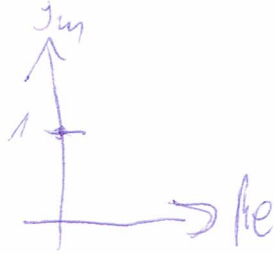


3,6 a)  $1e^{i\frac{\pi}{2}}$

$$a = \cos \frac{\pi}{2} = 0$$

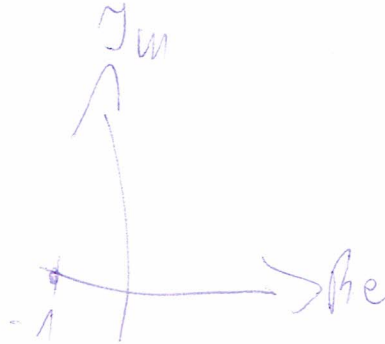
$$b = \sin \frac{\pi}{2} = 1$$



b)  $1e^{i\pi}$

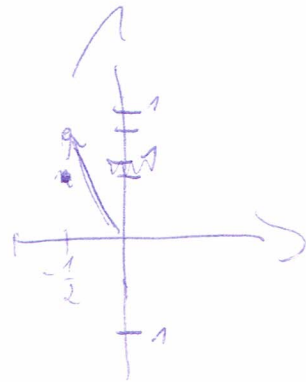
$$a = \cos \pi = -1$$

$$b = \sin \pi = 0$$



c)  $a = \cos -\frac{4\pi}{3} = \cos \frac{4\pi}{3} = -\frac{1}{2}$

