

【復習 1】 正負の数・文字式

1 P.4

- (1) ㉗, ㉘, ㉙, ㉚, ㉛  
 (2) ㉜, ㉝, ㉞, ㉟, ㊱

2 P.4

- (1) 14 (2) 36  
 (3) -23 (4) 15  
 (5) 32 (6) -20  
 (7) 28 (8) 7

【解説】

- (1)  $5 - (-9) = 5 + 9 = 14$   
 (2)  $(-6)^2 = (-6) \times (-6) = 36$   
 (3)  $3 \times (-5) - 8 = -15 - 8 = -23$   
 (4)  $35 \div (-7) - 5 \times (-4) = -5 + 20 = 15$   
 (5)  $-8 \times (-7 + 3) = -8 \times (-4) = 32$   
 (6)  $(5 - 9) \times 3 - 8 = (-4) \times 3 - 8 = -12 - 8 = -20$   
 (7)  $10 - (-3^2) \times 2 = 10 - (-9) \times 2 = 10 + 18 = 28$   
 (8)  $(-4)^2 + (5 - 2^3) \times 3 = 16 + (5 - 8) \times 3 = 16 - 9 = 7$

3 P.4

- (1) 21点 (2) 58点

【解説】

- (1) もっとも高い生徒はB,  
 もっとも低い生徒はCである。  
 $8 - (-13) = 21$  (点)  
 (2) 表の5つの数の平均は,  
 $\{(-6) + 8 + (-13) + (-4) + 5\} \div 5 = (-10) \div 5 = -2$   
 5人の得点の平均は,  
 $60 + (-2) = 58$  (点)

4 P.5

- (1) ①  $-7a$  ②  $x^2y$  ③  $\frac{3x+y}{2}$   
 (2) ①  $8 \times x \times y$  ②  $a \times a \times a \times b$   
 ③  $(a-b) \div 5$

5 P.5

- (1) 単項式...㉗, ㉘ 多項式...㉙, ㉚  
 (2) 4  
 (3)  $x^2, 3x$   
 (4) ㉛ 2 ㉜ 2 ㉝ 3 ㉞ 1

6 P.5

- (1)  $80a$  m (2)  $\frac{1}{5}a$  人  
 (3)  $1000 - 50a = b$  (4)  $2x + 7 > y$

【解説】

- (2)  $a \times \frac{20}{100} = \frac{1}{5}a$  (人)  
 (3) おつりは,  $(1000 - 50a)$  円

7

P.6

- |                 |                             |
|-----------------|-----------------------------|
| (1) $a + 8b$    | (2) $-3x^2 + x$             |
| (3) $-2x - 2$   | (4) $x + 3y$                |
| (5) $-18a$      | (6) $3a$                    |
| (7) $12a + 21b$ | (8) $10x - 15y - 5$         |
| (9) $3x + 4$    | (10) $4x^2 - 3x + 5$        |
| (11) $7x - 3$   | (12) $6x + 8y$              |
| (13) $9x$       | (14) $\frac{11x - 11y}{12}$ |

【解説】

- (3)  $(x-7) + (-3x+5) = x-7-3x+5$   
 $= -2x-2$
- (4)  $(4x+y) - (3x-2y) = 4x+y-3x+2y$   
 $= x+3y$
- (9)  $(6x+8) \div 2 = (6x+8) \times \frac{1}{2}$   
 $= 3x+4$
- (10)  $(12x^2-9x+15) \div 3 = (12x^2-9x+15) \times \frac{1}{3}$   
 $= 4x^2-3x+5$
- (11)  $3(x+5) + 2(2x-9) = 3x+15+4x-18$   
 $= 7x-3$
- (12)  $4(3x-y) - 6(x-2y) = 12x-4y-6x+12y$   
 $= 6x+8y$
- (13)  $\frac{1}{2}(4x^2+6x) - \frac{2}{3}(3x^2-9x) = 2x^2+3x-2x^2+6x$   
 $= 9x$
- (14)  $\frac{x-5y}{4} + \frac{2x+y}{3} = \frac{3(x-5y)+4(2x+y)}{12}$   
 $= \frac{3x-15y+8x+4y}{12}$   
 $= \frac{11x-11y}{12}$

8

P.6

- |            |               |
|------------|---------------|
| (1) $-6xy$ | (2) $16m^2$   |
| (3) $-2x$  | (4) $-15b$    |
| (5) $6b$   | (6) $-4x$     |
| (7) $2x^3$ | (8) $2a^2b^2$ |

【解説】

- (2)  $(-4m)^2 = (-4m) \times (-4m)$   
 $= 16m^2$
- (3)  $8xy \div (-4y) = -\frac{8xy}{4y}$   
 $= -2x$
- (4)  $(-10ab^2) \div \frac{2}{3}ab = (-10ab^2) \times \frac{3}{2ab}$   
 $= -15b$
- (5)  $4a \times 3b^2 \div 2ab = \frac{4a \times 3b^2}{2ab}$   
 $= 6b$
- (6)  $8x^3 \div (-2x) \div x = -\frac{8x^3}{2x \times x}$   
 $= -4x$
- (7)  $(-2x)^3 \times x \div (-4x) = (-8x^3) \times x \div (-4x)$   
 $= \frac{8x^3 \times x}{4x} = 2x^3$
- (8)  $6a^2b \times (-3ab) \div (-9a) = \frac{6a^2b \times 3ab}{9a}$   
 $= 2a^2b^2$

9

P.7

- |            |        |
|------------|--------|
| (1)① $-11$ | ② $-8$ |
| (2)① $4$   | ② $18$ |
| ③ $12$     | ④ $-6$ |

【解説】

- (1)①  $4a-3 = 4 \times (-2) - 3$   
 $= -11$
- ②  $a^3 = (-2)^3$   
 $= -8$
- (2)①  $2x+5y = 2 \times (-3) + 5 \times 2$   
 $= 4$
- ②  $x^2y = (-3)^2 \times 2$   
 $= 18$
- ③  $(-14x^2y^3) \div 7xy^2 = -2xy$   
 $= -2 \times (-3) \times 2 = 12$
- ④  $(7x-6y+8) - (5x-7y+10)$   
 $= 2x+y-2$   
 $= 2 \times (-3) + 2 - 2$   
 $= -6$

10

P.7

- |                             |                       |
|-----------------------------|-----------------------|
| (1) $x = \frac{7-3y}{2}$    | (2) $y = \frac{2}{x}$ |
| (3) $r = \frac{\ell}{2\pi}$ | (4) $b = 2m - a$      |

【解説】

- (1)  $2x+3y=7$   
 $2x=7-3y$   
 $x = \frac{7-3y}{2}$
- (2)  $5xy=10$   
 $y = \frac{10}{5x}$   
 $y = \frac{2}{x}$
- (3)  $\ell = 2\pi r$   
 $2\pi r = \ell$   
 $r = \frac{\ell}{2\pi}$
- (4)  $m = \frac{a+b}{2}$   
 $2m = a+b$   
 $a+b = 2m$   
 $b = 2m - a$

11

P.7

- (1)  $m, n$ を整数とすると、2つの偶数は  $2m, 2n$  と表せるから、

$$2m \times 2n = 4mn$$

$mn$ は整数だから、 $4mn$ は4の倍数である。

したがって、2つの偶数の積は4の倍数になる。

- (2) 2けたの自然数の十の位を  $x$ 、一の位を  $y$  とすると、この自然数は  $10x+y$  で、各位の数の和をひいた数は、

$$(10x+y) - (x+y) = 9x$$

$x$ は整数だから、 $9x$ は9の倍数である。

したがって、2けたの自然数から、その数の各位の数の和をひくと、9の倍数になる。

## 1 式の展開

## 確認問題 1

P.8

- |                       |                       |
|-----------------------|-----------------------|
| (1) $4x^2 + 8xy$      | (2) $-10a^2 + 6ab$    |
| (3) $-9a^2 + 6ab$     | (4) $-14x^2 + 21x$    |
| (5) $2x^2 - 4xy + 6x$ | (6) $6a^2 + 3ab - 9a$ |
| (7) $3a^2 - a$        | (8) $6a^2 + 15ab$     |

## 【解説】

- (1)  $4x(x+2y) = 4x \times x + 4x \times 2y$   
 $= 4x^2 + 8xy$
- (2)  $(5a-3b) \times (-2a) = 5a \times (-2a) - 3b \times (-2a)$   
 $= -10a^2 + 6ab$
- (3)  $-3a(3a-2b) = -3a \times 3a - 3a \times (-2b)$   
 $= -9a^2 + 6ab$
- (4)  $7x(-2x+3) = 7x \times (-2x) + 7x \times 3$   
 $= -14x^2 + 21x$
- (5)  $2x(x-2y+3) = 2x \times x - 2x \times 2y + 2x \times 3$   
 $= 2x^2 - 4xy + 6x$
- (6)  $(2a+b-3) \times 3a = 2a \times 3a + b \times 3a - 3 \times 3a$   
 $= 6a^2 + 3ab - 9a$
- (7)  $\frac{1}{3}a(9a-3) = \frac{1}{3}a \times 9a - \frac{1}{3}a \times 3$   
 $= 3a^2 - a$
- (8)  $\frac{3}{2}a(4a+10b) = \frac{3}{2}a \times 4a + \frac{3}{2}a \times 10b$   
 $= 6a^2 + 15ab$

## 確認問題 2

P.8

- |                 |                            |
|-----------------|----------------------------|
| (1) $5x^2 - 2x$ | (2) $3x^2 - 3x$            |
| (3) $6a^2 + a$  | (4) $\frac{1}{4}x^2 - 2xy$ |

## 【解説】

- (1)  $x(3x+4) + 2x(x-3) = 3x^2 + 4x + 2x^2 - 6x$   
 $= 5x^2 - 2x$
- (2)  $2x(x-5) + x(x+7) = 2x^2 - 10x + x^2 + 7x$   
 $= 3x^2 - 3x$
- (3)  $\frac{2}{3}a(6a-3) + a(2a+3) = 4a^2 - 2a + 2a^2 + 3a$   
 $= 6a^2 + a$
- (4)  $x(x+4y) - \frac{3}{4}x(x+8y) = x^2 + 4xy - \frac{3}{4}x^2 - 6xy$   
 $= \frac{1}{4}x^2 - 2xy$

## 確認問題 3

P.9

- |                 |             |
|-----------------|-------------|
| (1) $x+2y$      | (2) $3a-2b$ |
| (3) $-xy+3$     | (4) $a+2b$  |
| (5) $ab-2b^2-3$ | (6) $2a-2b$ |
| (7) $3ab-9b^2$  | (8) $12y-4$ |

## 【解説】

- (1)  $(2x^2+4xy) \div 2x = (2x^2+4xy) \times \frac{1}{2x}$   
 $= x+2y$
- (2)  $(9ab-6b^2) \div 3b = (9ab-6b^2) \times \frac{1}{3b}$   
 $= 3a-2b$
- (3)  $(4x^2y-12x) \div (-4x) = (4x^2y-12x) \times \left(-\frac{1}{4x}\right)$   
 $= -xy+3$
- (4)  $(5a^2b+10ab^2) \div 5ab = (5a^2b+10ab^2) \times \frac{1}{5ab}$   
 $= a+2b$
- (5)  $(a^2b-2ab^2-3a) \div a = (a^2b-2ab^2-3a) \times \frac{1}{a}$   
 $= ab-2b^2-3$
- (6)  $(a^2-ab) \div \frac{1}{2}a = (a^2-ab) \times \frac{2}{a}$   
 $= 2a-2b$
- (7)  $(2a^2b-6ab^2) \div \frac{2}{3}a = (2a^2b-6ab^2) \times \frac{3}{2a}$   
 $= 3ab-9b^2$
- (8)  $(9xy^2-3xy) \div \frac{3}{4}xy = (9xy^2-3xy) \times \frac{4}{3xy}$   
 $= 12y-4$

## 確認問題 4

P.9

- |                           |                     |
|---------------------------|---------------------|
| (1) $ab+3a+2b+6$          | (2) $xy+6x-8y-48$   |
| (3) $x^2+4xy+3y^2$        | (4) $6a^2-ab-12b^2$ |
| (5) $x^2-xy+3x-2y+2$      |                     |
| (6) $a^2-2ab-8b^2+3a-12b$ |                     |

## 【解説】

- (3)  $(x+3y)(x+y) = x^2 + xy + 3xy + 3y^2$   
 $= x^2 + 4xy + 3y^2$
- (4)  $(3a+4b)(2a-3b) = 6a^2 - 9ab + 8ab - 12b^2$   
 $= 6a^2 - ab - 12b^2$
- (5)  $(x+2)(x-y+1) = x(x-y+1) + 2(x-y+1)$   
 $= x^2 - xy + x + 2x - 2y + 2$   
 $= x^2 - xy + 3x - 2y + 2$

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

## 確認問題 5

P.10

- |                          |                                     |
|--------------------------|-------------------------------------|
| (1) $x^2+7x+12$          | (2) $a^2+15a+54$                    |
| (3) $x^2+4x-12$          | (4) $x^2+x-20$                      |
| (5) $y^2+4y-21$          | (6) $x^2-7x-8$                      |
| (7) $a^2-4a-60$          | (8) $x^2-8x+7$                      |
| (9) $x^2-17x+72$         | (10) $m^2-5m-50$                    |
| (11) $x^2-x+\frac{2}{9}$ | (12) $a^2+\frac{1}{4}a-\frac{3}{8}$ |

## 【解説】

- (1)  $(x+4)(x+3) = x^2 + (4+3)x + 4 \times 3$   
 $= x^2 + 7x + 12$
- (2)  $(a+6)(a+9) = a^2 + (6+9)a + 6 \times 9$   
 $= a^2 + 15a + 54$
- (3)  $(x-2)(x+6) = x^2 + (-2+6)x + (-2) \times 6$   
 $= x^2 + 4x - 12$
- (4)  $(x+5)(x-4) = x^2 + (5-4)x + 5 \times (-4)$   
 $= x^2 + x - 20$
- (5)  $(y-3)(y+7) = y^2 + (-3+7)y + (-3) \times 7$   
 $= y^2 + 4y - 21$
- (6)  $(x+1)(x-8) = x^2 + (1-8)x + 1 \times (-8)$   
 $= x^2 - 7x - 8$
- (7)  $(a-10)(a+6) = a^2 + (-10+6)a + (-10) \times 6$   
 $= a^2 - 4a - 60$
- (8)  $(x-7)(x-1) = x^2 + (-7-1)x + (-7) \times (-1)$   
 $= x^2 - 8x + 7$
- (9)  $(x-9)(x-8) = x^2 + (-9-8)x + (-9) \times (-8)$   
 $= x^2 - 17x + 72$
- (10)  $(m+5)(m-10) = m^2 + (5-10)m + 5 \times (-10)$   
 $= m^2 - 5m - 50$
- (11)  $\left(x - \frac{1}{3}\right)\left(x - \frac{2}{3}\right)$   
 $= x^2 + \left(-\frac{1}{3} - \frac{2}{3}\right)x + \left(-\frac{1}{3}\right) \times \left(-\frac{2}{3}\right)$   
 $= x^2 - x + \frac{2}{9}$
- (12)  $\left(a + \frac{3}{4}\right)\left(a - \frac{1}{2}\right)$   
 $= a^2 + \left(\frac{3}{4} - \frac{1}{2}\right)a + \frac{3}{4} \times \left(-\frac{1}{2}\right)$   
 $= a^2 + \frac{1}{4}a - \frac{3}{8}$

