

Math 103A: Winter 2014
Practice Midterm 2

Instructions: Please write your name on your blue book. Make it clear in your blue book what problem you are working on. Write legibly and explain your reasoning. This exam is graded out of 100 points. Following these instructions is worth 5 points.

Problem 1: [15 points] Give an example (with justification) of an Abelian group which is not cyclic.

Problem 2: [15 points] Let G be a group of order 16 and suppose $g \in G$ satisfies $g^8 \neq e$. What is $|g^2|$? Be sure to justify your answer.

Problem 3: [15 points] How many distinct right cosets does $\langle(1, 2, 3)\rangle$ have in A_4 ?

Problem 4: [15 points] What is the order of $((1, 2, 3)(4, 5), R_{90}) \in S_5 \oplus D_4$?

Problem 5: [15 points] Let G be a group. Prove that $|\text{Inn}(G)| = 1$ if and only if G is Abelian.

Problem 6: [20 points] List four groups of order 12 such that no two groups on your list are isomorphic.