

1)

$$1) a^3 + 64 = a^3 + 4^3 = (a+4)(a^2 - 4a + 4^2)$$

$$2) 8x^3 - y^3 = (2x)^3 - y^3 = (2x-y)(4x^2 - 2xy + y^2)$$

$$3) p^9 + a^{12} = (p^3)^3 + (a^4)^3 = (p^3 + a^4)(p^6 - p^3a^4 + a^8)$$

$$4) (a+3)^3 - 27 = (a+3)^3 - 3^3 = ((a+3)-3)((a+3)^2 - 3(a+3) + 3^2) =$$

$$= a \cdot ((a+3)^2 - 3a - 9 + 9) = a \cdot ((a+3)^2 - 3a)$$

$$1) 64a^3 + 27b^3 = (4a)^3 + (3b)^3 = (4a+3b)(16a^2 - 12ab + 9b^2)$$

$$2) m^3n^3 - k^{12} = (m^3n)^3 - (k^4)^3 = (m^3n - k^4)(m^6n^2 - m^3nk^4 + k^8)$$

3)

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

$$\downarrow$$

$$2^3 - \cancel{27x^3} + \cancel{27x^3} - 6x = -4$$

$$8 - 6x = -4$$

$$-6x = -4 - 8$$

$$-6x = -12$$

$$x = 2$$

4)

$$1) (y+5)^3 = y^3 + 3 \cdot y^2 \cdot 5 + 3y \cdot 5^2 + 5^3 = y^3 + 15y^2 + 75y + 125$$

$$2) (3a-6b)^3 = 9a^3 - 3 \cdot 9a^2 \cdot 6b + 9a \cdot 36b^2 - 216b^3 = 9a^3 - 162a^2b + 324ab^2 - 216b^3$$

$$3) (a^3+3b^4)^3 = a^9 + 3 \cdot a^6 \cdot 3b^4 + 3a^3 \cdot 9b^8 + 27b^{12} = a^9 + 9a^6b^4 + 27a^3b^8 + 27b^{12}$$

5)

$$(-15x^2) = -3 \cdot 5 \cdot x^2$$

$$(x-5)^3 = x^3 - 15x^2 + 3 \cdot x \cdot 5^2 - 5^3$$

$$(x-5)^3 = x^3 - 15x^2 + 75x - 125$$