$$b = \sin -\frac{4\pi}{3} = -\sin \frac{4\pi}{3} = -\frac{\sqrt{3}}{2}$$

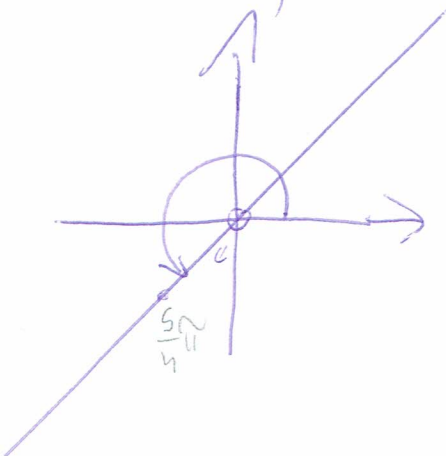


d)  $e^{-i}$

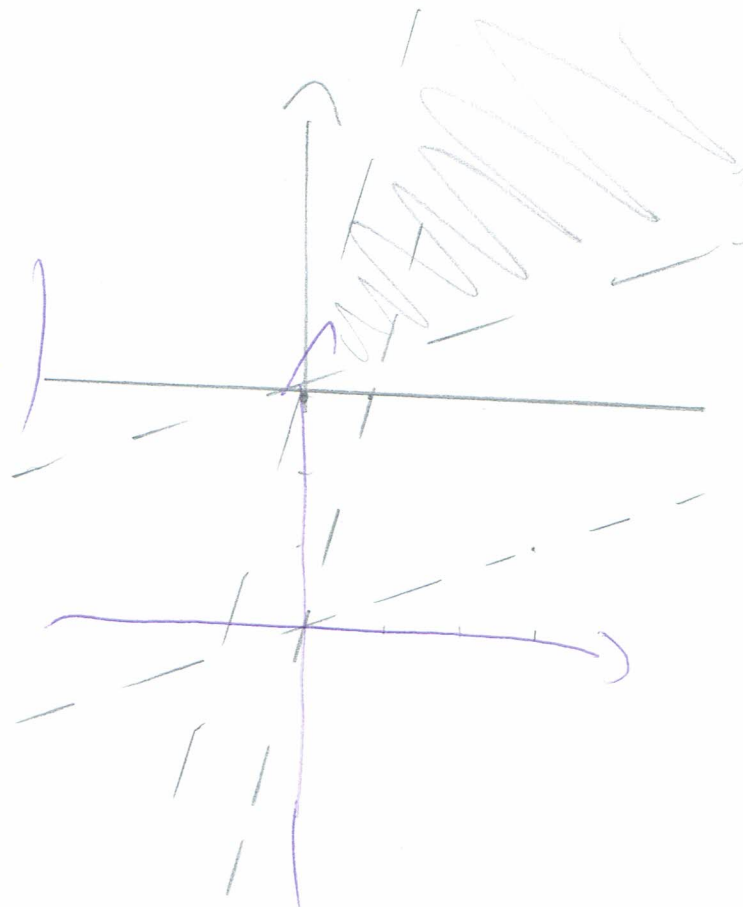
$$a = \cos -1 =$$

$$b = \sin -1 =$$

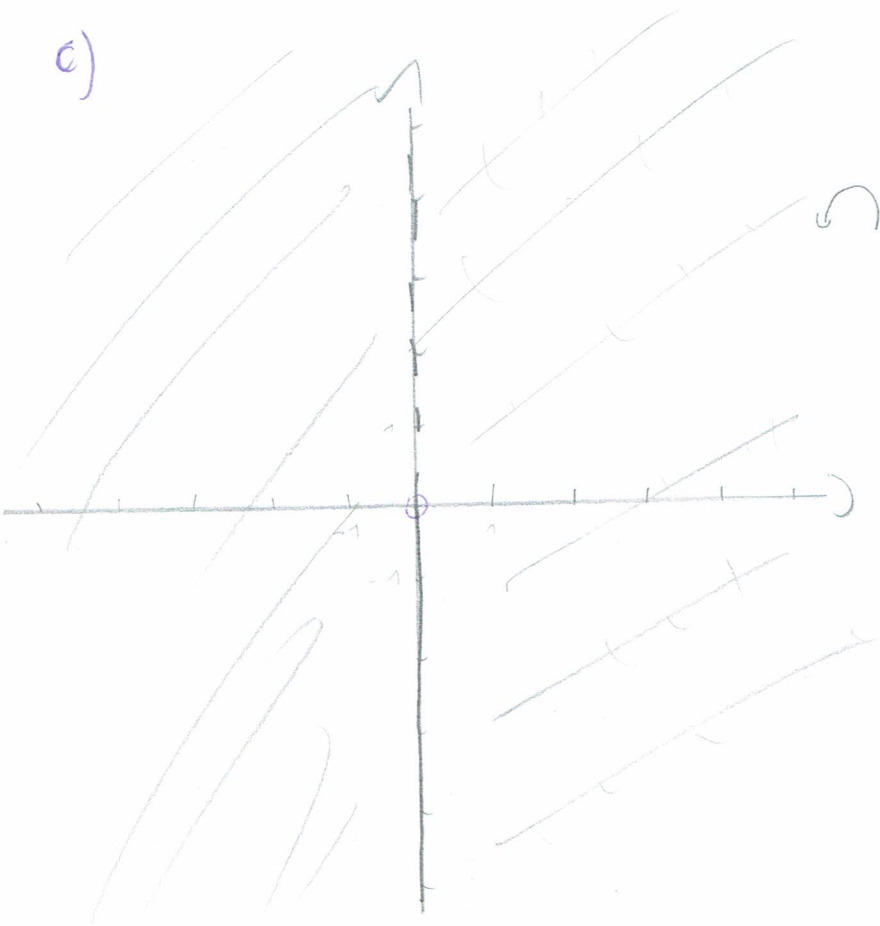
3,6 a)



b)

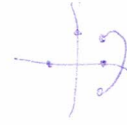


c)

