

## Solving Multi-Step Equations

1. Clear parentheses using the distributive property.
2. Combine like terms within each side of the equal sign.
3. Add/subtract terms to both sides of the equation to get the terms with variables on one side and constant terms on the other side.
4. Isolate the variable by multiplying/dividing both sides of the equation by the number with the variable.

Ex:  $3(2x - 5) - 3 = 2x + 8 + 6x$

$$6x - 15 - 3 = 2x + 8 + 6x$$

$$6x - 18 = 8x + 8$$

$$\begin{array}{r} 6x - 18 = 8x + 8 \\ -8 \quad -8 \\ \hline 6x - 26 = 8x \end{array}$$

$$\begin{array}{r} 6x - 26 = 8x \\ -6x \quad -6x \\ \hline -26 = 2x \end{array}$$

$$\begin{array}{r} -26 = 2x \\ \frac{-26}{2} = \frac{2x}{2} \\ -13 = x \end{array}$$

$$-13 = x \rightarrow \boxed{x = -13}$$

## Solving Absolute Value Equations

1. Isolate the absolute value.
2. Break the absolute value equation into two separate equations. For the first equation, set the expression inside the absolute value notation equal to the opposite side of the equation. For the second equation, make the number on the opposite side negative.
3. Solve each equation.

Ex:  $-3|3x+2| - 2 = -8$

$$-3|3x+2| - 2 = -8$$

$$\begin{array}{r} -3|3x+2| - 2 = -8 \\ +2 \quad +2 \\ \hline -3|3x+2| = -6 \end{array}$$

$$\begin{array}{r} -3|3x+2| = -6 \\ \frac{-3|3x+2|}{-3} = \frac{-6}{-3} \\ |3x+2| = 2 \end{array}$$

$$3x + 2 = 2$$

$$\begin{array}{r} 3x + 2 = 2 \\ \downarrow \\ x = 0 \end{array}$$

$$3x + 2 = -2$$

$$\begin{array}{r} 3x + 2 = -2 \\ \downarrow \\ x = -\frac{4}{3} \end{array}$$

$$\boxed{x = \{0, -\frac{4}{3}\}}$$

## Solving Word Problems Algebraically

1. Define a variable.
2. Write an equation.
3. Solve the equation.
4. Label your answer with the appropriate units.

Ex: Bobby is 4 years younger than twice Jimmy's age. If Bobby is 26 years old, how old is Jimmy?

Let  $j$  = Jimmy's age

$$2j - 4 = 26$$

$$j = 15$$

→ Jimmy is 15 years old

Solve each equation.

1. $-3x - 9 = -27$	2. $25 + 2(n + 2) = 30$	3. $-9b - 6 = -3b + 48$
4. $5 - (m - 4) = 2m + 3(m - 1)$	5. $-24 - 10k = -8(k + 4) - 2k$	6. $f - (-19) = 11f + 23 - 20f$
7. $\frac{3}{4}d - \frac{1}{2} = \frac{3}{8} + \frac{1}{2}d$	8. $-0.5g + 13 = 3g$	9. $-5(h + 12) - (4h - 2) = h - 8$
10. $ 3x + 4  = 16$	11. $3 x - 5  = 27$	12. $-8 2x - 6  + 4 = -60$

Solve each word problem algebraically.

13. The sum of two consecutive integers is one less than three times the smaller integer. Find the two integers.	14. The length of a rectangular picture is 5 inches more than three times the width. Find the dimensions of the picture if its perimeter is 74 inches.
--	--