

## Math 213 - Homework 10

Assigned: 10/24/07

Due: 10/31/07 at the start of class.

Notation: Exercise a.b.c(d) stands for part (d) of Exercise c from Section a.b.

Problems:

- (1) 8.1.4(a).
- (2) 8.1.6(d).
- (3) 8.1.54(a).
- (4) 8.3.8. (Irreflexive is defined after problem 8.1.8 on pg. 526)
- (5) 8.3.22.
- (6) Show that the relation coming from a tournament is antisymmetric.
- (7) 8.5.12. How many equivalence classes are there?
- (8) 8.5.16.
- (9) Suppose that  $m$  is a positive integer. Suppose that  $a_1, a_2, b_1,$  and  $b_2$  are positive integers with  $a_1 \equiv b_1 \pmod{m}$ , and  $a_2 \equiv b_2 \pmod{m}$ . Show that  $a_1 + a_2 \equiv b_1 + b_2 \pmod{m}$  and  $a_1 a_2 \equiv b_1 b_2 \pmod{m}$ .
- (10) Let  $A = \{(a, b) \in \mathbb{R} \mid \text{one of } a \text{ or } b \text{ is nonzero}\}$ . Define a relation on  $A$  by saying that  $(a, b)$  is related to  $(c, d)$  if and only if  $ax + by = 0$  and  $cx + dy = 0$  are the same line. Show that this is an equivalent relation.