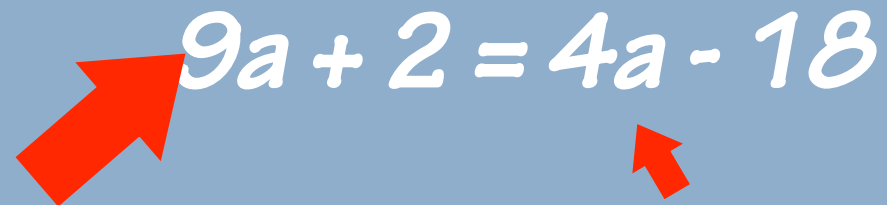


# *Solving Equations with Variables on Both Sides*

*To solve equations with variables on both sides, you want to use addition and subtraction to get all the variables on one side, and all the constants on the other. Here's an example:*

$$9a + 2 = 4a - 18$$


Variables on both sides of the  
equal sign!

*So if I want to get all the variables on one side and all the constants on the other, let's begin by identifying the variables and constants.*

Variables

Constants



*How would I go about moving all the variables to one side and all the constants to the other?*

$$\begin{array}{r} 9a + 2 = 4a - 18 \\ -4a \quad \quad -4a \\ \hline 5a + 2 = \quad -18 \end{array}$$

*Now how would I solve what's left?*

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

$$\frac{5a}{5} = \frac{-20}{5}$$

$$a = -4$$

HINT!

*Let's try another one.*

$$4w + 8 = 6w - 4$$

*Let's try another one.*

$$9 - (2k - 3) = k$$

*When will I ever use this???*

*Try using what you've learned to solve this problem:*

*Beth leaves home on her bicycle, riding at a steady rate of 8 mi/hr. Her brother Ted leaves home on his bicycle half an hour later following Beth's route. He rides at a steady rate of 12 mi/hr. How long after Beth leaves home will Ted catch up?*