

Maths 4255  
Spring 2009  
Take-Home Assignment # 4  
Due Date: In-Class on 03/05/2009

**Instructions:** Your solutions must appear in an organized and legible format to be given full consideration.

1. (**chap 4, ex1, Problems**) Two balls are chosen randomly from an urn containing 8 white, 4 black and 2 orange balls. Suppose that we win \$2 for each black ball selected and we lose \$1 for each white ball selected. Let  $X$  denote our winnings. What are the possible values of  $X$  and what are the probabilities associated with each value?
2. (**chap 4, ex17, Problems**) Suppose that the distribution function of  $X$  is given by

$$F_X(b) = \begin{cases} 0 & b < 0 \\ \frac{b}{4} & 0 \leq b < 1 \\ \frac{1}{2} + \frac{b-1}{4} & 1 \leq b < 2 \\ \frac{11}{12} & 2 \leq b < 3 \\ 1 & 3 \leq b \end{cases}$$

- (a) Find  $P(X = i)$ ,  $i = 1, 2, 3$ .
  - (b) Find  $P\left(\frac{1}{2} < X < \frac{3}{2}\right)$
3. (**chap 4, ex57, Problems**) Suppose that the number of accidents occurring on a highway each day is a Poisson random variable with parameter  $\lambda = 3$ .
    - (a) Find the probability that 3 or more accidents occur today.
    - (b) Repeat part (a) under the assumption that at least 1 accident occurs today.
  4. (**chap 4, ex79, Problems**) Suppose that a batch of 100 items contains 6 that are defective and 94 that are nondefective. If  $X$  is the number of defective items in a randomly drawn sample of 10 item from the batch, find
    - (a)  $P(X = 0)$ .
    - (b)  $P(X > 2)$ .