## 確認問題 6

P.11

- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| (1) $x^2+8x+16$                     | (2) $a^2+14a+49$                    |
| (3) $x^2+20x+100$                   | (4) $x^2-4x+4$                      |
| (5) $y^2-12y+36$                    | (6) $a^2-22a+121$                   |
| (7) $m^2-2mn+n^2$                   | (8) $x^2+x+\frac{1}{4}$             |
| (9) $x^2-\frac{1}{2}x+\frac{1}{16}$ | (10) $a^2-\frac{4}{3}a+\frac{4}{9}$ |

## 【解説】

- (1)  $(x+4)^2 = x^2 + 2 \times 4 \times x + 4^2$   
 $= x^2 + 8x + 16$
- (2)  $(a+7)^2 = a^2 + 2 \times 7 \times a + 7^2$   
 $= a^2 + 14a + 49$
- (3)  $(x+10)^2 = x^2 + 2 \times 10 \times x + 10^2$   
 $= x^2 + 20x + 100$
- (4)  $(x-2)^2 = x^2 - 2 \times 2 \times x + 2^2$   
 $= x^2 - 4x + 4$
- (5)  $(y-6)^2 = y^2 - 2 \times 6 \times y + 6^2$   
 $= y^2 - 12y + 36$
- (6)  $(a-11)^2 = a^2 - 2 \times 11 \times a + 11^2$   
 $= a^2 - 22a + 121$
- (7)  $(m-n)^2 = m^2 - 2 \times n \times m + n^2$   
 $= m^2 - 2mn + n^2$
- (8)  $\left(x + \frac{1}{2}\right)^2 = x^2 + 2 \times \frac{1}{2} \times x + \left(\frac{1}{2}\right)^2$   
 $= x^2 + x + \frac{1}{4}$
- (9)  $\left(x - \frac{1}{4}\right)^2 = x^2 - 2 \times \frac{1}{4} \times x + \left(\frac{1}{4}\right)^2$   
 $= x^2 - \frac{1}{2}x + \frac{1}{16}$
- (10)  $\left(a - \frac{2}{3}\right)^2 = a^2 - 2 \times \frac{2}{3} \times a + \left(\frac{2}{3}\right)^2$   
 $= a^2 - \frac{4}{3}a + \frac{4}{9}$

確認問題 7

P.11

- |                         |                          |
|-------------------------|--------------------------|
| (1) $x^2 - 1$           | (2) $a^2 - 9$            |
| (3) $m^2 - n^2$         | (4) $x^2 - 81$           |
| (5) $a^2 - 100$         | (6) $a^2 - 144$          |
| (7) $x^2 - \frac{1}{4}$ | (8) $a^2 - \frac{4}{25}$ |
| (9) $16 - x^2$          | (10) $36 - m^2$          |

【解説】

- (1)  $(x+1)(x-1) = x^2 - 1^2 = x^2 - 1$
- (2)  $(a-3)(a+3) = a^2 - 3^2 = a^2 - 9$
- (4)  $(x+9)(x-9) = x^2 - 9^2 = x^2 - 81$
- (5)  $(a+10)(a-10) = a^2 - 10^2 = a^2 - 100$
- (6)  $(a-12)(a+12) = a^2 - 12^2 = a^2 - 144$
- (7)  $(x + \frac{1}{2})(x - \frac{1}{2}) = x^2 - (\frac{1}{2})^2 = x^2 - \frac{1}{4}$
- (8)  $(a + \frac{2}{5})(a - \frac{2}{5}) = a^2 - (\frac{2}{5})^2 = a^2 - \frac{4}{25}$
- (9)  $(4+x)(4-x) = 4^2 - x^2 = 16 - x^2$
- (10)  $(6+m)(6-m) = 6^2 - m^2 = 36 - m^2$

確認問題 8

P.12・P.13

- |                        |                              |
|------------------------|------------------------------|
| (1)① $4x^2 + 16x + 15$ | ② $16a^2 - 8a - 3$           |
| ③ $9x^2 - 24x + 7$     | ④ $\frac{1}{4}x^2 + 4x + 15$ |
| ⑤ $4x^2 + 12x + 9$     | ⑥ $25x^2 - 40x + 16$         |
| ⑦ $9a^2 - 12ab + 4b^2$ | ⑧ $16x^2 + 56xy + 49y^2$     |
| ⑨ $9x^2 - 4$           | ⑩ $16a^2 - 81$               |
| ⑪ $25a^2 - 9b^2$       | ⑫ $4a^2 - \frac{1}{9}$       |

- (2)①  $a^2 + 2ab + b^2 + 5a + 5b + 6$
- ②  $x^2 + 2xy + y^2 + 3x + 3y - 4$
- ③  $x^2 - 2xy + y^2 - 16$
- ④  $a^2 + 2ab + b^2 - 25$
- ⑤  $a^2 + 2ab + b^2 + 6a + 6b + 9$
- ⑥  $a^2 - 2ab + b^2 - 4a + 4b + 4$

【解説】

- (1)①  $(2x+5)(2x+3) \xrightarrow{2x=A}$   $= (A+5)(A+3) = A^2 + 8A + 15 = 4x^2 + 16x + 15$
- ②  $(4a-3)(4a+1) \xrightarrow{4a=A}$   $= (A-3)(A+1) = A^2 - 2A - 3 = 16a^2 - 8a - 3$
- ③  $(-3x+7)(-3x+1) \xrightarrow{-3x=A}$   $= (A+7)(A+1) = A^2 + 8A + 7 = 9x^2 - 24x + 7$
- ④  $(\frac{1}{2}x+3)(\frac{1}{2}x+5) \xrightarrow{\frac{1}{2}x=A}$   $= (A+3)(A+5) = A^2 + 8A + 15 = \frac{1}{4}x^2 + 4x + 15$
- ⑤  $(2x+3)^2 = (2x)^2 + 2 \times 3 \times 2x + 3^2 = 4x^2 + 12x + 9$
- ⑥  $(5x-4)^2 = (5x)^2 - 2 \times 4 \times 5x + 4^2 = 25x^2 - 40x + 16$
- ⑦  $(3a-2b)^2 = (3a)^2 - 2 \times 2b \times 3a + (2b)^2 = 9a^2 - 12ab + 4b^2$
- ⑧  $(4x+7y)^2 = (4x)^2 + 2 \times 7y \times 4x + (7y)^2 = 16x^2 + 56xy + 49y^2$
- ⑨  $(3x+2)(3x-2) = (3x)^2 - 2^2 = 9x^2 - 4$

- ⑩  $(4a+9)(4a-9) = (4a)^2 - 9^2 = 16a^2 - 81$
- ⑪  $(5a+3b)(5a-3b) = (5a)^2 - (3b)^2 = 25a^2 - 9b^2$
- ⑫  $(2a + \frac{1}{3})(2a - \frac{1}{3}) = (2a)^2 - (\frac{1}{3})^2 = 4a^2 - \frac{1}{9}$
- (2)①  $(a+b+2)(a+b+3) \xrightarrow{a+b=X}$   $= (X+2)(X+3) = X^2 + 5X + 6 = a^2 + 2ab + b^2 + 5a + 5b + 6$
- ②  $(x+y-1)(x+y+4) \xrightarrow{x+y=X}$   $= (X-1)(X+4) = X^2 + 3X - 4 = x^2 + 2xy + y^2 + 3x + 3y - 4$
- ③  $(x-y+4)(x-y-4) \xrightarrow{x-y=X}$   $= (X+4)(X-4) = X^2 - 16 = x^2 - 2xy + y^2 - 16$
- ④  $(a+b-5)(a+b+5) \xrightarrow{a+b=X}$   $= (X-5)(X+5) = X^2 - 25 = a^2 + 2ab + b^2 - 25$
- ⑤  $(a+b+3)^2 \xrightarrow{a+b=X}$   $= (X+3)^2 = X^2 + 6X + 9 = a^2 + 2ab + b^2 + 6a + 6b + 9$
- ⑥  $(a-b-2)^2 \xrightarrow{a-b=X}$   $= (X-2)^2 = X^2 - 4X + 4 = a^2 - 2ab + b^2 - 4a + 4b + 4$

確認問題 9

P.13

- |                       |                      |
|-----------------------|----------------------|
| (1) $2x^2 + 7x + 7$   | (2) $2x^2 - 6x + 5$  |
| (3) $2x^2 + 6x$       | (4) $-3$             |
| (5) $2x + 38$         | (6) $2a^2 - 2a + 13$ |
| (7) $3x^2 + 12x - 31$ | (8) $3x^2 - 2x - 35$ |
| (9) $2x^2 + 16x + 44$ | (10) $3x^2 - 4x - 7$ |
| (11) $x^2 - 10x + 1$  | (12) $x^2 + 2x - 19$ |

【解説】

- (1)  $(x+1)^2 + (x+2)(x+3) = x^2 + 2x + 1 + x^2 + 5x + 6 = 2x^2 + 7x + 7$

- (2)  $(x+2)(x-2) + (x-3)^2 = x^2 - 4 + x^2 - 6x + 9 = 2x^2 - 6x + 5$
- (3)  $(x+1)(x+6) + (x+2)(x-3) = x^2 + 7x + 6 + x^2 - x - 6 = 2x^2 + 6x$
- (4)  $(x-9)(x-5) - (x-6)(x-8) = x^2 - 14x + 45 - (x^2 - 14x + 48) = x^2 - 14x + 45 - x^2 + 14x - 48 = -3$
- (5)  $(x-5)(x+5) - (x+7)(x-9) = x^2 - 25 - (x^2 - 2x - 63) = x^2 - 25 - x^2 + 2x + 63 = 2x + 38$
- (6)  $(a+2)^2 + (a-3)^2 = a^2 + 4a + 4 + a^2 - 6a + 9 = 2a^2 - 2a + 13$
- (7)  $2(x+3)^2 + (x+7)(x-7) = 2(x^2 + 6x + 9) + x^2 - 49 = 2x^2 + 12x + 18 + x^2 - 49 = 3x^2 + 12x - 31$
- (8)  $(x+1)(x-3) + 2(x+4)(x-4) = x^2 - 2x - 3 + 2(x^2 - 16) = x^2 - 2x - 3 + 2x^2 - 32 = 3x^2 - 2x - 35$
- (9)  $3(x+2)^2 - (x+4)(x-8) = 3(x^2 + 4x + 4) - (x^2 - 4x - 32) = 3x^2 + 12x + 12 - x^2 + 4x + 32 = 2x^2 + 16x + 44$
- (10)  $2(x-1)^2 + (x+3)(x-3) = 2(x^2 - 2x + 1) + x^2 - 9 = 2x^2 - 4x + 2 + x^2 - 9 = 3x^2 - 4x - 7$
- (11)  $3(x+3)(x-3) - 2(x+7)(x-2) = 3(x^2 - 9) - 2(x^2 + 5x - 14) = 3x^2 - 27 - 2x^2 - 10x + 28 = x^2 - 10x + 1$
- (12)  $5(x-3)^2 - 4(x-4)^2 = 5(x^2 - 6x + 9) - 4(x^2 - 8x + 16) = 5x^2 - 30x + 45 - 4x^2 + 32x - 64 = x^2 + 2x - 19$

## 1 標準問題

1

P.14

- |                       |                         |
|-----------------------|-------------------------|
| (1) $10x^2 + 6xy$     | (2) $-a^2 - 7ab$        |
| (3) $-12a^2 + 4ab$    | (4) $10m^2 - 5mn + 20m$ |
| (5) $6xy - 4y^2 + 2y$ | (6) $3a^2 - 4ab$        |

## 【解説】

- (1)  $2x(5x+3y) = 2x \times 5x + 2x \times 3y$   
 $= 10x^2 + 6xy$
- (2)  $(a+7b) \times (-a) = a \times (-a) + 7b \times (-a)$   
 $= -a^2 - 7ab$
- (3)  $4a(-3a+b) = 4a \times (-3a) + 4a \times b$   
 $= -12a^2 + 4ab$
- (4)  $5m(2m-n+4) = 5m \times 2m - 5m \times n + 5m \times 4$   
 $= 10m^2 - 5mn + 20m$
- (5)  $(3x-2y+1) \times 2y = 3x \times 2y - 2y \times 2y + 1 \times 2y$   
 $= 6xy - 4y^2 + 2y$
- (6)  $\frac{1}{2}a(6a-8b) = \frac{1}{2}a \times 6a - \frac{1}{2}a \times 8b$   
 $= 3a^2 - 4ab$

2

P.14

- |                  |                   |
|------------------|-------------------|
| (1) $5a^2 - 5a$  | (2) $x^2 - 11x$   |
| (3) $2x^2 - 6xy$ | (4) $-5a^2 - 17a$ |
| (5) $7x^2 - xy$  | (6) $a^2 - 10ab$  |

## 【解説】

- (1)  $a(2a+1) + 3a(a-2) = 2a^2 + a + 3a^2 - 6a$   
 $= 5a^2 - 5a$
- (2)  $3x(x-1) - 2x(x+4) = 3x^2 - 3x - 2x^2 - 8x$   
 $= x^2 - 11x$
- (3)  $5x(x-y) - x(3x+y) = 5x^2 - 5xy - 3x^2 - xy$   
 $= 2x^2 - 6xy$
- (4)  $-a(5-a) - 6a(2+a) = -5a + a^2 - 12a - 6a^2$   
 $= -5a^2 - 17a$
- (5)  $2x(3x+y) + x(x-3y) = 6x^2 + 2xy + x^2 - 3xy$   
 $= 7x^2 - xy$
- (6)  $4a(a-2b) - \frac{1}{2}a(6a+4b)$   
 $= 4a^2 - 8ab - 3a^2 - 2ab$   
 $= a^2 - 10ab$

3

P.14

- |               |                |
|---------------|----------------|
| (1) $4a - 3b$ | (2) $5x + 3y$  |
| (3) $3a - 4b$ | (4) $-4x + 3y$ |
| (5) $3b - 6a$ | (6) $6x + 9y$  |

