

Calcular  $(2+3i)^{2+3i}$

- convertendo  $2+3i$  para a forma exponencial, temos:

$$2+3i = \sqrt{2^2+3^2} e^{i \arctan 3/2} = \sqrt{13} e^{i \arctan 3/2}$$

- fazendo  $\begin{cases} R = \sqrt{13} \\ \theta = \arctan 3/2 \end{cases}$ , temos:

$$\begin{aligned} (2+3i)^{2+3i} &= (R e^{i\theta})^{2+3i} = R^{2+3i} \cdot (e^{i\theta})^{2+3i} = \\ &= R^{2+3i} \cdot e^{i\theta(2+3i)} = R^{2(1+\frac{3}{2}i)} \times e^{\theta(2i+3i^2)} = \\ &= (R^2)^{1+\frac{3}{2}i} \times e^{\theta(2i-3)} = (R^2)^{1+\frac{3}{2}i} \times e^{\theta(-3+2i)} \end{aligned}$$

- substituindo  $R$  pelo seu valor, temos:

$$\begin{aligned} [(\sqrt{13})^2]^{1+\frac{3}{2}i} \times e^{\theta(-3+2i)} &= 13^{1+\frac{3}{2}i} \times e^{\theta(-3+2i)} = \\ &= e^{\ln(13^{1+\frac{3}{2}i})} \times e^{\theta(-3+2i)} = e^{(1+\frac{3}{2}i)\ln(13)} \times e^{\theta(-3+2i)} = \\ &= e^{(1+\frac{3}{2}i)\ln(13) + \theta(-3+2i)} \end{aligned}$$

- substituindo  $\theta$  pelo seu valor, temos:

$$e^{(1+\frac{3}{2}i)\ln(13) + \arctan 3/2 \cdot (-3+2i)}$$

$$\hookrightarrow e^{\ln(13) - 3\arctan 3/2} \left\{ \cos\left[\frac{3}{2}\ln(13) + 2\arctan\left(\frac{3}{2}\right)\right] + i \sin\left[\frac{3}{2}\ln(13) + 2\arctan\left(\frac{3}{2}\right)\right] \right\}$$