$2+5i-(3-i)(2+3i)$ $\qquad -7-2i$

$(3-i)(2+3i)=6+9i-2i-3i^2=6+7i+3=$

$=9+7i$

$2+5i-(9+7i)=-7-2i$

$\frac{2-5i}{1+2i}=$ $\qquad -\frac{8}{5}-\frac{9}{5}i$

$\frac{2-5i}{1+2i}=\frac{(2-5i)(1-2i)}{(1+2i)(1-2i)}=\frac{(2-5i)(1-2i)}{1^2-4i^2}=\frac{(2-5i)(1-2i)}{5}=$

$=\frac{1}{5}(2-4i-5i-10)=\frac{1}{5}(-8-9i)=-\frac{8}{5}-\frac{9}{5}i$

$\frac{a-bi}{a+bi}$ $\qquad a,b\in R$ $\qquad \boxed{\frac{a^2-2abi-b^2}{a^2+b^2}}$

$\frac{a-bi}{a+bi}=\frac{(a-bi)(a-bi)}{(a+bi)(a-bi)}=\frac{a^2-abi-bai+b(i)^2}{a^2-b(i)^2}=$

$=\frac{a^2-2abi-b^2}{a^2+b^2}=\frac{a^2-b^2}{a^2+b^2}-\frac{2ab}{a^2+b^2}i$

$x+3y+i(2x-y)=4+i$ $\qquad x=1 \quad y=1$

$x+3y=4$

$2x-y=1$

$6x-3y=3$

$7x+0=7$

$x=1 \qquad y=1$

$z = \sqrt{3} + i$ $\quad$ $\mathrm{Re}\, z,\ \mathrm{Im}\, z,\ \bar{z},\ -z,\ |z|,\ \varphi$

$z = \sqrt{3} + 1 \cdot i$ $\quad$ goniometrický, exponenciálny

Gaussova rovina

$\mathrm{Re}\, z = \sqrt{3}$ $\quad$ $\mathrm{Im}\, z = 1$ $\quad$ $\bar{z} = \sqrt{3} - i$

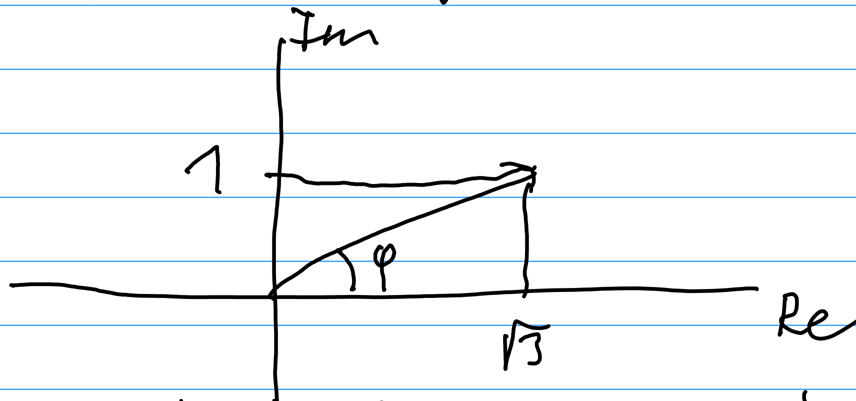
$-z = -\sqrt{3} - i$ $\quad$ $|z| = \sqrt{3} + 1$

$$|z| = \sqrt{(\sqrt{3})^2 + 1^2} = \sqrt{3+1} = \sqrt{4} = 2$$

$\varphi = 30° = \frac{\pi}{6}$

$\sin \varphi = \frac{1}{|z|} = \frac{1}{2}$

$\Rightarrow \varphi = \frac{\pi}{6}$

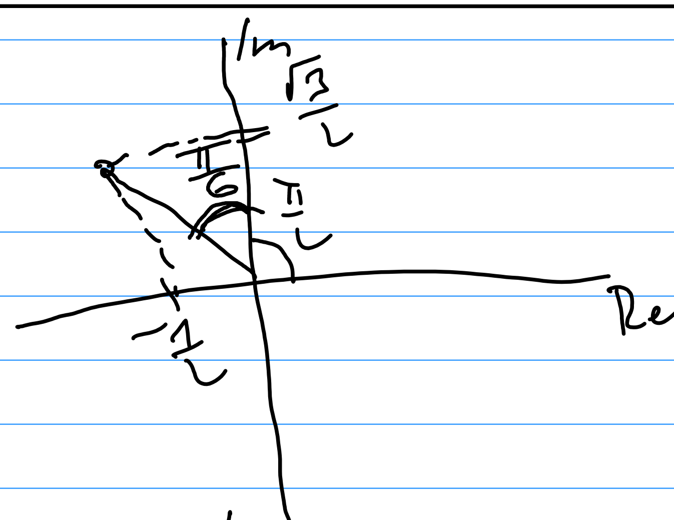


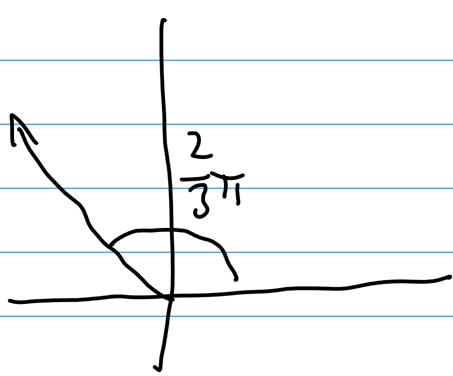
$$z = |z|(\cos\varphi + i \sin\varphi) = 2\left(\cos\frac{\pi}{6} + i \sin\frac{\pi}{6}\right)$$

