

More Induction

Induction doesn't **only** work for code!

Show that $\sum_{i=0}^n 2^i = 1 + 2 + 4 + \dots + 2^n = 2^{n+1} - 1$.

Let $P(n) = \text{"}\sum_{i=0}^n 2^i = 2^{n+1} - 1\text{"}$

We show $P(n)$ holds for all n by induction on n .

Base Case ()

Inductive Hypothesis:

Inductive Step:

$P(n)$ holds for all $n \geq 0$ by the principle of induction.

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Let's Try Another! Stamp Collecting

I have 4 cent stamps and 5 cent stamps (as many as I want of each).
Prove that I can make exactly n cents worth of stamps for all $n \geq 12$.

Try for a few values.

Then think...how would the inductive step go?