

数学 I 休校中の課題解答① (1章1節)

① ノートに問題を解いた後、丸付けをしてください。

② 解説を読んで考え方を確認し、間違えた原因や分からないこと、ポイント等をメモし、授業が始まったときに活かせるようにしましょう。

☆登校日 5 / 13 (水) にノートとスライドを提出してください。

教 p. 2

【問 1】《解答》

- (1) $x \times y = xy$ (2) $a \times (-4) = -4a$
(3) $3 \times x \times x = 3x^2$ (4) $a \div 5 = \frac{a}{5}$

教 p. 3

【問 2】《解答》

- (1) 次数は 1 , 係数は 5 (2) 次数は 2 , 係数は -3
(3) 次数は 3 , 係数は 1

【問 3】《解答》

- (1) 次数は 3 , 係数は $5x$ (2) 次数は 1 , 係数は $3a^2$
(3) 次数は 2 , 係数は $-b$

教 p. 4

【問 4】《解答》

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

【問 5】《解答》

- (1) 2次式 (2) 3次式

【問 6】《解答》

- (1) x に着目したとき
降べきの順に整理すると
 $3x^2 - yx + (-y + 1)$
よって、次数は 2 , 定数項は $-y + 1$
 y に着目したとき
降べきの順に整理すると
 $-(x + 1)y + (3x^2 + 1)$
よって、次数は 1 , 定数項は $3x^2 + 1$

- (2) x に着目したとき
降べきの順に整理すると
 $2x^2 + (5y + 1)x + (3y^2 - 2y + 6)$
よって、次数は 2 , 定数項は $3y^2 - 2y + 6$
 y に着目したとき
降べきの順に整理すると
 $3y^2 + (5x - 2)y + (2x^2 + x + 6)$
よって、次数は 2 , 定数項は $2x^2 + x + 6$

教 p. 5

【問 7】《解答》

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

【問 8】《解答》

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

教 p. 6

【問 9】《解答》

- (1) $a^2 \times a^5 = a^{2+5} = a^7$
(2) $(a^3)^2 = a^{3 \times 2} = a^6$
(3) $(a^3b^2)^4 = (a^3)^4(b^2)^4 = a^{3 \times 4}b^{2 \times 4} = a^{12}b^8$

【問 10】《解答》

- (1) $3x \times 4x^3 = (3 \times 4) \times (x^1 \times x^3) = 12x^4$
(2) $5x^3 \times (-3x^2) = \{5 \times (-3)\} \times (x^3 \times x^2) = -15x^5$
(3) $(3x^3)^3 = 3^3 \times (x^3)^3 = 27x^9$

教 p. 7

【問 11】《解答》

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

数学 I 休校中の課題解答② (1章1節)

【問 12】《解答》

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

$$\begin{aligned}(2) \quad (2x-1)(4x+3) &= 2x(4x+3) - (4x+3) \\ &= 8x^2 + 6x - 4x - 3 \\ &= 8x^2 + 2x - 3\end{aligned}$$

$$\begin{aligned}(3) \quad (x+3)(x^2-2x-1) \\ &= x(x^2-2x-1) + 3(x^2-2x-1) \\ &= x^3 - 2x^2 - x + 3x^2 - 6x - 3 \\ &= x^3 + x^2 - 7x - 3\end{aligned}$$

$$\begin{aligned}(4) \quad (2x^2+x-3)(x-4) \\ &= 2x^2(x-4) + x(x-4) - 3(x-4) \\ &= 2x^3 - 8x^2 + x^2 - 4x - 3x + 12 \\ &= 2x^3 - 7x^2 - 7x + 12\end{aligned}$$

教 p. 8

【問 13】《解答》

$$\begin{aligned}(1) \quad (x+5)^2 &= x^2 + 2 \cdot x \cdot 5 + 5^2 = x^2 + 10x + 25 \\ (2) \quad (x-4)^2 &= x^2 - 2 \cdot x \cdot 4 + 4^2 = x^2 - 8x + 16 \\ (3) \quad (2x+1)^2 &= (2x)^2 + 2 \cdot 2x \cdot 1 + 1^2 = 4x^2 + 4x + 1 \\ (4) \quad (x+2y)^2 &= x^2 + 2 \cdot x \cdot 2y + (2y)^2 = x^2 + 4xy + 4y^2 \\ (5) \quad (3x-y)^2 &= (3x)^2 - 2 \cdot 3x \cdot y + y^2 = 9x^2 - 6xy + y^2 \\ (6) \quad (3x+4y)^2 &= (3x)^2 + 2 \cdot 3x \cdot 4y + (4y)^2 \\ &= 9x^2 + 24xy + 16y^2\end{aligned}$$