## 【解説】

- (1)  $(8a^2 - 6ab) \div 2a = (8a^2 - 6ab) \times \frac{1}{2a}$   
 $= 4a - 3b$
- (2)  $(15xy + 9y^2) \div 3y = (15xy + 9y^2) \times \frac{1}{3y}$   
 $= 5x + 3y$
- (3)  $(6a^2b - 8ab^2) \div 2ab = (6a^2b - 8ab^2) \times \frac{1}{2ab}$   
 $= 3a - 4b$
- (4)  $(16x^2 - 12xy) \div (-4x)$   
 $= (16x^2 - 12xy) \times \left(-\frac{1}{4x}\right)$   
 $= -4x + 3y$
- (5)  $(ab - 2a^2) \div \frac{1}{3}a = (ab - 2a^2) \times \frac{3}{a}$   
 $= 3b - 6a$
- (6)  $(4x^2y + 6xy^2) \div \frac{2}{3}xy = (4x^2y + 6xy^2) \times \frac{3}{2xy}$   
 $= 6x + 9y$

4

P.14

- |                                     |                          |
|-------------------------------------|--------------------------|
| (1) $ac - ad + bc - bd$             | (2) $2xy + 3x - 8y - 12$ |
| (3) $6x^2 - 19x - 7$                | (4) $4a^2 - 7a - 15$     |
| (5) $a^2 - ab + 7a - 3b + 12$       |                          |
| (6) $6x^2 - 17xy + 5y^2 + 4x - 10y$ |                          |

## 【解説】

- (3)  $(3x+1)(2x-7) = 6x^2 - 21x + 2x - 7$   
 $= 6x^2 - 19x - 7$
- (4)  $(a-3)(4a+5) = 4a^2 + 5a - 12a - 15$   
 $= 4a^2 - 7a - 15$
- (5)  $(a+3)(a-b+4) = a(a-b+4) + 3(a-b+4)$   
 $= a^2 - ab + 4a + 3a - 3b + 12$   
 $= a^2 - ab + 7a - 3b + 12$
- (6)  $(3x-y+2)(2x-5y)$   
 $= 3x(2x-5y) - y(2x-5y) + 2(2x-5y)$   
 $= 6x^2 - 15xy - 2xy + 5y^2 + 4x - 10y$   
 $= 6x^2 - 17xy + 5y^2 + 4x - 10y$

5

P.15

- |   |                      |
|---|----------------------|
| (1) $x^2 + 9x + 14$                     | (2) $a^2 - 5a - 24$  |
| (3) $y^2 - y - 30$                      | (4) $m^2 - 13m + 36$ |
| (5) $x^2 + 12x + 36$                    | (6) $a^2 - 16a + 64$ |
| (7) $x^2 - \frac{3}{2}x + \frac{9}{16}$ | (8) $x^2 - 49$       |
| (9) $a^2 - 64$                          | (10) $25 - m^2$      |

## 【解説】

- (1)  $(x+2)(x+7) = x^2 + (2+7)x + 2 \times 7$   
 $= x^2 + 9x + 14$
- (2)  $(a-8)(a+3) = a^2 + (-8+3)a + (-8) \times 3$   
 $= a^2 - 5a - 24$
- (3)  $(y+5)(y-6) = y^2 + (5-6)y + 5 \times (-6)$   
 $= y^2 - y - 30$
- (4)  $(m-4)(m-9)$   
 $= m^2 + (-4-9)m + (-4) \times (-9)$   
 $= m^2 - 13m + 36$
- (5)  $(x+6)^2 = x^2 + 2 \times 6 \times x + 6^2$   
 $= x^2 + 12x + 36$
- (6)  $(a-8)^2 = a^2 - 2 \times 8 \times a + 8^2$   
 $= a^2 - 16a + 64$
- (7)  $\left(x - \frac{3}{4}\right)^2 = x^2 - 2 \times \frac{3}{4} \times x + \left(\frac{3}{4}\right)^2$   
 $= x^2 - \frac{3}{2}x + \frac{9}{16}$
- (8)  $(x+7)(x-7) = x^2 - 7^2$   
 $= x^2 - 49$
- (9)  $(a-8)(a+8) = a^2 - 8^2$   
 $= a^2 - 64$
- (10)  $(5+m)(5-m) = 5^2 - m^2$   
 $= 25 - m^2$

6

P.15

- |  |                     |
|--|---------------------|
| (1) $4x^2 + 12x + 5$                   | (2) $9a^2 + 6a - 8$ |
| (3) $16a^2 - 24ab + 9b^2$              | (4) $4m^2 - 25n^2$  |
| (5) $a^2 + 2ab + b^2 - 3a - 3b + 2$    |                     |
| (6) $x^2 - 2xy + y^2 - 36$             |                     |
| (7) $x^2 + 2xy + y^2 + 4x + 4y + 4$    |                     |
| (8) $a^2 - 2ab + b^2 - 10a + 10b + 25$ |                     |

## 【解説】

- (1)  $(2x+1)(2x+5)$   
 $= (A+1)(A+5)$  ←  $2x=A$  とおく  
 $= A^2 + 6A + 5$   
 $= 4x^2 + 12x + 5$
- (2)  $(3a-2)(3a+4)$   
 $= (A-2)(A+4)$  ←  $3a=A$  とおく  
 $= A^2 + 2A - 8$   
 $= 9a^2 + 6a - 8$
- (3)  $(4a-3b)^2 = (4a)^2 - 2 \times 3b \times 4a + (3b)^2$   
 $= 16a^2 - 24ab + 9b^2$
- (4)  $(2m+5n)(2m-5n) = (2m)^2 - (5n)^2$   
 $= 4m^2 - 25n^2$
- (5)  $(a+b-1)(a+b-2)$   
 $= (X-1)(X-2)$  ←  $a+b=X$  とおく  
 $= X^2 - 3X + 2$   
 $= a^2 + 2ab + b^2 - 3a - 3b + 2$
- (6)  $(x-y+6)(x-y-6)$   
 $= (X+6)(X-6)$  ←  $x-y=X$  とおく  
 $= X^2 - 36$   
 $= x^2 - 2xy + y^2 - 36$
- (7)  $(x+y+2)^2$   
 $= (X+2)^2$  ←  $x+y=X$  とおく  
 $= X^2 + 4X + 4$   
 $= x^2 + 2xy + y^2 + 4x + 4y + 4$
- (8)  $(a-b-5)^2$   
 $= (X-5)^2$  ←  $a-b=X$  とおく  
 $= X^2 - 10X + 25$   
 $= a^2 - 2ab + b^2 - 10a + 10b + 25$

7

P.15

- |                      |                    |
|----------------------|--------------------|
| (1) $2x^2 + 3x + 5$  | (2) $2x^2 - x$     |
| (3) $2x - 5$         | (4) $x^2 + 2x + 1$ |
| (5) $4x^2 - 9x - 28$ | (6) $-x^2 - x - 6$ |

## 【解説】

- (1)  $(x-1)^2 + (x+1)(x+4)$   
 $= x^2 - 2x + 1 + x^2 + 5x + 4$   
 $= 2x^2 + 3x + 5$
- (2)  $(x+4)(x-1) + (x-2)^2$   
 $= x^2 + 3x - 4 + x^2 - 4x + 4$   
 $= 2x^2 - x$

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

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

$$= x^2 - 4 - x^2 + 2x - 1$$

$$= 2x - 5$$

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

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

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

$$= x^2 + 2x + 1$$

$$(5) 3(x-2)^2 + (x+8)(x-5)$$

$$= 3(x^2 - 4x + 4) + x^2 + 3x - 40$$

$$= 3x^2 - 12x + 12 + x^2 + 3x - 40$$

$$= 4x^2 - 9x - 28$$

$$(6) (x-2)(x+7) - 2(x-1)(x+4)$$

$$= x^2 + 5x - 14 - 2(x^2 + 3x - 4)$$

$$= x^2 + 5x - 14 - 2x^2 - 6x + 8$$

$$= -x^2 - x - 6$$

1章 多項式

計算トレーニング

1

P.16

(1) $10a^2 + 5ab$	(2) $-6x^2 + 4xy$
(3) $-7m^2 + 2mn$	(4) $18xy + 30x^2$
(5) $a^2b - 3ab^2 + 4ab$	(6) $6xy - 8y^2 + 2y$
(7) $6x^2 - 9xy$	(8) $4a^2b + 6ab$

【解説】

$$(1) 5a(2a+b) = 5a \times 2a + 5a \times b$$

$$= 10a^2 + 5ab$$

$$(2) (3x-2y) \times (-2x) = 3x \times (-2x) - 2y \times (-2x)$$

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

$$(3) -m(7m-2n) = (-m) \times 7m - (-m) \times 2n$$

$$= -7m^2 + 2mn$$

$$(4) 6x(3y+5x) = 6x \times 3y + 6x \times 5x$$

$$= 18xy + 30x^2$$

$$(5) ab(a-3b+4) = ab \times a - ab \times 3b + ab \times 4$$

$$= a^2b - 3ab^2 + 4ab$$

$$(6) (3x-4y+1) \times 2y = 3x \times 2y - 4y \times 2y + 1 \times 2y$$

$$= 6xy - 8y^2 + 2y$$

$$(7) \frac{3}{2}x(4x-6y) = \frac{3}{2}x \times 4x - \frac{3}{2}x \times 6y$$

$$= 6x^2 - 9xy$$

$$(8) \frac{2}{5}a(10ab+15b) = \frac{2}{5}a \times 10ab + \frac{2}{5}a \times 15b$$

$$= 4a^2b + 6ab$$

2

P.16

(1) $ax + ay + bx + by$	(2) $ab + 5a - 4b - 20$
(3) $3x^2 + 5x - 2$	(4) $6a^2 - 13a - 28$
(5) $2a^2 + ab - 15b^2$	(6) $3x^2 - 19xy + 20y^2$
(7) $2a^2 - 3ab - 3a + 12b - 20$	
(8) $8x^2 - 10xy + 3y^2 + 12x - 6y$	

【解説】

$$(3) (x+2)(3x-1) = 3x^2 - x + 6x - 2$$

$$= 3x^2 + 5x - 2$$

$$(4) (3a+4)(2a-7) = 6a^2 - 21a + 8a - 28$$

$$= 6a^2 - 13a - 28$$

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

$$= 2a^2 + ab - 15b^2$$

$$(6) (x-5y)(3x-4y) = 3x^2 - 4xy - 15xy + 20y^2$$

$$= 3x^2 - 19xy + 20y^2$$

$$(7) (a-4)(2a-3b+5)$$

$$= a(2a-3b+5) - 4(2a-3b+5)$$

$$= 2a^2 - 3ab + 5a - 8a + 12b - 20$$

$$= 2a^2 - 3ab - 3a + 12b - 20$$

$$(8) (4x-3y+6)(2x-y)$$

$$= 4x(2x-y) - 3y(2x-y) + 6(2x-y)$$

$$= 8x^2 - 4xy - 6xy + 3y^2 + 12x - 6y$$

$$= 8x^2 - 10xy + 3y^2 + 12x - 6y$$

3

P.16

(1) $3x + 2y$	(2) $-2a + b$
(3) $-2m + 3n$	(4) $4a - 3b$
(5) $xy - y^2 - 2$	(6) $2x - 2$
(7) $10a - 5b$	(8) $6y - 9$

【解説】

$$(1) (12x^2 + 8xy) \div 4x = (12x^2 + 8xy) \times \frac{1}{4x}$$

$$= 3x + 2y$$

$$(2) (-6ab + 3b^2) \div 3b = (-6ab + 3b^2) \times \frac{1}{3b}$$

$$= -2a + b$$

$$(3) (10m^2 - 15mn) \div (-5m)$$

$$= (10m^2 - 15mn) \times \left(-\frac{1}{5m}\right)$$

$$= -2m + 3n$$

$$(4) (8a^2b - 6ab^2) \div 2ab = (8a^2b - 6ab^2) \times \frac{1}{2ab}$$

$$= 4a - 3b$$

$$(5) (x^2y - xy^2 - 2x) \div x = (x^2y - xy^2 - 2x) \times \frac{1}{x}$$

$$= xy - y^2 - 2$$

$$(6) (xy - y) \div \frac{1}{2}y = (xy - y) \times \frac{2}{y}$$

$$= 2x - 2$$

$$(7) (6a^2 - 3ab) \div \frac{3}{5}a = (6a^2 - 3ab) \times \frac{5}{3a}$$

$$= 10a - 5b$$

$$(8) (8xy^2 - 12xy) \div \frac{4}{3}xy = (8xy^2 - 12xy) \times \frac{3}{4xy}$$

$$= 6y - 9$$

4

P.17

(1) $x^2 + 11x + 18$	(2) $a^2 - 13a + 42$
(3) $y^2 - y - 56$	(4) $4x^2 + 8x - 45$
(5) $x^2 - 24x + 144$	(6) $m^2 + 18m + 81$
(7) $9a^2 + 30ab + 25b^2$	(8) $4x^2 - 28xy + 49y^2$
(9) $a^2 - 36$	(10) $81 - m^2$
(11) $25x^2 - y^2$	(12) $4a^2 - 49b^2$
(13) $x^2 + 2xy + y^2 - 2x - 2y - 15$	
(14) $a^2 - 2ab + b^2 - 16$	
(15) $x^2 - 4xy + 4y^2 + 2x - 4y + 1$	
(16) $9a^2 + 6ab + b^2 - 12a - 4b + 4$	

【解説】

$$(1) (x+2)(x+9) = x^2 + (2+9)x + 2 \times 9$$

$$= x^2 + 11x + 18$$

$$(2) (a-7)(a-6) = a^2 + (-7-6)a + (-7) \times (-6)$$

$$= a^2 - 13a + 42$$

$$(3) (y-8)(y+7) = y^2 + (-8+7)y + (-8) \times 7$$

$$= y^2 - y - 56$$

$$(4) (2x-5)(2x+9)$$

$$= (A-5)(A+9) \quad \leftarrow 2x=A \text{ とおく}$$

$$= A^2 + 4A - 45$$

$$= 4x^2 + 8x - 45$$

$$(5) (x-12)^2 = x^2 - 2 \times 12 \times x + 12^2$$

$$= x^2 - 24x + 144$$

$$(6) (m+9)^2 = m^2 + 2 \times 9 \times m + 9^2$$

$$= m^2 + 18m + 81$$

$$(7) (3a+5b)^2 = (3a)^2 + 2 \times 5b \times 3a + (5b)^2$$

$$= 9a^2 + 30ab + 25b^2$$

$$(8) (2x-7y)^2 = (2x)^2 - 2 \times 7y \times 2x + (7y)^2$$

$$= 4x^2 - 28xy + 49y^2$$

$$(9) (a+6)(a-6) = a^2 - 6^2$$

$$= a^2 - 36$$

$$(10) (9+m)(9-m) = 9^2 - m^2$$

$$= 81 - m^2$$

$$(11) (5x+y)(5x-y) = (5x)^2 - y^2$$

$$= 25x^2 - y^2$$

$$(12) (2a-7b)(2a+7b) = (2a)^2 - (7b)^2$$

$$= 4a^2 - 49b^2$$

$$(13) (x+y-5)(x+y+3)$$

$$= (X-5)(X+3) \quad \leftarrow x+y=X \text{ とおく}$$

$$= X^2 - 2X - 15$$

$$= x^2 + 2xy + y^2 - 2x - 2y - 15$$

$$(14) (a-b+4)(a-b-4)$$

$$= (X+4)(X-4) \quad \leftarrow a-b=X \text{ とおく}$$

$$= X^2 - 16$$

$$= a^2 - 2ab + b^2 - 16$$

$$(15) (x-2y+1)^2$$

$$= (X+1)^2 \quad \leftarrow x-2y=X \text{ とおく}$$

$$= X^2 + 2X + 1$$

$$= x^2 - 4xy + 4y^2 + 2x - 4y + 1$$

$$(16) (3a+b-2)^2$$

$$= (X-2)^2 \quad \leftarrow 3a+b=X \text{ とおく}$$

$$= X^2 - 4X + 4$$

$$= 9a^2 + 6ab + b^2 - 12a - 4b + 4$$

5

P.17

(1) $2x^2 - 9x + 10$	(2) $12a$
(3) $3x$	(4) $2a^2 - 10a - 37$
(5) $x^2 - 6xy + y^2$	(6) $3x^2 + 8x - 43$
(7) $5xy - 3y^2$	(8) $11a - 22$

