

Multiplying Polynomials by Monomials

You can use the distributive property to multiply a polynomial by a monomial.

Example 1: Multiply each of the following

a) $5a(3a^2 + 4)$

$$\begin{aligned} 5a(3a^2 + 4) &= 5a(3a^2) + 5a(4) && \text{Use the Distributive Property} \\ &= 15a^3 + 20a \end{aligned}$$

b) $-3xy(2x^2y + 3xy^2 - 7y^3)$

$$\begin{aligned} -3xy(2x^2y + 3xy^2 - 7y^3) &= -3xy(2x^2y) + (-3xy)(3xy^2) + (-3xy)(-7y^3) \\ &= -6x^3y^2 - 9x^2y^3 + 21xy^4 \end{aligned}$$

Example 2: Simplify: $2a(5a^2 + 3a - 2) + 8(3a^2 - 7a + 1)$

$$\begin{aligned} 2a(5a^2 + 3a - 2) + 8(3a^2 - 7a + 1) &= 2a(5a^2) + 2a(3a) + 2a(-2) + 8(3a^2) + 8(-7a) + 8(1) \\ &= 10a^3 + 6a^2 - 4a + 24a^2 - 56a + 8 \\ &= 10a^3 + 30a^2 - 60a + 8 \end{aligned}$$