

# 展開と因数分解 [式の展開]

## 式の展開

展開

多項式の積を単項式の和(ひとつの多項式)の形の式で表すこと

積の形

$$(a + b)(c + d) = ac + ad + bc + bd$$

和の形

展開の基本は分配法則

$$(a + b)(c + d) = a(c + d) + b(c + d)$$
$$= ac + ad + bc + bd$$

<例>  $(x + 2)(y + 3) = xy + 3x + 2y + 6$

$$(2x + 1)(x - 5) = 2x^2 - 10x + x - 5$$

※同類項は計算

$$= 2x^2 - 9x - 5 \quad \downarrow \text{項が3つ以上も同様}$$

$$(x + 2)(x + y - 1) = x^2 + xy - x + 2x + 2y - 2$$
$$= x^2 + xy + x + 2y - 2$$

<確認問題>

次の式を展開せよ。

(1)  $(2a + 1)(3b + 4)$

(6)  $(x - 1)(2x - 3)$

(2)  $(a - 1)(2b + 3)$

(7)  $(x + 2y)(x - 4y)$

(3)  $(3a - 1)(2b - 1)$

(8)  $(x + 3)(x + y - 4)$

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

(9)  $(2a - 3)(a - b - 4)$

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

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積の形

$$(a+b)(c+d) = ac + ad + bc + bd$$

和の形

展開の基本は分配法則

$$\begin{aligned}(a+b)(c+d) &= a(c+d) + b(c+d) \\ &= ac + ad + bc + bd\end{aligned}$$

<例>  $(x+2)(y+3) = xy + 3x + 2y + 6$

$$(2x+1)(x-5) = 2x^2 - 10x + x - 5$$

※同類項は計算

$$= 2x^2 - 9x - 5$$

↓項が3つ以上も同様

$$(x+2)(x+y-1) = x^2 + xy - x + 2x + 2y - 2$$

$$= x^2 + xy + x + 2y - 2$$

<確認問題>

次の式を展開せよ。

(1)  $(2a+1)(3b+4)$

$$(2a+1)(3b+4) = 6ab + 8a + 3b + 4$$

(2)  $(a-1)(2b+3)$

$$(a-1)(2b+3) = 2ab + 3a - 2b - 3$$

(3)  $(3a-1)(2b-1)$

$$(3a-1)(2b-1) = 6ab - 3a - 2b + 1$$

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

$$\begin{aligned}(3a+2)(2a+1) &= 6a^2 + 3a + 4a + 2 \\ &= 6a^2 + 7a + 2\end{aligned}$$

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

$$\begin{aligned}(2x+5)(3x-4) &= 6x^2 - 8x + 15x - 20 \\ &= 6x^2 + 7x - 20\end{aligned}$$

(6)  $(x-1)(2x-3)$

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

(7)  $(x+2y)(x-4y)$

$$\begin{aligned}(x+2y)(x-4y) &= x^2 - 4xy + 2xy - 8y^2 \\ &= x^2 - 2xy - 8y^2\end{aligned}$$

(8)  $(x+3)(x+y-4)$

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

(9)  $(2a-3)(a-b-4)$

$$\begin{aligned}(2a-3)(a-b-4) &= 2a^2 - 2ab - 8a - 3a + 3b + 12 \\ &= 2a^2 - 2ab - 11a + 3b + 12\end{aligned}$$