

■練習、補充問題(節末)、章末問題の解答

第1章 数と式

○練習の解答

練習1

- (1) 係数6, 次数2
- (2) 係数1, 次数1
- (3) 係数-1, 次数4
- (4) 係数-3, 次数3

練習2

- (1) 係数2a, 次数3
- (2) 係数3x, 次数2
- (3) 係数-6a, 次数3

練習3

- (1)  $4x^2 + 3x - 1 - 2x^3 - 4x + 6$   
 $= (4-2)x^2 + (3-4)x + (-1+6)$   
 $= 2x^2 - x + 5$
- (2)  $3a^2 - 2ab - 4b^2 - 5a^2 + 2ab - 8b^2$   
 $= (3-5)a^2 + (-2+2)ab + (-4-8)b^2$   
 $= -2a^2 - 12b^2$

練習4

- (1) 3次式
- (2) 4次式

練習5

- (1) 3次式, 定数項 $b^2+c$
- (2) 2次式, 定数項 $ax^2+c$

練習6

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

練習7

- (1)  $A+B = (2x^2 + 3x - 1) + (4x^2 - 5x - 6)$   
 $= (2+4)x^2 + (3-5)x + (-1-6)$   
 $= 6x^2 - 2x - 7$
- $A-B = (2x^2 + 3x - 1) - (4x^2 - 5x - 6)$   
 $= 2x^2 + 3x - 1 - 4x^2 + 5x + 6$   
 $= (2-4)x^2 + (3+5)x + (-1+6)$   
 $= -2x^2 + 8x + 5$
- (2)  $A+B = (4x^3 - 3x^2 - 2x + 5) + (2x^3 - 3x^2 + 7)$   
 $= (4+2)x^3 + (-3-3)x^2 - 2x + (5+7)$

$$\begin{aligned}
 &= 6x^3 - 6x^2 - 2x + 12 \\
 A - B &= (4x^3 - 3x^2 - 2x + 5) - (2x^3 - 3x^2 + 7) \\
 &= 4x^3 - 3x^2 - 2x + 5 - 2x^3 + 3x^2 - 7 \\
 &= (4-2)x^3 + (-3+3)x^2 - 2x + (5-7) \\
 &= 2x^3 - 2x - 2
 \end{aligned}$$

練習8

- (1)  $A+2B = (x^2 + 4x - 3) + 2(2x^2 - x + 4)$   
 $= x^2 + 4x - 3 + 4x^2 - 2x + 8$   
 $= (1+4)x^2 + (4-2)x + (-3+8)$   
 $= 5x^2 + 2x + 5$
  - (2)  $2A-3B = 2(x^2 + 4x - 3) - 3(2x^2 - x + 4)$   
 $= 2x^2 + 8x - 6 - 6x^2 + 3x - 12$   
 $= (2-6)x^2 + (8+3)x + (-6-12)$   
 $= -4x^2 + 11x - 18$
- 練習9
- (1)  $2a^3 \times 4a^2 = (2 \times 4) \times a^{3+2} = 8a^5$
  - (2)  $a^2 \times (-3a) = -3 \times a^{2+1} = -3a^3$
  - (3)  $4ab^2 \times b^4 = 4 \times a \times b^{2+4} = 4ab^6$
  - (4)  $3x^2y \times (-2x^3y^2) = 3 \times (-2) \times x^{2+3} \times y^{1+2} = -6x^5y^3$
  - (5)  $(-a^2b^3)^2 = (-1)^2 \times (a^2)^2 \times (b^3)^2 = a^4b^6$
  - (6)  $(-3x^2y)^3 = (-3)^3 \times (x^2)^3 \times y^3 = -27x^6y^3$

練習10

- (1)  $4x^2(2x^2 - 3x + 5)$   
 $= 4x^2 \times 2x^2 + 4x^2 \times (-3x) + 4x^2 \times 5$   
 $= 8x^4 - 12x^3 + 20x^2$
- (2)  $(3a^2 - a - 2) \times (-2a)$   
 $= 3a^2 \times (-2a) + (-a) \times (-2a) + (-2) \times (-2a)$   
 $= -6a^3 + 2a^2 + 4a$

練習11

- (1)  $(2x-1)(4x^2+3) = (2x-1) \cdot 4x^2 + (2x-1) \cdot 3$   
 $= 8x^3 - 4x^2 + 6x - 3$
- (2)  $(2x^2 + x - 3)(x - 2)$   
 $= (2x^2 + x - 3)x + (2x^2 + x - 3) \cdot (-2)$   
 $= 2x^3 + x^2 - 3x - 4x^2 - 2x + 6$   
 $= 2x^3 - 3x^2 - 5x + 6$
- (3)  $(x+3)(x^2 - 2x + 1) = x(x^2 - 2x + 1) + 3(x^2 - 2x + 1)$   
 $= x^3 - 2x^2 + x + 3x^2 - 6x + 3$   
 $= x^3 + x^2 - 5x + 3$
- (4)  $(2x+1)(3x^2 + x - 2)$   
 $= 2x(3x^2 + x - 2) + 1 \cdot (3x^2 + x - 2)$   
 $= 6x^3 + 2x^2 - 4x + 3x^2 + x - 2$   
 $= 6x^3 + 5x^2 - 3x - 2$

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)  $(x-2)(x-4) = x^2 + (-2) + (-4)x + (-2) \cdot (-4)$   
 $= x^2 - 6x + 8$   
 (7)  $(x+2y)(x+5y) = x^2 + (2y+5y)x + 2y \cdot 5y$   
 $= x^2 + 7xy + 10y^2$   
 (8)  $(x+y)(x-4y) = x^2 + (y-4y)x + y \cdot (-4y)$   
 $= x^2 - 3xy - 4y^2$   
 (9)  $(x-2a)(x-7a) = x^2 + (-2a-7a)x + (-2a) \cdot (-7a)$   
 $= x^2 - 9ax + 14a^2$

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

練習 1 4

- (1)  $(3a-b+2)(3a-b-2)$   
 $= (3a-b) + 2)(3a-b) - 2) = (3a-b)^2 - 2^2$   
 $= 9a^2 - 6ab + b^2 - 4$   
 (2)  $(x-y+3)(x-y-2)$   
 $= [(x-y) + 3][(x-y) - 2] = (x-y)^2 + (x-y) - 6$   
 $= x^2 - 2xy + y^2 + x - y - 6$

練習 1 5

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

(2)  $x^2+1=A$  とおくと

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

練習 1 6

- (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 7

- (1)  $(x+1)^2(x-1)^2 = [(x+1)(x-1)]^2 = (x^2-1)^2$   
 $= (x^2)^2 - 2 \cdot x^2 \cdot 1 + 1^2 = x^4 - 2x^2 + 1$   
 (2)  $(x^2+1)(x+1)(x-1) = (x^2+1)(x^2-1)$   
 $= (x^2)^2 - 1^2 = x^4 - 1$