【解説】

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

$$= x^2 - x - 6 + x^2 - 8x + 16$$

$$= 2x^2 - 9x + 10$$

$$(2) (a+3)^2 - (a-3)^2 = a^2 + 6a + 9 - (a^2 - 6a + 9)$$

$$= a^2 + 6a + 9 - a^2 + 6a - 9$$

$$= 12a$$

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

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

$$= x^2 + 3x - 4 - x^2 + 4$$

$$= 3x$$

- (4)  $3(a-2)(a+2)-(a+5)^2$   
 $= 3(a^2-4)-(a^2+10a+25)$   
 $= 3a^2-12-a^2-10a-25$   
 $= 2a^2-10a-37$
- (5)  $2(x-y)^2-(x+y)^2$   
 $= 2(x^2-2xy+y^2)-(x^2+2xy+y^2)$   
 $= 2x^2-4xy+2y^2-x^2-2xy-y^2$   
 $= x^2-6xy+y^2$
- (6)  $4(x-3)(x+4)-(x+1)(x-5)$   
 $= 4(x^2+x-12)-(x^2-4x-5)$   
 $= 4x^2+4x-48-x^2+4x+5$   
 $= 3x^2+8x-43$
- (7)  $(2x-y)(x+y)-2(x-y)^2$   
 $= 2x^2+2xy-xy-y^2-2(x^2-2xy+y^2)$   
 $= 2x^2+xy-y^2-2x^2+4xy-2y^2$   
 $= 5xy-3y^2$
- (8)  $(2a-5)(2a+5)-(a-3)(4a+1)$   
 $= 4a^2-25-(4a^2+a-12a-3)$   
 $= 4a^2-25-4a^2+11a+3$   
 $= 11a-22$

1章 多項式

2 因数分解

確認問題 1

P.18

- (1) ①  $x^2-5x-6$     ④  $x+1$     ⑦  $x-6$   
           ②  $x^2-64$     ⑤  $x+8$     ⑧  $x-8$
- (2) ①  $a(x-y)$     ②  $x(y+6)$   
           ③  $5x(a-b)$     ④  $4a(2m-n)$   
           ⑤  $ab(a+b)$     ⑥  $2xy(3x-5)$   
           ⑦  $7ay(2a-3y)$     ⑧  $5xy(1+3y)$   
           ⑨  $3b(ab-4a-3)$     ⑩  $2xy(4x-2y+1)$

確認問題 2

P.19

- (1)  $(x+2)(x+7)$     (2)  $(x-2)(x-8)$   
           (3)  $(x-6)(x-7)$     (4)  $(x-1)(x+9)$   
           (5)  $(x-7)(x+8)$     (6)  $(x+3)(x-6)$   
           (7)  $(a+2)(a-6)$     (8)  $(y+6)(y+9)$   
           (9)  $(x-6)(x+8)$     (10)  $(x+8)(x-9)$   
           (11)  $(x-3)(x+15)$     (12)  $(a-7)(a-9)$

【解説】

(1)  $x^2 + \boxed{9}x + \boxed{14}$   
           和    積

積が14, 和が9となる2数は, 2, 7

$$x^2+9x+14=(x+2)(x+7)$$

(2)  $x^2 - \boxed{10}x + \boxed{16}$   
           和    積

積が16, 和が-10となる2数は, -2, -8

$$x^2-10x+16=(x-2)(x-8)$$

確認問題 3

P.20

- (1)  $(x+2)^2$     (2)  $(x+6)^2$   
           (3)  $(x-5)^2$     (4)  $(a-8)^2$   
           (5)  $(m-1)^2$     (6)  $(x+4)^2$   
           (7)  $(y+7)^2$     (8)  $(x-10)^2$   
           (9)  $(a+3)^2$     (10)  $(x-9)^2$

【解説】

(1)  $x^2+4x+4=x^2+2 \times 2 \times x+2^2$   
 $= (x+2)^2$

- (2)  $x^2+12x+36=x^2+2 \times 6 \times x+6^2$   
 $= (x+6)^2$
- (3)  $x^2-10x+25=x^2-2 \times 5 \times x+5^2$   
 $= (x-5)^2$
- (4)  $a^2-16a+64=a^2-2 \times 8 \times a+8^2$   
 $= (a-8)^2$

確認問題 4

P.20

- (1)  $(x+1)(x-1)$     (2)  $(a+4)(a-4)$   
           (3)  $(m+5)(m-5)$     (4)  $(y+10)(y-10)$   
           (5)  $(x+8)(x-8)$     (6)  $(7+y)(7-y)$   
           (7)  $(3+m)(3-m)$     (8)  $(p+11)(p-11)$

【解説】

- (1)  $x^2-1=x^2-1^2$   
 $= (x+1)(x-1)$
- (2)  $a^2-16=a^2-4^2$   
 $= (a+4)(a-4)$
- (6)  $49-y^2=7^2-y^2$   
 $= (7+y)(7-y)$
- (7)  $9-m^2=3^2-m^2$   
 $= (3+m)(3-m)$

1章 多項式

2 標準問題

1

P.21

- (1)  $y(x+4)$     (2)  $b(a-c)$   
           (3)  $m(x+y-1)$     (4)  $5x(2x-5y+3)$

2

P.21

- (1)  $(x+2)(x+5)$     (2)  $(x-3)(x-6)$   
           (3)  $(x-4)(x+5)$     (4)  $(x+2)(x-8)$   
           (5)  $(x-3)(x-9)$     (6)  $(x+2)(x-10)$   
           (7)  $(x-5)(x+8)$     (8)  $(x+6)(x-7)$

【解説】

(1)  $x^2 + \boxed{7}x + \boxed{10}$   
           和    積

積が10, 和が7となる2数は, 2, 5  
 $x^2+7x+10=(x+2)(x+5)$

(2)  $x^2 - \boxed{9}x + \boxed{18}$   
           和    積

積が18, 和が-9となる2数は, -3, -6

$$x^2-9x+18=(x-3)(x-6)$$

(3)  $x^2 + \boxed{1}x - \boxed{20}$   
           和    積

積が-20, 和が1となる2数は, -4, 5

$$x^2+x-20=(x-4)(x+5)$$

3

P.21

- (1)  $(x-1)^2$     (2)  $(y+3)^2$   
           (3)  $(m+5)^2$     (4)  $(x-7)^2$   
           (5)  $(a+9)^2$     (6)  $(x-\frac{1}{2})^2$

【解説】

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

(2)  $y^2+6y+9=y^2+2 \times 3 \times y+3^2$   
 $= (y+3)^2$

(6)  $x^2-x+\frac{1}{4}=x^2-2 \times \frac{1}{2} \times x+(\frac{1}{2})^2$   
 $= (x-\frac{1}{2})^2$

4

P.21

- (1)  $(x+3)(x-3)$     (2)  $(a+6)(a-6)$   
           (3)  $(m+7)(m-7)$     (4)  $(y+8)(y-8)$   
           (5)  $(x+10)(x-10)$     (6)  $(5+p)(5-p)$

【解説】

(1)  $x^2-9=x^2-3^2$   
 $= (x+3)(x-3)$

(2)  $a^2-36=a^2-6^2$   
 $= (a+6)(a-6)$

(6)  $25-p^2=5^2-p^2$   
 $= (5+p)(5-p)$

3 いろいろな因数分解

確認問題 1

P.22

- |                     |                      |
|---------------------|----------------------|
| (1) $2(x+2)(x+3)$   | (2) $5(a+2)(a-3)$    |
| (3) $5(x+4)(x-4)$   | (4) $-3(x-2)(x+4)$   |
| (5) $4(m+3)(m-5)$   | (6) $2(a+5)^2$       |
| (7) $3(m+5)(m-5)$   | (8) $4(1+p)(1-p)$    |
| (9) $a(x+1)(x+5)$   | (10) $a(x+y)(x-y)$   |
| (11) $y(x+3)(x-7)$  | (12) $2a(b-3)^2$     |
| (13) $x(x-2)(x-6)$  | (14) $2x(y+7)(y-7)$  |
| (15) $5a(m-1)(m+2)$ | (16) $-4b(a+4)(a-5)$ |

【解説】

- (1)  $2x^2 + 10x + 12 = 2(x^2 + 5x + 6)$   
 $= 2(x+2)(x+3)$
- (2)  $5a^2 - 5a - 30 = 5(a^2 - a - 6)$   
 $= 5(a+2)(a-3)$
- (3)  $5x^2 - 80 = 5(x^2 - 16)$   
 $= 5(x+4)(x-4)$
- (4)  $-3x^2 - 6x + 24 = -3(x^2 + 2x - 8)$   
 $= -3(x-2)(x+4)$
- (5)  $4m^2 - 8m - 60 = 4(m^2 - 2m - 15)$   
 $= 4(m+3)(m-5)$
- (6)  $2a^2 + 20a + 50 = 2(a^2 + 10a + 25)$   
 $= 2(a+5)^2$
- (7)  $3m^2 - 75 = 3(m^2 - 25)$   
 $= 3(m+5)(m-5)$
- (8)  $4 - 4p^2 = 4(1 - p^2)$   
 $= 4(1+p)(1-p)$
- (9)  $ax^2 + 6ax + 5a = a(x^2 + 6x + 5)$   
 $= a(x+1)(x+5)$
- (10)  $ax^2 - ay^2 = a(x^2 - y^2)$   
 $= a(x+y)(x-y)$
- (11)  $x^2y - 4xy - 21y = y(x^2 - 4x - 21)$   
 $= y(x+3)(x-7)$
- (12)  $2ab^2 - 12ab + 18a = 2a(b^2 - 6b + 9)$   
 $= 2a(b-3)^2$
- (13)  $x^3 - 8x^2 + 12x = x(x^2 - 8x + 12)$   
 $= x(x-2)(x-6)$
- (14)  $2xy^2 - 98x = 2x(y^2 - 49)$   
 $= 2x(y+7)(y-7)$

- (15)  $5am^2 + 5am - 10a = 5a(m^2 + m - 2)$   
 $= 5a(m-1)(m+2)$
- (16)  $-4a^2b + 4ab + 80b = -4b(a^2 - a - 20)$   
 $= -4b(a+4)(a-5)$

確認問題 2

P.23

- |   |   |
|---|---|
| (1) $(2x-1)^2$                            | (2) $(3a+5)^2$                              |
| (3) $(9a-2)^2$                            | (4) $(x+4y)^2$                              |
| (5) $(6x+1)(6x-1)$                        | (6) $(2x+5)(2x-5)$                          |
| (7) $(3x+8)(3x-8)$                        | (8) $(4a+7b)(4a-7b)$                        |
| (9) $(2x+5y)^2$                           | (10) $(3a - \frac{1}{2}b)^2$                |
| (11) $(x + \frac{y}{3})(x - \frac{y}{3})$ | (12) $(a + \frac{4}{5}b)(a - \frac{4}{5}b)$ |
| (13) $2y(2x+3z)(2x-3z)$                   |   |
| (14) $3a(2b-1)^2$                         |   |

【解説】

- (1)  $4x^2 - 4x + 1 = (2x)^2 - 2 \times 1 \times 2x + 1^2$   
 $= (2x-1)^2$
- (2)  $9a^2 + 30a + 25 = (3a)^2 + 2 \times 5 \times 3a + 5^2$   
 $= (3a+5)^2$
- (3)  $81a^2 - 36a + 4 = (9a)^2 - 2 \times 2 \times 9a + 2^2$   
 $= (9a-2)^2$
- (4)  $x^2 + 8xy + 16y^2 = x^2 + 2 \times 4y \times x + (4y)^2$   
 $= (x+4y)^2$
- (5)  $36x^2 - 1 = (6x)^2 - 1^2$   
 $= (6x+1)(6x-1)$
- (6)  $4x^2 - 25 = (2x)^2 - 5^2$   
 $= (2x+5)(2x-5)$
- (7)  $9x^2 - 64 = (3x)^2 - 8^2$   
 $= (3x+8)(3x-8)$
- (8)  $16a^2 - 49b^2 = (4a)^2 - (7b)^2$   
 $= (4a+7b)(4a-7b)$
- (9)  $4x^2 + 20xy + 25y^2 = (2x)^2 + 2 \times 5y \times 2x + (5y)^2$   
 $= (2x+5y)^2$
- (10)  $9a^2 - 3ab + \frac{1}{4}b^2 = (3a)^2 - 2 \times \frac{1}{2}b \times 3a + (\frac{1}{2}b)^2$   
 $= (3a - \frac{1}{2}b)^2$
- (11)  $x^2 - \frac{y^2}{9} = x^2 - (\frac{y}{3})^2$   
 $= (x + \frac{y}{3})(x - \frac{y}{3})$
- (12)  $a^2 - \frac{16}{25}b^2 = a^2 - (\frac{4}{5}b)^2$   
 $= (a + \frac{4}{5}b)(a - \frac{4}{5}b)$

- (13)  $8x^2y - 18yz^2 = 2y(4x^2 - 9z^2)$   
 $= 2y(2x+3z)(2x-3z)$
- (14)  $12ab^2 - 12ab + 3a = 3a(4b^2 - 4b + 1)$   
 $= 3a(2b-1)^2$

