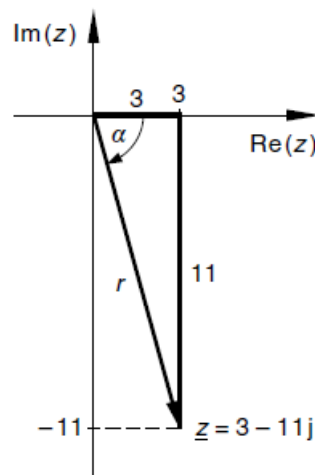# Übungsserie 11

Lösung

Aufgabe 1:

a)

$$\begin{aligned}
z &= 3 - 11i = 11.402 \cdot \mathrm{e}^{4.9786i} = 11.402(\cos 4.9786 + i \cdot \sin 4.9786) \\
z^* &= 3 + 11i = 11.402 \cdot \mathrm{e}^{-4.9786i} = 11.402(\cos 4.9786 - i \cdot \sin 4.9786)
\end{aligned}$$

b)

$$\begin{aligned}
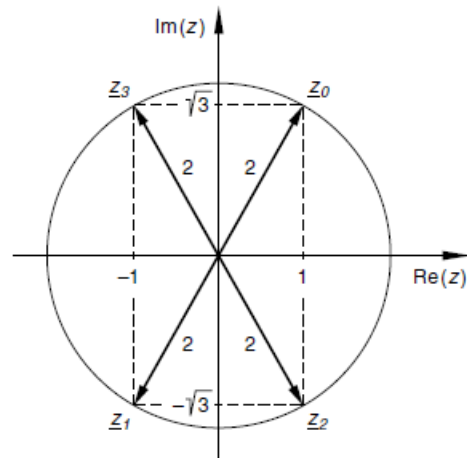z &= 1.796 - 0.071i \\
z^* &= 1.796 + 0.071i
\end{aligned}$$

c)

$$\frac{z_1^* \cdot z_3}{0.5 z_2} = 4$$

d)

$$(1 - \sqrt{2}\, i)^3 = 3\sqrt{3} \cdot \mathrm{e}^{15.9837i} = 5.196 \cdot \mathrm{e}^{3.4173i}$$

Aufgabe 2:

$$\begin{aligned}
z_0 &= 2 \cdot \mathrm{e}^{\frac{\pi}{3}i} = 1 + \sqrt{3}\, i \\
z_1 &= 2 \cdot \mathrm{e}^{\frac{4\pi}{3}i} = -1 - \sqrt{3}\, i \\
z_2 &= z_0^* = 2 \cdot \mathrm{e}^{-\frac{\pi}{3}i} = 1 - \sqrt{3}\, i \\
z_3 &= z_1^* = 2 \cdot \mathrm{e}^{-\frac{4\pi}{3}i} = -1 + \sqrt{3}\, i
\end{aligned}$$

$Im(z)$

$\underline{z_3}$ $\underline{z_0}$

$\sqrt{3}$

2   2

-1 1 $Re(z)$

2   2

$-\sqrt{3}$

$\underline{z_1}$ $\underline{z_2}$

Aufgabe 3: