













- Other counting tools. casework, complements, symmetry..
- Set theory is your friend! Principle of inclusion / exclusion
- Counting problems will ask you to decide what tool to use and often combine strategies
- Combinatorial proof: count the same thing in two ways!

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Combinatorial Proof III Observation #3: Elements in row n sum to 2^n . In other words: $\sum_{i=1}^{n} \binom{n}{i} = 2^{n}$

Algebraic Method: Don't try this at home!

Double-Counting Method ("Combinatorial Proof"): $\binom{n}{o} + \binom{n}{1} + \dots + \binom{n}{n}$ # of subsets of m people, LHS. pick pick pickn nobody 1 pers. people Separated by Size У х 2 XJ \rightarrow on team or RHS : Pers # 1 Pers #2 - - . pers # m not on $= \mathcal{S}_{u}$ team. 20/22

Another Combinatorial Proof
From Notes: $\binom{n}{k+1} = \binom{p-1}{k} + \binom{p-2}{k} + \ldots + \binom{k}{k}$
Algebraic Method: Don't try this at home! 00005 ng k: 1 fewCr thon
Double-Counting Method ("Combinatorial Proof"): K+1.
CHS: Choosing (141) people of a find right carrier 2 mm
." Iowest" person #1: Choose rest of team trom (n-1)
Count . "lowest" person 2: choose rest of team (k)
Cases! choose k people (n-2)
•" lowest" person the ktl (*)-1
{n-k, n-k+1, n-1, n} \k/- +
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