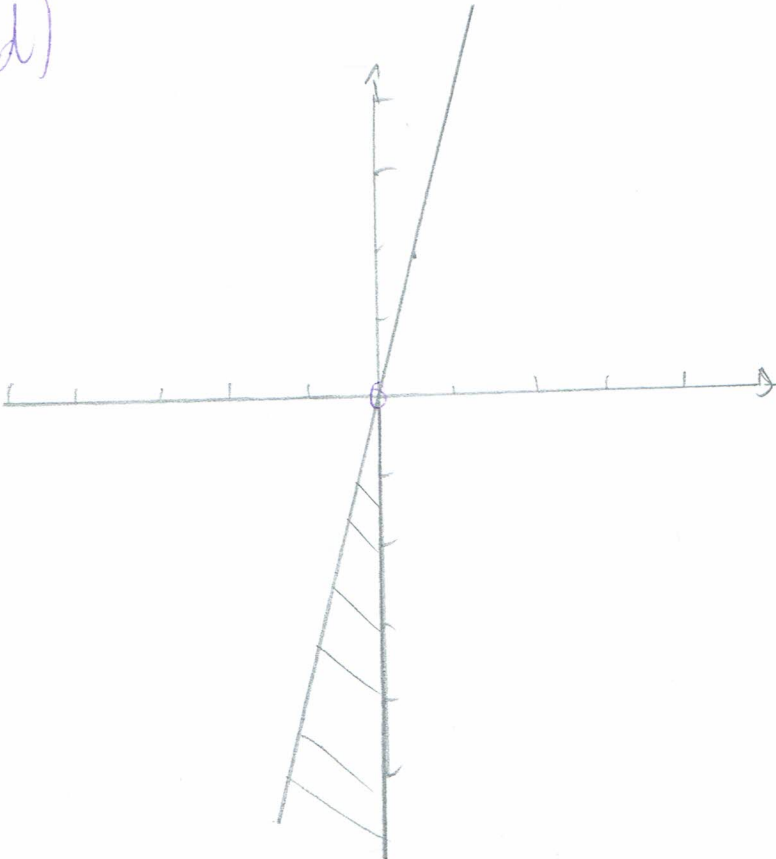


$$a+bi$$

$$a^*+b$$



d)

