

## 1 章 数と式の計算

## §2 いろいろな数と式 (p.21~p.32)

## 問 1

$$(1) \text{ 与式} = \frac{3^3 x^3 y^6}{3^2 x^4 y^2 z^6}$$

$$= \frac{3y^4}{xz^6}$$

$$(2) \text{ 与式} = \frac{(x+1)(x-3)}{x(x+2)(x-3)}$$

$$= \frac{x+1}{x(x+2)}$$

$$(3) \text{ 与式} = \frac{\{(a+b)+c\}\{(a+b)-c\}}{\{a+(b+c)\}\{a-(b+c)\}}$$

$$= \frac{(a+b+c)(a+b-c)}{(a+b+c)(a-b-c)}$$

$$= \frac{a+b-c}{a-b-c}$$

## 問 2

$$(1) \text{ 与式} = \frac{1(x-1)}{(x+1)(x-1)} + \frac{2(x+1)}{(x-1)(x+1)}$$

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

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

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

$$(2) \text{ 与式} = \frac{x+2}{(x-1)(x+2)} + \frac{x+3}{(x-1)(x-3)}$$

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

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

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

$$= \frac{2x}{(x-1)(x-3)}$$

$$(3) \text{ 与式} = \frac{y(x-y)}{1(x-y)} + \frac{y^2}{x-y}$$

$$= \frac{xy-y^2+y^2}{x-y}$$

$$= \frac{xy}{x-y}$$

$$(4) \text{ 与式} = \frac{a}{b(a+b)} - \frac{b}{a(a+b)}$$

$$= \frac{a \cdot a}{b(a+b) \cdot a} - \frac{b \cdot b}{a(a+b) \cdot b}$$

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

$$= \frac{(a+b)(a-b)}{ab(a+b)}$$

$$= \frac{a-b}{ab}$$

## 問 3

$$(1) \text{ 与式} = \frac{3b^2c \times 4a^3}{8a \times 9bc}$$

$$= \frac{a^2b}{6}$$

$$(2) \text{ 与式} = \frac{t^2+3t}{t+5} \times \frac{t^2-t-30}{t^3+6t^2+9t}$$

$$= \frac{t(t+3) \times (t+5)(t-6)}{(t+5) \times t(t+3)^2}$$

$$= \frac{t-6}{t+3}$$

$$(3) \text{ 与式} = \frac{x^2+x}{2x^2+x-6} \times \frac{4x^2-6x}{x^2-1} \times \frac{x^2+x-2}{x^2}$$

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

$$= 2$$

$$(4) \text{ 与式} = \frac{5y^3 \times \{-(x-y)\}}{x(x-y) \times 10y^2}$$

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

$$= -\frac{y}{2x}$$

## 問4

$$(1) \text{ 与式} = \frac{\frac{ad}{bc} \times bc}{\frac{a^2}{b} \times bc} = \frac{ad}{a^2c} = \frac{d}{ac}$$

$$(2) \text{ 与式} = \frac{\left(1 - \frac{1}{x}\right) \times x}{\left(x - \frac{1}{x}\right) \times x} = \frac{x-1}{x^2-1}$$

$$= \frac{x-1}{(x+1)(x-1)}$$

$$= \frac{1}{x+1}$$

$$(3) \text{ 与式} = \frac{(x+3) \times (x-1)}{\left(x+1 - \frac{8}{x-1}\right) \times (x-1)}$$

$$= \frac{(x+3)(x-1)}{(x+1)(x-1) - 8}$$

$$= \frac{(x+3)(x-1)}{x^2-1-8}$$

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

$$= \frac{x-1}{x-3}$$

## 問5

(1)

$$\begin{array}{r} 3x-2 \\ x+2 \overline{) 3x^2+4x-1} \\ \underline{3x^2+6x} \phantom{-1} \\ -2x-1 \\ \underline{-2x-4} \\ 3 \end{array}$$

$$\text{よって, 与式} = 3x-2 + \frac{3}{x+2}$$

(2)

