1. Show that, if ω is an n^{th} root of unity, then so is ω^{-1}.
2. Show that, if ω is an n^{th} root of unity, then so is ω^k for any $k \in \mathbb{N}$.

An n^{th} root of unity is called *primitive* if it is not an m^{th} root of unity for any $m \in \mathbb{Z}^+$ with $1 \leq m < n$.

3. Prove that, if ω is a primitive n^{th} root of unity, then $\omega^0, \omega^1, \ldots, \omega^{n-1}$ are all distinct.
4. Show that, if ω is a primitive 5^{th} root of unity, then

$$\omega^4 + \omega^3 + \omega^2 + \omega + 1 = 0$$