工共 212 工業数学 IV
第 2 回
複素数 (続き)

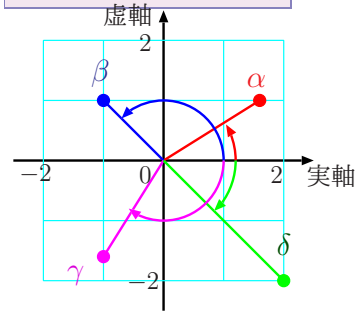
演習 2-1 解答

- $1+3i$ 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 $\boxed{-2i}$ $(2i=0+2i$ 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

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

演習 2-3 解答 (1)



演習 2-3 解答 (2)

$$\alpha=\sqrt{3}+i, \quad |\alpha|=\boxed{2}, \quad \operatorname{Arg}\alpha=\boxed{\pi/6}$$
$$\beta=-1+i, \quad |\beta|=\boxed{\sqrt{2}}, \quad \operatorname{Arg}\beta=\boxed{3\pi/4}$$
$$\gamma=-1-\sqrt{3}i, \quad |\gamma|=\boxed{2}, \quad \operatorname{Arg}\gamma=\boxed{-2\pi/3}$$
$$\delta=2-2i, \quad |\delta|=\boxed{2\sqrt{2}}, \quad \operatorname{Arg}\delta=\boxed{-\pi/4}$$

演習 2-4 解答

$$1+i=\boxed{\sqrt{2}}\left(\cos\boxed{\pi/4}+i\sin\boxed{\pi/4}\right)=\boxed{\sqrt{2}}e^{i\boxed{\pi/4}}$$
$$-2i=\boxed{2}\left(\cos\boxed{-\pi/2}+i\sin\boxed{-\pi/2}\right)=\boxed{2}e^{i\boxed{-\pi/2}}$$
$$-5=\boxed{5}\left(\cos\boxed{\pi}+i\sin\boxed{\pi}\right)=\boxed{5}e^{i\boxed{\pi}}$$

演習 2-5 解答 (1)

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

演習 2-5 解答 (2)

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