$$\begin{array}{r} -4x+2 \\ x^2+x+1 \overline{) -4x^3-2x^2+x-5} \\ \underline{-4x^3-4x^2-4x} \phantom{-5} \\ 2x^2+5x-5 \\ \underline{2x^2+2x+2} \\ 3x-7 \end{array}$$

$$\text{よって, 与式} = -4x+2 + \frac{3x-7}{x^2+x+1}$$

## 問6

$$(1) \text{ 与式} = |0-1| + |0-3|$$

$$= |-1| + |-3|$$

$$= 1+3=4$$

$$(2) \text{ 与式} = |\pi-1| + |\pi-3|$$

$$= (\pi-1) + (\pi-3)$$

$$= 2\pi-4$$

$$(3) \text{ 与式} = \left|\frac{\pi}{2}-1\right| + \left|\frac{\pi}{2}-3\right|$$

$$= \left(\frac{\pi}{2}-1\right) - \left(\frac{\pi}{2}-3\right)$$

$$= 2$$

## 問7

$$(1) \text{ 与式} = 2\sqrt{3} - 3\sqrt{3} + 4\sqrt{3}$$

$$= 3\sqrt{3}$$

$$(2) \text{ 与式} = \sqrt{5}\sqrt{5 \cdot 6} + 2 \cdot 2\sqrt{6} - 3 \cdot 3\sqrt{6}$$

$$= 5\sqrt{6} + 4\sqrt{6} - 9\sqrt{6}$$

$$= 0$$

$$(3) \text{ 与式} = 2\sqrt{3} \cdot \sqrt{3} + 2\sqrt{3} \cdot 3\sqrt{2} - \sqrt{2} \cdot \sqrt{3} - \sqrt{2} \cdot 3\sqrt{2}$$

$$= 6 + 6\sqrt{6} - \sqrt{6} - 6$$

$$= 5\sqrt{6}$$

$$(4) \text{ 与式} = \{(1+2\sqrt{5}) + (1-2\sqrt{5})\} \{(1+2\sqrt{5}) - (1-2\sqrt{5})\}$$

$$= 2 \cdot 4\sqrt{5}$$

$$= 8\sqrt{5}$$

## 問8

$$(1) \text{ 与式} = |\sqrt{3}-4| = -(\sqrt{3}-4)$$

$$= 4-\sqrt{3}$$

$$(2) \text{ 与式} = \sqrt{(\pi-5)^2}$$

$$= |\pi-5| = -(\pi-5)$$

$$= 5-\pi$$

## 問9

$$(1) \text{ 与式} = \frac{12 \cdot \sqrt{6}}{5\sqrt{6} \cdot \sqrt{6}}$$

$$= \frac{12\sqrt{6}}{5 \cdot 6}$$

$$= \frac{2\sqrt{6}}{5}$$

$$(2) \text{ 与式} = \frac{1 \cdot (\sqrt{5}-2)}{(\sqrt{5}+2)(\sqrt{5}-2)}$$

$$= \frac{\sqrt{5}-2}{5-4}$$

$$= \sqrt{5}-2$$

$$(3) \text{ 与式} = \frac{\sqrt{2}(\sqrt{5}+\sqrt{3})}{(\sqrt{5}-\sqrt{3})(\sqrt{5}+\sqrt{3})}$$

$$= \frac{\sqrt{10} + \sqrt{6}}{5 - 3}$$

$$= \frac{\sqrt{10} + \sqrt{6}}{2}$$

$$(4) \text{ 与式} = \frac{(2\sqrt{3} - 3)(2\sqrt{3} - 3)}{(2\sqrt{3} + 3)(2\sqrt{3} - 3)}$$

