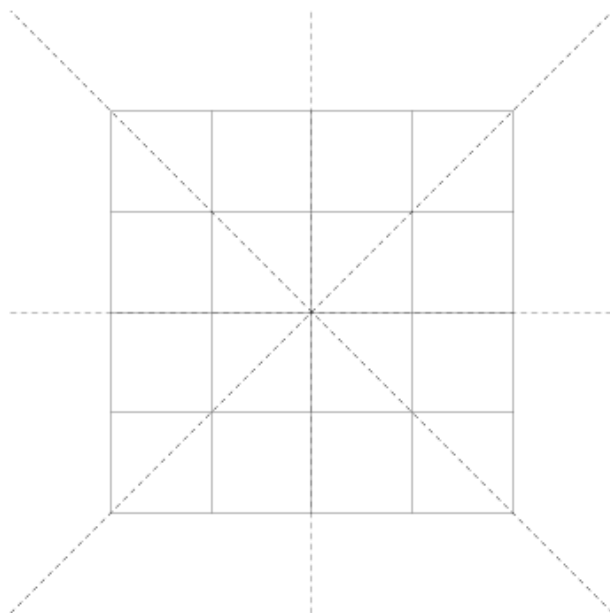


M501 Combinatorics I

exercise sheet # 5



Exercise # 1

(4 points)

Consider the 4×4 board shown above.

- Up to Dihedral symmetry, in how many different ways can you color 8 of the boxes black?
- Up to Dihedral symmetry, how many Domino tilings can you find?

Exercise # 2

(2 points)

Compute the number of simple graphs on 5 vertices using cycle enumerators.

Exercise # 3

(2 points)

What is the rotational symmetry group of the cube? Compute the cycle enumerator of this group acting on the faces of the cube.

Exercise # 4

(2 points)

Let G and H be groups acting on finite sets A and B respectively. Let $G \times H$ act on $A \cup B$ by

$$(g, h)(x) = \begin{cases} g(x) & \text{if } x \in A \\ h(x) & \text{if } x \in B \end{cases}$$

Compute the cycle enumerator of this action from the cycle enumerators $C(G, A)$ and $C(H, B)$.

due to Friday, 11/4/05.