

"Finding X"

Name: _____

In general:

- Deal with things added to/subtracted from the term with the variable, then things multiplied onto/divided into the variable.
- Look at what the number is doing relative to the variable, remove the number, and do the opposite to the other side.

A. Numbers being added/subtracted relative to the term with the variable.

Example. Solve for X:

$$\begin{aligned} X + 5 &= 2 \\ X + \cancel{5} - \cancel{5} &= 2 - 5 \\ X &= -3 \end{aligned}$$

Or, simply: $X + 5 = 2$
 $X + \cancel{5} = 2 - 5$
 $X = -3$
Take to the other side and do
opposite operation
(Opposite of + is -)

Try These. Solve for X:

a. $X + 3 = 6$

$$\begin{aligned} x &= 6 - 3 \\ x &= 3 \checkmark \end{aligned}$$

b. $X - 3 = 6$

$$\begin{aligned} x &= 6 + 3 \\ x &= 9 \checkmark \end{aligned}$$

c. $3 + X = -6$

$$\begin{aligned} x &= -6 - 3 \\ x &= -9 \checkmark \end{aligned}$$

d. $3 - X = 6$

$$\begin{aligned} -x &= 6 - 3 \\ -x &= 3 \\ x &= -3 \checkmark \end{aligned}$$

B. Numbers being multiplied/divided relative to the term with the variable

Examples. Solve for X:

a. $5X = 15$

$$5X/5 = 15/5$$

$$X = 3$$

(Op. of mult is divide)

Or, simply: $5X = 15$

$$5X = 15 \div 5$$

$$X = 3$$

Take to the other side and do
opposite operation

b. $\frac{1}{2}X = 5$

$$\frac{1}{2}X * 2 = 5 * 2$$

$$X = 10$$

(Op. of divide is mult.)

Or, simply: $\frac{1}{2}X = 5$

$$\cancel{\frac{1}{2}}X = 5 * 2$$

$$X = 10$$

Take to the other side and do
opposite operation

Try These. Solve for X:

a. $\frac{3X}{3} = \frac{24}{3}$

$$x = 8 \checkmark$$

b. $\frac{-3X}{-3} = \frac{24}{-3}$

$$x = -8 \checkmark$$

c. $\frac{x}{4} = 6$
 $x = 24 \checkmark$

d. $\frac{x}{4} = -6$
 $x = -24 \checkmark$

C. Putting it all together.

Example. Solve for the variable:

$$3X - 5 = 40$$

$$3X - 5 + 5 = 40 + 5 \text{ (deal with the term added/subtracted from the X term first)}$$

$$3X = 45$$

$$3X \div 3 = 45 \div 3 \text{ (then deal with the number multiplied or divided onto X)}$$

$$X = 15$$

Try These. Solve for the variable:

a. $4X + 5 = 21$

$$4X = 16$$

$$X = 4 \checkmark$$

b. $-6A + 2 = 20$

$$-6A = 18$$

$$A = -3 \checkmark$$

c. $\frac{1}{2}R - 3 = 7$

$$\frac{R}{2} = 10$$

$$R = 20 \checkmark$$

d. $4 + 5Y = 19$

$$5Y = 15$$

$$Y = 3 \checkmark$$

e. $7 - H = -9$

$$-H = -16$$

$$H = 16 \checkmark$$

f. $-2 - 2F = -2$

$$-2F = 0$$

$$F = 0 \checkmark$$

g. $-\frac{1}{4}V + 8 = 5$

$$-\frac{V}{4} = -3$$

$$-V = -12$$

$$V = 12 \checkmark$$

h. $X \div 5 + 2 = \frac{1}{5}$

$$5\left(\frac{X}{5} + 2\right) = \left(\frac{1}{5}\right)5$$

$$X + 10 = 1$$

$$X = -9 \checkmark$$

i. $5 = 4Y - 3$

$$8 = 4Y$$

$$2 = Y \checkmark$$

j. $7 = \frac{3}{5}H + 1$

$$6 = \frac{3}{5}H$$

$$30 = 2H$$

$$15 = H \checkmark$$

k. $\frac{1}{4} = \frac{1}{4}R + 2$

$$\left(\frac{1}{4} - 2\right) = \left(\frac{R}{4}\right)$$

$$1 - 8 = R$$

$$-7 = R \checkmark$$

l. $7 = 9 + 5V$

$$7 - 9 = 5V$$

$$-2 = 5V$$

$$-\frac{2}{5} = V \checkmark$$

m. $2K + 3 = 3K + 5$

$$-2 = K \checkmark$$

n. $5N - 3 = 4 - 7N$

$$12N = 7$$

$$N = \frac{7}{12} \checkmark$$

o. $\frac{1}{2}M + \frac{1}{3} = 1 - M$

$$6\left(\frac{M}{2} + \frac{1}{3}\right) = 6(1 - M)$$

$$3M + 2 = 6 - 6M$$

$$9M = 6 - 2$$

$$9M = 4$$

$$M = \frac{4}{9} \checkmark$$

p. $(-2P + \frac{1}{5} = 3 + \frac{1}{5}P) 15$

$$-30P + 12 = 45 + 5P$$

$$-35P = 33$$

$$P = -\frac{33}{35} \checkmark$$