

# Unit 1 - Combinatorics - Basic Methods

## Week 2 - Combinatorial Proof

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Reading: AC 2.4, rest of chapter 2

### 1

AC 2.9.21:

Give a combinatorial proof that

$$\sum_{j=0}^k \binom{m}{j} \binom{w}{k-j} = \binom{m+w}{k}$$

### 2

AC 2.9.26:

How many lattice paths go from  $(0, 0)$  to  $(14, 73)$  which do not go through  $(6, 37)$ ?

### 3

AC 2.9.32:

How many ways are there to color a set of 27 objects such that 7 are painted white, 6 are painted gold, 2 are painted blue, 7 are painted yellow, and 5 are painted green.