

# Homework # 2

Due: Feb 24, 2011, 4:30 PM

Instructor: John C.S. Lui

## Note: Deduction Policy for Late Submissions.

Late submissions **must** be handed to TA'office (Room 120, SHB) by person. We will not handle any late submissions in the homework collection box in 10/F, SHB.

- Deduct 30% for one day late submission (within 24 hours).
  - Deduct 60% for two days late submission (within 48 hours).
  - Deduct 100% for more than two days late submission (after 48 hours).
1. If two fair dice are rolled, what is the *conditional probability* that the first one lands on 6 given that the sum of the dice is  $i$ ? Compute for all values for  $i$  between 2 and 12.
  2. A couple has 2 children. What is the probability that both are girls if the older of the two is a girl?
  3. Consider 3 urns. Urn  $A$  contains 2 white and 4 red balls, urn  $B$  contains 8 white and 4 red balls, urn  $C$  contains 1 white and 3 red balls. If 1 ball is selected from each urn, what is the probability that the ball chosen from URN  $A$  was white given that exactly 2 white balls were selected?
  4. An urn initially contains 5 white and 7 black balls. Each time a ball is selected, its color is noted and it is replaced in the urn along with 2 other balls of the same color. Compute the probability that
    - (a) the first 2 balls selected are black and the next 2 are white;
    - (b) of the first 4 balls selected, exactly 2 are black.
  5. In a certain community, 36 percent of the families own a dog and 22 percent of the families that own a dog also own a cat. In addition, 30 percent of the families own a cat. What is
    - (a) the probability that a randomly selected family owns both a dog and a cat?
    - (b) the conditional probability that a randomly selected family owns a dog given that it owns a cat?
  6. Fifty-two percent of the students of a certain college are females. Five percent of the students in this college are majoring in computer science. Two percent of the students are women majoring in computer science. If a student is selected at random, find the conditional probability that
    - (a) the student is female given that the student is majoring in computer science;
    - (b) this student is majoring in computer science given that the student is female.