

9) $36n^2 - 4$

10) $12b^2 - 27$

11) $5n^2 - 125$

12) $27b^2 - 75$
 $3(\sqrt{9b^2} - \sqrt{25})$
 $3(3b + 5)(3b - 5)$

13) $25n^2 - 16$

14) $9p^2 - 4$

$(5n - 4)(5n + 4)$

15) $x^2 - 4$

16) $25m^2 - 1$

5-4 Factoring Special Products

Sum and Difference of Cube

Sum of two cubes $+$ $-$ $+$

$$\sqrt[3]{a^3} + \sqrt[3]{b^3} = (a+b)(a^2 - ab + b^2)$$

Difference of two cubes $-$ $+$ $+$

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

Sum of two cubes

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

$$\sqrt[3]{x^6} = x^2$$

Factor

$$\sqrt[3]{8x^3} + \sqrt[3]{y^3} = (2x+y)(4x^2 - 2xy + y^2)$$

$$a = 2x \quad a^2 = (2x)(2x)$$

$$b = y \quad b^2 = y \cdot y = y^2$$

$$\sqrt[3]{27x^3} + \sqrt[3]{8y^6} \quad a = 3x$$

$$b = 2y^2$$

$$(3x+2y^2)(9x^2 - 6xy^2 + 4y^4)$$

Sum of two cubes

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

Factor

$$\sqrt[3]{a^6} + \sqrt[3]{64b^3} \quad (a^2 + 4b)(a^4 - 4a^2b + 16b^2)$$

$$a = a^2 \quad b = 4b$$

$$a^2 = (a^2)$$

$$\sqrt[3]{125a^3} + \sqrt[3]{27b^9} \quad (b^3)^2$$

$$a = 5a \quad b = 3b^3$$

$$(5a + 3b^3)(25a^2 - 15ab^3 + 9b^6)$$

Difference of two cubes

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

Factor

$$\sqrt[3]{8a^3} - \sqrt[3]{27b^6} \quad a = 2a \quad b = 3b^2$$

$$(2a - 3b^2)(4a^2 + 6ab^2 + 9b^4)$$

$$x^3 - 27y^3 \quad a = x \quad b = 3y$$

$$(x - 3y)(x^2 + 3xy + 9y^2)$$

Difference of two cubes

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

Factor

$$64x^{12} - 8y^3 \quad a = 4x^4 \quad b = 2y$$
$$(4x^4 - 2y)(16x^8 + 8x^4y + 4y^2)$$

$$216x^6 - y^3 \quad a = 6x^2 \quad b = y$$
$$(6x^2 - y)(36x^4 + 6x^2y + y^2)$$