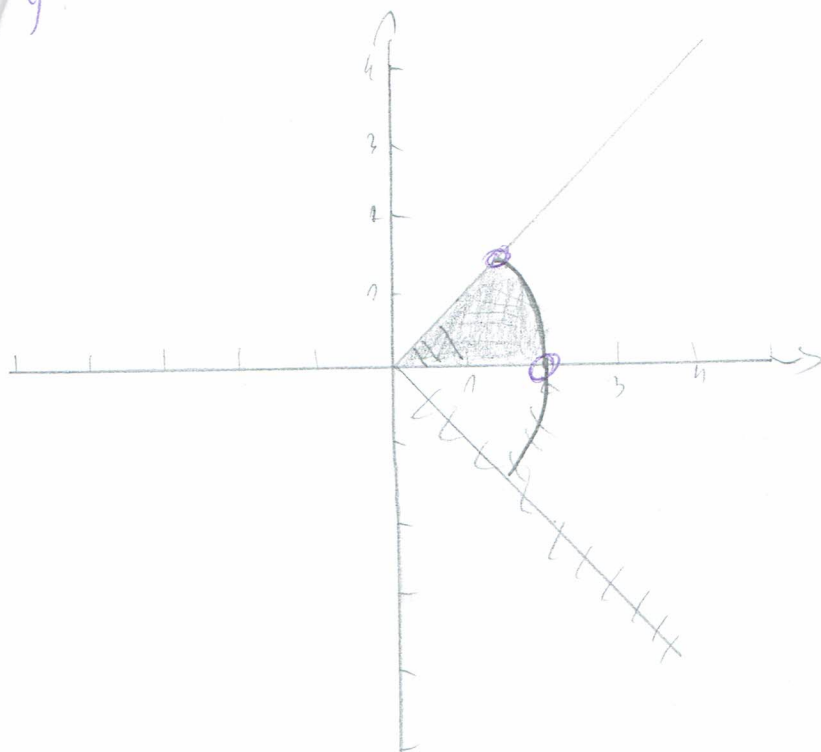


$$a+bi$$

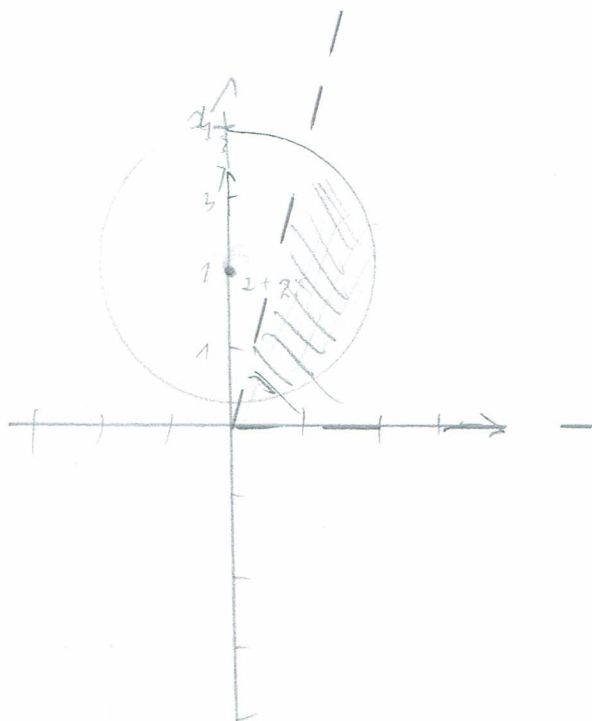
$$-a-bi$$



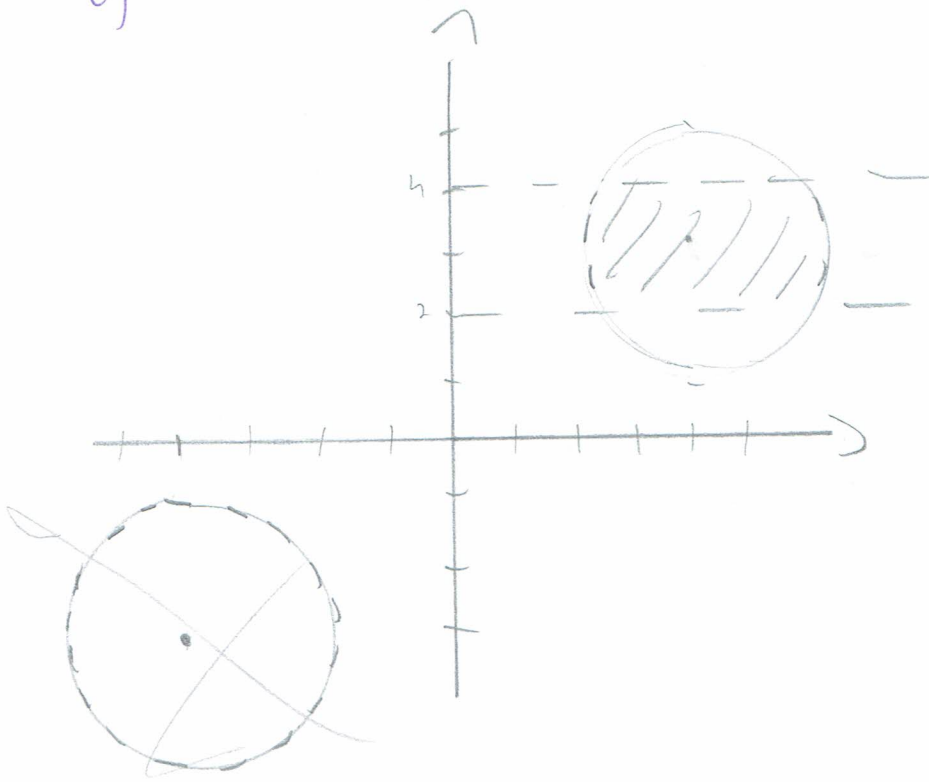
5)



