Lesson 6-6

Example 1

Solve: $3x + 2y = -4$
$5x + 2y = 8$

Solution

$3x + 2y = -4$
$5x + 2y = 8$ The y-coefficients are the same so *subtract* the equations.

$3x + 2y = -4$ ☐ $3x + 2y = -4$
$-(5x + 2y = 8)$ $\underline{-5x - 2y = -8}$
$-2x = -12$ Remember, to subtract, you
$x = 6$ add the opposite of each term.

Choose one of the original equations.

$3x + 2y = -4$
$3(6) + 2y = -4$ Substitute for x.
$2y = -22$
$y = -11$ The check is left to you. The solution is (6, -11).

Example 2

Solve: $4x - 5y = -4$
$4y = 3x + 2$

Solution

$4x - 5y = -4$
$-3x + 4y = 2$ Rewrite the second equation in standard form.
$4x - 5y = -4$ ☐ $3(4x - 5y = -4)$ ☐ $12x - 15y = -12$
$-3x + 4y = 2$ ☐ $4(-3x + 4y = 2)$ ☐ $\underline{-12x + 16y = 8}$
Add. ☐ $y = -4$

$-3x + 4y = -4$ Choose one of the original equations.
$-3x + 4(-4) = 2$ Substitute for y.
$-3x = 18$
$x = -6$

The check is left to you. The solution is (-6, -4).

Example 3

ENTERTAINMENT Thomas sold 28 movie tickets for a total of $148. If each adult ticket sold for $6 and each children's ticket sold for $4, how many of each kind did he sell?

Solution

Make a chart for the number and value of the tickets.

	Adult	Child	Total
Number	A	C	$A + C$
Value	$6A$	$4C$	$6A + 4C$

Write and solve a system of equations to represent the problem.

The number of tickets sold is 28. $A + C = 28$
The value of the tickets is $148. $6A + 4C = 148$

$$\begin{array}{rcll} A + C = 28 & \square & -4A - 4C = -112 & \text{Multiply the first equation by } -4. \\ 6A + 4C = 148 & \square & \underline{6A + 4C = 148} & \\ & & 2A = 36 & \\ & & A = 18 & \end{array}$$

$$\begin{array}{ll} A + C = 28 & \text{Choose one of the original equations.} \\ 18 + C = 28 & \text{Substitute for } A. \\ C = 10 & \end{array}$$

Thomas sold 18 adult tickets and 10 children's tickets.