# Problem 1.2

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## Problem 1.2

0.0/2.0 points (ungraded)

Let $\varepsilon$ be arbitrary $n$-th rooth of unity (distinct from 1). Prove the following equality.

$$1+2\varepsilon+3\varepsilon^2+\ldots+n\varepsilon^{n-1}=\frac{n}{\varepsilon-1}$$

In order to prove it, compute this sum in the closed form. To this end, notice that the summed series can be obtained by differentiation of a more usual geometric series. What is the result?

$$1+2\varepsilon+3\varepsilon^2+\ldots+n\varepsilon^{n-1}=\frac{(n(\ \square\ )-1)\varepsilon^{\square}-}{(\ \square\ )^{\square}}$$

| | | | | | |
|---|---|---|---|---|---|
| $\varepsilon-1$ | $\varepsilon+1$ | $n$ | $2$ | $1$ | |

Notice that from this result the statment of the problem follows immediately.

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