# 1 Theorem

The sum of the n nth roots of unity is always 0, for $n >= 2$.

# 2 Proof

We will denote the nth root of the complex number $z$ with $\zeta_n$.

Then, it follows that:

$w = n$

$\zeta_1 = \sqrt[n]{r}(\sin\frac{\theta+2\pi(1)}{n} + \cos\frac{\theta+2\pi(1)}{n})$

$\zeta_2 = \sqrt[n]{r}(\sin\frac{\theta+2\pi(2)}{n} + \cos\frac{\theta+2\pi(2)}{n})$

$\zeta_3 = \sqrt[n]{r}(\sin\frac{\theta+2\pi(3)}{n} + \cos\frac{\theta+2\pi(3)}{n})$