Name _____ Date _____

# WORKSHEET 3.12: SOLVING INEQUALITIES WITH VARIABLES ON ONE SIDE

To solve an inequality with a variable on one side, follow the steps below:

1. Add the same number to or subtract the same number from both sides to isolate the variable.
2. Multiply or divide both sides of the inequality by the same nonzero number so that the coefficient of the variable is 1.
3. When you multiply or divide both sides of the inequality by the same negative number, switch the direction of the inequality symbol.

## EXAMPLES

Solve each inequality.

$$\begin{array}{r} 3x+4> \ 10 \\ -4 \quad -4 \\ \hline 3x>6 \\ \frac{3x}{3}>\frac{6}{3} \\ x>2 \end{array} \qquad \begin{array}{r} -2x-8>10 \\ +8 \quad +8 \\ \hline -2x>18 \\ \frac{-2x}{-2}<\frac{18}{-2} \\ x<-9 \end{array} \qquad \begin{array}{r} 2+5x \leq -13 \\ -2 \qquad -2 \\ \hline 5x \leq -15 \\ \frac{5x}{5} \leq \frac{-15}{5} \\ x \leq -3 \end{array}$$

**DIRECTIONS:** Solve each inequality.

1. $x-4>3$
2. $y+10 \leq 12$
3. $-6x \geq 30$
4. $-x<8$
5. $7<2y-11$
6. $14-6x \geq -10$
7. $\frac{y}{2}-1>4$
8. $6-\frac{x}{5}>-14$

**CHALLENGE:** Tim solved the inequality $4<-3x-2$. He found that $6<-3x$ and that $-2>x$. The correct answer on his teacher's answer key was $x<-2$. Was Tim also correct? Explain your answer.

Name Answer Key Date

# WORKSHEET 3.12: SOLVING INEQUALITIES WITH VARIABLES ON ONE SIDE

To solve an inequality with a variable on one side, follow the steps below:

1. Add the same number to or subtract the same number from both sides to isolate the variable.
2. Multiply or divide both sides of the inequality by the same nonzero number so that the coefficient of the variable is 1.
3. When you multiply or divide both sides of the inequality by the same negative number, switch the direction of the inequality symbol.

## EXAMPLES

Solve each inequality.

$3x + 4 > 10$
$-4 \quad -4$
$3x > 6$
$\frac{3x}{3} > \frac{6}{3}$
$x > 2$

$-2x - 8 > 10$
$+8 \quad +8$
$-2x > 18$
$\frac{-2x}{-2} < \frac{18}{-2}$
$x < -9$

$2 + 5x \leq -13$
$-2 \quad -2$
$5x \leq -15$
$\frac{5x}{5} \leq \frac{-15}{5}$
$x \leq -3$

**DIRECTIONS:** Solve each inequality.

1. $x - 4 > 3$
   $x > 7$
2. $y + 10 \leq 12$
   $x \leq 2$
3. $-6x \geq 30$
   $x \leq -5$
4. $-x < 8$
   $x > -8$
5. $7 < 2y - 11$
   $y > 9$
6. $14 - 6x \geq -10$
   $x \leq 4$
7. $\frac{y}{2} - 1 > 4$
   $y > 10$
8. $6 - \frac{x}{5} > -14$
   $x < 100$

**CHALLENGE:** Tim solved the inequality $4 < -3x - 2$. He found that $6 < -3x$ and that $-2 > x$. The correct answer on his teacher's answer key was $x < -2$. Was Tim also correct? Explain your answer.

Tim is correct. The variable may be placed on the left side of the inequality $-2 > x$ is the same as $x < -2$.