確認問題 3

P.24

- |                       |                      |
|-----------------------|----------------------|
| (1) $(a+b+1)^2$       | (2) $(x+y+2)(x+y-5)$ |
| (3) $(x+3)(x-5)$      | (4) $(a+1)(a+7)$     |
| (5) $(x+y)(a+3)$      | (6) $(a+b)(x-2y)$    |
| (7) $(3x-2)(x+4)$     | (8) $(a+b+3)(a+b-3)$ |
| (9) $(x+y)(m-n)$      | (10) $(a-b)(x-3)$    |
| (11) $(a-3+b)(a-3-b)$ |                      |
| (12) $(a+b+c)(a+b-c)$ |                      |
| (13) $(x+1)(y+1)$     | (14) $(a-1)(b-2)$    |

【解説】

- (1)  $(a+b)^2 + 2(a+b) + 1$   $\leftarrow a+b=A$ とおく  
 $= A^2 + 2A + 1$   
 $= (A+1)^2$   
 $= (a+b+1)^2$
- (2)  $(x+y)^2 - 3(x+y) - 10$   $\leftarrow x+y=A$ とおく  
 $= A^2 - 3A - 10$   
 $= (A+2)(A-5)$   
 $= (x+y+2)(x+y-5)$
- (3)  $(x+1)^2 - 4(x+1) - 12$   $\leftarrow x+1=A$ とおく  
 $= A^2 - 4A - 12$   
 $= (A+2)(A-6)$   
 $= (x+1+2)(x+1-6)$   
 $= (x+3)(x-5)$
- (4)  $(a+3)^2 + 2(a+3) - 8$   $\leftarrow a+3=A$ とおく  
 $= A^2 + 2A - 8$   
 $= (A-2)(A+4)$   
 $= (a+3-2)(a+3+4)$   
 $= (a+1)(a+7)$
- (5)  $a(x+y) + 3(x+y)$   $\leftarrow x+y=A$ とおく  
 $= aA + 3A$   
 $= A(a+3)$   
 $= (x+y)(a+3)$
- (6)  $x(a+b) - 2y(a+b)$   $\leftarrow a+b=A$ とおく  
 $= xA - 2yA$   
 $= A(x-2y)$   
 $= (a+b)(x-2y)$
- (7)  $(2x+1)^2 - (x-3)^2$   $\leftarrow 2x+1=A, x-3=B$ とおく  
 $= A^2 - B^2$   
 $= (A+B)(A-B)$   
 $= (2x+1+x-3)(2x+1-x+3)$   
 $= (3x-2)(x+4)$
- (8)  $(a+b)^2 - 9$   $\leftarrow a+b=A$ とおく  
 $= A^2 - 9$   
 $= (A+3)(A-3)$   
 $= (a+b+3)(a+b-3)$
- (9)  $m(x+y) - nx - ny$   $\leftarrow x+y=A$ とおく  
 $= m(x+y) - n(x+y)$   
 $= mA - nA$   
 $= A(m-n)$   
 $= (x+y)(m-n)$
- (10)  $x(a-b) - 3a + 3b$   $\leftarrow a-b=A$ とおく  
 $= xA - 3A$   
 $= A(x-3)$   
 $= (a-b)(x-3)$
- (11)  $a^2 - 6a + 9 - b^2$   $\leftarrow a-3=A$ とおく  
 $= (a-3)^2 - b^2$   
 $= A^2 - b^2$   
 $= (A+b)(A-b)$   
 $= (a-3+b)(a-3-b)$
- (12)  $a^2 + 2ab + b^2 - c^2$   $\leftarrow a+b=A$ とおく  
 $= (a+b)^2 - c^2$   
 $= A^2 - c^2$   
 $= (A+c)(A-c)$   
 $= (a+b+c)(a+b-c)$
- (13)  $xy + y + x + 1$   $\leftarrow x+1=A$ とおく  
 $= y(x+1) + (x+1)$   
 $= yA + A$   
 $= A(y+1)$   
 $= (x+1)(y+1)$
- (14)  $ab - b - 2a + 2$   $\leftarrow a-1=A$ とおく  
 $= b(a-1) - 2(a-1)$   
 $= bA - 2A$   
 $= A(b-2)$   
 $= (a-1)(b-2)$



3 標準問題

1

P.25

- (1)  $3(x+3)(x-5)$  (2)  $4(a-4)(a+5)$   
 (3)  $5(m+5)(m-5)$  (4)  $2(4+y)(4-y)$   
 (5)  $a(x-4)^2$  (6)  $2x(y-2)(y+5)$   
 (7)  $3a(b+3)(b-3)$  (8)  $-4b(a+1)(a-3)$

【解説】

- (1)  $3x^2 - 6x - 45 = 3(x^2 - 2x - 15)$   
 $= 3(x+3)(x-5)$   
 (2)  $4a^2 + 4a - 80 = 4(a^2 + a - 20)$   
 $= 4(a-4)(a+5)$   
 (3)  $5m^2 - 125 = 5(m^2 - 25)$   
 $= 5(m+5)(m-5)$   
 (4)  $32 - 2y^2 = 2(16 - y^2)$   
 $= 2(4+y)(4-y)$   
 (5)  $ax^2 - 8ax + 16a = a(x^2 - 8x + 16)$   
 $= a(x-4)^2$   
 (6)  $2xy^2 + 6xy - 20x = 2x(y^2 + 3y - 10)$   
 $= 2x(y-2)(y+5)$   
 (7)  $3ab^2 - 27a = 3a(b^2 - 9)$   
 $= 3a(b+3)(b-3)$   
 (8)  $-4a^2b + 8ab + 12b = -4b(a^2 - 2a - 3)$   
 $= -4b(a+1)(a-3)$

2

P.25

- (1)  $(3x+1)^2$  (2)  $(2a-3)^2$   
 (3)  $(5a+1)(5a-1)$  (4)  $(9x+8y)(9x-8y)$   
 (5)  $(4x-3y)^2$  (6)  $(2m-\frac{n}{2})^2$   
 (7)  $3a(2b+c)(2b-c)$  (8)  $2x(3y-2)^2$

【解説】

- (1)  $9x^2 + 6x + 1 = (3x)^2 + 2 \times 1 \times 3x + 1^2$   
 $= (3x+1)^2$   
 (2)  $4a^2 - 12a + 9 = (2a)^2 - 2 \times 3 \times 2a + 3^2$   
 $= (2a-3)^2$   
 (3)  $25a^2 - 1 = (5a)^2 - 1^2$   
 $= (5a+1)(5a-1)$   
 (4)  $81x^2 - 64y^2 = (9x)^2 - (8y)^2$   
 $= (9x+8y)(9x-8y)$

- (5)  $16x^2 - 24xy + 9y^2 = (4x)^2 - 2 \times 3y \times 4x + (3y)^2$   
 $= (4x-3y)^2$   
 (6)  $4m^2 - 2mn + \frac{n^2}{4} = (2m)^2 - 2 \times \frac{n}{2} \times 2m + (\frac{n}{2})^2$   
 $= (2m - \frac{n}{2})^2$   
 (7)  $12ab^2 - 3ac^2 = 3a(4b^2 - c^2)$   
 $= 3a(2b+c)(2b-c)$   
 (8)  $18xy^2 - 24xy + 8x = 2x(9y^2 - 12y + 4)$   
 $= 2x(3y-2)^2$

3

P.25

- (1)  $(x+y+3)(x+y+4)$  (2)  $(a+b-2)^2$   
 (3)  $(x-1)(x-11)$  (4)  $(a+1)(b+3)$   
 (5)  $(x+y+4)(x+y-4)$  (6)  $(3a+4)(a-6)$   
 (7)  $(x+2+y)(x+2-y)$  (8)  $(x+2)(y-2)$

【解説】

- (1)  $(x+y)^2 + 7(x+y) + 12$   $\leftarrow x+y=A$ とおく  
 $= A^2 + 7A + 12$   
 $= (A+3)(A+4)$   
 $= (x+y+3)(x+y+4)$   
 (2)  $(a+b)^2 - 4(a+b) + 4$   $\leftarrow a+b=A$ とおく  
 $= A^2 - 4A + 4$   
 $= (A-2)^2$   
 $= (a+b-2)^2$   
 (3)  $(x-5)^2 - 2(x-5) - 24$   $\leftarrow x-5=A$ とおく  
 $= A^2 - 2A - 24$   
 $= (A+4)(A-6)$   
 $= (x-1)(x-11)$   
 (4)  $b(a+1) + 3(a+1)$   $\leftarrow a+1=A$ とおく  
 $= bA + 3A$   
 $= A(b+3)$   
 $= (a+1)(b+3)$   
 (5)  $(x+y)^2 - 16$   $\leftarrow x+y=A$ とおく  
 $= A^2 - 16$   
 $= (A+4)(A-4)$   
 $= (x+y+4)(x+y-4)$   
 (6)  $(2a-1)^2 - (a+5)^2$   $\leftarrow 2a-1=A, a+5=B$ とおく  
 $= A^2 - B^2$   
 $= (A+B)(A-B)$   
 $= (2a-1+a+5)(2a-1-a-5)$   
 $= (3a+4)(a-6)$

- (7)  $x^2 + 4x + 4 - y^2$   
 $= (x+2)^2 - y^2$   $\leftarrow x+2=A$ とおく  
 $= A^2 - y^2$   
 $= (A+y)(A-y)$   
 $= (x+2+y)(x+2-y)$   
 (8)  $xy + 2y - 2x - 4$   
 $= y(x+2) - 2(x+2)$   $\leftarrow x+2=A$ とおく  
 $= yA - 2A$   
 $= A(y-2)$   
 $= (x+2)(y-2)$

4 式の計算の利用

確認問題 1

P.26

- (1) 1000 (2) 840  
 (3) 1521 (4) 9025  
 (5) 896 (6) 3599

【解説】

- (1)  $55^2 - 45^2 = (55+45) \times (55-45)$   
 $= 100 \times 10 = 1000$   
 (2)  $47^2 - 37^2 = (47+37) \times (47-37)$   
 $= 84 \times 10 = 840$   
 (3)  $39^2 = (40-1)^2$   
 $= 1600 - 80 + 1 = 1521$   
 (4)  $95^2 = (100-5)^2$   
 $= 10000 - 1000 + 25 = 9025$   
 (5)  $28 \times 32 = (30-2) \times (30+2)$   
 $= 900 - 4 = 896$   
 (6)  $59 \times 61 = (60-1) \times (60+1)$   
 $= 3600 - 1 = 3599$

確認問題 2

P.26

- (1) -20 (2) 3600  
 (3) 25

【解説】

- (1)  $(x-5)^2 - (x-3)(x-6) = -x + 7$   
 $= -27 + 7 = -20$   
 (2)  $x^2 - 6x + 9 = (x-3)^2$   
 $= (63-3)^2$   
 $= 60^2 = 3600$   
 (3)  $a^2 - b^2 = (a+b)(a-b)$   
 $= (6.25 + 3.75) \times (6.25 - 3.75)$   
 $= 10 \times 2.5 = 25$

確認問題 3

P.27

$S = (b+2a)(c+2a) - bc$   
 $= 4a^2 + 2ab + 2ac \quad \dots \textcircled{1}$   
 $\ell = (b+a) \times 2 + (c+a) \times 2$   
 $= 4a + 2b + 2c$   
 したがって、 $a\ell = a(4a + 2b + 2c)$   
 $= 4a^2 + 2ab + 2ac \quad \dots \textcircled{2}$   
 ①、②より、 $S = a\ell$

確認問題 4

P.27

(1) 小さい方の整数を  $n$  とすると、大きい方の整数は  $n+1$  と表される。

このとき、平方の和は、

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

だから、この和は2つの続いた整数の積の2倍に1を加えた数に等しい。

(2) 中央の整数を  $n$  とすると、3つの数は、 $n-1$ ,  $n$ ,  $n+1$  と表される。

このとき、最大の数の平方と最小の数の平方の差は、

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

これは、中央の数の4倍に等しい。

1章 多項式

4 標準問題

1

P.28

- |          |          |
|----------|----------|
| (1) 3600 | (2) 1800 |
| (3) 50   | (4) 2704 |
| (5) 9604 | (6) 1591 |
| (7) 6396 | (8) 100  |

【解説】

- (1)  $68^2 - 32^2 = (68 + 32) \times (68 - 32)$   
 $= 100 \times 36 = 3600$
- (2)  $45^2 - 15^2 = (45 + 15) \times (45 - 15)$   
 $= 60 \times 30 = 1800$
- (3)  $7.5^2 - 2.5^2 = (7.5 + 2.5) \times (7.5 - 2.5)$   
 $= 10 \times 5 = 50$
- (4)  $52^2 = (50 + 2)^2$   
 $= 2500 + 200 + 4 = 2704$
- (5)  $98^2 = (100 - 2)^2$   
 $= 10000 - 400 + 4 = 9604$
- (6)  $43 \times 37 = (40 + 3) \times (40 - 3)$   
 $= 1600 - 9 = 1591$
- (7)  $78 \times 82 = (80 - 2) \times (80 + 2)$   
 $= 6400 - 4 = 6396$

(8)  $35^2 - 2 \times 35 \times 25 + 25^2 = (35 - 25)^2$   
 $= 10^2 = 100$

2

P.28

- |                   |                         |
|-------------------|-------------------------|
| (1) -211          | (2) 40000               |
| (3) 1600          | (4) 5.6                 |
| (5) $\frac{1}{9}$ | (6) 520 cm <sup>2</sup> |

【解説】

- (1)  $(x+5)(x-5) - (x+8)(x-3) = -5x - 1$   
 $= -5 \times 42 - 1$   
 $= -211$
- (2)  $a^2 + 10a + 25 = (a+5)^2$   
 $= (195+5)^2$   
 $= 200^2 = 40000$
- (3)  $(2x-3y)^2 - (3x-2y)^2 = -5x^2 + 5y^2$   
 $= 5(y+x)(y-x)$   
 $= 5 \times (18-2) \times (18+2)$   
 $= 5 \times 16 \times 20 = 1600$
- (4)  $x^2 - 4y^2 = (x+2y)(x-2y)$   
 $= (2.4 + 2 \times 0.2) \times (2.4 - 2 \times 0.2)$   
 $= 2.8 \times 2 = 5.6$
- (5)  $x^2 + 4xy + 4y^2 = (x+2y)^2$   
 $= \left\{ \frac{2}{3} + 2 \times \left( -\frac{1}{6} \right) \right\}^2$   
 $= \left( \frac{1}{3} \right)^2 = \frac{1}{9}$
- (6)  $(65+2)^2 - (65-2)^2 = 67^2 - 63^2$   
 $= (67+63) \times (67-63)$   
 $= 130 \times 4 = 520 \text{ (cm}^2\text{)}$

3

P.29

(1) 3つの長方形に分けて面積を考えると、

$$\begin{aligned} S &= a(b-a) + ac + a(a+d) \\ &= ab - a^2 + ac + a^2 + ad \\ &= ab + ac + ad \quad \dots \text{①} \end{aligned}$$

また、 $l = \left( b - \frac{a}{2} \right) + c + \left( \frac{a}{2} + d \right)$   
 $= b + c + d$

