b = \frac{rk - t}{m}$

Practice

Rewrite in terms of y (Solve for y):

1. $2x + y = 8$
2. $5x - y = 2$
3. $2x + 5y = 20$
4. $5x - 2y = 10$
5. $3x + 6y = 18$
6. $x - 2y = 6$
7. $x + 4y = 8$
8. $2x - 3y - 18 = 0$
9. $3x - y + 9 = 0$

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

Rewrite in terms of x (Solve for x):

10. $x + 4y = 6$

11. $x - 5y = 7$

12. $2x - y = 4$

13. $3x + y = 12$

14. $2x + 3y = 8$

15. $2x + 5y = 10$

16. $3x - 5y - 30 = 0$

17. $2x - 7y - 14 = 0$

18. $5x - 4y + 5 = 0$

Rewrite the formula in terms of the variable given:

19. $a = \frac{1}{2}bh$; b

20. $P = a + b + c$; a

21. $d = rt$; r

22. $PV = nRT$; P

23. $P = 2L + 2W$; W

24. $R = \frac{C - S}{t}$; C

25. $I = \frac{E}{R + r}$; r

26. $R = \frac{MB - T}{K}$; M

27. $K = mr - mv$; m

(first factor out the GCF, m)

28. $S = \pi r (r - l)$; l

29. $A = P + Prt$; r

30. $A = \frac{P}{1 - c}$; c

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30. _____

Equations: Solving For a Variable: Practice
Answer Key

1. $y = 8 - 2x$
2. $y = 5x - 2$
3. $y = \frac{-2}{5}x + 4$
4. $y = \frac{5}{2}x - 5$
5. $y = -\frac{1}{2}x + 3$
6. $y = \frac{1}{2}x - 3$
7. $y = -\frac{1}{4}x + 2$
8. $y = \frac{2}{3}x - 6$
9. $y = 3x + 9$
10. $x = -4y + 6$
11. $x = 5y + 7$
12. $x = \frac{1}{2}y + 2$
13. $x = -\frac{1}{3}y + 4$
14. $x = -\frac{3}{2}y + 4$
15. $x = -\frac{5}{2}y + 5$
16. $x = \frac{5}{3}y + 10$
17. $x = \frac{7}{2}y + 7$
18. $x = \frac{4}{5}y - 1$
19. $b = \frac{2A}{h}$
20. $a = P - b - c$
21. $r = \frac{d}{t}$
22. $P = \frac{nRT}{V}$
23. $W = \frac{P - 2L}{2}$
24. $C = Rt + S$
25. $r = \frac{E - IR}{I}$
26. $m = \frac{RK + T}{B}$
27. $m = \frac{K}{r - v}$
28. $I = \frac{\pi r^2 - S}{\pi r}$
29. $r = \frac{A - P}{Pt}$
30. $c = \frac{A - P}{A}$