

99 【複素数】

(1)  $(1+i)(3-i)$  を計算せよ.

$$\begin{aligned} &= 3 - i + 3i - i^2 \\ &= 3 - i + 3i + 1 \\ &= \underline{4 + 2i} \end{aligned}$$

(2)  $\frac{2+i}{3-2i}$  を計算せよ.

$$\begin{aligned} &= \frac{2+i}{3-2i} \times \frac{3+2i}{3+2i} \\ &= \frac{6+3i+4i-2}{9+4} = \frac{4+7i}{13} \end{aligned}$$

(3)  $x^2 - x + 1 = 0$  を解け.

$$\begin{aligned} x &= \frac{1 \pm \sqrt{1-4}}{2} \\ &= \frac{1 \pm \sqrt{3}i}{2} \end{aligned}$$

(4) 27 の 3 乗根を求めよ.

$$\begin{aligned} \omega^3 &= 27 \\ \omega^3 - 27 &= 0 \\ (\omega - 3)(\omega^2 + 3\omega + 9) &= 0 \end{aligned} \quad \int \quad \begin{aligned} \omega &= 3, \frac{-3 \pm \sqrt{9-4 \cdot 9}}{2} \\ &= 3, \frac{-3 \pm 3\sqrt{3}i}{2} \end{aligned}$$

(5)  $x^2 + 3x + 5 = 0$  の 2 解を  $\alpha, \beta$  とする.  $\alpha + \beta$ ,  $\alpha\beta$  の値を求めよ.

$$\begin{aligned} x^2 + 3x + 5 &= (x-\alpha)(x-\beta) \\ &= x^2 - (\alpha+\beta)x + \alpha\beta \end{aligned}$$

$$\therefore \begin{cases} \alpha + \beta = -3 \\ \alpha\beta = 5 \end{cases}$$

(6) 和が 1, 積が  $-1$  である 2 数を求めよ.

2 数は  $\alpha, \beta$  とする.

$$\begin{cases} \alpha + \beta = 1 \\ \alpha\beta = -1 \end{cases}$$

$$\begin{aligned} (x-\alpha)(x-\beta) &= 0 \\ x^2 - (\alpha+\beta)x + \alpha\beta &= 0 \\ x^2 - x - 1 &= 0 \end{aligned}$$

$$x = \frac{1 \pm \sqrt{1+4}}{2}$$

$$\therefore \text{2 数は } \frac{1 \pm \sqrt{5}}{2}$$