Name _____ Date _____

Study Guide
For use with the lesson "Multiply Polynomials"

GOAL **Multiply polynomials.**

EXAMPLE 1 ## Multiply a monomial and a polynomial

Find the product $5x^4(2x^3 - 3x^2 + x - 6)$.

Solution

$5x^4(2x^3 - 3x^2 + x - 6)$ Write product.

$= 5x^4(2x^3) - 5x^4(3x^2) + 5x^4(x) - 5x^4(6)$ Distributive property

$= 10x^7 - 15x^6 + 5x^5 - 30x^4$ Product of powers property

Exercises for Example 1

Find the product.

1. $3x^2(7x^2 - 2x + 3)$

2. $4x^5(3x^3 - 2x^2 - 8x + 9)$

EXAMPLE 2 ## Multiply polynomials vertically

Find the product $(5m^2 - 2m + 3)(2m + 7)$.

Solution

STEP 1 **Multiply** by 7.

$$\begin{array}{r} 5m^2 - 2m + 3 \\ \times \quad 2m + 7 \\ \hline 35m^2 - 14m + 21 \end{array}$$

STEP 2 **Multiply** by $2m$.

$$\begin{array}{r} 5m^2 - 2m + 3 \\ \times \quad 2m + 7 \\ \hline 35m^2 - 14m + 21 \\ 10m^3 - 4m^2 + 6m \\ \hline \end{array}$$

STEP 3 **Add** products.

$$\begin{array}{r} 5m^2 - 2m + 3 \\ \times \quad 2m + 7 \\ \hline 35m^2 - 14m + 21 \\ 10m^3 - 4m^2 + 6m \\ \hline 10m^3 + 31m^2 - 8m + 21 \end{array}$$

EXAMPLE 3 ## Multiply polynomials horizontally

Find the product $(9x^2 - x + 6)(5x - 2)$.

Solution

$(9x^2 - x + 6)(5x - 2)$ Write product.

$= 9x^2(5x - 2) - x(5x - 2) + 6(5x - 2)$ Distributive property

$= 45x^3 - 18x^2 - 5x^2 + 2x + 30x - 12$ Distributive property

$= 45x^3 - 23x^2 + 32x - 12$ Combine like terms.

LESSON 8.2 | **Study Guide** *continued*
For use with the lesson "Multiply Polynomials"

EXAMPLE 4 ## Multiply binomials using FOIL pattern

Find the product $(2x - 1)(7x + 6)$.

Solution

$(2x - 1)(7x + 6)$	Write product.
$= (2x)(7x) + (2x)(6) + (-1)(7x) + (-1)(6)$	Write product of terms.
$= 14x^2 + 12x + (-7x) + (-6)$	Multiply.
$= 14x^2 + 5x - 6$	Combine like terms.

Exercises for Examples 2, 3, and 4

Find the product.

3. $(m^2 + 6m + 4)(3m - 1)$ **4.** $(2n + 7)(3n + 4)$

5. $(2p^2 - p + 6)(p + 7)$ **6.** $(6q^2 - 5q - 4)(2q - 3)$

7. $(5t + 9)(3t - 8)$ **8.** $(8s - 7)(9s - 7)$

EXAMPLE 5 ## Standardized Test Practice

The dimensions of a rectangle are $3x - 1$ and $x + 5$. Which expression represents the area of the rectangle?

A $3x^2 + 16x - 5$ **B** $3x^2 + 14x - 4$ **C** $3x^2 + 14x - 5$ **D** $4x + 4$

Solution

Area = length • width	Formula for area of a rectangle
$= (3x - 1)(x + 5)$	Substitute for length and width.
$= (3x)(x) + (3x)(5) + (-1)(x) + (-1)(5)$	Use FOIL pattern.
$= 3x^2 + 15x + (-x) + (-5)$	Multiply.
$= 3x^2 + 14x - 5$	Combine like terms.

The correct answer is C.

Exercise for Example 5

9. The dimensions of a rectangle are $y + 9$ and $2y - 3$. Write an expression for the area of the rectangle.

LESSON 8.2