だから、 $al = ab + ac + ad \quad \dots \text{②}$

①, ②より、 $S = al$

(2) 2つの半円を合わせると1つの円になるから、

$$\begin{aligned} S &= ax \times 2 + \pi \left( \frac{x}{2} + a \right)^2 - \pi \left( \frac{x}{2} \right)^2 \\ &= 2ax + \pi ax + \pi a^2 \quad \dots \text{①} \end{aligned}$$

道の中央を通る半円の直径は、 $(x+a)$  m であるから、

$$\begin{aligned} l &= x \times 2 + \pi(x+a) \\ &= 2x + \pi x + \pi a \end{aligned}$$

したがって、 $al = a(2x + \pi x + \pi a)$

$$= 2ax + \pi ax + \pi a^2 \quad \dots \text{②}$$

①, ②より、 $S = al$

4

P.29

(1) 中央の整数を  $n$  とすると、3つの数は、 $n-1$ ,  $n$ ,  $n+1$  と表される。

このとき、大きい方の2数の積から小さい方の2数の積をひいた差は、

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

これは、中央の数の2倍に等しい。

(2) もっとも小さい整数を  $n$  とすると、4つの数は、 $n$ ,  $n+1$ ,  $n+2$ ,  $n+3$  と表される。

このとき、大きい方の2数の積から小さい方の2数の積をひいた差は、

$$\begin{aligned} (n+2)(n+3) - n(n+1) &= n^2 + 5n + 6 - n^2 - n \\ &= 4n + 6 \quad \dots \text{①} \end{aligned}$$

また、4つの数の和は、

$$\begin{aligned} n + (n+1) + (n+2) + (n+3) &= 4n + 6 \quad \dots \text{②} \end{aligned}$$

①, ②より、大きい方の2数の積から小さい方の2数の積をひいた差は、もとの4つの数の和に等しい。

(3) 2つの続いた偶数の積に1を加えた和は、

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

2つの偶数  $2n$ ,  $2n+2$  の間にある奇数は  $2n+1$  だから、これはその平方に等しい。

(4) 奇数と奇数の積は、

$$\begin{aligned} (2m+1)(2n+1) &= 4mn + 2m + 2n + 1 \\ &= 2(2mn + m + n) + 1 \end{aligned}$$

$2mn + m + n$  は整数だから、これは奇数である。

## 計算トレーニング

1

P.30

- |                        |                        |
|------------------------|------------------------|
| (1) $12a^2 + 21ab$     | (2) $-8x^2 + 36xy$     |
| (3) $-12m^2 - 2mn$     | (4) $14xy - 21x^2$     |
| (5) $6a^2 - 3ab + 12a$ | (6) $2xy - 6y^2 + 10y$ |
| (7) $2x^2 - 3xy$       | (8) $4a^2 + 10ab$      |

## 【解説】

- (1)  $3a(4a+7b) = 3a \times 4a + 3a \times 7b$   
 $= 12a^2 + 21ab$
- (2)  $(2x-9y) \times (-4x) = 2x \times (-4x) - 9y \times (-4x)$   
 $= -8x^2 + 36xy$
- (3)  $-2m(6m+n) = -2m \times 6m - 2m \times n$   
 $= -12m^2 - 2mn$
- (4)  $7x(2y-3x) = 7x \times 2y - 7x \times 3x$   
 $= 14xy - 21x^2$
- (5)  $3a(2a-b+4) = 3a \times 2a - 3a \times b + 3a \times 4$   
 $= 6a^2 - 3ab + 12a$
- (6)  $(x-3y+5) \times 2y = x \times 2y - 3y \times 2y + 5 \times 2y$   
 $= 2xy - 6y^2 + 10y$
- (7)  $\frac{1}{4}x(8x-12y) = \frac{1}{4}x \times 8x - \frac{1}{4}x \times 12y$   
 $= 2x^2 - 3xy$
- (8)  $\frac{2}{5}a(10a+25b) = \frac{2}{5}a \times 10a + \frac{2}{5}a \times 25b$   
 $= 4a^2 + 10ab$

2

P.30

- |                |              |
|----------------|--------------|
| (1) $2x+3$     | (2) $3a-2b$  |
| (3) $-3x-2y$   | (4) $4a-5$   |
| (5) $2ab+3b+4$ | (6) $3x-9y$  |
| (7) $10a-15b$  | (8) $36x+24$ |

## 【解説】

- (1)  $(6x^2+9x) \div 3x = (6x^2+9x) \times \frac{1}{3x}$   
 $= 2x+3$
- (2)  $(12ab-8b^2) \div 4b = (12ab-8b^2) \times \frac{1}{4b}$   
 $= 3a-2b$

- (3)  $(15x^2y+10xy^2) \div (-5xy)$   
 $= (15x^2y+10xy^2) \times \left(-\frac{1}{5xy}\right)$   
 $= -3x-2y$
- (4)  $(24a^2b-30ab) \div 6ab = (24a^2b-30ab) \times \frac{1}{6ab}$   
 $= 4a-5$
- (5)  $(4a^2b+6ab+8a) \div 2a = (4a^2b+6ab+8a) \times \frac{1}{2a}$   
 $= 2ab+3b+4$
- (6)  $(2xy-6y^2) \div \frac{2}{3}y = (2xy-6y^2) \times \frac{3}{2y}$   
 $= 3x-9y$
- (7)  $(8a^2-12ab) \div \frac{4}{5}a = (8a^2-12ab) \times \frac{5}{4a}$   
 $= 10a-15b$
- (8)  $(30x^2y+20xy) \div \frac{5}{6}xy = (30x^2y+20xy) \times \frac{6}{5xy}$   
 $= 36x+24$

3

P.30

- |                           |                       |
|---------------------------|-----------------------|
| (1) $xy-4x+5y-20$         | (2) $2ab+12a-7b-42$   |
| (3) $3x^2+22x-16$         | (4) $6p^2+pq-q^2$     |
| (5) $2x^2-5xy-12y^2$      | (6) $-5a^2+13ab+6b^2$ |
| (7) $3x^2-xy+13x-3y+12$   |                       |
| (8) $3a^2+2ab-8b^2+2a+4b$ |                       |

## 【解説】

- (1)  $(3x-2)(x+8) = 3x^2+24x-2x-16$   
 $= 3x^2+22x-16$
- (2)  $(2p+q)(3p-q) = 6p^2-2pq+3pq-q^2$   
 $= 6p^2+pq-q^2$
- (3)  $(x-4y)(2x+3y) = 2x^2+3xy-8xy-12y^2$   
 $= 2x^2-5xy-12y^2$
- (4)  $(5a+2b)(-a+3b) = -5a^2+15ab-2ab+6b^2$   
 $= -5a^2+13ab+6b^2$
- (5)  $(x+3)(3x-y+4)$   
 $= x(3x-y+4) + 3(3x-y+4)$   
 $= 3x^2-xy+4x+9x-3y+12$   
 $= 3x^2-xy+13x-3y+12$
- (6)  $(3a-4b+2)(a+2b)$   
 $= 3a(a+2b) - 4b(a+2b) + 2(a+2b)$   
 $= 3a^2+6ab-4ab-8b^2+2a+4b$   
 $= 3a^2+2ab-8b^2+2a+4b$

4

P.31

- |                               |                       |
|-------------------------------|-----------------------|
| (1) $x^2+3x-28$               | (2) $a^2-4a-45$       |
| (3) $x^2+8xy+15y^2$           | (4) $4x^2-20x+21$     |
| (5) $a^2-26a+169$             | (6) $9x^2+36x+36$     |
| (7) $16a^2+24ab+9b^2$         | (8) $25x^2-20xy+4y^2$ |
| (9) $x^2-64$                  | (10) $144-m^2$        |
| (11) $9x^2-49$                | (12) $25a^2-64b^2$    |
| (13) $x^2+2xy+y^2+x+y-20$     |                       |
| (14) $a^2+2ab+b^2-36$         |                       |
| (15) $a^2-2ab+b^2+6a-6b+9$    |                       |
| (16) $4x^2+4xy+y^2-16x-8y+16$ |                       |

## 【解説】

- (1)  $(x-4)(x+7) = x^2+(-4+7)x+(-4) \times 7$   
 $= x^2+3x-28$
- (2)  $(a+5)(a-9) = a^2+(5-9)a+5 \times (-9)$   
 $= a^2-4a-45$
- (3)  $(x+5y)(x+3y) = x^2+(5y+3y)x+5y \times 3y$   
 $= x^2+8xy+15y^2$
- (4)  $(2x-3)(2x-7)$   
 $= (2x)^2+(-3-7) \times 2x+(-3) \times (-7)$   
 $= 4x^2-20x+21$
- (5)  $(a-13)^2 = a^2-2 \times 13 \times a+13^2$   
 $= a^2-26a+169$
- (6)  $(3x+6)^2 = (3x)^2+2 \times 6 \times 3x+6^2$   
 $= 9x^2+36x+36$
- (7)  $(4a+3b)^2 = (4a)^2+2 \times 3b \times 4a+(3b)^2$   
 $= 16a^2+24ab+9b^2$
- (8)  $(5x-2y)^2 = (5x)^2-2 \times 2y \times 5x+(2y)^2$   
 $= 25x^2-20xy+4y^2$
- (9)  $(x+8)(x-8) = x^2-8^2$   
 $= x^2-64$
- (10)  $(12-m)(12+m) = 12^2-m^2$   
 $= 144-m^2$
- (11)  $(3x+7)(3x-7) = (3x)^2-7^2$   
 $= 9x^2-49$
- (12)  $(5a+8b)(5a-8b) = (5a)^2-(8b)^2$   
 $= 25a^2-64b^2$
- (13)  $(x+y-4)(x+y+5)$   
 $= (X-4)(X+5)$   $\leftarrow x+y=X$ とおく  
 $= X^2+X-20$   
 $= x^2+2xy+y^2+x+y-20$

- (14)  $(a+b+6)(a+b-6)$   
 $= (X+6)(X-6)$   $\leftarrow a+b=X$ とおく  
 $= X^2-36$   
 $= a^2+2ab+b^2-36$
- (15)  $(a-b+3)^2$   
 $= (X+3)^2$   $\leftarrow a-b=X$ とおく  
 $= X^2+6X+9$   
 $= a^2-2ab+b^2+6a-6b+9$
- (16)  $(2x+y-4)^2$   
 $= (X-4)^2$   $\leftarrow 2x+y=X$ とおく  
 $= X^2-8X+16$   
 $= 4x^2+4xy+y^2-16x-8y+16$

5

P.31

- |                    |               |
|--------------------|---------------|
| (1) $2x^2-7x$      | (2) $3x+1$    |
| (3) $15x+33$       | (4) $9a-46$   |
| (5) $x^2+10xy+y^2$ | (6) $8x^2+18$ |
| (7) $2a^2-6ab+b^2$ | (8) $-6a-2$   |

## 【解説】

- (1)  $(x-2)^2+(x+1)(x-4)$   
 $= x^2-4x+4+x^2-3x-4$   
 $= 2x^2-7x$
- (2)  $(x+3)(x-3)-(x+2)(x-5)$   
 $= x^2-9-(x^2-3x-10)$   
 $= x^2-9-x^2+3x+10$   
 $= 3x+1$
- (3)  $2(x+4)^2-(2x-1)(x+1)$   
 $= 2(x^2+8x+16)-(2x^2+2x-x-1)$   
 $= 2x^2+16x+32-2x^2-x+1$   
 $= 15x+33$
- (4)  $(a-5)(a+6)-(a-4)^2$   
 $= a^2+a-30-(a^2-8a+16)$   
 $= a^2+a-30-a^2+8a-16$   
 $= 9a-46$
- (5)  $3(x+y)^2-2(x-y)^2$   
 $= 3(x^2+2xy+y^2)-2(x^2-2xy+y^2)$   
 $= 3x^2+6xy+3y^2-2x^2+4xy-2y^2$   
 $= x^2+10xy+y^2$
- (6)  $(2x+3)^2+(2x-3)^2$   
 $= 4x^2+12x+9+4x^2-12x+9$   
 $= 8x^2+18$

(7)  $(a-3b)(a+b) + (a-2b)^2$   
 $= a^2 - 2ab - 3b^2 + a^2 - 4ab + 4b^2$   
 $= 2a^2 - 6ab + b^2$

(8)  $(3a+1)(3a-1) - (3a+1)^2$   
 $= 9a^2 - 1 - (9a^2 + 6a + 1)$   
 $= 9a^2 - 1 - 9a^2 - 6a - 1$   
 $= -6a - 2$

**6**

P.32

(1) $2a(x+2y)$	(2) $4y(x-2y)$
(3) $5m(2x-3y)$	(4) $4ab(3a+4b)$
(5) $7xy(x-3)$	(6) $a(x-y+z)$
(7) $2a(2a-4b+3)$	(8) $3xy(x+2y-3)$

**7**

P.32

(1) $(x+5)(x+7)$	(2) $(x+4)(x-8)$
(3) $(a-5)(a-10)$	(4) $(y-7)(y+9)$
(5) $(x+2y)(x+7y)$	(6) $(a+3b)(a-6b)$
(7) $(x+8)^2$	(8) $(p-11)^2$
(9) $(3a-1)^2$	(10) $(2x+5)^2$
(11) $(x+7y)^2$	(12) $(4x-\frac{y}{2})^2$
(13) $(x+9)(x-9)$	(14) $(6+p)(6-p)$
(15) $(2x+7)(2x-7)$	(16) $(9a+1)(9a-1)$
(17) $(5x+8y)(5x-8y)$	
(18) $(3m+\frac{n}{3})(3m-\frac{n}{3})$	

**【解説】**

(1)  $x^2 + \overset{和}{12}x + \overset{積}{35}$   
積が35, 和が12になる2数は, 5, 7  
 $x^2 + 12x + 35 = (x+5)(x+7)$

(5)  $x^2 + \overset{和}{9y}x + \overset{積}{14y^2}$   
積が $14y^2$ , 和が $9y$ になる2式は,  $2y, 7y$   
 $x^2 + 9xy + 14y^2 = (x+2y)(x+7y)$

(6)  $a^2 - \overset{和}{3b}a + \overset{積}{-18b^2}$   
積が $-18b^2$ , 和が $-3b$ になる2式は,  $3b, -6b$   
 $a^2 - 3ab - 18b^2 = (a+3b)(a-6b)$

(7)  $x^2 + 16x + 64 = x^2 + 2 \times 8 \times x + 8^2$   
 $= (x+8)^2$

(9)  $9a^2 - 6a + 1 = (3a)^2 - 2 \times 1 \times 3a + 1^2$   
 $= (3a-1)^2$

(11)  $x^2 + 14xy + 49y^2 = x^2 + 2 \times 7y \times x + (7y)^2$   
 $= (x+7y)^2$

