

Math 128B, problem set 10
Outline due: Wed Apr 27
Due: Mon May 02
Last revision due: Mon May 16

Problems to be done, but not turned in: (Ch. 24) 1, 3, 5, 9, 11, 17, 19, 21, 25, 27, 31, 35, 39, 47, 51.

Fun: (Ch. 24) 49.

Problems to be turned in:

1. For each prime p dividing the order of S_5 , exhibit one Sylow p -subgroup of S_5 , and determine the number of Sylow p -subgroups of S_5 .
2. (Ch. 24) 14.
3. (Ch. 24) 20.
4. (Ch. 24) 26.
5. Let G be a group of order $495 = 3^2 \cdot 5 \cdot 11$.
 - (a) Prove that for some prime p , G contains a normal Sylow p -subgroup.
 - (b) Prove that G contains a subgroup of order 55.
6. (Ch. 24) 40.
7. Recall that D_5 is the symmetry group of a regular pentagon. Number the vertices of our standard regular pentagon 1, 2, 3, 4, 5, let R_θ denote a counterclockwise rotation of θ degrees, and let F_i be the reflection whose axis of symmetry passes through vertex i . Recall that the elements of D_5 are R_{72k} , for $0 \leq k \leq 4$, and F_i , for $1 \leq i \leq 5$. Calculate all conjugacy classes of D_5 .