

[練習 1 2]

- (1) $(2x+5)^2 = (2x)^2 + 2 \cdot 2x \cdot 5 + 5^2$
 $= 4x^2 + 20x + 25$
- (2) $(2x-3y)^2 = (2x)^2 - 2 \cdot 2x \cdot 3y + (3y)^2$
 $= 4x^2 - 12xy + 9y^2$
- (3) $(5x+4y)(5x-4y) = (5x)^2 - (4y)^2$
 $= 25x^2 - 16y^2$
- (4) $(x+1)(x+5) = x^2 + (1+5)x + 1 \cdot 5$
 $= x^2 + 6x + 5$
- (5) $(x-3)(x+8) = x^2 + (-3+8)x + (-3) \cdot 8$
 $= x^2 + 5x - 24$
- (6) $(x-y)(x-4y) = x^2 + (-y-4y)x + (-y) \cdot (-4y)$
 $= x^2 - 5xy + 4y^2$

[練習 1 3]

- (1) $(2x+1)(4x+5) = 2 \cdot 4x^2 + (2 \cdot 5 + 1 \cdot 4)x + 1 \cdot 5$
 $= 8x^2 + 14x + 5$
- (2) $(x+4)(2x-3) = 1 \cdot 2x^2 + \{1 \cdot (-3) + 4 \cdot 2\}x + 4 \cdot (-3)$
 $= 2x^2 + 5x - 12$
- (3) $(3x-7)(x+2) = 3 \cdot 1x^2 + \{3 \cdot 2 + (-7) \cdot 1\}x + (-7) \cdot 2$
 $= 3x^2 - x - 14$
- (4) $(2x-5)(2x-1)$
 $= 2 \cdot 2x^2 + \{2 \cdot (-1) + (-5) \cdot 2\}x + (-5) \cdot (-1)$
 $= 4x^2 - 12x + 5$
- (5) $(x+3y)(2x-y)$
 $= 1 \cdot 2x^2 + \{1 \cdot (-1) + 3 \cdot 2\}xy + 3 \cdot (-1)y^2$
 $= 2x^2 + 5xy - 3y^2$
- (6) $(3x-2a)(4x-3a)$
 $= 3 \cdot 4x^2 + \{3 \cdot (-3) + (-2) \cdot 4\}ax + (-2) \cdot (-3)a^2$
 $= 12x^2 - 17ax + 6a^2$

[練習 1 4]

- (1) $(a+b-c)^2 = \{(a+b)-c\}^2$
 $= (a+b)^2 - 2(a+b)c + c^2$
 $= a^2 + 2ab + b^2 - 2ac - 2bc + c^2$
 $= a^2 + b^2 + c^2 + 2ab - 2bc - 2ca$
- (2) $(x+2y+3z)^2 = \{(x+2y)+3z\}^2$
 $= (x+2y)^2 + 2(x+2y) \cdot 3z + (3z)^2$
 $= x^2 + 4xy + 4y^2 + 6xz + 12yz + 9z^2$
 $= x^2 + 4y^2 + 9z^2 + 4xy + 12yz + 6zx$

[練習 1 5]

- (1) $(x^2+3x+2)(x^2-3x+2)$
 $= \{(x^2+2)+3x\}\{(x^2+2)-3x\}$
 $= (x^2+2)^2 - (3x)^2$
 $= x^4 + 4x^2 + 4 - 9x^2$
 $= x^4 - 5x^2 + 4$
- (2) $(x-y-z)(x-y+z) = \{(x-y)-z\}\{(x-y)+z\}$
 $= (x-y)^2 - z^2$
 $= x^2 - 2xy + y^2 - z^2$

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

[練習 1 6]

- (1) $12x^3 - 8x^2y = 4x^2(3x-2y)$
- (2) $3a^2x + 6ax^2 + ax = ax(3a+6x+1)$

[練習 1 7]

- (1) $(a+b)c + d(a+b) = (a+b)(c+d)$
- (2) $(x-2y)a + (2y-x)b = (x-2y)a - (x-2y)b$
 $= (x-2y)(a-b)$

[練習 1 8]

