

## Pstat 172B, Spring 2008: Homework 4.

1. Do problems 9.1, 9.2, 9.7, and 9.11 from the textbook.
2. (Fall 2005, #16, SOA) For the future lifetimes of  $(x)$  and  $(y)$ :
  - (i) With probability 0.4,  $T(x) = T(y)$  (i.e., deaths occur simultaneously).
  - (ii) With probability 0.6, the joint density function is

$$f_{T(x),T(y)}(t, s) = 0.0005, \quad 0 < t < 40, 0 < s < 50$$

Calculate  $\text{Prob}[T(x) < T(y)]$ .

3. (Fall 2005, #23, SOA) Kevin and Kira are in a history competition:
  - (i) In each round, every child still in the contest faces one question. A child is out as soon as he or she misses one question. The contest will last at least 5 rounds.
  - (ii) For each question, Kevins probability and Kiras probability of answering that question correctly are each 0.8; their answers are independent.

Calculate the conditional probability that both Kevin and Kira are out by the start of round five, given that at least one of them participates in round 3.

4. (Fall 2006, #25, SOA) You are given:
  - (i) The future lifetimes of (40) and (50) are independent.
  - (ii) The survival function for (40) is based on a constant force of mortality,  $\mu = 0.05$ .
  - (iii) The survival function for (50) follows DeMoivres law with  $\omega = 110$ .

Calculate the probability that (50) dies within 10 years and dies before (40).

5. (Spring 2007, #14, SOA) The probability that (30) will survive five years is a. The probability that (30) will die before (35) is b. The future lifetimes of (30) and (35) are independent and follow the same mortality table. Determine the probability that (30) will die second and within five years of the death of (35).