

# General Mathematics and Computational Science I

## Exercise 10

October 26, 2006

1. A card is drawn at random from a standard deck of 52 cards. What is the probability of drawing
  - (a) a king of spades?
  - (b) a king?
  - (c) not a king?
  - (d) a diamond?
  - (e) a face card (jack, queen, or king)?
2. In the game of Yahtzee (or Yacht), five dice are thrown. Show that the probability of throwing a *large straight* (5 numbers in a row, the order does not matter) is  $\frac{5}{162}$ .  
Alternatively, you may solve the following, harder, problem. Show that the probability of throwing a *small straight* (4 numbers in a row) is  $\frac{10}{81}$ . Do not count small straights which are also large straights.  
(The actual rules of the game allow to repeat throwing a selected subset of dice twice. This is considerably more complicated to analyze.)
3. It is believed that 2 genes  $A$  and  $B$  may play some part in the susceptibility of an individual to a disease. Of 100 patients investigated, 17 carry gene  $A$ , 33 carry gene  $B$  and 67 carry neither. Find the probability that a patient carries only gene  $A$ , only gene  $B$  or both.