Objective 1: Multiply polynomials

- When multiplying exponential forms that have the same base, we can add the exponents and keep the same base
  - \( n^a \cdot n^b = n^{a+b} \)
  - \( 5^a \cdot 5^b = 5^{a+b} = 5^b \)
  - \( x^a \cdot x^b = x^{a+b} \)

- To multiple monomials:
  - Multiply the coefficients
  - Add the exponents of the like bases

\[
(2x^4)(3x^6) = 2 \cdot 3 \cdot x^{4+6} = 6x^{10}
\]

Objective 2: Simplify monomials raised to a power

- To simplify an exponential form raised to a power, we can multiply the exponents and keep the same base
  - \( (n^a)^b = n^{a \cdot b} \)
  - \( (5^a)^b = 5^{ab} \)
  - \( (x^a)^b = x^{ab} \)

- To simplify a monomial raised to a power
  - Evaluate the coefficient raised to that power
  - Multiply each variable’s exponent by the power

\[
(2x^2)^4 = 2^4 \cdot x^{2 \cdot 4} = 16x^{11}
\]

Objective 3: Multiply a polynomial by a monomial
3.4 Multiplying Polynomials

- To multiply a polynomial by a monomial, use the distributive property to multiply each term in the polynomial by the monomial
  - \(2x(3x^2 + 4x + 1)\)

**Objective 4:** Multiply polynomials

- To multiply two polynomials
  - Multiply every term in the first polynomial by every term in the second polynomial
  - Combine like terms
  - \((x + 5)(x + 1)\)
  - \((x + 4)(2x^2 + 5x - 3)\)

- The product of two conjugates is a difference of two squares
  - \((a + b)(a - b) = a^2 - b^2\)
  - \((3x + 5)(3x - 5)\)