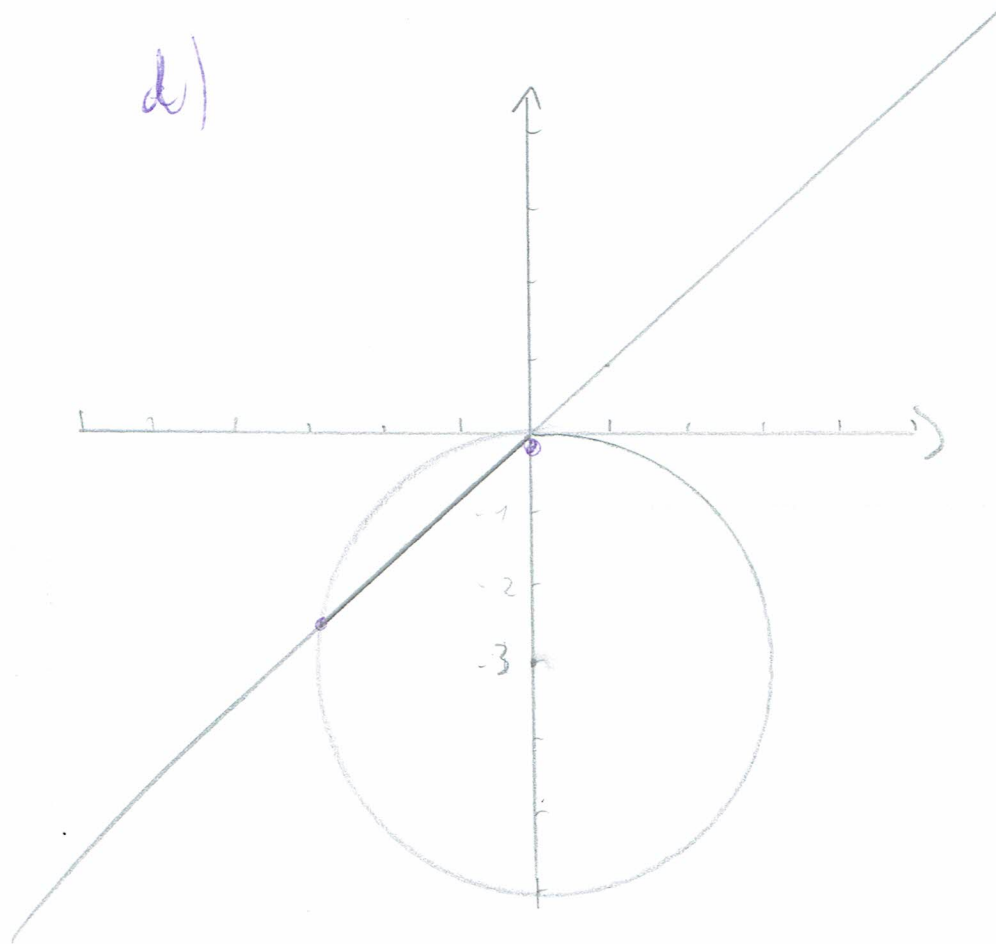
6)



c)



d)



Alga

$$|z^2| = |z|^2$$

$$|z| e^{i\varphi}$$

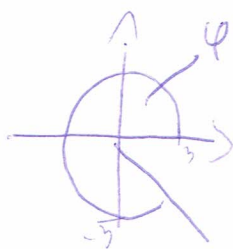
$$3.1) |z| = \sqrt{x^2 + y^2}$$

$$a) \text{ und } d) \frac{(3 - \sqrt{3}i)^2}{(\sqrt{2} + 2i)^3} = 9 - 6\sqrt{3}i - 3$$

$$\frac{(3 - \sqrt{3})^2}{(\sqrt{2} + 2i)^3} = \frac{(\sqrt{9+3})^2}{(\sqrt{2+4})^3} = \frac{12}{\sqrt{6}^3} = \frac{\sqrt{6}}{3}$$

