Additional Examples — Lesson 9-3

1 EXAMPLE **Simplify $(2y - 3)(y + 2)$.**

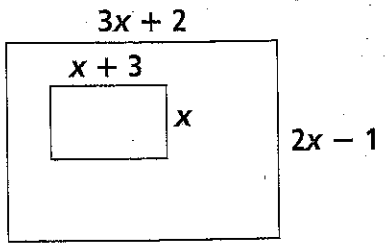
$$(2y - 3)(y + 2) = (2y - 3)(y) + (2y - 3)(2) \quad \text{Distribute } 2y - 3.$$
$$= 2y^2 - 3y + 4y - 6 \quad \text{Now distribute } y \text{ and } 2.$$
$$= 2y^2 + y - 6 \quad \text{Simplify.}$$

2 EXAMPLE **Simplify $(4x + 2)(3x - 6)$.**

	First		Outer		Inner		Last
$(4x + 2)(3x - 6)$	$= (4x)(3x)$	$+$	$(4x)(-6)$	$+$	$(2)(3x)$	$+$	$(2)(-6)$
	$= 12x^2$	$-$	$24x$	$+$	$6x$	$-$	12
	$= 12x^2$	$-$		$18x$		$-$	12

The product is $12x^2 - 18x - 12$.

3 EXAMPLE **Find the area of the shaded region. Simplify.**



area of outer rectangle = $(3x + 2)(2x - 1)$

area of hole = $x(x + 3)$

area of shaded region = area of outer rectangle − area of hole

$= (3x + 2)(2x - 1) \quad -x(x + 3)$	Substitute.
$= 6x^2 - 3x + 4x - 2 \quad -x^2 - 3x$	Use FOIL to simplify $(3x + 2)(2x - 1)$ and the Distributive Property to simplify $x(x + 3)$.
$= 6x^2 - x^2 - 3x + 4x - 3x - 2$	Group like terms.
$= 5x^2 - 2x - 2$	Simplify.

4 EXAMPLE Simplify the product $(3x^2 - 2x + 3)(2x + 7)$.

Method 1: Multiply using the vertical method.

$$
\begin{array}{rrrrrrl}
 & & 3x^2 & - & 2x & + & 3 \\
 & & & & 2x & + & 7 \\
\hline
 & & 21x^2 & - & 14x & + & 21 \quad \text{Multiply by 7.} \\
6x^3 & - & 4x^2 & + & 6x & & \quad \text{Multiply by } 2x. \\
\hline
6x^3 & + & 17x^2 & - & 8x & + & 21 \quad \text{Add like terms.}
\end{array}
$$

Method 2: Multiply using the horizontal method.

$$(2x + 7)(3x^2 - 2x + 3)$$

$$= (2x)(3x^2) - (2x)(2x) + (2x)(3) + (7)(3x^2) - (7)(2x) + (7)(3)$$
$$= 6x^3 - 4x^2 + 6x + 21x^2 - 14x + 21$$
$$= 6x^3 + 17x^2 - 8x + 21$$

The product is $6x^3 + 17x^2 - 8x + 21$.