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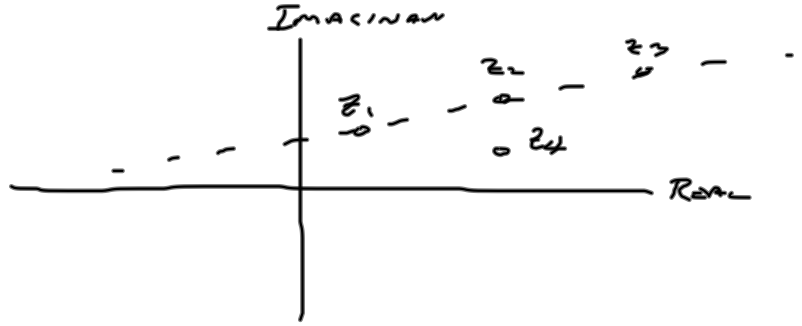
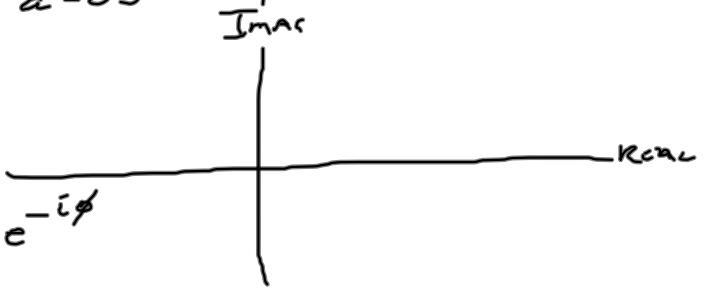
Problem Session

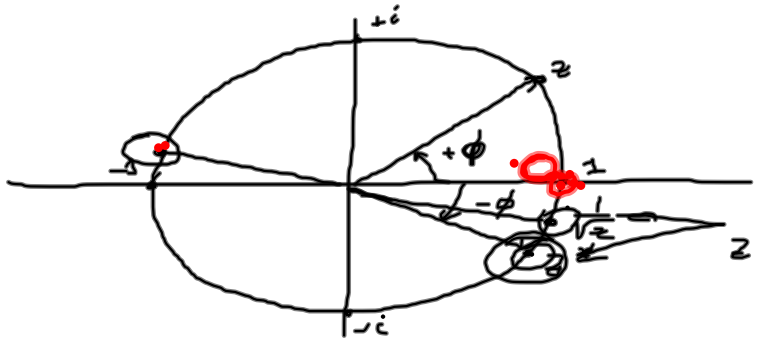


$$z^{-1/2} = z^x = a - ib = |z| e^{-i\phi}$$

$$(z^x)^x = z$$



$$|z|^{-1/2} \left(e^{+i\phi}\right)^{-1/2} = |z| e^{-i\phi}$$



$$|z|^{-1/2} = |z|$$

$$\frac{1}{\sqrt{|z|}} = |z| = 1$$

$z^x = z^{-1/2}$

$$z^{-1/2} = \frac{1}{\sqrt{|z|}} e^{-j\left(\frac{\phi}{2} \pm \pi\right)}$$

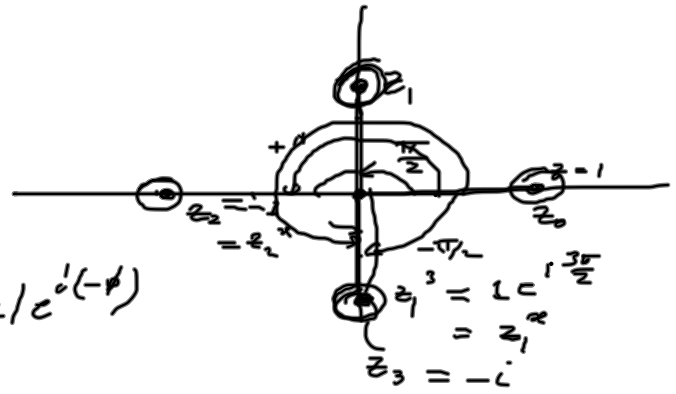
$\frac{1}{\sqrt{|z|}} \to 1$

$$-\phi \overset{\pm 2\pi}{=} -\frac{\phi}{2} + 2\pi$$

$$\phi = 0$$

(3)

$z^3 = z^*$



$1^3 = 1^* = 1$

$|z|^3 e^{i3\phi} = |z| e^{i(-\phi)}$

$|z|^3 = |z| \Rightarrow |z| = 1, 0$

$3\phi = -\phi + 2\pi l$

$4\phi = 2\pi l \Rightarrow l = 0 \Rightarrow 4\phi = 0 \Rightarrow \phi = 0$

$|z| e^{i\phi} = 1 e^{i\cdot 0} = 1 + 0i$

$\Rightarrow l = 1 \Rightarrow 4\phi = 2\pi \Rightarrow \phi = \frac{\pi}{2} \Rightarrow z_1 = +i$

$\Rightarrow l = 2 \Rightarrow 4\phi = [illegible] \Rightarrow \phi = \pi \Rightarrow z_2 = +1$

$\Rightarrow l = 3 \Rightarrow \phi = \frac{3\pi}{2} \Rightarrow z_3 = -i$

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