(12)  $16x^2 - 4xy + \frac{y^2}{4} = (4x)^2 - 2 \times \frac{y}{2} \times 4x + (\frac{y}{2})^2$   
 $= (4x - \frac{y}{2})^2$

(13)  $x^2 - 81 = x^2 - 9^2$   
 $= (x+9)(x-9)$

(15)  $4x^2 - 49 = (2x)^2 - 7^2$   
 $= (2x+7)(2x-7)$

(16)  $81a^2 - 1 = (9a)^2 - 1^2$   
 $= (9a+1)(9a-1)$

(17)  $25x^2 - 64y^2 = (5x)^2 - (8y)^2$   
 $= (5x+8y)(5x-8y)$

(18)  $9m^2 - \frac{n^2}{9} = (3m)^2 - (\frac{n}{3})^2$   
 $= (3m + \frac{n}{3})(3m - \frac{n}{3})$

**8**

P.33

(1) $2(x+2)(x-5)$	(2) $5(a+1)(a+2)$
(3) $3(x+3)(x-3)$	(4) $-4(a-1)^2$
(5) $7(m+1)(m-2)$	(6) $6(x+y)^2$
(7) $5(1+m)(1-m)$	(8) $3(2a+5)(2a-5)$
(9) $a(x-4)(x-8)$	(10) $2a(x+2y)(x-2y)$
(11) $3a(b+2)(b-4)$	(12) $x(x+2)(x-7)$
(13) $3b(2a+3)(2a-3)$	(14) $3x(y-2)^2$

**【解説】**

(1)  $2x^2 - 6x - 20 = 2(x^2 - 3x - 10)$   
 $= 2(x+2)(x-5)$

(2)  $5a^2 + 15a + 10 = 5(a^2 + 3a + 2)$   
 $= 5(a+1)(a+2)$

(3)  $3x^2 - 27 = 3(x^2 - 9)$   
 $= 3(x+3)(x-3)$

(4)  $-4a^2 + 8a - 4 = -4(a^2 - 2a + 1)$   
 $= -4(a-1)^2$

(5)  $7m^2 - 7m - 14 = 7(m^2 - m - 2)$   
 $= 7(m+1)(m-2)$

(6)  $6x^2 + 12xy + 6y^2 = 6(x^2 + 2xy + y^2)$   
 $= 6(x+y)^2$

(7)  $5 - 5m^2 = 5(1 - m^2)$   
 $= 5(1+m)(1-m)$

(8)  $12a^2 - 75 = 3(4a^2 - 25)$   
 $= 3(2a+5)(2a-5)$

(9)  $ax^2 - 12ax + 32a = a(x^2 - 12x + 32)$   
 $= a(x-4)(x-8)$

(10)  $2ax^2 - 8ay^2 = 2a(x^2 - 4y^2)$   
 $= 2a(x+2y)(x-2y)$

(11)  $3ab^2 - 6ab - 24a = 3a(b^2 - 2b - 8)$   
 $= 3a(b+2)(b-4)$

(12)  $x^3 - 5x^2 - 14x = x(x^2 - 5x - 14)$   
 $= x(x+2)(x-7)$

(13)  $12a^2b - 27b = 3b(4a^2 - 9)$   
 $= 3b(2a+3)(2a-3)$

(14)  $3xy^2 - 12xy + 12x = 3x(y^2 - 4y + 4)$   
 $= 3x(y-2)^2$

**9**

P.33

(1) $(x+y-3)(x+y-5)$	
(2) $(a-b+4)(a-b-6)$	
(3) $(x+1)^2$	(4) $(x-y)(m+2)$
(5) $(x+y+8)(x+y-8)$	
(6) $(a+b+5)(a-b+3)$	
(7) $(x-4+y)(x-4-y)$	
(8) $(a-b+2c)(a-b-2c)$	
(9) $(a-3)(b-2)$	(10) $(x+2)(y-3)$

**【解説】**

(1)  $(x+y)^2 - 8(x+y) + 15$   
 $= A^2 - 8A + 15$   
 $= (A-3)(A-5)$   
 $= (x+y-3)(x+y-5)$

(2)  $(a-b)^2 - 2(a-b) - 24$   
 $= A^2 - 2A - 24$   
 $= (A+4)(A-6)$   
 $= (a-b+4)(a-b-6)$

(3)  $(x-4)^2 + 10(x-4) + 25$   
 $= A^2 + 10A + 25$   
 $= (A+5)^2$   
 $= (x+1)^2$

(4)  $m(x-y) + 2(x-y)$   
 $= mA + 2A$   
 $= A(m+2)$   
 $= (x-y)(m+2)$

(5)  $(x+y)^2 - 64$   
 $= A^2 - 64$   
 $= (A+8)(A-8)$   
 $= (x+y+8)(x+y-8)$

(6)  $(a+4)^2 - (b+1)^2$   
 $= A^2 - B^2$   
 $= (A+B)(A-B)$   
 $= (a+4+b+1)(a+4-b-1)$   
 $= (a+b+5)(a-b+3)$

(7)  $x^2 - 8x + 16 - y^2$   
 $= (x-4)^2 - y^2$   
 $= A^2 - y^2$   
 $= (A+y)(A-y)$   
 $= (x-4+y)(x-4-y)$

(8)  $a^2 - 2ab + b^2 - 4c^2$   
 $= (a-b)^2 - 4c^2$   
 $= A^2 - (2c)^2$   
 $= (A+2c)(A-2c)$   
 $= (a-b+2c)(a-b-2c)$

(9)  $b(a-3) - 2a + 6$   
 $= b(a-3) - 2(a-3)$   
 $= bA - 2A$   
 $= A(b-2)$   
 $= (a-3)(b-2)$

(10)  $xy + 2y - 3x - 6$   
 $= y(x+2) - 3(x+2)$   
 $= yA - 3A$   
 $= (x+2)(y-3)$

**1** P.34

① 分配 ② 展開 ③  $ac+ad+bc+bd$   
 ④  $x^2+(a+b)x+ab$  ⑤  $x^2+2ax+a^2$   
 ⑥  $x^2-2ax+a^2$  ⑦  $x^2-a^2$

**2** P.34

⑧ 因数 ⑨ 因数分解  
 ⑩  $m(a+b)$  ⑪  $(x+a)(x+b)$  ⑫  $(x+a)^2$   
 ⑬  $(x-a)^2$  ⑭  $(x+a)(x-a)$

**3** P.34

⑮  $x+y$  ⑯  $A^2+4A+3$   
 ⑰  $A+1$  ⑱  $A+3$ (⑰と⑱は順不同可)  
 ⑲  $x+y+1$  ⑳  $x+y+3$ (⑲と⑳は順不同可)

**4** P.34

㉑ 65 ㉒ 15 ㉓ 80 ㉔ 50  
 (㉓と㉔は順不同可) ㉕ 4000  
 ㉖ 5 ㉗ 75 ㉘ 70 ㉙ 4900

**1** P.35

(1)  $21a^2-35ab$  (2)  $-2x^2-9x$   
 (3)  $-2x+4$  (4)  $8x-12y$

**【解説】**

(1)  $7a(3a-5b) = 7a \times 3a - 7a \times 5b$   
 $= 21a^2 - 35ab$   
 (2)  $3x(x-2) - x(5x+3) = 3x^2 - 6x - 5x^2 - 3x$   
 $= -2x^2 - 9x$   
 (3)  $(8x^2-16x) \div (-4x) = (8x^2-16x) \times \left(-\frac{1}{4x}\right)$   
 $= -2x + 4$   
 (4)  $(6xy-9y^2) \div \frac{3}{4}y = (6xy-9y^2) \times \frac{4}{3y}$   
 $= 8x - 12y$

**2** P.35

(1)  $2xy+5x-8y-20$  (2)  $x^2+2x-63$   
 (3)  $9a^2-12a-32$  (4)  $49m^2-42m+9$   
 (5)  $4x^2-81y^2$  (6)  $a^2+2ab+b^2-49$

**【解説】**

(2)  $(x+9)(x-7) = x^2 + (9-7)x + 9 \times (-7)$   
 $= x^2 + 2x - 63$   
 (3)  $(3a-8)(3a+4)$   
 $= (3a)^2 + (-8+4) \times 3a + (-8) \times 4$   
 $= 9a^2 - 12a - 32$   
 (4)  $(7m-3)^2 = (7m)^2 - 2 \times 3 \times 7m + 3^2$   
 $= 49m^2 - 42m + 9$   
 (5)  $(2x+9y)(2x-9y) = (2x)^2 - (9y)^2$   
 $= 4x^2 - 81y^2$   
 (6)  $(a+b+7)(a+b-7)$   $\leftarrow a+b=X$ とおく  
 $= (X+7)(X-7)$   
 $= X^2 - 49$   
 $= a^2 + 2ab + b^2 - 49$

**3** P.35

(1)  $2x^2-6x+8$  (2)  $-10x-24$   
 (3)  $3x-37$  (4)  $13x^2-12x+8$

**【解説】**

(1)  $(x-3)^2 + (x-1)(x+1) = x^2 - 6x + 9 + x^2 - 1$   
 $= 2x^2 - 6x + 8$   
 (2)  $(x-4)(x+2) - (x+4)^2$   
 $= x^2 - 2x - 8 - (x^2 + 8x + 16)$   
 $= x^2 - 2x - 8 - x^2 - 8x - 16$   
 $= -10x - 24$   
 (3)  $2(x-5)(x+4) - (x-3)(2x+1)$   
 $= 2(x^2 - x - 20) - (2x^2 + x - 6x - 3)$   
 $= 2x^2 - 2x - 40 - 2x^2 + 5x + 3$   
 $= 3x - 37$   
 (4)  $(3x+1)(3x-1) + (2x-3)^2$   
 $= 9x^2 - 1 + 4x^2 - 12x + 9$   
 $= 13x^2 - 12x + 8$

**4** P.35

(1)  $6x(xy-2)$  (2)  $(m-7)(m-8)$   
 (3)  $(a+6)(a-10)$  (4)  $\left(a-\frac{3}{2}\right)^2$   
 (5)  $(x+20)(x-20)$  (6)  $(0.6+m)(0.6-m)$

**【解説】**

(2)  $m^2 - 15m + 56$   
 和 積  
 積が56, 和が-15になる2数は, -7, -8  
 $m^2 - 15m + 56 = (m-7)(m-8)$   
 (4)  $a^2 - 3a + \frac{9}{4} = a^2 - 2 \times \frac{3}{2} \times a + \left(\frac{3}{2}\right)^2$   
 $= \left(a - \frac{3}{2}\right)^2$   
 (5)  $x^2 - 400 = x^2 - 20^2$   
 $= (x+20)(x-20)$   
 (6)  $0.36 - m^2 = 0.6^2 - m^2$   
 $= (0.6+m)(0.6-m)$

**5** P.36

(1)  $3(x+4)(x-6)$  (2)  $4(p+5)(p-5)$   
 (3)  $(5x-4y)^2$  (4)  $(3a+8b)(3a-8b)$   
 (5)  $2a(3b+2)(3b-2)$   
 (6)  $(a+b-3)(a+b-5)$   
 (7)  $(x-y+7)(x-y-7)$   
 (8)  $(a-3)(b-4)$

**【解説】**

(1)  $3x^2 - 6x - 72 = 3(x^2 - 2x - 24)$   
 $= 3(x+4)(x-6)$   
 (2)  $4p^2 - 100 = 4(p^2 - 25)$   
 $= 4(p+5)(p-5)$   
 (3)  $25x^2 - 40xy + 16y^2 = (5x)^2 - 2 \times 4y \times 5x + (4y)^2$   
 $= (5x-4y)^2$   
 (4)  $9a^2 - 64b^2 = (3a)^2 - (8b)^2$   
 $= (3a+8b)(3a-8b)$   
 (5)  $18ab^2 - 8a = 2a(9b^2 - 4)$   
 $= 2a(3b+2)(3b-2)$   
 (6)  $(a+b)^2 - 8(a+b) + 15$   $\leftarrow a+b=A$ とおく  
 $= A^2 - 8A + 15$   
 $= (A-3)(A-5)$   
 $= (a+b-3)(a+b-5)$   
 (7)  $(x-y)^2 - 49$   $\leftarrow x-y=A$ とおく  
 $= A^2 - 49$   
 $= (A+7)(A-7)$   
 $= (x-y+7)(x-y-7)$   
 (8)  $ab - 3b - 4a + 12$   
 $= b(a-3) - 4(a-3)$   $\leftarrow a-3=A$ とおく  
 $= bA - 4A$   
 $= A(b-4)$   
 $= (a-3)(b-4)$

- (1)① 600                      ② 4891  
 (2)① 189                      ② 40000  
 (3) 28  
 (4) Aの方がBより25 cm<sup>2</sup>だけ大きい  
 (5) 3つの続いた奇数は、整数  $n$  を使って、 $2n-1$ ,  $2n+1$ ,  $2n+3$  と表される。  
 この3つの奇数の平方の和に1を加えると、  
 $(2n-1)^2 + (2n+1)^2 + (2n+3)^2 + 1$   
 $= 4n^2 - 4n + 1 + 4n^2 + 4n + 1$   
 $\qquad\qquad\qquad + 4n^2 + 12n + 9 + 1$   
 $= 12n^2 + 12n + 12$   
 $= 12(n^2 + n + 1)$   
 $n^2 + n + 1$  は整数だから、これは12の倍数になる。

## 【解説】

- (1)①  $35^2 - 25^2 = (35+25) \times (35-25)$   
 $= 60 \times 10 = 600$   
 ②  $73 \times 67 = (70+3) \times (70-3)$   
 $= 4900 - 9 = 4891$   
 (2)①  $(x+2)(x-3) - (x-1)^2 = x-7$   
 $= 196 - 7 = 189$   
 ②  $x^2 + 8x + 16 = (x+4)^2$   
 $= (196+4)^2$   
 $= 200^2 = 40000$   
 (3)  $a^2 - b^2 = (a+b)(a-b)$   
 $= 8 \times 3.5 = 28$   
 (4) Aの面積は、 $x^2$  cm<sup>2</sup>  
 Bの面積は、 $(x+5)(x-5) = x^2 - 25$  (cm<sup>2</sup>)

## 1

- (1)  $a^3 + 1$   
 (2)  $10x^2 - 51xy + 8x + 56y^2 - 28y$   
 (3)  $4a^2 + 4ab + b^2 - 9$   
 (4)  $x^2 + 4xy + 4y^2 - 8x - 16y + 16$   
 (5)  $x^2 - 2xy + y^2 - x + y - 56$   
 (6)  $9a^2 - b^2 + 2b - 1$

