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Problem 1.2

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Problem 1.2

0.0/2.0 points (ungraded)

Let ε 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?

$$1 + 2\varepsilon + 3\varepsilon^2 + \dots + n\varepsilon^{n-1} = \frac{(n(\lfloor 1 \rfloor) - 1)\varepsilon^{\lfloor 1 \rfloor})}{(\lfloor 1 \rfloor)^{\lfloor 1 \rfloor}}$$



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

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