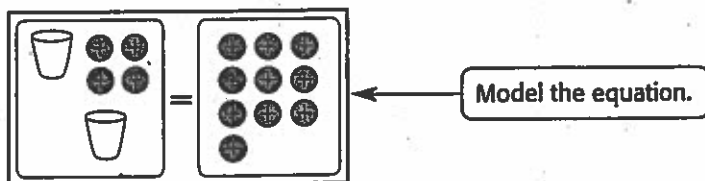


Study Guide and Intervention

Solving Two-Step Equations

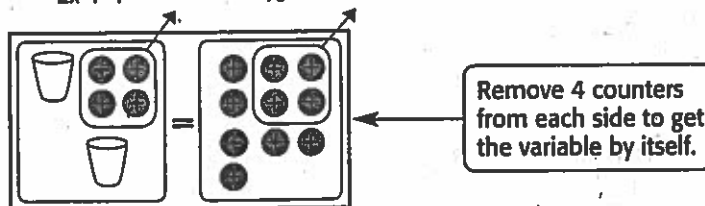
Equations that have two different operations are called **two-step equations**. You can work backward using the reverse of the order of operations to solve a two-step equation.

EXAMPLE 1 Solve $2x + 4 = 10$ using models.



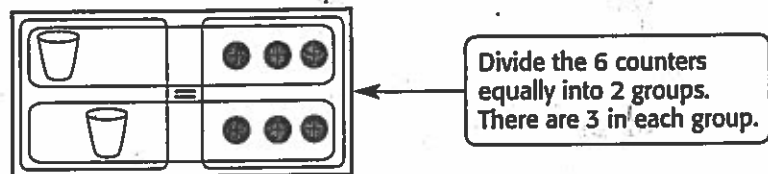
$$2x + 4 = 10$$

Model the equation.



$$2x + 4 - 4 = 10 - 4$$

Remove 4 counters from each side to get the variable by itself.



$$\begin{aligned} 2x &= 6 \\ x &= 3 \end{aligned}$$

Divide the 6 counters equally into 2 groups. There are 3 in each group.

EXAMPLE 2 Solve $-3z - 4 = 8$. Check your solution.

$$\begin{aligned} -3z - 4 &= 8 && \text{Write the equation.} \\ +4 &= +4 && \text{Add 4 to each side.} \\ -3z &= 12 && \text{Simplify.} \\ \frac{-3z}{-3} &= \frac{12}{-3} && \text{Divide each side by } -3. \\ z &= -4 && \text{Simplify.} \end{aligned}$$

$$\begin{aligned} \text{Check } -3z - 4 &= 8 && \text{Write the original equation.} \\ -3(-4) - 4 &\stackrel{?}{=} 8 && \text{Replace } z \text{ with } -4. \\ 12 - 4 &\stackrel{?}{=} 8 && \text{Multiply.} \\ 8 &= 8 \checkmark && \text{Simplify.} \end{aligned}$$

The solution is -4 .

EXERCISES

Solve each equation. Use models if necessary.

1. $4m + 5 = 9$

2. $3n + 4 = -2$

3. $3 = 2s - 5$

4. $5 = -7 + 4b$

5. $6a - 5 = 7$

6. $-13 + 3c = 8$

7. One more than four times a number is thirteen. What is the number?

8. Three is seven less than two times a number. What is the number?

Practice: Word Problems**Solving Two-Step Equations**

<p>1. FIRE TRUCKS Fire Station A has one more than twice as many fire trucks as Fire Station B. If Fire Station A has three fire trucks, write and solve an equation to find how many fire trucks Fire Station B has.</p>	<p>2. TOY CARS Tanisha has 7 less than 4 times as many toy cars as Fernando. If Tanisha has 9 cars, write and solve an equation to find how many toy cars Fernando has.</p>
<p>3. ADDRESS Danielle and Erin live on the same street. Danielle lives at number 13. If Danielle's house number is 5 less than 3 times Erin's house number, write and solve an equation to find Erin's house number.</p>	<p>4. BIRTHDAY CAKE Mrs. Zeng is slicing her son's birthday cake. To make sure everyone will have enough, she slices the cake so that the number of slices is 6 more than twice the number of people at the party. If she slices the cake into 20 slices, write and solve an equation to find how many people are at the party.</p>
<p>5. DINOSAURS The largest complete dinosaur we know of was a Brachiosaurus. It reached a length of 23 meters. Its length was one less than twice its height. Write and solve an equation to find the height of the Brachiosaurus.</p>	<p>6. BABY-SITTING Last week, Enrique earned \$30.00 baby-sitting. Enrique earned \$5.00 less than 7 times what Rhea earned. Write and solve an equation to find how much money Rhea earned baby-sitting last week.</p>
<p>7. ELECTION Raj received 8 more than 3 times as many votes as Vinny in a school election. Raj received 44 votes. Write and solve an equation to find how many votes Vinny received.</p>	<p>8. JACK-O-LANTERN It took Suki 127 minutes from start to finish to carve her pumpkin. Carving the pumpkin took her 13 fewer minutes than 10 times as long as it took her to pick the pumpkin out at the pumpkin patch. Write and solve an equation to find how long it took Suki to pick out her pumpkin.</p>