

展開と因数分解 [いろいろな因数分解(1)]

<演習問題>

次の式を因数分解せよ。

(1) $4x^2 + 8x + 3$

(2) $9x^2 + 12x + 4$

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

(4) $16x^2 - 1$

(5) $2x^2 + 14x + 20$

(6) $3x^2 - 6x + 3$

(7) $2x^2 + 8x + 8$

(8) $5x^2 - 5$

(9) $9x^2 + 18x + 8$

(10) $25x^2 + 10x + 1$

(11) $9x^2 - 12x + 4$

(12) $25x^2 - 4$

(13) $ax^2 + 8ax + 16a$

(14) $2ax^2 + 10ax + 12a$

(15) $x^2 + 7xy + 12y^2$

(16) $x^2 - xy - 2y^2$

(17) $9x^2 + 30xy + 25y^2$

(18) $4x^2 - 12xy + 9y^2$

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<演習問題>

次の式を因数分解せよ。

(1) $4x^2 + 8x + 3$

$$\begin{aligned}4x^2 + 8x + 3 &= (2x)^2 + (1+3) \times 2x + 1 \times 3 \\ &= (2x+1)(2x+3)\end{aligned}$$

(2) $9x^2 + 12x + 4$

$$\begin{aligned}9x^2 + 12x + 4 &= (3x)^2 + 2 \times 2 \times 3x + 2^2 \\ &= (3x+2)^2\end{aligned}$$

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

$$\begin{aligned}4x^2 - 4x + 1 &= (2x)^2 - 2 \times 1 \times 2x + 1^2 \\ &= (2x-1)^2\end{aligned}$$

(4) $16x^2 - 1$

$$\begin{aligned}16x^2 - 1 &= (4x)^2 - 1^2 \\ &= (4x+1)(4x-1)\end{aligned}$$

(5) $2x^2 + 14x + 20$

$$\begin{aligned}2x^2 + 14x + 20 &= 2(x^2 + 7x + 10) \\ &= 2(x+2)(x+5)\end{aligned}$$

(6) $3x^2 - 6x + 3$

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

(7) $2x^2 + 8x + 8$

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

(8) $5x^2 - 5$

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

(9) $9x^2 + 18x + 8$

$$\begin{aligned}9x^2 + 18x + 8 &= (3x)^2 + (2+4) \times 3x + 2 \times 4 \\ &= (3x+2)(3x+4)\end{aligned}$$

(10) $25x^2 + 10x + 1$

$$\begin{aligned}25x^2 + 10x + 1 &= (5x)^2 + 2 \times 1 \times 5x + 1^2 \\ &= (5x+1)^2\end{aligned}$$

(11) $9x^2 - 12x + 4$

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

(12) $25x^2 - 4$

$$\begin{aligned}25x^2 - 4 &= (5x)^2 - 2^2 \\ &= (5x+2)(5x-2)\end{aligned}$$

(13) $ax^2 + 8ax + 16a$

$$\begin{aligned}ax^2 + 8ax + 16a &= a(x^2 + 8x + 16) \\ &= a(x+4)^2\end{aligned}$$

(14) $2ax^2 + 10ax + 12a$

$$\begin{aligned}2ax^2 + 10ax + 12a &= 2a(x^2 + 5x + 6) \\ &= 2a(x+2)(x+3)\end{aligned}$$

(15) $x^2 + 7xy + 12y^2$

$$\begin{aligned}x^2 + 7xy + 12y^2 &= x^2 + (3y+4y) \times x + 3y \times 4y \\ &= (x+3y)(x+4y)\end{aligned}$$

(16) $x^2 - xy - 2y^2$

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

(17) $9x^2 + 30xy + 25y^2$

$$\begin{aligned}9x^2 + 30xy + 25y^2 &= (3x)^2 + 2 \times 3x \times 5y + (5y)^2 \\ &= (3x+5y)^2\end{aligned}$$

(18) $4x^2 - 12xy + 9y^2$

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