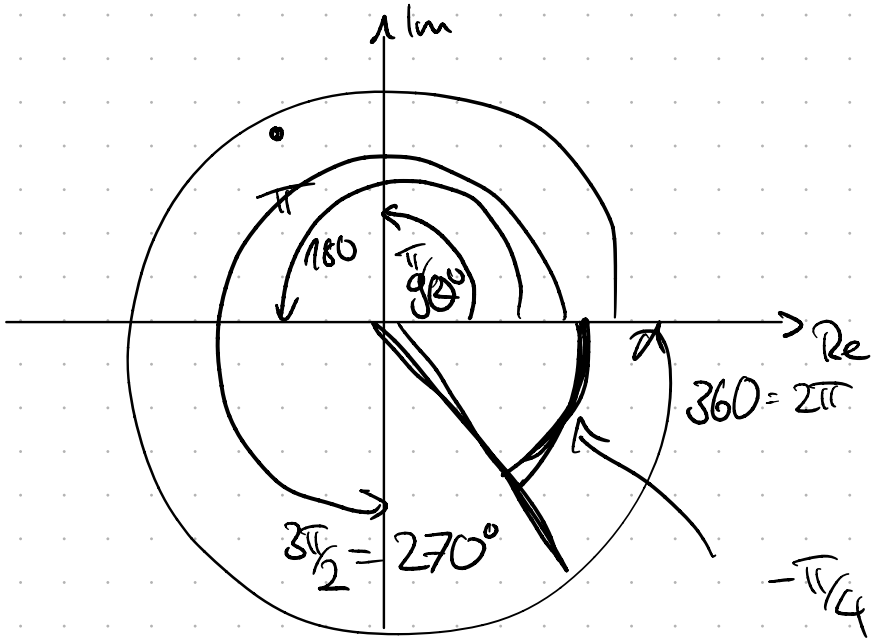


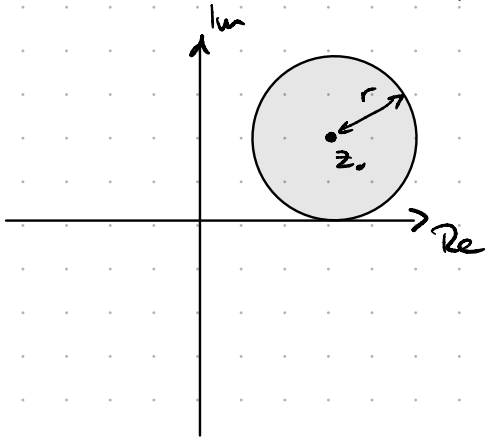
https://www.youtube.com/watch?v=NMmtKcQ6qfI

$-\pi/4$ oder $\frac{7\pi}{4}$

Komplexe Mengen zeichnen

Menge $M = \{ z \in \mathbb{C} \mid |z - z_0| = r \}$

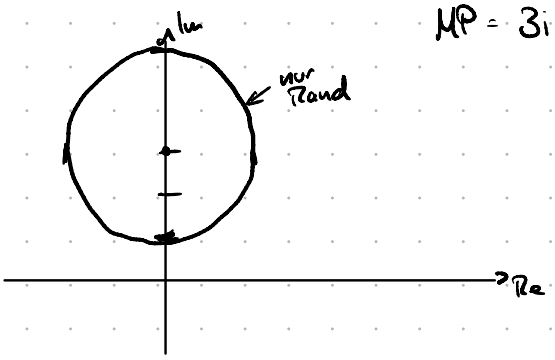
↳ Kreis mit Mittelpunkt z_0 & Radius r



Bsp

$M_1 = \{ z \in \mathbb{C} \mid |z - 3i| = 2 \}$

MP = 3i r = 2

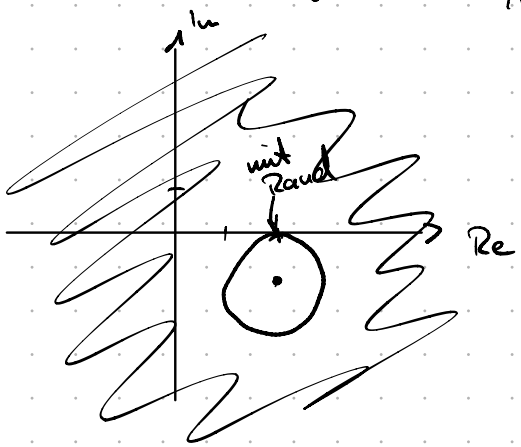


M

$|z - z_0| \leq r$ Kreis mit Füllung & Rand

$|z - z_0| < r$ Kreis mit Füllung & ohne Rand

$\{ z \in \mathbb{C} \mid |z - 2 + i| \geq 1 \}$ MP $z_0 = 2 - i$



$\frac{1}{z}$

$M_2 = \{ z \in \mathbb{C} \mid \operatorname{Im}(z) = 3 \}$

Ansatz: $z = a + ib \Rightarrow b = 3$

$\operatorname{Im}(a + ib) = 3$

$b = 3$

$M_3 = \{ z \in \mathbb{C} \mid \operatorname{Im}(\frac{1}{z}) = 4 \}$

Ansatz $z = a + ib \Rightarrow \frac{1}{z} = \frac{1}{a+b} \cdot \frac{a-ib}{a-ib}$

$\frac{1}{z} = \frac{\bar{z}}{z \cdot \bar{z}} = \frac{a - ib}{a^2 + b^2} \Rightarrow \operatorname{Im}\left(\frac{a-ib}{a^2+b^2}\right) = 4$

$\frac{-b}{a^2+b^2} = 4 \quad | \cdot a^2 + b^2$

$-b = 4(a^2 + b^2)$

$0 = 4(a^2 + b^2 + \frac{1}{4}b)$

$= (a^2 + (b + \frac{1}{8})^2 - \frac{1}{64} \quad | + \frac{1}{64}$

$\frac{1}{64} = a^2 + (b + \frac{1}{8})^2$

Kreis mit MP = $\begin{pmatrix} 0 \\ -\frac{1}{8} \end{pmatrix}$ Re / Im

$r = \frac{1}{8}$