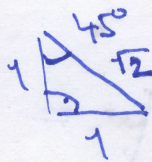
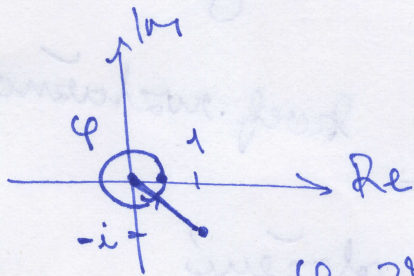


1.

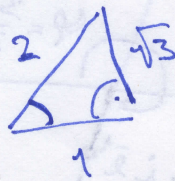
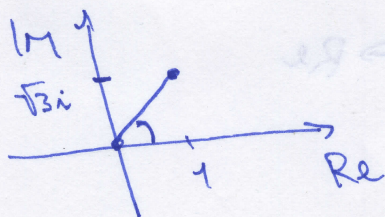
$$R = \left(\frac{1-i}{1+\sqrt{3}i} \right)^{24}$$

$$1-i = \sqrt{2} \cdot \left(\cos \frac{7}{4}\pi + i \sin \frac{7}{4}\pi \right)$$



$$\varphi = 2\pi - \frac{\pi}{4} = \frac{7}{4}\pi$$

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



$$|R| = \sqrt{3+1} = \sqrt{4} = 2$$

$$\sin \varphi = \frac{\sqrt{3}}{2} \Rightarrow \varphi = \frac{\pi}{3}$$

$$R = \left(\frac{1-i}{1+\sqrt{3}i} \right)^{24} = \frac{(\sqrt{2})^{24} \cdot \left(\cos \left(24 \cdot \frac{7}{4}\pi \right) + i \sin \left(24 \cdot \frac{7}{4}\pi \right) \right)}{2^{24} \cdot \left(\cos \left(24 \cdot \frac{\pi}{3} \right) + i \sin \left(24 \cdot \frac{\pi}{3} \right) \right)}$$

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$$= \left(\frac{1}{\sqrt{2}} \right)^{24} \cdot \frac{\cos 42\pi + i \sin 42\pi}{\cos 8\pi + i \sin 8\pi} = \left(\frac{1}{2} \right)^{12} \cdot \frac{1+i \cdot 0}{1+i \cdot 0} = \left(\frac{1}{2} \right)^{12}$$

$$\operatorname{Re} R = \left(\frac{1}{2} \right)^{12} = 2^{-12}$$

$$\operatorname{Im} R = 0$$