

50. 多項式の展開③

| | | | |
|--|-----------------------------|--|---------------|
| (1) $x^3 + 9x^2 + 27x + 27$ | (2) $8x^3 - 12x^2 + 6x - 1$ | (3) $64x^3 - 24x^2 + 3x - \frac{1}{8}$ | |
| (4) $64x^6 - 48x^4 + 12x^2 - 1$ | (5) $x^3 + 8$ | (6) $125x^3 - 8y^3$ | (7) $x^6 - 1$ |
| (8) $a^3 + 3a^2b + 3ab^2 + b^3 + 3a^2c + 6abc + 3b^2c + c^3$ | | | |

次の式を展開せよ。

$$(1) (x+3)^3 = x^3 + 3 \cdot x^2 \cdot 3 + 3 \cdot x \cdot 3^2 + 3^3$$

$$= x^3 + 9x^2 + 27x + 27$$

$$(2) (2x-1)^3 = (2x)^3 + 3(2x)^2(-1) + 3(2x)(-1)^2 + (-1)^3$$

$$= 8x^3 - 12x^2 + 6x - 1$$

$$(3) \left(4x - \frac{1}{2}\right)^3 = (4x)^3 + 3(4x)^2\left(-\frac{1}{2}\right) + 3(4x)\left(-\frac{1}{2}\right)^2 + \left(-\frac{1}{2}\right)^3$$

$$= 64x^3 - 24x^2 + 3x - \frac{1}{8}$$

$$(4) (2x+1)^3(2x-1)^3 = \{(2x+1)(2x-1)\}^3$$

$$= (4x^2 - 1)^3$$

$$= (4x^2)^3 + 3(4x^2)^2(-1) + 3(4x^2)(-1)^2 + (-1)^3$$

$$= 64x^6 - 48x^4 + 12x^2 - 1$$

$$(5) (x+2)(x^2 - 2x + 4) = x^3 + 2^3$$

$$= x^3 + 8$$

$$(6) (5x-2y)(25x^2 + 10xy + 4y^2) = (5x)^3 - (2y)^3$$

$$= 125x^3 - 8y^3$$

$$(7) (x-1)(x+1)(x^2 + x + 1)(x^2 - x + 1) = (x-1)(x^2 + x + 1)(x+1)(x^2 - x + 1)$$

$$= (x^3 - 1)(x^3 + 1)$$

$$= x^6 - 1$$

$$(8) (a+b+c)^3 = \{(a+b)+c\}^3$$

$$= (a+b)^3 + 3(a+b)^2c + 3(a+b)c^2 + c^3$$

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

$$= a^3 + 3a^2b + 3ab^2 + b^3 + 3a^2c + 6abc + 3b^2c + c^3$$