- (1) $x^2 + 10x + 25 = x^2 + 2 \cdot x \cdot 5 + 5^2 = (x+5)^2$
- (2) $x^2 - 12x + 36 = x^2 - 2 \cdot x \cdot 6 + 6^2 = (x-6)^2$
- (3) $x^2 + 6xy + 9y^2 = x^2 + 2 \cdot x \cdot 3y + (3y)^2 = (x+3y)^2$
- (4) $4a^2 - 4ab + b^2 = (2a)^2 - 2 \cdot 2a \cdot b + b^2 = (2a-b)^2$
- (5) $16a^2 - 25b^2 = (4a)^2 - (5b)^2 = (4a+5b)(4a-5b)$
- (6) $2x^2 - 18y^2 = 2\{x^2 - (3y)^2\} = 2(x+3y)(x-3y)$

[練習 1 9]

- (1) $x^2 + 8x + 12 = x^2 + (2+6)x + 2 \cdot 6 = (x+2)(x+6)$
- (2) $x^2 - 7x + 12 = x^2 + (-3-4)x + (-3) \cdot (-4)$
 $= (x-3)(x-4)$
- (3) $a^2 + a - 20 = a^2 + (-4+5)a + (-4) \cdot 5$
 $= (a-4)(a+5)$
- (4) $x^2 + 5xy + 6y^2 = x^2 + (2y+3y)x + 2y \cdot 3y$
 $= (x+2y)(x+3y)$
- (5) $a^2 - 8ab + 15b^2 = a^2 + (-3b-5b)a + (-3b) \cdot (-5b)$
 $= (a-3b)(a-5b)$
- (6) $x^2 - ax - 12a^2 = x^2 + (3a-4a)x + 3a \cdot (-4a)$
 $= (x+3a)(x-4a)$

[練習 2 0]

- (1) $3x^2 + 7x + 2 = (x+2)(3x+1)$
- (2) $2x^2 + 9x + 10 = (x+2)(2x+5)$
- (3) $2x^2 - 13x + 6 = (x-6)(2x-1)$
- (4) $4y^2 + 5y - 21 = (y+3)(4y-7)$
- (5) $3x^2 + 5xy - 2y^2 = (x+2y)(3x-y)$
- (6) $6x^2 - 7ax - 3a^2 = (2x-3a)(3x+a)$

[練習 2 1]

- (1) $(x-y)^2 - 5(x-y) + 6 = \{(x-y)-2\}\{(x-y)-3\}$
 $= (x-y-2)(x-y-3)$
- (2) $2(x+3y)^2 - (x+3y) - 1$
 $= \{(x+3y)-1\}\{2(x+3y)+1\}$
 $= (x+3y-1)(2x+6y+1)$
- (3) $(x+y)^2 - 9 = (x+y)^2 - 3^2 = (x+y+3)(x+y-3)$

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

$$= (x+y-1)(x-y+1)$$

$$(5) \quad x^4 - 8x^2 - 9 = (x^2+1)(x^2-9)$$

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

$$(6) \quad x^4 - 16 = (x^2)^2 - 4^2$$

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

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

[練習 2 2]

$$(1) \quad x^2 + xy - 4x - y + 3 = (x-1)y + (x^2 - 4x + 3)$$

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

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

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

$$(2) \quad x^2 + ax - 3a - 9 = (x-3)a + (x^2 - 9)$$

$$= (x-3)a + (x+3)(x-3)$$

$$= (x-3)\{a + (x+3)\}$$

$$= (x-3)(x+a+3)$$

[練習 2 3]

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

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

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

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

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

$$(2) \quad 3x^2 - 5ax + 2a^2 - 3x + a - 6$$

$$= 3x^2 + (-5a-3)x + (2a^2 + a - 6)$$

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

$$= \{x - (a+2)\}\{3x - (2a-3)\}$$

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

[練習 2 4]

$$ab(a-b) + bc(b-c) + ca(c-a)$$

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

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

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

$$= (b-c)(a-b)(a-c)$$

$$= -(a-b)(b-c)(c-a)$$

[p. 19 発展 練習 1]

