

15.5 Multiplying a Polynomial by a Monomial

Example 1

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

$$5a \cdot 3a^2 \quad 5a \cdot 4$$

$$15a^3 + 20a$$

Example 2

Find $2m^2(5m^2 - 7m + 8)$.

$$2m^2 \cdot 5m^2 \quad 2m^2 \cdot -7m \quad 2m^2 \cdot 8$$

$$10m^4 - 14m^3 + 16m^2$$

Example 3

Find $\frac{1}{2}k(-4k^2 - 3)$.

$$\frac{1}{2}k \cdot -4k^2 \quad \frac{1}{2}k \cdot -3$$

$$-2k^3 - \frac{3}{2}k$$

Example 4

Find $-5g^2(3g^2 + 4g - 1)$.

$$-5g^2 \cdot 3g^2 \quad -5g^2 \cdot 4g \quad -5g^2 \cdot -1$$

$$-15g^4 - 20g^3 + 5g^2$$

Example 5

Find $\frac{2}{3}ab^2(9a^3b^2 - 15ab^2 - 24a^2b)$.

$$\frac{2}{3}ab^2 \cdot 9a^3b^2 \quad \frac{2}{3}ab^2 \cdot -15ab^2 \quad \frac{2}{3}ab^2 \cdot -24a^2b$$

$$\frac{2}{3} \cdot 9$$

$$\frac{18}{3}$$

$$6a^4b^4 - 10a^2b^4 - 16a^3b^3$$

Example 6

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

$$-3xy \cdot 2x^2y \quad -3xy \cdot 3xy^2 \quad -3xy \cdot -7y^2$$

$$-6x^3y^2 - 9x^2y^3 + 21xy^3$$

Example 7

Simplify $8(4x - 3) - 3x(4x^2 - 2)$.

$$8 \cdot 4x \quad 8 \cdot -3 \quad -3x \cdot 4x^2 \quad -3x \cdot -2$$

$$\boxed{32x} - 24 - 12x^3 + \boxed{6x}$$

$$\boxed{-12x^3 + 38x - 24}$$

Example 8

Simplify $3r(9r^2 + 7r - 12) + 4(4r^2 - 3r + 7)$.

$$3r \cdot 9r^2 \quad 3r \cdot 7r \quad 3r \cdot -12 \quad 4 \cdot 4r^2 \quad 4 \cdot -3r \quad 4 \cdot 7$$

$$\underline{27r^3} + \boxed{21r^2} - \boxed{36r} + \boxed{16r^2} - \boxed{12r} + \underline{28}$$

$$\boxed{27r^3 + 37r^2 - 48r + 28}$$