

MATH 233, HOMEWORK 9

EQUIVALENCE RELATIONS, EQUIVALENCE CLASSES AND QUOTIENT SETS

Due by 10 am, Friday, May 3rd

1. HOMEWORK POLICY

You are strongly encouraged to work in groups to exchange ideas and help each other understand how to approach problems, but the work you turn in must be your own! If you work with others on an assignment, be sure to indicate the names of the other students on your homework. Additionally, if you use any outside resources (i.e. internet sources, other mathematicians, other books) to help you solve homework problems, you must cite your sources. Failure to follow these rules will result in a score of zero on an assignment and may constitute a violation of academic integrity.

Homework must be legible, well-organized, and written in complete sentences. Handwritten work is fine, but you are encouraged to type up the problems in LaTeX.

Additional guidelines: If you submit hand written work make sure it is written legibly and stapled. If you submit work through email mail, it must be submitted as a **single pdf file** and have your name on the first page. Failure to follow these guidelines will result in a loss of points.

2. READINGS AND RESPONSES.

- (1) Read Sections 7.2, 7.3, 7.4, 7.5 and 7.6.
- (2) Suppose X is a set of college students and for all $x, y \in X$, $x \sim y$ if and only if x and y are roommates. Explain how X/\sim is a partition of X .
- (3) Explain (informally) how a quotient set is a way of gluing certain elements of the original set together.
- (4) Explain the relationships of 7.5.1 and 7.5.2 to 7.2.12 and 7.3.10.

3. PROBLEMS

- (1) Prove Theorem 7.2.12. (Hint: we started the proof of this result in class)
- (2) Do Exercise 7.3.5 parts 2, 3 and 5.
- (3) Prove theorem 7.3.10.
- (4) Do Exercise 7.4.6 parts 2 and 3.
- (5) Prove Lemma 7.6.3.