

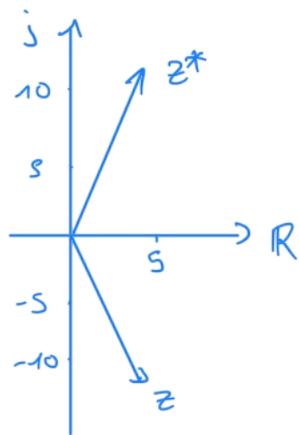
Serie 11

1 a) $z = 3 - 11i$

$$\bar{z}^* = 3 + 11i$$

$$r = \sqrt{3^2 + 11^2} = \sqrt{130}$$

$$\varphi = \tan^{-1}\left(\frac{-11}{3}\right) = -1.3$$



$$\text{tri Form} = \sqrt{130} (\cos(1.3) + \sin(1.3)i)$$

$$\text{exp Form} = \sqrt{130} e^{1.3i}$$

b) $z = 4(\cos(-40^\circ) + \sin(-40^\circ)i) + 2e^{i30^\circ} - 3 + 1.5i$

$$= 3.06 - i2.57 + \sqrt{3} + i - 3 + i1.5$$

$$z = \underline{\underline{1.80 - i0.07}}$$

$$\bar{z}^* = \underline{\underline{1.80 + i0.07}}$$

$$z=x \quad y=1$$

c) $I_1 = \frac{2+i}{1-2i} \quad z_2 = 2e^{-i\pi/3} \quad I_3 = 4(\cos(30^\circ) + i \sin(30^\circ))$

$$I_1 = \frac{\sqrt{5} e^{i 0.46}}{\sqrt{5} e^{i -1.11}} = \underline{e^{i 1.57}}$$

$$I_1^* = \underline{e^{i -1.57}}$$

$$I_2 = 4e^{i 0.52}$$

$$\frac{5e^{i -1.57} \cdot 4e^{i 0.52}}{e^{i -1.05}} = \underline{20e}$$

d) $z = 1 - \sqrt{2}i = \sqrt{3} e^{i -1.11}$

$$z^3 = \left(\sqrt{3} e^{i -1.11}\right)^3 = 3\sqrt{3} e^{i -3.33}$$

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$$z^4 + 4z^2 + 16 = 0$$

$$u = z^2$$

$$u^2 + 4u + 16 = 0$$

$$u_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$u_1 = -2 + 2\sqrt{3}i = 4e^{i-\frac{\pi}{3}}$$

$$u_2 = -2 - 2\sqrt{3}i = 4e^{i\frac{4\pi}{3}}$$

$$z_{1,2} = 2e^{i\left(\frac{-\frac{\pi}{3} + k2\pi}{2}\right)^{k=0,1}}$$

$$z_{3,4} = 2e^{i\left(\frac{\frac{\pi}{3} + k2\pi}{2}\right)^{k=0,1}}$$

$z_1 = 2e^{i\frac{\pi}{6}}$
$z_2 = 2e^{i\frac{5\pi}{6}}$
$z_3 = 2e^{i\frac{7\pi}{6}}$
$z_4 = 2e^{i\frac{-5\pi}{6}}$

