# induction

## BASE CASE

- Set n to lowest possible value

$$\sum_{k=0}^{n} 2^k = 2^{n+1} - 1$$

$$2^0 = 2^{0+1} - 1$$

- Solve and Prove True

$$1 = 2 - 1$$

$$1 = 1$$

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## INDUCTIVE HYPOTHESIS

- Restate problem with n+1

$$\sum_{k=0}^{n+1} 2^k = 2^{(n+1)+1} - 1$$

- Expand Sum

$$\sum_{k=0}^{n} 2^k + 2^{(n+1)} = 2^{(n+2)} - 1$$

- Replace Base Case

$$2^{(n+1)} - 1 + 2^{(n+1)} = 2^{(n+2)} - 1$$

- Solve and Prove True

$$2^{n+2} - 1 = 2^{n+2} - 1$$

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