

## Math 342 — Counting I

**Problem 1.** Some debit card security pins are made of 4 digits from the numbers 0 to 9 with repetition allowed. Assume a security pin is chosen randomly with all equally likely.

- a. Find the number of elements in the sample space.
- b. Find the probability of each of the following events.
  1. The security pin does not contain the number 1.
  2. The security pin contains at least one 1.
  3. The security pin contains exactly one 1.

**Problem 2.** A standard 52 card deck contains 13 cards of each suit; that is 13 clubs, 13 spades, 13 hearts, and 13 diamonds. Suppose 4 cards are drawn, one at a time, without replacement.

- a. Find the number of elements in the sample space.
- b. Find the probability of each of the following events.
  1. All 4 cards are of different suits.
  2. All 4 cards are of the same suit.

**Problem 3.** A coin is flipped six times. The sample space  $\Omega$  of this experiment consists of 6-element ordered sequences whose entries are each  $H$  or  $T$ .

- a. Find  $|\Omega|$
- b. Find the number of elements in each of the following events.
  1. The first two flips are heads and the last two flips are tails.
  2. Exactly one of the flips is heads.
  3. At least one of the flips is heads.

**Problem 4.** Eight people will be seated in a row. Find the number of possible seating arrangements given the following restrictions.

- a. No restrictions.
- b. Suppose 4 people are wearing glasses and 4 are not. Glasses wearers and non-wearers must be alternated.
- c. Suppose 5 people are children and 3 are not. The 5 children must be seated consecutively.
- d. Alice and Bob are two of the eight people. They must be seated so that there exactly two people between them.