

電 210 電気数学 IV

第 2 回

複素数 (続き)

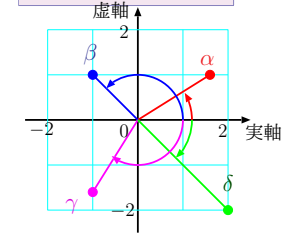
演習 2-1 解答

- $1 + 3i$ の共役複素数は $\boxed{1} + \boxed{-3}i (= 1 - 3i)$
- $-1 - 5i$ の共役複素数は $\boxed{-1} + \boxed{5}i$
- $2i$ の共役複素数は $\boxed{-2}i$ ($2i = 0 + 2i$ だから)
- -3 の共役複素数は $\boxed{-3}$ ($-3 = -3 + 0i$ だから)

演習 2-2 解答

- $\overline{(1+i) + (2+3i)} = \overline{3+4i} = \boxed{3} + \boxed{-4}i$
- $\overline{(1+i)(2+3i)} = \overline{(1+(-1)i)(2+(-3)i)} = \boxed{3} + \boxed{-4}i$
- $\overline{(2+i)(3-i)} = \overline{7+1i} = \boxed{7} + \boxed{-1}i$
- $\overline{(2+i)(3-i)} = \overline{(2+(-1)i)(3+1i)} = \boxed{7} + \boxed{-1}i$

演習 2-3 解答 (1)



演習 2-3 解答 (2)

$$\begin{aligned} \alpha &= \sqrt{3} + i, & |\alpha| &= \boxed{2}, & \text{Arg } \alpha &= \boxed{\pi/6} \\ \beta &= -1 + i, & |\beta| &= \boxed{\sqrt{2}}, & \text{Arg } \beta &= \boxed{3\pi/4} \\ \gamma &= -1 - \sqrt{3}i, & |\gamma| &= \boxed{2}, & \text{Arg } \gamma &= \boxed{-2\pi/3} \\ \delta &= 2 - 2i, & |\delta| &= \boxed{2\sqrt{2}}, & \text{Arg } \delta &= \boxed{-\pi/4} \end{aligned}$$

演習 2-4 解答

$$\begin{aligned} 1 + i &= \sqrt{2} \left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right) = \sqrt{2} e^{i\pi/4} \\ -2i &= 2 \left(\cos \frac{-\pi}{2} + i \sin \frac{-\pi}{2} \right) = 2 e^{i(-\pi/2)} \\ -5 &= 5 \left(\cos \pi + i \sin \pi \right) = 5 e^{i\pi} \end{aligned}$$

演習 2-5 解答 (1)

$$\begin{aligned} \alpha &= 2e^{i\pi/3} = 2 \left(\cos \frac{\pi}{3} + i \sin \frac{\pi}{3} \right) \\ &= \boxed{1} + \boxed{\sqrt{3}}i \text{ に対して} \\ \bar{\alpha} &= 2e^{i(-\pi/3)} = 2 \left(\cos \frac{-\pi}{3} + i \sin \frac{-\pi}{3} \right) \\ &= \boxed{1} + \boxed{-\sqrt{3}}i \end{aligned}$$

演習 2-5 解答 (2)

$$\begin{aligned} \beta &= 3e^{-i\pi/2} = 3 \left(\cos \frac{-\pi}{2} + i \sin \frac{-\pi}{2} \right) \\ &= \boxed{0} + \boxed{-3}i \text{ に対して} \\ \bar{\beta} &= 3e^{i\pi/2} = 3 \left(\cos \frac{\pi}{2} + i \sin \frac{\pi}{2} \right) \\ &= \boxed{0} + \boxed{3}i \end{aligned}$$