$$= \frac{12 - 12\sqrt{3} + 9}{12 - 9}$$

$$= \frac{21 - 12\sqrt{3}}{3}$$

$$= 7 - 4\sqrt{3}$$

問 10

$$(1) \text{ 与式} = 6 + 8i - 3i - 4i^2$$

$$= 6 + 5i - 4 \cdot (-1)$$

$$= \mathbf{10 + 5i}$$

$$(2) \text{ 与式} = i^2 \cdot i - \frac{i}{i^2}$$

$$= -1 \cdot i - \frac{i}{-1}$$

$$= -i + i = \mathbf{0}$$

$$(3) \text{ 与式} = \frac{(1 + 2i)(3 + 4i)}{(3 - 4i)(3 + 4i)}$$

$$= \frac{3 + 4i + 6i + 8i^2}{9 - 16i^2}$$

$$= \frac{3 + 10i - 8}{9 + 16}$$

$$= \frac{10i - 5}{25}$$

$$= \frac{2i - 1}{5}$$

$$= -\frac{1}{5} + \frac{2}{5}i$$

$$(4) \text{ 与式} = \frac{(3 - 2i)(3 - 2i)}{(3 + 2i)(3 - 2i)} + \frac{(3 + 2i)(3 + 2i)}{(3 - 2i)(3 + 2i)}$$

$$= \frac{(9 - 12i + 4i^2) + (9 + 12i + 4i^2)}{9 - 4i^2}$$

$$= \frac{18 + 8i^2}{9 + 4}$$

$$= \frac{18 - 8}{13} = \frac{\mathbf{10}}{\mathbf{13}}$$

問 11

$$(1) \text{ 与式} = \sqrt{4i} \times \sqrt{16i}$$

$$= 2i \times 4i$$

$$= 8i^2$$

$$= 8 \cdot (-1)$$

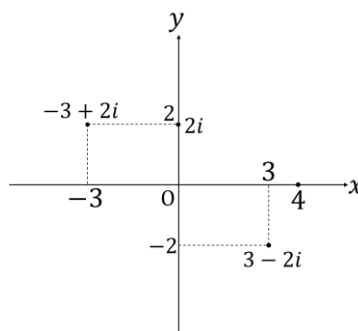
$$= \mathbf{-8}$$

$$(2) \text{ 与式} = \sqrt{4i} - \sqrt{16i}$$

$$= 2i - 4i$$

$$= \mathbf{-2i}$$

問 12



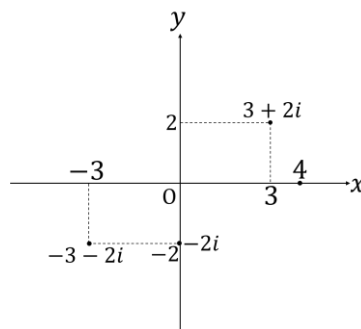
問 13

$$(1) \overline{3 - 2i} = \mathbf{3 + 2i}$$

$$(2) \overline{-3 + 2i} = \mathbf{-3 - 2i}$$

$$(3) \overline{2i} = \mathbf{-2i}$$

$$(4) \overline{4} = \mathbf{4}$$



問 14

$$(1) \text{ 与式} = 4 + i + 4 - i$$

$$= \mathbf{8}$$

$$(2) \text{ 与式} = (4 + i)(4 - i)$$

$$= 16 - i^2$$

$$= 16 - (-1)$$

$$= \mathbf{17}$$

$$(3) \text{ 与式} = (1 + 3i)(1 + 3i)$$

$$= 1 + 6i + 9i^2$$

$$= 1 + 6i - 9$$

$$= \mathbf{-8 + 6i}$$

問 15

$$\begin{aligned}(1) \quad |4i| &= \sqrt{0^2 + 4^2} \\ &= \sqrt{16} \\ &= \mathbf{4}\end{aligned}$$

$$\begin{aligned}(2) \quad |3 + i| &= \sqrt{3^2 + 1^2} \\ &= \sqrt{9 + 1} \\ &= \sqrt{\mathbf{10}}\end{aligned}$$

$$\begin{aligned}(3) \quad |3 - i| &= \sqrt{3^2 + (-1)^2} \\ &= \sqrt{9 + 1} \\ &= \sqrt{\mathbf{10}}\end{aligned}$$

$$\begin{aligned}(4) \quad |-1 - 3i| &= \sqrt{(-1)^2 + (-3)^2} \\ &= \sqrt{1 + 9} \\ &= \sqrt{\mathbf{10}}\end{aligned}$$