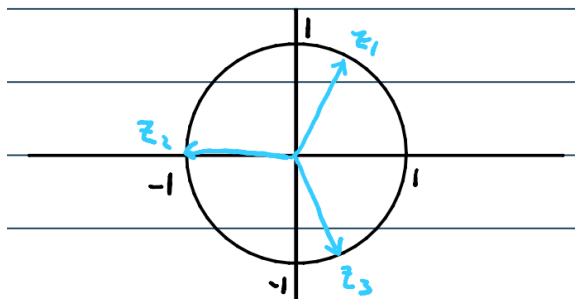P2 Find and plot all $z \in \mathbb{C}$ such that $z^3 = -1$.

Answer: We have $z^3 = -1 \implies z^3 = \cos\pi + i\sin\pi$, so by the nth roots formula, the roots are:

$z_1 = \cos\frac{\pi}{3} + i\sin\frac{\pi}{3} = \frac{1}{2} + \frac{\sqrt{3}}{2}i$

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

$z_3 = \cos\left(\frac{\pi}{3} + \frac{4\pi}{3}\right) + i\sin\left(\frac{\pi}{3} + \frac{4\pi}{3}\right) = \frac{1}{2} - \frac{\sqrt{3}}{2}i$

I certify on my honor that I have neither given nor received any help, or used any non-permitted resources, while completing this evaluation.

Signature:

Date: 12/13/2020