

# Variables on Both Sides

## I. Develop a Strategy

### A. Combine Variables First

ex: 
$$\begin{array}{r} x + 3 = 2x + 5 \\ \hline -x \quad \downarrow \quad -x \\ \hline -3 = x + 5 \\ \hline -5 \quad -5 \\ \hline -2 = x \end{array}$$

ex: 
$$\begin{array}{r} 3y + 8 = y - 7 \\ \hline -y \quad \downarrow \quad \text{negative} \\ \hline 2y + 8 = -7 \\ \hline -8 \quad -8 \\ \hline 2y = -15 \\ \hline \frac{2y}{2} = \frac{-15}{2} \\ \hline y = \frac{-15}{2} \end{array}$$

ex:

$$\begin{array}{r|l}
 \cancel{4a} & 9 \\
 \underline{\cancel{4a}} & \\
 -9 & = 6a + 11 \\
 -11 & \\
 \hline
 -20 & = 2a + 11 \\
 \underline{\phantom{-20}} & \\
 -20 & \\
 \hline
 -20 & = 2a \\
 \underline{\phantom{-20}} & \\
 -20 & \\
 \hline
 -10 & = a
 \end{array}$$

## II. Negative Coefficients

ex:  $-7j + 5 = -12j - 10$

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$5j + 5 = -10$

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$5j = -15$

$j = -3$

$$\text{ex: } 8w - 7 = -2w + 13$$

$$+ 2w$$

$$10w - 7 = 13$$

$$+ 7$$

$$\frac{10w}{10} = \frac{20}{10}$$

$$w = 2$$