

## 9.2: Multiply Polynomials

Name \_\_\_\_\_

### Warm-up

Simplify each expression.

1.)  $x^4 y^2 \cdot xy^3$   
 $x^5 y^5$

2.)  $(3x^5 y)^3$   
 $27x^{15} y^3$

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

4.)  $4(2x^2 - 3x + 1)$   
 $8x^2 - 12x + 4$

**Multiplying a monomial by a polynomial-** Use the distributive property to multiply each term in the polynomial by the monomial. Be sure to multiply coefficients, and then the variable parts!

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

$3x^2 \cdot 2x^3 + 3x^2(-x^2) + 3x^2(-7x) + 3x^2(-3)$   
 $6x^5 - 3x^4 - 21x^3 - 9x^2$

2.)  $-2x^3(x^3 - 5x^2 + 3x - 7)$

$-2x^3(x^3) + (-2x^3)(-5x^2) + (-2x^3)(3x) + (-2x^3)(-7)$   
 $-2x^6 + 10x^5 - 6x^4 + 14x^3$

### Multiplying polynomials

#### Using a table (area method)

Write each polynomial along the length and width of a rectangular table. Multiply each pair of terms and write the product in the appropriate cell. Write the entire product horizontally, and combine like terms, if possible.

3.  $(3a+4)(a-2)$

	a	-2
3a	$3a^2$	$-6a$
4	$4a$	$-8$

$3x^2 - 2a - 8$

4.)  $(x^2 + 2x + 1)(x + 2)$

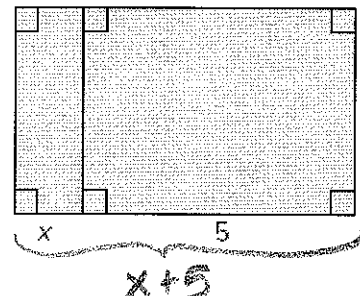
	$x^2$	$2x$	1
x	$x^3$	$2x^2$	$x$
2	$2x^2$	$4x$	2

$x^3 + 4x^2 + 5x + 2$

When multiplying several terms in polynomials, we actually still use the distributive property. There are several methods based on the distributive property that can be used to multiply polynomials, including the table method above. **You just must remember to multiply EVERY term in the first polynomial by EVERY term in the second polynomial!**

<p>5.) <math>(5b-6) \cdot (3b^2-2b+5)</math></p> $\begin{array}{r} 15b^3 - 10b^2 + 25b \\ + \quad -18b^2 + 12b - 30 \\ \hline 15b^3 - 28b^2 + 37b - 30 \end{array}$	<p>6.) <math>(a^2-6a-3) \cdot (2a-5)</math></p> $\begin{array}{r} 2a^3 - 12a^2 - 6a \\ + \quad -5a^2 + 30a + 15 \\ \hline 2a^3 - 17a^2 + 24a + 15 \end{array}$
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7. Write a polynomial that represents the area of the rectangle:



$$3x(x+5)$$

$$3x^2 + 15x = A$$

**Practice** – Multiply the polynomials using any method you prefer.

<p>8.) <math>(3k-1)(4k+9)</math></p> $\begin{array}{r} 12k^2 + 27k - 4k - 9 \\ 12k^2 + 23k - 9 \end{array}$	<p>9.) <math>(2y-3)(3y^2-y+5)</math></p> $\begin{array}{r} 6y^3 - 2y^2 + 10y \\ + \quad -9y^2 + 3y - 15 \\ \hline 6y^3 - 11y^2 + 13y - 15 \end{array}$
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**Practice assignment (homework):** page 565: (5, 8, 18, 23, 24, 37, 43)  
 Write the original problem first; show all steps of work using any multiplication method you choose!