

## Aufgabe 1:

$$\left(\frac{1}{2} + i \frac{\sqrt{3}}{2}\right)^{2011} = \left(\cos\left(\frac{\pi}{3}\right) + i \sin\left(\frac{\pi}{3}\right)\right)^{2011}$$

$$\stackrel{\text{de Moivre}}{=} \cos\left(\frac{2011\pi}{3}\right) + i \sin\left(\frac{2011\pi}{3}\right) \stackrel{2011=670 \cdot 3 + 1}{=} \cos\left(\frac{\pi}{3} + 335 \cdot 2\pi\right) + i \sin\left(\frac{\pi}{3} + 335 \cdot 2\pi\right)$$

$$= \cos\left(\frac{\pi}{3}\right) + i \sin\left(\frac{\pi}{3}\right) = \frac{1}{2} + i \frac{\sqrt{3}}{2}$$