

1. Simplify each of the following. Write your answers as polynomials in standard form.

(a) $(2x^2 + 3)(2x^2 - 3)$

$$\begin{aligned}(2x^2 + 3)(2x^2 - 3) &= (2x^2)^2 - 3^2 \\ &= 4x^4 - 9\end{aligned}$$

(b) $6x^2(4x^3 + 2)$

$$\begin{aligned}6x^2(4x^3 + 2) &= (6x^2)(4x^3) + (6x^2)(2) \\ &= 24x^5 + 12x^2\end{aligned}$$

(c) $(4 - x^3)^2$

$$\begin{aligned}(4 - x^3)^2 &= (4 - x^3)(4 - x^3) \\ &= 16 - 4x^3 - 4x^3 + x^6 \\ &= x^6 - 8x^3 + 16\end{aligned}$$

2. Find the greatest common divisor of each group of expressions.

(a) 21, 28

$$\begin{array}{ccc} & 21 & \\ 3 & / & \backslash \\ & & 7 \end{array} \qquad \begin{array}{ccc} & 28 & \\ 2 & / & \backslash \\ & 4 & \backslash \\ & & 7 \\ & 2 & \end{array}$$

The greatest common divisor (factor) is 7.

(b) $8x^3y^2z^3, 12x^2z^4$

The greatest common factor is $4x^2z^3$.

(c) $2x^2y, 3xy, 6xyz$

The greatest common factor is xy .

3. Factor each polynomial completely.

(a) $x^2 - 16$

$$x^2 - 16 = (x - 4)(x + 4)$$

(b) $y^3 - 27$

$$y^3 - 27 = (y - 3)(y^2 + 3y + 9)$$

(c) $6x + 4$

$$6x + 4 = 2(3x + 2)$$

(d) $9x^2y^3 - 18xy$

$$9x^2y^3 - 18xy = 9xy(xy^2 - 2)$$