Lesson 8-4

Example 1   Equations with Variables on Each Side
Solve $12 + 3x = 4x$. Check your solution.

$12 + 3x = 4x$	Write the equation.
$12 + 3x - 3x = 4x - 3x$	Subtract $3x$ from each side.
$12 = x$	Simplify by combining like terms.

To check your solution, replace x with 12 in the original equation.

Check

$12 + 3x = 4x$	Write the equation.
$12 + 3(12) \stackrel{?}{=} 4(12)$	Replace x with 12.
$48 = 48$ ✓	The sentence is true.

The solution is 12.

Example 2 Equations with Variables on Each Side
Solve $7n - 3 = 5n - 5$.

$7n - 3 = 5n - 5$	Write the equation.
$7n - 5n - 3 = 5n - 5n - 5$	Subtract $5n$ from each side.
$2n - 3 = -5$	Simplify.
$2n - 3 + 3 = -5 + 3$	Add 3 to each side.
$2n = -2$	Simplify.
$n = -1$	Mentally divide each side by 2.

The solution is –1.   Check this solution.

Example 3 Real-World Example
CELL PHONES A cellular phone provider charges $9.95 per month plus $0.10 per minute for calls. Another cellular phone provider charges $14.95 per month plus $0.08 per minute for calls. For how many minutes of calls is the monthly cost of both providers the same?

Words $9.95 per month plus $0.10 per minute equals
$14.95 per month plus $0.08 per minute

Variable   Let m represent the minutes.

Equation $9.95 + 0.10m = 14.95 + 0.08m$

$9.95 + 0.10m = 14.95 + 0.08m$	Write the equation.
$9.95 + 0.10m - 0.10m = 14.95 + 0.08m - 0.10m$	Subtract 0.10m.
$9.95 = 14.95 - 0.02m$	
$9.95 - 14.95 = 14.95 - 14.95 - 0.02m$	Subtract 14.95 from each side.
$-5 = -0.02m$	
$\dfrac{-5}{-0.02} = \dfrac{-0.02m}{-0.02}$	Divide each side by –0.02.
$250 = m$	

The monthly cost is the same for 250 minutes of calls.