$$z = |z| e^{i\varphi} = 2e^{i\frac{\pi}{6}}$$

$$z^3 = -\frac{1}{2} + i\frac{\sqrt{3}}{2}$$

$$\left|-\frac{1}{2} + i\frac{\sqrt{3}}{2}\right| = \sqrt{\frac{1}{4} + \frac{3}{4}} = 1$$





$$\frac{\pi}{6} + \frac{\pi}{2} = \frac{4}{6}\pi = \frac{2}{3}\pi$$

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

$$z^3 = \cos\frac{2}{3}\pi + i \sin\frac{2}{3}\pi$$

$$z = |z|(\cos\alpha + i\sin\alpha)$$

$$z^3 = |z|^3(\cos\alpha + i\sin\alpha)^3 = |z|^3(\cos 3\alpha + i\sin 3\alpha)$$

$$|z|^3(\cos 3\alpha + i\sin 3\alpha) = 1\left(\cos\left(\tfrac{2}{3}\pi + 2k\pi\right) + i\sin\left(\tfrac{2}{3}\pi + 2k\pi\right)\right)$$

$$k \in \mathbb{Z}$$

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

$$3\alpha = \tfrac{2}{3}\pi + 2k\pi \qquad k \in \mathbb{Z}$$

$$\alpha = \tfrac{2}{9}\pi + \tfrac{2}{3}k\pi \qquad k \in \mathbb{Z}$$

$$\alpha = \tfrac{2}{9}\pi + \tfrac{2}{3}k\pi, \qquad k = 0, 1, 2$$

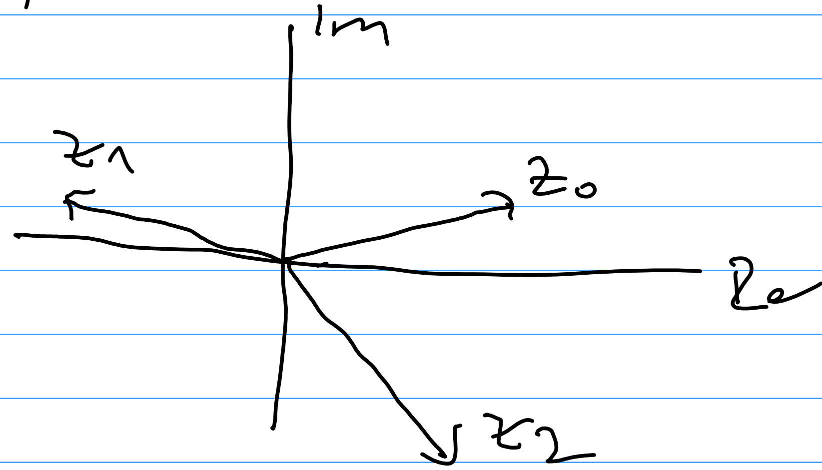
$$z_0 = 1\left(\cos\tfrac{2}{9}\pi + i\sin\tfrac{2}{9}\pi\right)$$

$$z_1 = 1\left(\cos\left(\tfrac{2}{9}\pi + \tfrac{2}{3}\pi\right) + i\sin\left(\tfrac{2}{9}\pi + \tfrac{2}{3}\pi\right)\right) =$$

$$= \cos\tfrac{8}{9}\pi + i\sin\tfrac{8}{9}\pi$$

$$z_2 = 1\left(\cos\left(\tfrac{2}{9}\pi + \tfrac{4}{3}\pi\right) + i\sin\left(\tfrac{2}{9}\pi + \tfrac{4}{3}\pi\right)\right) =$$

$$= \cos\tfrac{14}{9}\pi + i\sin\tfrac{14}{9}\pi$$



$$z = \sqrt{5}\left(\cos\frac{4}{3}\pi + i\sin\frac{4}{3}\pi\right)$$

$$w = 4\left(\cos\frac{\pi}{5} + i\sin\frac{\pi}{5}\right)$$

$$zw = |z||w|\left(\cos\alpha + i\sin\alpha\right)\left(\cos\beta + i\sin\beta\right) =$$

$$= |z||w|\left(\cos(\alpha+\beta) + i\sin(\alpha+\beta)\right)$$

$$zw = \sqrt{5}\,4\left(\cos\left(\frac{4}{3}\pi + \frac{1}{5}\pi\right) + i\sin\left(\frac{4}{3}\pi + \frac{1}{5}\pi\right)\right) =$$

$$\sqrt{5}\,4\left(\cos\frac{23}{15}\pi + i\sin\frac{23}{15}\pi\right)$$

$$w^n = \left[4\left(\cos\frac{\pi}{5} + i\sin\frac{\pi}{5}\right)\right]^n = 4^n\left(\cos\frac{\pi}{5} + i\sin\frac{\pi}{5}\right)^n =$$

$$= 4^n\left(\cos\frac{n\pi}{5} + i\sin\frac{n\pi}{5}\right)$$

$$\frac{z}{w} = \frac{|z|}{|w|}\left(\cos(\alpha-\beta) + i\sin(\alpha-\beta)\right) =$$

$$= \frac{\sqrt{5}}{4}\left(\cos\left(\frac{4}{3}\pi - \frac{\pi}{5}\right) + i\sin\left(\frac{4}{3}\pi - \frac{\pi}{5}\right)\right) =$$

$$= \frac{\sqrt{5}}{4}\left(\cos\frac{17}{15}\pi + i\sin\frac{17}{15}\pi\right)$$