The Well Ordering Principle, III

Geometric sums
\[ 1 + r + r^2 + r^3 + \cdots + r^n = \frac{r^{n+1} - 1}{r - 1} \]

Proof by WOP. Let \( m \) be smallest \( n \) with \( \neq \). But for \( n = 0 \), so \( m > 0 \), and
\[ 1 + r + r^2 + r^3 + \cdots + r^{m-1} = \frac{r^m - 1}{r - 1} \]

Well Ordering Principle Proofs

To prove \( \forall n \in \mathbb{N}. P(n) \) using WOP:
• define set of counterexamples
  \[ C := \{ n \in \mathbb{N} \mid \text{NOT } P(n) \} \]
• assume \( C \) is not empty. By WOP, have minimum element \( m \in C \)
• Reach a contradiction somehow ...
  ...or by proving \( P(m) \)