

Homework Assignment #2

Due Date, Wednesday 9/27

1. Give a combinatorial proof of the following identity.

$$\sum_{i=k}^n \binom{i}{k} = \binom{n+1}{k+1}$$

Do not give an algebraic proof, inductive proof, or a proof that uses Pascal's recurrence. Hint, given a subset S of $\{1, 2, 3, \dots, n-1, n, n+1\}$ with $k+1$ elements in it, consider the largest element in S .

2. Use the binomial theorem to expand the sum $(4x-2)^{10}$. (No proof necessary, just calculations.)
3. If you were to expand the sum $(x-3y-2z)^{15}$, then what would the coefficient of the term $x^8y^3z^4$ be? Please don't actually expand the sum. (No proof necessary, just calculations.)
4. Problem 12 on page 155.