【問 14】《解答》

$$\begin{aligned}(1) \quad (x+5)(x-5) &= x^2 - 5^2 = x^2 - 25 \\ (2) \quad (x-3)(x+3) &= (x+3)(x-3) = x^2 - 3^2 = x^2 - 9 \\ (3) \quad (2x+1)(2x-1) &= (2x)^2 - 1^2 = 4x^2 - 1 \\ (4) \quad (4x+3y)(4x-3y) &= (4x)^2 - (3y)^2 = 16x^2 - 9y^2\end{aligned}$$

教 p. 9

【問 15】《解答》

$$\begin{aligned}(1) \quad (x+3)(x+5) &= x^2 + (3+5)x + 3 \cdot 5 = x^2 + 8x + 15 \\ (2) \quad (x+2)(x-10) &= x^2 + \{2+(-10)\}x + 2 \cdot (-10) \\ &= x^2 - 8x - 20 \\ (3) \quad (x-4)(x+3) &= x^2 + \{(-4)+3\}x + (-4) \cdot 3 \\ &= x^2 - x - 12\end{aligned}$$

$$\begin{aligned}(4) \quad (x-3)(x-6) &= x^2 + \{(-3)+(-6)\}x + (-3) \cdot (-6) \\ &= x^2 - 9x + 18\end{aligned}$$

$$(5) \quad (x+y)(x+4y) = x^2 + (y+4y)x + y \cdot 4y = x^2 + 5xy + 4y^2$$

$$\begin{aligned}(6) \quad (x-3y)(x+2y) &= x^2 + \{(-3y)+2y\}x + (-3y) \cdot 2y \\ &= x^2 - xy - 6y^2\end{aligned}$$

【問 16】《解答》

$$\begin{aligned}(1) \quad (x+4)(2x+3) &= (1 \cdot 2)x^2 + (1 \cdot 3 + 4 \cdot 2)x + 4 \cdot 3 \\ &= 2x^2 + 11x + 12\end{aligned}$$

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

$$\begin{aligned}(3) \quad (5x-3)(x+2) &= (5 \cdot 1)x^2 + \{5 \cdot 2 + (-3) \cdot 1\}x + (-3) \cdot 2 \\ &= 5x^2 + 7x - 6\end{aligned}$$

$$\begin{aligned}(4) \quad (3x-1)(2x-3) \\ &= (3 \cdot 2)x^2 + \{3 \cdot (-3) + (-1) \cdot 2\}x + (-1) \cdot (-3) \\ &= 6x^2 - 11x + 3\end{aligned}$$

$$\begin{aligned}(5) \quad (x+2y)(4x-5y) \\ &= (1 \cdot 4)x^2 + \{1 \cdot (-5y) + 2y \cdot 4\}x + 2y \cdot (-5y) \\ &= 4x^2 + 3xy - 10y^2\end{aligned}$$

$$\begin{aligned}(6) \quad (3x-y)(4x-3y) \\ &= (3 \cdot 4)x^2 + \{3 \cdot (-3y) + (-y) \cdot 4\}x + (-y) \cdot (-3y) \\ &= 12x^2 - 13xy + 3y^2\end{aligned}$$

教 p. 10

【問 17】《解答》

$$\begin{aligned}(1) \quad a+b=A \text{とおくと} \\ (a+b+3)(a+b-2) &= (A+3)(A-2) = A^2 + A - 6 \\ &= (a+b)^2 + (a+b) - 6 \\ &= a^2 + 2ab + b^2 + a + b - 6\end{aligned}$$

$$\begin{aligned}(2) \quad a+b=A \text{とおくと} \\ (a+b+1)(a+b-1) &= (A+1)(A-1) = A^2 - 1 \\ &= (a+b)^2 - 1 \\ &= a^2 + 2ab + b^2 - 1\end{aligned}$$

【問 18】《解答》

$$\begin{aligned}(1) \quad a+b=A \text{とおくと} \\ (a+b-1)^2 &= (A-1)^2 = A^2 - 2A + 1 \\ &= (a+b)^2 - 2(a+b) + 1 \\ &= a^2 + 2ab + b^2 - 2a - 2b + 1\end{aligned}$$

$$\begin{aligned}(2) \quad a-b=A \text{とおくと} \\ (a-b-c)^2 &= (A-c)^2 = A^2 - 2Ac + c^2 \\ &= (a-b)^2 - 2(a-b)c + c^2 \\ &= a^2 - 2ab + b^2 - 2ac + 2bc + c^2 \\ &= a^2 + b^2 + c^2 - 2ab + 2bc - 2ca\end{aligned}$$

教 p. 11

【問 1】《解答》

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

$$\begin{aligned}(2) \quad (x-2)(x^2+2x+4) &= (x-2)(x^2+x \cdot 2 + 2^2) = x^3 - 2^3 \\ &= x^3 - 8\end{aligned}$$

