

Komplexe Zahlen

Bringen Sie $\frac{1}{1+2i}$ in Standardform $a+bi$, $a, b \in \mathbb{R}$

Lösung:

$$\begin{aligned}\frac{1}{1+2i} &= \frac{1}{1+2i} \cdot \frac{1-2i}{1-2i} = \frac{1-2i}{1+4} \\ &= \underline{\underline{\frac{1}{5} - \frac{2}{5}i}}\end{aligned}$$

Bestimme die Polarform von $-3-3i$

Lösung:

$$r = |-3-3i| = \sqrt{9+9} = 3\sqrt{2}$$

$$\cos(\varphi) = -\frac{\sqrt{2}}{2} \Rightarrow \varphi \in \left\{ \frac{3\pi}{4}, \frac{5\pi}{4} \right\}$$

$$\sin(\varphi) = -\frac{\sqrt{2}}{2} \Rightarrow \varphi \in \left\{ \frac{5\pi}{4}, \frac{7\pi}{4} \right\}$$

$$\Rightarrow \varphi = \frac{5\pi}{4}$$

$$\Rightarrow -3-3i = \underline{\underline{3\sqrt{2} \operatorname{cis}\left(\frac{5\pi}{4}\right)}}$$