$$2+5i-(3-i)(2+3i)$$

$$-4+2i$$
$$\boxed{\cancel{= -7-2i}}$$

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

$$2+5i-(3-i)(2+3i) = 2+5i-(9+7i) = \underline{\underline{-7-2i}}$$

$$i^2 = -1$$

$$\frac{2-5i}{1+2i}$$

$$-\frac{8}{5}-\frac{9}{5}i$$

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

$$= \frac{-8-9i}{5} = -\frac{8}{5}-\frac{9}{5}i$$

$$\frac{a-bi}{a+bi} \qquad a,b \in R$$

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

$$\frac{a-bi}{a+bi}\cdot\frac{a-bi}{a-bi} = \frac{(a-bi)(a-bi)}{a^2+b^2} =$$

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

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

$$x+3y+i(2x-y) = 4+i$$

$x=1 \quad y=-1$

$x=1 \quad y=1$

$$x+3y=4$$
$$2x-y=1$$
$$6x-3y=3$$
$$7x=7$$
$$x=1$$
$$y=1$$

$$a+bi=4+i$$
$$a=x+3y$$
$$b=2x-y$$
$$a=4$$
$$b=1$$
$$x+3y=4$$
$$2x-y=1$$

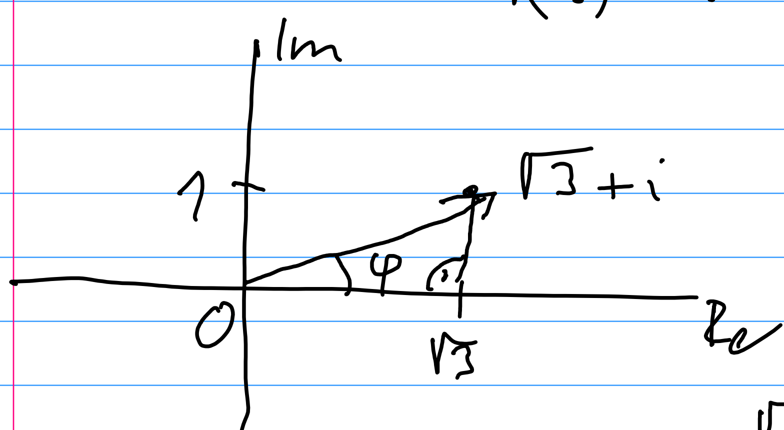
$z=\sqrt{3}+i$ $\qquad$ $\mathrm{Re}\,z,\ \mathrm{Im}\,z,\ \bar{z},\ -z,\ |z|,\ \varphi$

$\sqrt{3}+1\cdot i$ $\qquad$ Gaussova rovina

goniometrický a exponenciálny tvar

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

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



$$\underline{\varphi=30^\circ=\frac{\pi}{6}} \qquad \cos\varphi=\frac{\sqrt{3}}{2}$$

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

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

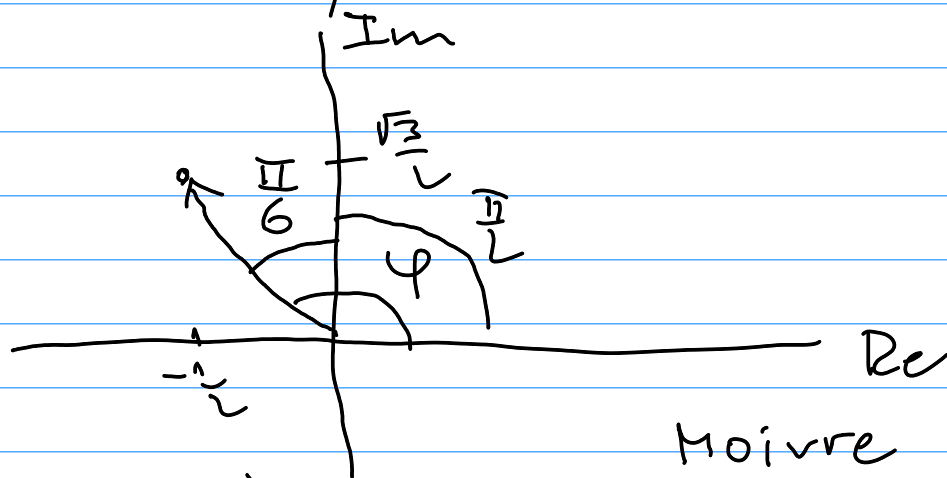
$z = 6$

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

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

$$-\frac{1}{2} + i\frac{\sqrt{3}}{2} = 1(\cos\varphi + i\sin\varphi) \qquad \varphi = \frac{2}{3}\pi$$

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



Moivre

$$\underline{z = |z|(\cos\alpha + i\sin\alpha)} \qquad (\cos\alpha + i\sin\alpha)^n =$$

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

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

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

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

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

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

$$k = 0, 1, 2$$

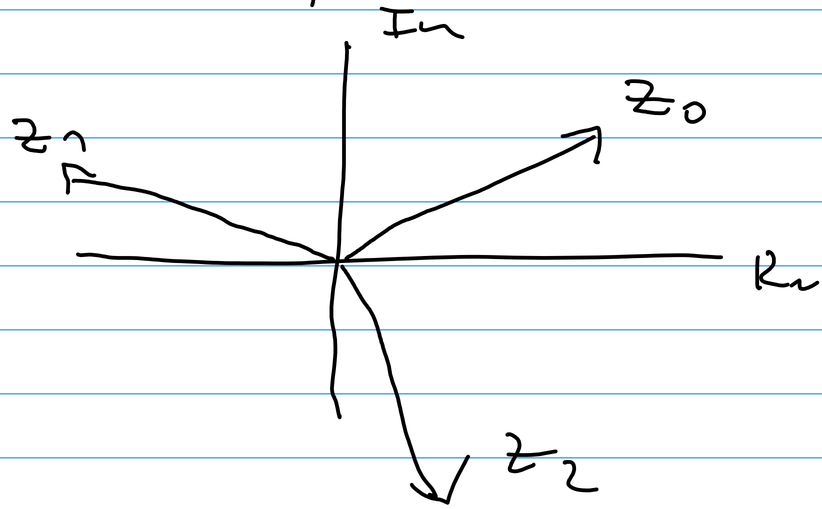
$$z_0 = 1\left(\cos\frac{2}{9}\pi + i\sin\frac{2}{9}\pi\right) = \cos\frac{2}{9}\pi + i\sin\frac{2}{9}\pi$$

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

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

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

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



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

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

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

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

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

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

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

$$z^4 = 5^2 \left(\cos \frac{16}{3}\pi + i \sin \frac{16}{3}\pi\right)$$