【問 2】《解答》

$$\begin{aligned}(1) \quad (x+2)^3 &= x^3 + 3 \cdot x^2 \cdot 2 + 3 \cdot x \cdot 2^2 + 2^3 \\ &= x^3 + 6x^2 + 12x + 8\end{aligned}$$

$$\begin{aligned}(2) \quad (2x-1)^3 &= (2x)^3 - 3 \cdot (2x)^2 \cdot 1 + 3 \cdot 2x \cdot 1^2 - 1^3 \\ &= 8x^3 - 12x^2 + 6x - 1\end{aligned}$$

$$\begin{aligned}(3) \quad (x+2y)^3 &= x^3 + 3 \cdot x^2 \cdot 2y + 3 \cdot x \cdot (2y)^2 + (2y)^3 \\ &= x^3 + 6x^2y + 12xy^2 + 8y^3\end{aligned}$$

教 p. 12

【問 19】《解答》

$$\begin{aligned}(1) \quad ab - 2bc - abc &= b(a - 2c - ac) \\ (2) \quad x^2 + 2x &= x \cdot x + x \cdot 2 = x(x+2) \\ (3) \quad 3x^2 - 6xy &= 3x \cdot x - 3x \cdot 2y = 3x(x-2y) \\ (4) \quad a^2b + 2ab^2 - ab &= ab \cdot a + ab \cdot 2b - ab \cdot 1 = ab(a+2b-1)\end{aligned}$$

教 p. 13

【問 20】《解答》

$$\begin{aligned}(1) \quad x^2 + 8x + 16 &= x^2 + 2 \cdot x \cdot 4 + 4^2 = (x+4)^2 \\ (2) \quad 9x^2 - 6x + 1 &= (3x)^2 - 2 \cdot 3x \cdot 1 + 1^2 = (3x-1)^2 \\ (3) \quad 4x^2 + 4xy + y^2 &= (2x)^2 + 2 \cdot 2x \cdot y + y^2 = (2x+y)^2 \\ (4) \quad 25x^2 - 20xy + 4y^2 &= (5x)^2 - 2 \cdot 5x \cdot 2y + (2y)^2 = (5x-2y)^2\end{aligned}$$

【問 21】《解答》

$$\begin{aligned}(1) \quad x^2 - 9 &= x^2 - 3^2 = (x+3)(x-3) \\ (2) \quad 16x^2 - 1 &= (4x)^2 - 1^2 = (4x+1)(4x-1) \\ (3) \quad 4x^2 - 25y^2 &= (2x)^2 - (5y)^2 = (2x+5y)(2x-5y)\end{aligned}$$

数学 I 休校中の課題解答③ (1章1節)

【問 22】《解答》

- (1) 積が 3, 和が 4 となる 2 つの数は 1 と 3 であるから
 $x^2 + 4x + 3 = (x + 1)(x + 3)$
- (2) 積が 4, 和が -5 となる 2 つの数は -1 と -4 であるから
 $x^2 - 5x + 4 = (x - 1)(x - 4)$
- (3) 積が -10, 和が 3 となる 2 つの数は -2 と 5 であるから
 $x^2 + 3x - 10 = (x - 2)(x + 5)$
- (4) 積が -24, 和が -2 となる 2 つの数は 4 と -6 であるから
 $x^2 - 2x - 24 = (x + 4)(x - 6)$

【問 23】《解答》

- (1) 積が $5y^2$, 和が $6y$ となる 2 つの式は y と $5y$ であるから
 $x^2 + 6xy + 5y^2 = (x + y)(x + 5y)$
- (2) 積が $-12y^2$, 和が y となる 2 つの式は $-3y$ と $4y$ であるから
 $x^2 + xy - 12y^2 = (x - 3y)(x + 4y)$

教 p. 15

【問 24】《解答》

- (1) $3x^2 + 7x + 2 = (x + 2)(3x + 1)$
- $$\begin{array}{r} 1 \quad 2 \longrightarrow 6 \\ 3 \quad 1 \longrightarrow 1 \\ \hline 7 \end{array}$$
- (2) $3x^2 - 8x + 5 = (x - 1)(3x - 5)$
- $$\begin{array}{r} 1 \quad -1 \longrightarrow -3 \\ 3 \quad -5 \longrightarrow -5 \\ \hline -8 \end{array}$$
- (3) $2x^2 + 11x + 15 = (x + 3)(2x + 5)$
- $$\begin{array}{r} 1 \quad 3 \longrightarrow 6 \\ 2 \quad 5 \longrightarrow 5 \\ \hline 11 \end{array}$$
- (4) $6x^2 - 13x + 2 = (x - 2)(6x - 1)$
- $$\begin{array}{r} 1 \quad -2 \longrightarrow -12 \\ 6 \quad -1 \longrightarrow -1 \\ \hline -13 \end{array}$$