$$c) (1 + \sqrt{2}i)^4 = |\sqrt{1^2+2}|^4 = 9$$

$$3.2) c) z = 3 - 5i$$



$$\varphi = 2\pi - \frac{\pi}{4}$$

$$\varphi = \frac{7\pi}{4}$$

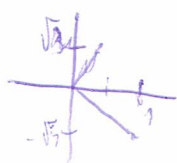
$$3.3) x + iy$$

$$|z| \left( \frac{x}{|z|} + i \frac{y}{|z|} \right) = |z| (\cos \varphi + i \sin \varphi) = |z| e^{i\varphi}$$

$$3.4) c) \frac{1 - \sqrt{3}i}{\sqrt{3} + i} =$$

$$\frac{1 - \sqrt{3}i}{1 - \sqrt{3}i}$$

$$\frac{2 \left( \cos \frac{5\pi}{6} + i \sin \frac{5\pi}{6} \right)}{2 \left( \cos \frac{\pi}{6} + i \sin \frac{\pi}{6} \right)} = \cos \left( \frac{5\pi}{6} - \frac{\pi}{6} \right) + i \sin \left( \frac{5\pi}{6} - \frac{\pi}{6} \right) =$$



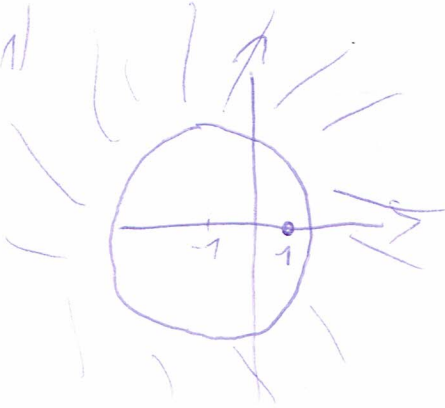
$$38h) \stackrel{ALGA}{=} 3|z-1| \leq |z^2-1| < 6|z+1|$$

