3d) Aufgabe 3

$z \to \frac{1}{z}$ für $z = 2+it$

$$2+it \to \frac{1}{2+it} = \frac{1}{2+it} \cdot \frac{2-it}{2-it} = \frac{2-it}{4+t^2}$$

$$= \underbrace{\frac{2}{4+t^2}}_{\text{IR}} - \underbrace{\frac{t}{4+t^2}}_{\text{I}} i = \frac{2}{4+t^2} - \frac{t}{4+t^2} \cdot \frac{\frac{1}{t^2}}{\frac{1}{t^2}} i$$

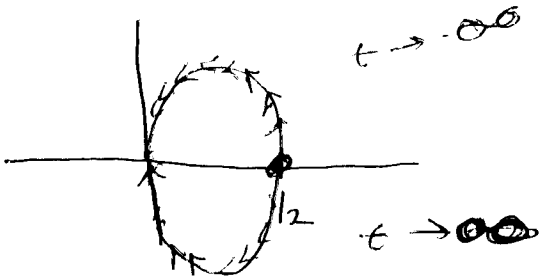
$$= \frac{2}{4+t^2} - \frac{\frac{1}{t}}{\frac{4}{t^2}+1} i$$

$t = 0 \Rightarrow \frac{2}{4}$

$t \to \infty \Rightarrow \frac{2}{4+t^2} - \frac{\frac{1}{t}}{\frac{4}{t^2}+1} i = 0 + \frac{0}{1} i = 0$

($\frac{1}{t} \to 0$, $\frac{4}{t^2}+1 \to 1$)

$t \to -\infty$ also $\frac{1}{z} \to 0$



See http://www.math.ucla.edu/~tao/java/Complex.html