Ejercicio 1 Apartado a)

$z = (1+i)^{2020}$

$\begin{cases} 1 = \sqrt{2} \cos \alpha \\ 1 = \sqrt{2} \, \text{sen} \, \alpha \end{cases} \quad \alpha = \pi/4$

$|1 + i| = \sqrt{1^2 + i^2} = \sqrt{2}$

$\left(\sqrt{2} \; e^{i\pi/4} \right) = 2^{1010} \; e^{i\frac{2020\pi}{4}} = 2^{1010} \underbrace{e^{i504\pi}}_{1} \underbrace{e^{i\pi}}_{-1}$

$= -2^{1010}$ //

Ejercicio 1 Apartado b)

$\left(\overline{z} \right)^3 + i \overline{z} = 0 \rightsquigarrow \overline{z} \left((i\overline{z})^2 + i \right) = 0$

$\begin{cases} \overline{z} = 0 \Leftrightarrow z = 0 \\ \overline{z}^2 + i = 0 \rightsquigarrow \\ \overline{z}^2 + 1 = 0 \Leftrightarrow \\ z^2 - i = 0 \end{cases}$

$z^2 = i = e^{i\left(\frac{\pi}{2} + 2\pi k \right)}$

$K = 0, 1 \qquad z_k = e^{i \frac{\pi/2 + 2\pi k}{2}}$

$z_0 = e^{i\pi/4} \qquad z_1 = e^{i \frac{5\pi}{4}}$

Ejercicio 2

Equivalencias a utilizar:

$\text{tg} \frac{1}{n} \sim \frac{1}{n}$

$\log n \sim \log n - 1$

$\boxed{\text{Solución} = \frac{1}{2}}$