Proof Without Words: Series of Perfect Powers

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Proof Without Words: Series of Perfect Powers

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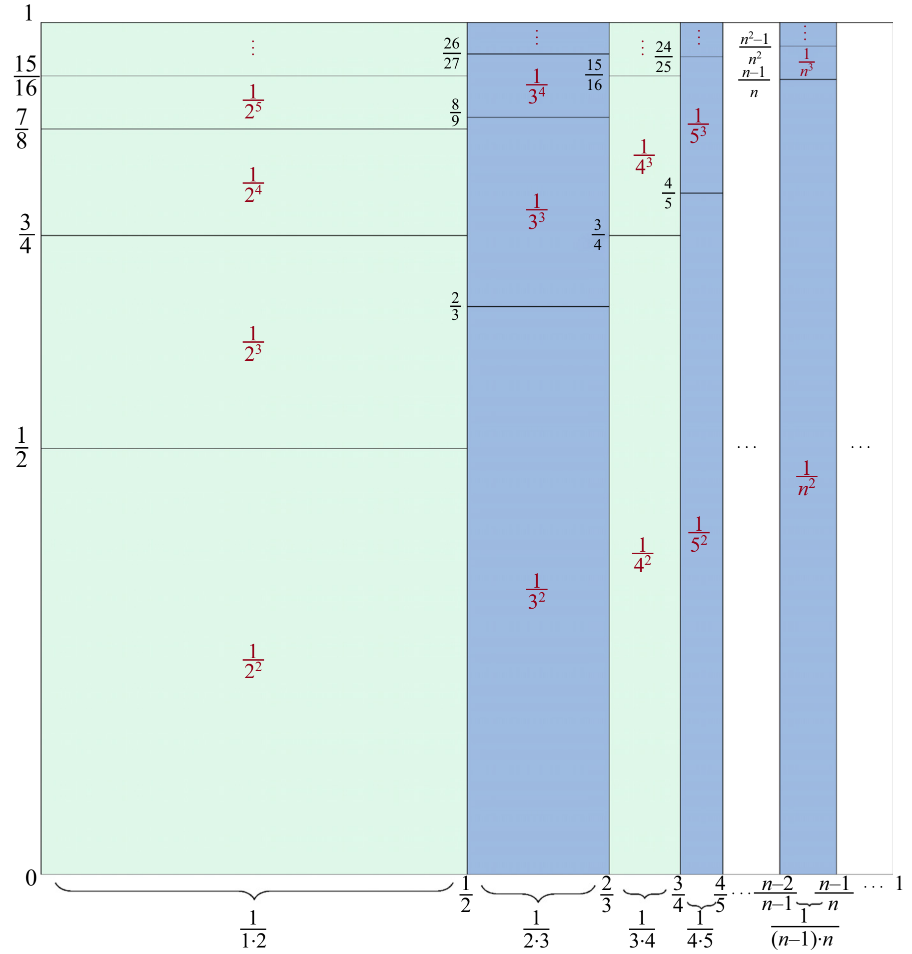
The *multiset* of perfect powers is the collection $\mathbf{P} = \{n^m \mid n > 1;\ m > 1\}$:

$$\mathbf{P} = \{2^2, 2^3, 2^4, \ldots, 3^2, 3^3, 3^4, \ldots, 4^2, 4^3, 4^4 \ldots, 5^2, 5^3, 5^4, \ldots\}.$$

Theorem. *The sum of reciprocals of perfect powers is* 1: $\displaystyle\sum_{b\in\mathbf{P}} \frac{1}{b} = \sum_{n\geq 2}\sum_{m\geq 2} \frac{1}{n^m} = 1.$



Summary. We wordlessly show that the sum of reciprocals of perfect powers (with duplicates included) is 1.

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