## 【解説】

- (1)  $(a^2 - a + 1)(a + 1)$   
 $= a^2(a+1) - a(a+1) + (a+1)$   
 $= a^3 + a^2 - a^2 - a + a + 1$   
 $= a^3 + 1$   
 (2)  $(2x-7y)(5x-8y+4)$   
 $= 2x(5x-8y+4) - 7y(5x-8y+4)$   
 $= 10x^2 - 16xy + 8x - 35xy + 56y^2 - 28y$   
 $= 10x^2 - 51xy + 8x + 56y^2 - 28y$   
 (3)  $(2a+b+3)(2a+b-3)$   $\leftarrow 2a+b=X$ とおく  
 $= (X+3)(X-3)$   
 $= X^2 - 9$   
 $= 4a^2 + 4ab + b^2 - 9$   
 (4)  $(x+2y-4)^2$   $\leftarrow x+2y=X$ とおく  
 $= (X-4)^2$   
 $= X^2 - 8X + 16$   
 $= x^2 + 4xy + 4y^2 - 8x - 16y + 16$   
 (5)  $(x-y+7)(x-y-8)$   $\leftarrow x-y=X$ とおく  
 $= (X+7)(X-8)$   
 $= X^2 - X - 56$   
 $= x^2 - 2xy + y^2 - x + y - 56$   
 (6)  $(3a+b-1)(3a-b+1)$   $\leftarrow b-1=X$ とおく  
 $= (3a+X)(3a-X)$   
 $= 9a^2 - X^2$   
 $= 9a^2 - (b-1)^2$   
 $= 9a^2 - b^2 + 2b - 1$

- (1)  $-5a^2 + 28ab + 12b^2$   
 (2)  $18xy - 34y^2$

## 【解説】

- (1)  $4(a+2b)^2 - (3a-2b)^2$   
 $= 4(a^2 + 4ab + 4b^2) - (9a^2 - 12ab + 4b^2)$   
 $= 4a^2 + 16ab + 16b^2 - 9a^2 + 12ab - 4b^2$   
 $= -5a^2 + 28ab + 12b^2$   
 (2)  $(3x-5y)(3x+5y) - 9(x-y)^2$   
 $= 9x^2 - 25y^2 - 9(x^2 - 2xy + y^2)$   
 $= 9x^2 - 25y^2 - 9x^2 + 18xy - 9y^2$   
 $= 18xy - 34y^2$

## 3

- (1)  $-5x(a+2b)(a-2b)$   
 (2)  $(a+6b)(a-8b)$   
 (3)  $(x+4)(x-4)$                       (4)  $(a-10)^2$   
 (5)  $(x+y)(x-y-1)$   
 (6)  $(a+b+1)(a+b+2)$

## 【解説】

- (1)  $-5a^2x + 20b^2x = -5x(a^2 - 4b^2)$   
 $= -5x(a+2b)(a-2b)$   
 (2)  $a^2 \overbrace{-2b}^{\text{和}} \times a \overbrace{-48b^2}^{\text{積}}$   
 積が  $-48b^2$ 、和が  $-2b$  になる2式は、 $6b$ ,  $-8b$   
 $a^2 - 2ab - 48b^2 = (a+6b)(a-8b)$   
 (3)  $2x(x+4) - (x+4)^2$   $\leftarrow x+4=A$ とおく  
 $= 2xA - A^2$   
 $= A(2x-A)$   
 $= (x+4)(x-4)$   
 (4)  $(a-3)^2 - 14(a-3) + 49$   $\leftarrow a-3=A$ とおく  
 $= A^2 - 14A + 49$   
 $= (A-7)^2$   
 $= (a-10)^2$   
 (5)  $x^2 - y^2 - x - y$   
 $= (x+y)(x-y) - (x+y)$   $\leftarrow x+y=A$ とおく  
 $= A(x-y) - A$   
 $= A(x-y-1)$   
 $= (x+y)(x-y-1)$

- (6)  $a^2 + 2ab + b^2 + 3a + 3b + 2$   
 $= (a+b)^2 + 3(a+b) + 2$   $\leftarrow a+b=A$ とおく  
 $= A^2 + 3A + 2$   
 $= (A+1)(A+2)$   
 $= (a+b+1)(a+b+2)$

## 4

- (1)① 24.9984                      ② 94.2  
 (2) 9  
 (3) -150

## 【解説】

- (1)①  $5.04 \times 4.96 = (5+0.04) \times (5-0.04)$   
 $= 25 - 0.0016 = 24.9984$   
 ②  $6.5^2 \times 3.14 - 3.5^2 \times 3.14$   
 $= (6.5^2 - 3.5^2) \times 3.14$   
 $= (6.5+3.5) \times (6.5-3.5) \times 3.14$   
 $= 10 \times 3 \times 3.14 = 94.2$   
 (2)  $9x^2 + 12xy + 4y^2 = (3x+2y)^2$   
 $= (3 \times 0.2 + 2 \times 1.2)^2$   
 $= 3^2 = 9$   
 (3)  $(3x+5y)^2 - (3x-5y)^2$   
 $= 9x^2 + 30xy + 25y^2 - (9x^2 - 30xy + 25y^2)$   
 $= 60xy$   
 $= 60 \times \frac{5}{3} \times \left(-\frac{3}{2}\right) = -150$

## 5

- (1)  $a^2 + b^2 = a^2 + b^2 + 2ab - 2ab$   
 $= (a+b)^2 - 2ab$   
 $= (-2)^2 - 2 \times 8$   
 $= 4 - 16$   
 $= -12$   
 (2)  $a^2 - 2ab + b^2 = a^2 + b^2 + 2ab - 4ab$   
 $= (a+b)^2 - 4ab$   
 $= (-2)^2 - 4 \times 8$   
 $= 4 - 32$   
 $= -28$

6

P.38

連続した4つの自然数を、 $n$ を自然数として、 $n$ ,  $n+1$ ,  $n+2$ ,  $n+3$ とすると、

$$\begin{aligned} n^2 + (n+1)^2 + (n+2)^2 + (n+3)^2 \\ &= n^2 + n^2 + 2n + 1 + n^2 + 4n + 4 + n^2 + 6n + 9 \\ &= 4n^2 + 12n + 14 \\ &= 4(n^2 + 3n + 3) + 2 \end{aligned}$$

$n^2 + 3n + 3$ は整数だから、 $4(n^2 + 3n + 3) + 2$ を4でわったときの余りは2である。

7

P.38

$AB = 2r + 2a$ であるから、

$$\begin{aligned} S &= \pi(r+a)^2 - \pi r^2 \\ &= 2\pi ar + \pi a^2 \quad \dots \textcircled{1} \end{aligned}$$

$AM = 2r + a$ であるから、

$$\begin{aligned} \ell &= \pi(2r+a) \\ &= 2\pi r + \pi a \end{aligned}$$

したがって、 $a\ell = a(2\pi r + \pi a)$

$$= 2\pi ar + \pi a^2 \quad \dots \textcircled{2}$$

①、②より、 $S = a\ell$

8

P.38

(1)  $(a+b)$ cm

(2) (1)より、 $AB$ を直径とする半円の面積は、

$$\frac{\pi}{2}(a+b)^2 = \frac{\pi}{2}a^2 + \pi ab + \frac{\pi}{2}b^2$$

$AC$ を直径とする半円の面積は $\frac{\pi}{2}a^2$ 、 $BC$ を直径とする半円の面積は $\frac{\pi}{2}b^2$ 、よって、

$$\begin{aligned} P \text{の面積} &= \frac{\pi}{2}a^2 + \pi ab + \frac{\pi}{2}b^2 - \frac{\pi}{2}a^2 - \frac{\pi}{2}b^2 \\ &= \pi ab \text{ (cm}^2\text{)} \end{aligned}$$

【解説】

(1)  $\frac{1}{2}(2a+2b) = a+b$  (cm)

9

P.39

左上の数を $a$ とすると、右上の数は $a+1$ 、左下の数は $a+7$ 、右下の数は $a+8$ と表されるから、

右上と左下の数の積は、 $(a+1)(a+7) = a^2 + 8a + 7$

左上と右下の数の積は、 $a(a+8) = a^2 + 8a$

よってこの2数の差は、

$$a^2 + 8a + 7 - (a^2 + 8a) = 7$$

ゆえに、このような囲み方をした4つの数において、常に右上と左下の数の積が、左上と右下の数の積より7大きくなる。

10

P.39

2つの自然数は、 $10a+b$ ,  $10a+c$ と表され、

$b+c=10$ である。

この2つの数の積は、

$$\begin{aligned} (10a+b)(10a+c) \\ &= 100a^2 + (b+c) \times 10a + bc \\ &= 100a^2 + 100a + bc \\ &= 100a(a+1) + bc \end{aligned}$$

したがって、下2けたは一の位の数の積に、その上の2けたは十の位の数とそれに1を加えた数の積になる。

11

P.39

(1) (例)  $x(x+8)$ と12の和になっていて、因数の積の形になっていないから。

(2) 7, 8, 13

【解説】

(2) 12を2つの自然数の積の形で表すと、

$$1 \times 12, 2 \times 6, 3 \times 4$$

□に入る数は、

$$1+12=13, 2+6=8, 3+4=7$$

2章 平方根

## 5 平方根

## 確認問題 1

P.40・P.41

- (1) ①  $\pm 2$                   ②  $\pm 6$                   ③  $\pm 9$   
           ④  $\pm \frac{3}{4}$                   ⑤  $\pm \frac{7}{8}$                   ⑥  $\pm 0.3$
- (2) ①  $\pm \sqrt{5}$                 ②  $\pm \sqrt{0.7}$               ③  $\pm \sqrt{\frac{2}{11}}$
- (3) ① 4                        ②  $-\frac{5}{6}$                     ③ 13
- (4) ① 6                        ② 15                      ③ 81

## 確認問題 2

P.41

- (1)  $\sqrt{3} < \sqrt{5}$                 (2)  $\sqrt{21} > \sqrt{19}$   
           (3)  $3 > \sqrt{8}$                 (4)  $7 < \sqrt{50}$   
           (5)  $\sqrt{90} > 9$               (6)  $\sqrt{0.6} < 1$   
           (7)  $-\sqrt{10} > -\sqrt{11}$       (8)  $-8 < -\sqrt{63}$   
           (9)  $2 < \sqrt{7} < 3$         (10)  $\sqrt{21} < 5 < \sqrt{26}$

【解説】

(3)  $3^2 = 9$ ,  $(\sqrt{8})^2 = 8$

$$9 > 8 \text{ だから, } \sqrt{9} > \sqrt{8}$$

$$3 > \sqrt{8}$$

(4)  $7^2 = 49$ ,  $(\sqrt{50})^2 = 50$

$$49 < 50 \text{ だから, } \sqrt{49} < \sqrt{50}$$

$$7 < \sqrt{50}$$

(5)  $(\sqrt{90})^2 = 90$ ,  $9^2 = 81$

$$90 > 81 \text{ だから, } \sqrt{90} > \sqrt{81}$$

$$\sqrt{90} > 9$$

(6)  $(\sqrt{0.6})^2 = 0.6$ ,  $1^2 = 1$

$$0.6 < 1 \text{ だから, } \sqrt{0.6} < \sqrt{1}$$

$$\sqrt{0.6} < 1$$

(7)  $\sqrt{10} < \sqrt{11}$

$$-\sqrt{10} > -\sqrt{11}$$

(8)  $8^2 = 64$ ,  $(\sqrt{63})^2 = 63$

$$\sqrt{64} > \sqrt{63}$$

$$8 > \sqrt{63}$$

$$-8 < -\sqrt{63}$$

(9)  $2^2 = 4$ ,  $3^2 = 9$ ,  $(\sqrt{7})^2 = 7$

$$4 < 7 < 9 \text{ だから, } \sqrt{4} < \sqrt{7} < \sqrt{9}$$

$$2 < \sqrt{7} < 3$$

(10)  $5^2 = 25$ ,  $(\sqrt{21})^2 = 21$ ,  $(\sqrt{26})^2 = 26$

$21 < 25 < 26$  だから、

$$\sqrt{21} < \sqrt{25} < \sqrt{26}$$

$$\sqrt{21} < 5 < \sqrt{26}$$

## 確認問題 3

P.42

(1) 有理数… ㉞, ㉟, ㊱, ㊲

無理数… ㉟

(2) ㉞ A                      ㉟ B  
           ㊱ C                      ㊲ D

## 確認問題 4

P.43

(1) 2, 3, 5, 7, 11, 13, 17, 19, 23, 29

- (2) ①  $2^2$                     ②  $2^2 \times 3$                 ③  $2 \times 3^2$   
           ④  $2^2 \times 5$               ⑤  $2 \times 3 \times 7$               ⑥  $2^2 \times 13$   
           ⑦  $3^2 \times 7$               ⑧  $3^4$                       ⑨  $2 \times 3 \times 5^2$

【解説】

- (2) ①  $\begin{array}{r} 2 \overline{) 8} \\ \underline{4} \\ 4 \\ \underline{4} \\ 0 \end{array}$                   ②  $\begin{array}{r} 2 \overline{) 12} \\ \underline{4} \\ 8 \\ \underline{4} \\ 0 \end{array}$                   ③  $\begin{array}{r} 3 \overline{) 18} \\ \underline{9} \\ 9 \\ \underline{9} \\ 0 \end{array}$   
           ④  $\begin{array}{r} 2 \overline{) 20} \\ \underline{10} \\ 10 \\ \underline{10} \\ 0 \end{array}$                   ⑤  $\begin{array}{r} 2 \overline{) 42} \\ \underline{21} \\ 21 \\ \underline{21} \\ 0 \end{array}$                   ⑥  $\begin{array}{r} 2 \overline{) 52} \\ \underline{26} \\ 26 \\ \underline{26} \\ 0 \end{array}$   
           ⑦  $\begin{array}{r} 3 \overline{) 63} \\ \underline{21} \\ 21 \\ \underline{21} \\ 0 \end{array}$                   ⑧  $\begin{array}{r} 3 \overline{) 81} \\ \underline{27} \\ 27 \\ \underline{27} \\ 0 \end{array}$                   ⑨  $\begin{array}{r} 2 \overline{) 150} \\ \underline{75} \\ 75 \\ \underline{75} \\ 0 \end{array}$

## 確認問題 5

P.43

(1) ①  $\pm 21$                     ②  $\pm 18$

(2) ①  $n = 5$ ,  $\sqrt{45n} = 15$

          ②  $n = 6$ ,  $\sqrt{96n} = 24$

【解説】

- (1) ①  $\begin{array}{r} 3 \overline{) 441} \\ \underline{3} \ 147 \\ \underline{7} \ 49 \\ \underline{7} \\ 0 \end{array}$                   ②  $\begin{array}{r} 2 \overline{) 324} \\ \underline{2} \ 162 \\ \underline{3} \ 81 \\ \underline{3} \ 27 \\ \underline{3} \ 9 \\ \underline{3} \\ 0 \end{array}$

$$441 = (3 \times 7)^2$$

$$= 21^2$$

$$324 = (2 \times 3^2)^2$$

$$= 18^2$$