$$3|z-1| \quad |z-1| \neq 0 \quad |z+1| < 6|z+1|$$

$$1^\circ \quad 3|z-1| \leq |z-1||z+1|$$

$$\bullet z=1 \quad \text{OK}$$

$$2^\circ \bullet z \neq 1 \quad 3 \leq |z+1|$$

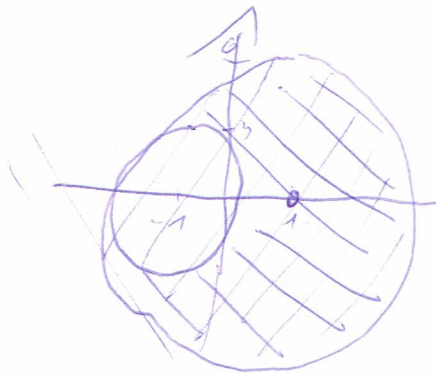


$$2^\circ \quad |z-1||z+1| < 6|z+1|$$

$$\bullet z=-1 \quad \text{Nie geht vorhin zu}$$

$$\bullet z \neq -1$$

$$|z-1| < 6$$

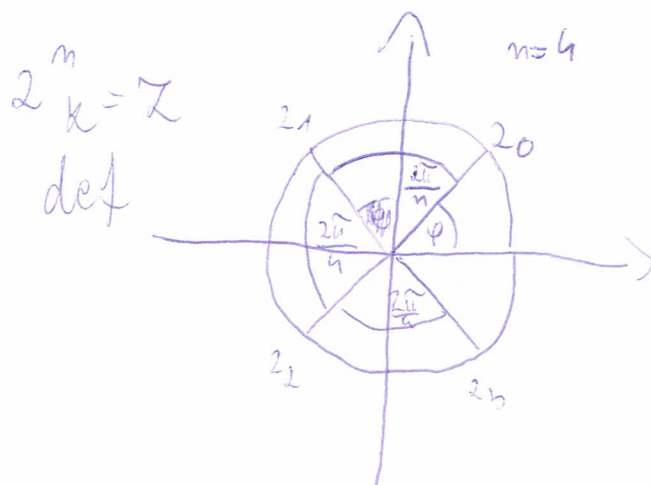


$$\sqrt[n]{z}$$

$$= \{z_0, \dots, z_{n-1}\}$$

$n$  pierwiastków

1-4



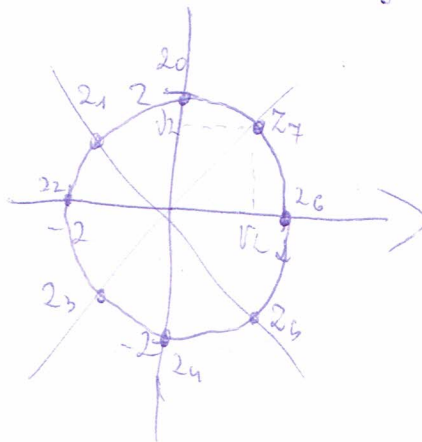
$$\sqrt[8]{(1+i)^{16}}$$

$$z_0^8 = (1+i)^{16}$$

$$z_0 = (1+i)^2 = 1+2i-1 = 2i$$

$$|z_0| = \sqrt{4} = 2$$

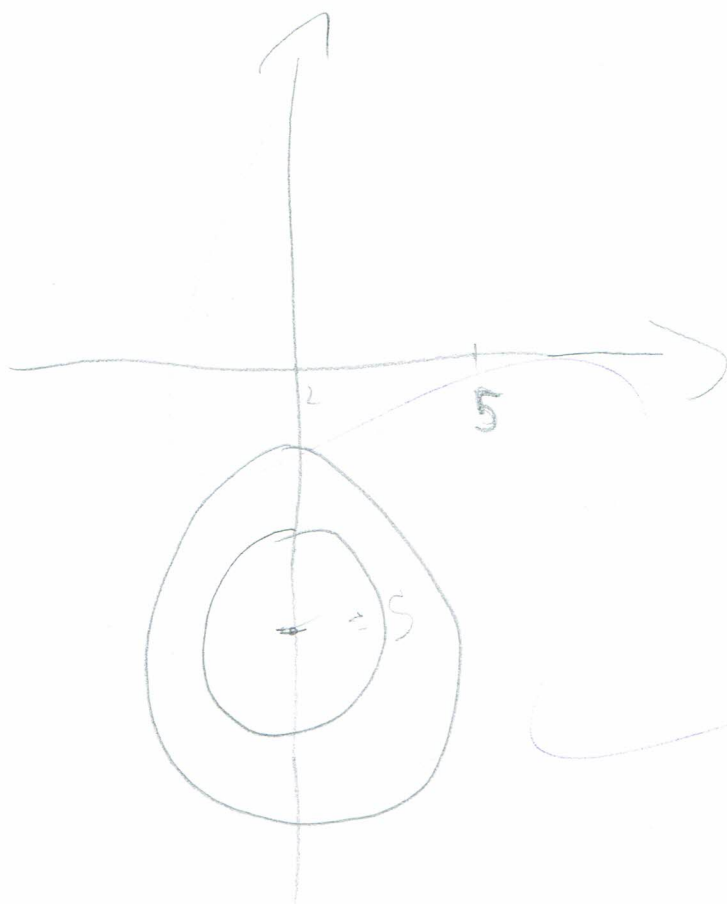
$$\frac{2\pi}{8} = \frac{\pi}{4} = 45^\circ$$



$$z_{k+1} = z_k \left( \cos \frac{2\pi}{n} + i \sin \frac{2\pi}{n} \right)$$

ALGA

$$3.89) f(z) = z \xrightarrow{50} z-5 \xrightarrow{P_i} i z - 5$$



$$3.89) |\bar{z} + 2 - i| \leq |z|$$

$$|\bar{z} + \overline{2+i}| \leq |z|$$

$$|\overline{z + 2 + i}| \leq |z|$$

$$|z + 2 + i| \leq |z|$$

