Name_____ Date_____

WORKSHEET 3.6: SOLVING EQUATIONS WITH VARIABLES ON BOTH SIDES

- -

To solve equations that have the same variable on both sides, follow the steps below:

1. Eliminate the parentheses and simplify each side.

2. Add or subtract the variable expression to or from each side of the equation so that the variable is on only one side of the equation.

3. Solve for the variable and check your solution.

EXAMPLES

$3x + 8 = 5x - 2$ can be solved in either of two ways. (Note that both sides of the equation are already simplified.)

$3x + 8 = \quad 5x - 2$	
$-3x \qquad\quad -3x$	Subtract $3x$.
$\overline{\qquad\qquad\qquad}$	
$8 = \quad 2x - 2$	
$+2 \qquad\quad +2$	Add 2.
$\overline{\qquad\qquad\qquad}$	
$10 = 2x$	
$\dfrac{10}{2} = \dfrac{2x}{2}$	Divide by 2.
$5 = x$	

$3x + 8 = \quad 5x - 2$	
$-5x \qquad\quad -5x$	Subtract $5x$.
$\overline{\qquad\qquad\qquad}$	
$-2x + 8 = -2$	
$-8 \quad -8$	Subtract 8.
$\overline{\qquad\qquad\qquad}$	
$-2x = -10$	
$\dfrac{-2x}{-2} = \dfrac{-10}{-2}$	Divide by -2.
$x = 5$	

DIRECTIONS: Solve each equation.

1. $9y = 5y + 16$

2. $12x + 85 = 7x$

3. $-8y = -13y - 65$

4. $59 + x = 2 - 2x$

5. $3(y + 10) = 2y$

6. $2(2x - 1) = 6(x + 2)$

7. $-18 + x = -x + 12$

8. $3(y - 1) = 2(y + 5)$

CHALLENGE: Meg solved $3(x + 2) = 4x$ by subtracting $3x$ from both sides. She found $x = 2$. Her answer was incorrect. Explain where she made her mistake and then solve the equation.

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Name _Answer Key_____ Date _____

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To solve equations that have the same variable on both sides, follow the steps below:

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3. Solve for the variable and check your solution.

EXAMPLES

$3x + 8 = 5x - 2$ can be solved in either of two ways. (Note that both sides of the equation are already simplified.)

$$
\begin{array}{ll}
3x + 8 = \quad 5x - 2 & \\
-3x \quad\quad\;\; -3x & \text{Subtract } 3x. \\
\hline
\quad 8 = \quad 2x - 2 & \\
\quad +2 \quad\quad\quad +2 & \text{Add 2.} \\
\hline
\quad 10 = 2x & \\
\dfrac{10}{2} = \dfrac{2x}{2} & \text{Divide by 2.} \\
\quad 5 = x &
\end{array}
$$

$$
\begin{array}{ll}
3x + 8 = \quad 5x - 2 & \\
-5x \quad\quad\;\; -5x & \text{Subtract } 5x. \\
\hline
-2x + 8 = -2 & \\
\quad -8 \quad -8 & \text{Subtract 8.} \\
\hline
\quad -2x = -10 & \\
\dfrac{-2x}{-2} = \dfrac{-10}{-2} & \text{Divide by } -2. \\
\quad x = 5 &
\end{array}
$$

DIRECTIONS: Solve each equation.

1. $9y = 5y + 16$

$$y = 4$$

2. $12x + 85 = 7x$

$$x = -17$$

3. $-8y = -13y - 65$

$$y = -13$$

4. $59 + x = 2 - 2x$

$$x = -19$$

5. $3(y + 10) = 2y$

$$y = -30$$

6. $2(2x - 1) = 6(x + 2)$

$$x = -7$$

7. $-18 + x = -x + 12$

$$x = 15$$

8. $3(y - 1) = 2(y + 5)$

$$y = 13$$

CHALLENGE: Meg solved $3(x + 2) = 4x$ by subtracting $3x$ from both sides. She found $x = 2$. Her answer was incorrect. Explain where she made her mistake and then solve the equation.

Meg did not simplify before subtracting 3x.

$3x + 6 = 4x$; $x = 6$