

8.2 Part 1 Multiplying Polynomials

Multiplying a Polynomial by a Monomial

Example 1

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

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

$$15a^3 + 20a$$

Example 2

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

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

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

Example 3

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

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

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

Example 4

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

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

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

Example 5

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

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

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

Example 6

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

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

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

Example 7

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

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

$$27r^3 + 21r^2 - 36r - 16r^2 + 12r - 28$$

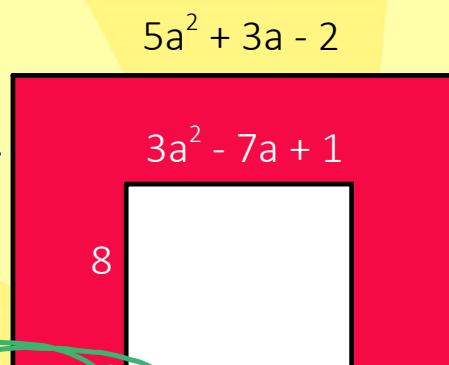
$$27r^3 + 5r^2 - 24r - 28$$

Example 8

Area = Length x Width

Find the measure of the area of the shaded region in simplest terms.

big rect. - sm. rect. = red



$$2a(5a^2 + 3a - 2) - 8(3a^2 - 7a + 1) = \text{red}$$

$$2a \cdot 5a^2 + 2a \cdot 3a - 2a \cdot 2 - 8 \cdot 3a^2 - 8 \cdot 7a + 8 \cdot 1 = \text{red}$$

$$10a^3 + 6a^2 - 4a - 24a^2 + 56a - 8 = \text{red}$$

$$10a^3 - 18a^2 + 52a - 8 = \text{red area.}$$

Example 9

$$\begin{aligned} \text{Solve } x(x-3) + 4x - 3 &= 8x + 4 + x(3+x), \\ x \cdot x - x \cdot 3 + 4x - 3 &= 8x + 4 + x \cdot 3 + x \cdot x, \\ x^2 - 3x + 4x - 3 &= 8x + 4 + 3x + x^2, \\ \cancel{x^2} - 3x + 4x - 3 &= 11x + 4 + \cancel{x^2}, \\ \cancel{x^2} - 3 &= 11x + 4 \\ \cancel{-x} - 3 &= 11x + 4 \\ -3 &= 10x + 4 \\ \cancel{-4} & \\ -7 &= 10x \\ \frac{-7}{10} &= \frac{10x}{10} \\ \boxed{\frac{-7}{10} = x} \end{aligned}$$

Example 10

$$\begin{aligned} \text{Solve } t(t-5) + 2t - 1 &= 7t + 3 + t(8+t), \\ t \cdot t - t \cdot 5 + 2t - 1 &= 7t + 3 + t \cdot 8 + t \cdot t, \\ t^2 - 5t + 2t - 1 &= 7t + 3 + 8t + t^2, \\ \cancel{t^2} - 3t - 1 &= 15t + 3 + \cancel{t^2}, \\ \cancel{t^2} - 3t - 1 &= 15t + 3 \\ \cancel{+3t} & \\ -1 &= 18t + 3 \\ \cancel{-3} & \\ -4 &= 18t \\ \frac{-4}{18} &= \frac{18t}{18} \\ \boxed{\frac{-2}{9} = t} \end{aligned}$$