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

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

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

$\boxed{27r^3 + 5r^2 - 24r - 28}$

Example 8

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

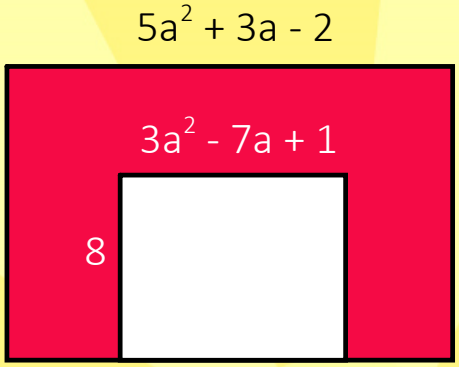
Shaded Area = big whole rectangle − small rectangle

$SA = 2a(5a^2 + 3a - 2) + -8(3a^2 - 7a + 1)$

$SA = 2a \cdot 5a^2 + 2a \cdot 3a - 2a \cdot 2 \quad -8 \cdot 3a^2 - -8 \cdot 7a + -8 \cdot 1$

$SA = 10a^3 + 6a^2 - 4a \quad -24a^2 + 56a - 8$

$SA = 10a^3 - 18a^2 + 52a - 8$



Example 9

Solve $x(x - 3) + 4x - 3 = 8x + 4 + x(3 + x)$.

$x^2 - 3x + 4x - 3 = 8x + 4 + 3x + x^2$

$x^2 + x - 3 = 11x + 4 + x^2$

$-x^2 \qquad -x^2$

$x - 3 = 11x + 4$

$+3 \qquad +3$

$x = 11x + 7$

$-11x \qquad -11x$

$\frac{-10x}{-10} = \frac{7}{-10}$

$x = -\frac{7}{10}$

Example 10

Solve $t(t - 5) + 2t - 1 = 7t + 3 + t(8 + t)$.

$t^2 - 5t + 2t - 1 = 7t + 3 + 8t + t^2$

$t^2 - 3t - 1 = 15t + 3 + t^2$

$-t^2 \qquad -t^2$

$-3t - 1 = 15t + 3$

$+3t \qquad +3t$

$-1 = 18t + 3$

$-3 \qquad -3$

$\frac{-4}{18} = \frac{18t}{18}$

$-\frac{2}{9} = t$