Section 5.2: MULTIPLYING POLYNOMIALS

When you are done with your homework you should be able to…

- Use the product rule for exponents
- Use the power rule for exponents
- Use the products-to-power rule
- Multiply monomials
- Multiply a monomial and a polynomial
- Multiply polynomials when neither is a monomial

WARM-UP:

Add or subtract the following polynomials:

a. $\left(-22r^7+6r^3-r^2\right)-\left(2r^7+r^2-1\right)$

b. $\left(8x^4-x^3-x^2\right)+\left(-8x^4+x^3\right)$

THE PRODUCT RULE FOR EXPONENTS

We have seen that _____ are used to indicate _____ multiplication. Recall that 3^4 = _____. Now consider $3^4 \cdot 3^2$:

THE PRODUCT RULE

When multiplying _____ expressions with the _____ base, _____ the _____. Use this _____ as the _____ of the _____ base.

Example 1: Simplify each expression.

a. $2^5 \cdot 2^3$

b. $x^2 \cdot x \cdot x^4$

THE POWER RULE (POWERS TO POWERS)

When an _____ _____ is _____ to a _____, _____ the _____. Place the _____ of the _____on the _____ and _____ the _____.

Example 2: Simplify each expression.

a. $\left(4^2\right)^3$

b. $\left(x^{12}\right)^5$

THE PRODUCTS-TO-POWERS RULE FOR EXPONENTS

When a _____ is _____ to a _____, _____ each _____ to the _____.

Example 3: Simplify each expression.

a. $(-2y)^5$

b. $(10x^3)^2$

MULTIPLYING MONOMIALS

To _____ _____ with the _____ base, _____ the _____ and then multiply the _____. Use the _____ rule for _____ to multiply the _____.

Example 4: Multiply.

a. $(8x)(-11x^4)$

b. $(7y^3)(2y^2)$

c. $\left(\frac{2}{5}x^4\right)\left(-\frac{5}{6}x^7\right)$

MULTIPLYING A MONOMIAL AND A POLYNOMIAL THAT IS NOT A MONOMIAL

To _____ a _____ and a _____, use the _____ property to _____ each _____ of the _____ by the _____.

Example 5: Multiply.

a. $3x^2(2x-5)$

b. $-x(x^2+6x-5)$

MULTIPLYING POLYNOMIALS WHEN NEITHER IS A MONOMIAL

Multiply each _____ of one _____ by each _____ of the other polynomial. Then _____ _____ terms.

Example 6: Multiply.

a. $(x+2)(x+5)$

b. $(2x+5)(x+3)$

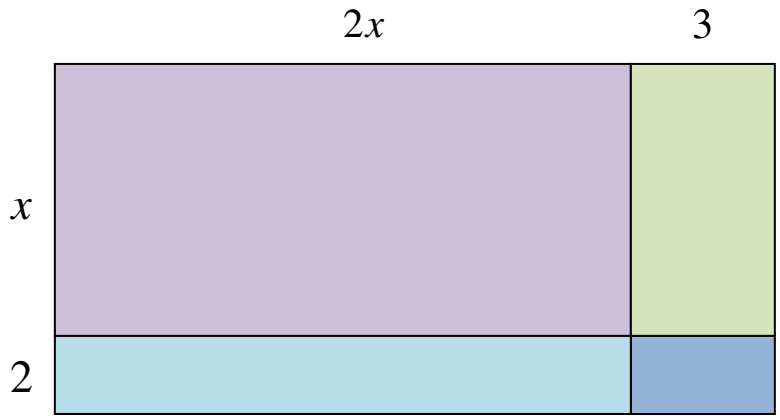
c. $\left(x^2-7x+9\right)(x+4)$

Example 6: Simplify.

a. $3x^2\left(6x^3+2x-3\right)-4x^3\left(x^2-5\right)$

b. $(y+6)^2-(y-2)^2$

APPLICATION



a. Express the area of the large rectangle as the product of two binomials.

b. Find the sum of the areas of the four smaller rectangles.

c. Use polynomial multiplication to show that your expressions for area in parts (a) and (b) are equal.