【問 25】《解答》

- (1) $2x^2 + 5x - 3 = (x + 3)(2x - 1)$
- $$\begin{array}{r} 1 \quad 3 \longrightarrow 6 \\ 2 \quad -1 \longrightarrow -1 \\ \hline 5 \end{array}$$
- (2) $5x^2 + 7x - 6 = (x + 2)(5x - 3)$
- $$\begin{array}{r} 1 \quad 2 \longrightarrow 10 \\ 5 \quad -3 \longrightarrow -3 \\ \hline 7 \end{array}$$
- (3) $6x^2 + x - 2 = (2x - 1)(3x + 2)$
- $$\begin{array}{r} 2 \quad -1 \longrightarrow -3 \\ 3 \quad 2 \longrightarrow 4 \\ \hline 1 \end{array}$$
- (4) $9x^2 - 9x - 10 = (3x + 2)(3x - 5)$
- $$\begin{array}{r} 3 \quad 2 \longrightarrow 6 \\ 3 \quad -5 \longrightarrow -15 \\ \hline -9 \end{array}$$

【問 26】《解答》

- (1) $2x^2 + 3xy + y^2 = 2x^2 + 3y \cdot x + y^2 = (x + y)(2x + y)$
- $$\begin{array}{r} 1 \quad y \longrightarrow 2y \\ 2 \quad y \longrightarrow y \\ \hline 3y \end{array}$$
- (2) $6x^2 - 13xy + 6y^2 = 6x^2 - 13y \cdot x + 6y^2 = (2x - 3y)(3x - 2y)$
- $$\begin{array}{r} 2 \quad -3y \longrightarrow -9y \\ 3 \quad -2y \longrightarrow -4y \\ \hline -13y \end{array}$$
- (3) $9x^2 - 6xy - 8y^2 = 9x^2 - 6y \cdot x - 8y^2 = (3x + 2y)(3x - 4y)$
- $$\begin{array}{r} 3 \quad 2y \longrightarrow 6y \\ 3 \quad -4y \longrightarrow -12y \\ \hline -6y \end{array}$$

教 p. 16

【問 27】《解答》

- (1) $x + y = A$ とおくと
 $(x + y)^2 + 7(x + y) + 12 = A^2 + 7A + 12 = (A + 3)(A + 4) = (x + y + 3)(x + y + 4)$

- (2) $x - y = A$ とおくと
 $(x - y)^2 + 6(x - y) + 9 = A^2 + 6A + 9 = (A + 3)^2 = (x - y + 3)^2$
- (3) $x + 2y = A$ とおくと
 $(x + 2y)^2 - 4 = A^2 - 4 = (A + 2)(A - 2) = (x + 2y + 2)(x + 2y - 2)$
- (4) $x + y = A$ とおくと
 $3(x + y)^2 + 2(x + y) - 1 = 3A^2 + 2A - 1 = (A + 1)(3A - 1) = (x + y + 1)\{3(x + y) - 1\} = (x + y + 1)(3x + 3y - 1)$
- $$\begin{array}{r} 1 \quad 1 \longrightarrow 3 \\ 3 \quad -1 \longrightarrow -1 \\ \hline 2 \end{array}$$

【問 28】《解答》

- (1) $(a - 2)x + 3(2 - a) = (a - 2)x - 3(a - 2) = (a - 2)(x - 3)$
- (2) $(a - b)x - (b - a)y = (a - b)x + (a - b)y = (a - b)(x + y)$

教 p. 17

【問 29】《解答》

- (1) $x^2 + xy - yz - z^2 = (x - z)y + x^2 - z^2 = (x - z)y + (x + z)(x - z) = (x - z)(y + x + z) = (x - z)(x + y + z)$
- (2) $a^2 + b^2 - bc + ca - 2ab = (a - b)c + a^2 - 2ab + b^2 = (a - b)c + (a - b)^2 = (a - b)(c + a - b) = (a - b)(a - b + c)$

【問 30】《解答》

- (1) $x^2 + 3xy + 2y^2 + 2x + y - 3 = x^2 + (3y + 2)x + 2y^2 + y - 3 = x^2 + (3y + 2)x + (y - 1)(2y + 3) = \{x + (y - 1)\}\{x + (2y + 3)\} = (x + y - 1)(x + 2y + 3)$
- $$\begin{array}{r} 1 \quad -1 \longrightarrow -2 \\ 2 \quad 3 \longrightarrow 3 \\ \hline 1 \end{array}$$
- $$\begin{array}{r} 1 \quad y-1 \longrightarrow y-1 \\ 1 \quad 2y+3 \longrightarrow 2y+3 \\ \hline 3y+2 \end{array}$$

