

WEEK 2 (SEP 18-25)

Office hours and tutorials begin this week.

The plan is cover sections 2.5, 2.6, and 2.7.

Here are some problems you might think about. They are not part of your homework, but try and do them before classes begin next week so that you follow the lectures better.

1. In how many ways can we sit 12 people around a round table if three friends insist of sitting together? Configurations that can be identified by rotation are considered the same.
2. Let $m, n \in \mathbb{Z}$ with $0 \leq m \leq n$. Give a *combinatorial proof* of the equality

$$\sum_{i=0}^{n-m} \binom{n}{i} \binom{n-i}{n-m-i} = \binom{n}{m} 2^{n-m}.$$

No algebraic manipulations are allowed; you must give combinatorial interpretations of both sides in the way that they are written.

3. How many triangles with vertices placed at the intersection points of a 2×4 square grid are there? The picture below shows an example; the intersection points are the 15 blue dots.

Note. A configuration with three points in a line does not count: the triangle must have positive area.)

