Intro to Abstract Math
Fall 2009

Homework 13
Due October 5

Exercise 37. Let A, B, C, D be sets. Prove that

$$[(A - C) \times B] \cup [A \times (B - D)] \subseteq (A \times B) - (C \times D).$$

Exercise 38. Let $A = \{a, b, c, d, e\}$ and

$$R = \{(a, a), (a, e), (b, b), (b, c), (b, d), (c, b), (c, c), (c, d), (d, b), (d, c), (d, d), (e, a), (e, e)\}.$$

Is R an equivalence relation on A? Be sure to prove your answer.

Exercise 39. Prove that

$$Q = \{((a, b), (c, d)) \mid ad - bc = 0\}$$

is an equivalence relation on $\mathbb{Z} \times \mathbb{N}$, using only properties of integers (i.e. you *may not* introduce fractions).