

Group Theory: Computational Assignment #1.

Assigned Friday, January 18th, 2013

Due Friday, January 25th, 2013.

Each problem is worth a maximum of 2 points which go towards the computational part of your grade. Submit your code along with your results.

Question 1.

Write a Magma script to find an example of two matrices $M, N \in GL_7(\mathbb{Q})$ such that $|M|$ and $|N|$ are finite, but $|MN|$ is infinite. Estimate the probability that the product of two invertible 3×3 matrices of finite order with coefficients in $\{-1, 0, 1\}$ will have infinite order.

Question 2.

Let $\sigma(n; d)$ denote the number of elements of order d in S_n . For each $n \in \{1, \dots, 11\}$, calculate $\sigma(n; d)$ for every $d \mid n!$.