

次の式を因数分解しなさい。

(1) $x^2 - xy - 2x - 2y^2 + 7y - 3$

$$x^2 + (-y-2)x - (2y^2 - 7y + 3)$$

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

$$(x+y-3) \{x-(2y-1)\}$$

$$\begin{array}{r} 1 \times -3 \rightarrow -6 \\ 2 \times -1 \rightarrow -2 \\ \hline -7 \end{array}$$

$$\begin{array}{r} 1 \times -4-3 \rightarrow -4-3 \\ 1 \times -(2y-1) \rightarrow -2y-1 \\ \hline -2y+1 \end{array}$$

$$\underline{(x+y-3)(x-2y+1)}$$

(2) $a^2 + 10ab - 3a - 15b + 25b^2$

$$a^2 + (10b-3)a + 5b(5b-3)$$

$$\underline{(a+5b)(a+5b-3)}$$

$$\begin{array}{r} 1 \times 5b \rightarrow 5b \\ 1 \times 5b-3 \rightarrow 5b-3 \\ \hline 10b-3 \end{array}$$

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

$$a^2 + (-5b-2)a + (2b-3)(3b+5)$$

$$\{a-(2b-3)\} \{a-(3b+5)\}$$

$$\underline{(a-2b+3)(a-3b-5)}$$

$$\begin{array}{r} 2 \times -3 \rightarrow -6 \\ 3 \times 5 \rightarrow 15 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 1 \times -(2b-3) \rightarrow 2b-3 \quad -2b+3 \\ 1 \times -(3b+5) \rightarrow 3b+5 \quad -3b-5 \\ \hline -5b-2 \end{array}$$

(4) $x^4 + 2x^2 + 9$

$$= x^4 + 6x^2 + 9 - 4x^2$$

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

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

$$\underline{(x^2+2x+3)(x^2-2x+3)}$$

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

$$= a^2b - a^2c + b^2c - ab^2 + ac^2 - bc^2$$

$$= (b-c)a^2 - (b^2-c^2)a + bc(b-c)$$

$$= \underline{(b-c)a^2} - \underline{(b+c)(b-c)a} + \underline{bc(b-c)}$$

$$= (b-c) \{a^2 - (b+c)a + bc\}$$

$$\underline{= (b-c)(a-b)(a-c)}$$