

1

次の式を展開しなさい。

$$(1) \quad (2x + 1)^3$$

$$\begin{aligned} &= (2x)^3 + 3 \times (2x)^2 \times 1 + 3 \times (2x) \times 1^2 + 1^3 \\ &= 8x^3 + 12x^2 + 6x + 1 \end{aligned}$$

$$(2) \quad (3x - 2y)^3$$

$$\begin{aligned} &= (3x)^3 - 3 \times (3x)^2 \times (2y) + 3 \times (3x) \times (2y)^2 - (2y)^3 \\ &= 27x^3 - 54x^2y + 36xy^2 - 8y^3 \end{aligned}$$

$$(3) \quad (4x + y)(16x^2 - 4xy + y^2)$$

$$\begin{aligned} &= (4x)^3 + y^3 \\ &= 64x^3 + y^3 \end{aligned}$$

$$(4) \quad (6x - 2)(36x^2 + 12x + 4)$$

$$\begin{aligned} &= (6x)^3 - 2^3 \\ &= 216x^3 - 8 \end{aligned}$$

2

次の式を因数分解しなさい。

$$(1) \quad 27x^3 - 8y^3$$

$$\begin{aligned} &= (3x)^3 - (2y)^3 \\ &= \{(3x) - (2y)\} \{(3x)^2 + (3x) \times (2y) + (2y)^2\} \\ &= (3x - 2y)(9x^2 + 6xy + 4y^2) \end{aligned}$$

$$(2) \quad a^3b^3 + c^3$$

$$\begin{aligned} &= (ab)^3 + c^3 \\ &= \{(ab) + c\} \{(ab)^2 - (ab) \times c + c^2\} \\ &= (ab + c)(a^2b^2 - abc + c^2) \end{aligned}$$

$$(3) \quad x^3 + 6x^2y + 12xy^2 + 8y^3$$

$$\begin{aligned} &= \boxed{x^3} + 3 \times x^2 \times (2y) + 3 \times x \times (2y)^2 + \boxed{(2y)^3} \\ &= (x + 2y)^3 \end{aligned}$$

$$(4) \quad 54x^4 - 128xy^3$$

$$\begin{aligned} &= 2x(27x^3 - 64y^3) \\ &= 2x \{(3x)^3 - (4y)^3\} \\ &= 2x \{(3x) - (4y)\} \{(3x)^2 + (3x) \times (4y) + (4y)^2\} \\ &= 2x(3x - 4y)(9x^2 + 12xy + 16y^2) \end{aligned}$$

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(1) $8x^3 + 12x + 6x + 1$	(2) $27x^3 - 54x^2y + 36xy^2 - 8y^3$
(3) $64x^3 + y^3$	(4) $216x^3 - 8$

2

(1) $(3x - 2y)(9x^2 + 6xy + 4y^2)$	(2) $(ab + c)(a^2b^2 - abc + c^2)$
(3) $(x + 2y)^2$	(4) $2x(3x - 4y)(9x^2 + 12xy + 16y^2)$