

因数分解(難関)⑦

次の式を因数分解しなさい。

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

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

(3) $(x - 3)(x + 3) + x(x - 7) + (3 - x)(x + 1)$

(4) $2a^2 - 4ab - 2bc + ac$

(5) $b^2 - 4ac + 2b(a - c)$

解答

(1)
$$\begin{aligned} & (x - 3)^2 + (x + 3)(x - 3) + 3x \\ &= x^2 - 6x + 9 + x^2 - 9 + 3x \\ &= 2x^2 - 3x \\ &\equiv x(2x - 3) \end{aligned}$$

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

$a + 1 = M$ とすると

$$\begin{aligned} & -4M + M^3 \\ &= M(M^2 - 4) \\ &= M(M + 2)(M - 2) \\ &\equiv (a + 1)(a + 3)(a - 1) \end{aligned}$$

(3)
$$\begin{aligned} & (x - 3)(x + 3) + x(x - 7) + (3 - x)(x + 1) \\ &= x^2 - 9 + x^2 - 7x - x^2 + 2x + 3 \\ &= x^2 - 5x - 6 \\ &\equiv (x - 6)(x + 1) \end{aligned}$$

(4)
$$\begin{aligned} & 2a^2 - 4ab - 2bc + ac \\ &= 2a(a - 2b) + c(a - 2b) \\ &\equiv (a - 2b)(2a + c) \end{aligned}$$

(5)
$$\begin{aligned} & b^2 - 4ac + 2b(a - c) \\ &= b(2a + b) - 2c(2a + b) \\ &\equiv (2a + b)(b - 2c) \end{aligned}$$