## Math 301: Homework 9

Mary Radcliffe

due 21 Nov2016

Complete the following problems. Fully justify each response.

- 1. Prove Dilworth's Theorem using Hall's Theorem.
- 2. Complete problems 9 & 14 from Applied Combinatorics on page 125 (figure 6.18 is on page 126).
- 3. Let A be a set of natural numbers, having size n. Prove that there exists a subset  $S \subset A$  having  $|S| \ge \sqrt{n}$  such that one of the two properties below is true.
  - For every distinct  $x, y \in S$ , either x|y or y|x.
  - Every pair of distinct  $x, y \in S$  are mutually indivisible.