

When solving multi-step algebra problems, you need to use the distributive property to remove any parentheses, combine like terms, and then isolate the variable by adding, subtracting, multiplying and/or dividing both sides of the equation by the same thing. Consider the following examples:

Example 1: $3(x+6)=5x-2$

Step 1: Use the distributive property to remove parentheses.

$$3x+18=5x-2$$

Step 2: Subtract $5x$ from each side to move the terms with variables to the left side of the equation.

$$\begin{array}{r} -5x \quad -5x \\ \hline -2x+18=-2 \end{array}$$

Step 3: Subtract 18 from each side to move the integers to the right side of the equation.

$$\begin{array}{r} -18 \quad -18 \\ \hline -2x = -20 \end{array}$$

Step 4: Divide both sides by -2 to solve for x .

$$\begin{array}{r} -2 \quad -2 \\ \hline x=10 \end{array}$$

Step 5: Check your answer by substituting the value of x in the original equation.

$$3(10)+18=5(10)-2$$

$$30+18=50-2$$

$$48=48 \checkmark$$

Example 2: $\frac{3(x-3)}{2}=9$

Step 1: Use the distributive property to remove parentheses.

$$\frac{3x-9}{2}=9$$

Step 2: Multiply both sides by 2 to eliminate the fraction.

$$\frac{2(3x-9)}{2}=(2)9$$

Step 3: Add 9 to both sides and combine like terms.

$$\begin{array}{r} 3x-9=18 \\ +9 \quad +9 \\ \hline 3x=27 \end{array}$$

Step 4: Divide both sides by 3 to solve for x .

$$\begin{array}{r} 3x=27 \\ \hline 3 \quad 3 \\ \hline x=9 \end{array}$$

Step 5: Check your answer by substituting the value of x in the original equation.

$$\frac{3(9-3)}{2}=9$$

$$\frac{3(6)}{2}=9$$

$$\frac{18}{2}=9$$

$$9=9 \checkmark$$

Solve the following multi-step algebra problems. Be sure to check your answers.

1. $2(y-3)=4y+6$

2. $\frac{3(m+4)}{2}=12$

3. $5(b-4)=10b+5$

4. $-8(y+4)=10y+4$

5. $\frac{4(n+3)}{5}=n-3$

6. $3(2y+2)=7+3y$

7. $4(2c+3)-7=13$

8. $4+x-2(x-6)=8$

9. $\frac{7x+4}{3}=2x-1$

10. $\frac{1}{2}(b-2)=5$