$$\binom{\complement}{m} q^m = {}^{q^m}\!\blacktriangle q^m = \left\{ q^m \xrightarrow[\text{bij lin}]{} q^m \right\} \ni \nearrow = \begin{bmatrix} {}_0\nearrow \\ {}_{m-1}\nearrow \end{bmatrix} \text{ free}$$

$$\sharp \binom{\complement}{m} q^m = \prod_i^m \underbrace{q^m - q^i}$$

$$\text{LHS } = \sharp \nearrow = \underbrace{q^m - 1}\,\underbrace{q^m - q}\,\underbrace{q^m - q^2} \cdots \underbrace{q^m - q^{m-1}} = \text{ RHS}$$