Aufgabe 2)

$$z^4 + 4z^2 + 16 = 0$$

$$u = z^2$$

$$u^2 + 4u + 16$$

$$a = 1; \quad b = 4; \quad c = 16$$

Mitternachtsformel

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

~~$$\frac{-4 \pm \sqrt{4 - 4\cdot1\cdot16}}{2\cdot1} = -1 \pm \sqrt{63}$$~~

$$\frac{-4 \pm \sqrt{16 - 4\cdot1\cdot16}}{2\cdot1} = \frac{-4 \pm \sqrt{-48}}{2} = -2 \pm \sqrt{-3} \quad \uparrow i$$

$$r = \sqrt{(-2)^2 + (2\sqrt{3})^2} = 4e^{-\pi/3}, \quad 4e^{\pi/3} \qquad -2 \pm 2\sqrt{3}i$$

$$Z_1 = \sqrt{u_1} \Rightarrow 2e^{-\pi/6}, \quad 2e^{\pi/6}$$

$$x = r\cdot\cos(\varphi) \quad y = r\cdot\sin(\varphi)$$

$\varphi = -\pi/6 \Rightarrow$

$$x = 1{,}7321$$
$$y = -1$$
$$z = 1{,}7321 - 1i$$

$\varphi = \pi/6 \Rightarrow$

$$x = 1{,}7321$$
$$y = 1$$
$$Z_2 = 1{,}7321 + 1i$$

Z4) $r_0 = 2$

$r = \sqrt[4]{2} = 1,1892$

$\varphi_k = \dfrac{\varphi + k \cdot 2\pi}{n} \Rightarrow \dfrac{\pi/6 + k \cdot 2\pi}{4}$ $K(0-4)$

$\varphi_0 = \pi/24$ ~~0,1309~~ $X = r \cdot \cos(\varphi)$

$\varphi_1 = 13\pi/24$ $y = r \cdot \sin(\varphi)$

$\varphi_2 = 25\pi/24$

$\varphi_3 = 37\pi/24$

$\varphi_4 = 49\pi/24$

k	X	y
0	1,17903	0,15522
1	-0,15522	1,17903
2	-1,17903	-0,15522
3	0,15522	-1,17903
4	1,17903	0,155222