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

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

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

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

$$(3) \quad (3a+b)^3 = (3a)^3 + 3 \cdot (3a)^2 \cdot b + 3 \cdot 3a \cdot b^2 + b^3$$

$$= 27a^3 + 27a^2b + 9ab^2 + b^3$$

$$(4) \quad (x-2y)^3 = x^3 - 3 \cdot x^2 \cdot 2y + 3 \cdot x \cdot (2y)^2 - (2y)^3$$

$$= x^3 - 6x^2y + 12xy^2 - 8y^3$$

[p. 20 発展 練習 2]

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

$$= x^3 + 8$$

$$(2) \quad (x-3)(x^2 + 3x + 9) = (x-3)(x^2 + x \cdot 3 + 3^2) = x^3 - 3^3$$

$$= x^3 - 27$$

$$(3) \quad (x+3y)(x^2 - 3xy + 9y^2)$$

$$= (x+3y)\{x^2 - x \cdot 3y + (3y)^2\}$$

$$= x^3 + (3y)^3 = x^3 + 27y^3$$

$$(4) \quad (2x-a)(4x^2 + 2ax + a^2)$$

$$= (2x-a)\{(2x)^2 + 2x \cdot a + a^2\} = (2x)^3 - a^3$$

$$= 8x^3 - a^3$$

[p. 20 発展 練習 3]

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

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

$$(2) \quad x^3 + 27a^3 = x^3 + (3a)^3 = (x+3a)(x^2 - x \cdot 3a + (3a)^2)$$

$$= (x+3a)(x^2 - 3ax + 9a^2)$$

$$(3) \quad x^3 - 64 = x^3 - 4^3 = (x-4)(x^2 + x \cdot 4 + 4^2)$$

$$= (x-4)(x^2 + 4x + 16)$$

$$(4) \quad 125x^3 - y^3 = (5x)^3 - y^3 = (5x-y)\{(5x)^2 + 5x \cdot y + y^2\}$$

$$= (5x-y)(25x^2 + 5xy + y^2)$$

[練習 2 5]

$$(1) \quad \frac{1}{3} = 0.333\cdots = 0.\dot{3}$$

$$(2) \quad \frac{8}{9} = 0.888\cdots = 0.\dot{8}$$

$$(3) \quad \frac{3}{22} = 0.1363636\cdots = 0.1\dot{3}\dot{6}$$

$$(4) \quad \frac{15}{7} = 2.142857142857\cdots = 2.\dot{1}4285\dot{7}$$

[練習 2 6]

$$(1) \quad x = 0.\dot{1} \text{ とおく。}$$

右の計算から

$$\begin{array}{r} 9x = 1 \\ \hline x = \frac{1}{9} \end{array}$$

$$\begin{array}{r} 10x = 1.111\cdots \\ -) \quad x = 0.111\cdots \\ \hline 9x = 1 \end{array}$$

$$\text{よって} \quad x = \frac{1}{9}$$

$$(2) \quad x = 0.\dot{2}\dot{7} \text{ とおく。}$$

右の計算から

$$\begin{array}{r} 99x = 27 \\ \hline x = \frac{27}{99} = \frac{3}{11} \end{array}$$

$$\begin{array}{r} 100x = 27.272727\cdots \\ -) \quad x = 0.272727\cdots \\ \hline 99x = 27 \end{array}$$

$$\text{よって} \quad x = \frac{27}{99} = \frac{3}{11}$$

$$(3) \quad x = 0.\dot{6}4\dot{8} \text{ とおく。}$$

右の計算から

$$\begin{array}{r} 999x = 648 \\ \hline x = \frac{648}{999} = \frac{24}{37} \end{array}$$

$$\begin{array}{r} 1000x = 648.648648\cdots \\ -) \quad x = 0.648648\cdots \\ \hline 999x = 648 \end{array}$$

$$\text{よって} \quad x = \frac{648}{999} = \frac{24}{37}$$

$$(4) \quad x = 0.2\dot{5}\dot{4} \text{ とおく。}$$

右の計算から

$$\begin{array}{r} 990x = 252 \\ \hline x = \frac{252}{990} = \frac{14}{55} \end{array}$$

$$\begin{array}{r} 1000x = 254.545454\cdots \\ -) \quad 10x = 2.545454\cdots \\ \hline 990x = 252 \end{array}$$

$$\text{よって} \quad x = \frac{252}{990} = \frac{14}{55}$$