

**Homework 2**

August 27, 2013

Due: at the start of class on Thursday, Sept. 9 / Friday, Sept. 10

1. Let  $D$  be a discrete random variable with the following pmf.

$$P(D = k) = \begin{cases} 1/10 & \text{if } k = 5 \\ 3/10 & \text{if } k = 6 \\ 2/5 & \text{if } k = 7 \\ 1/10 & \text{if } k = 8 \\ 1/10 & \text{if } k = 9 \\ 0 & \text{otherwise.} \end{cases}$$

Find

a)  $E[\min(D, 7)]$ .

a)  $E[(7 - D)^+]$  (which represents the expected amount of left-over items).

(Recall that  $(7 - D)^+ = \max\{7 - D, 0\}$ ).

2. Now assume that  $D$  is a continuous random variable and uniformly distributed between 5 and 10. Find

a)  $E[\max(D, 8)]$ .

a)  $E[(D - 8)^+]$  (which represents the expected amount of shortage).

3. David buys fruits and vegetables wholesale and retails them at Davids Produce on La Vista Road. One of the more difficult decisions is the amount of bananas to buy. Let us make some simplifying assumptions, and assume that David purchases bananas once a week at 10 cents per pound and retails them at 30 cents per pound during the week. Bananas that are more than a week old are too ripe and are sold for 5 cents per pound. Suppose the demand for the good bananas follows the same distribution as  $D$  given in the first question. What is the expected profit of David in a week if he buys 7 pounds of banana?
4. Now assume that the demand for the good bananas is uniformly distributed between 5 and 10. What is the expected profit of David in a week if he buys 7 pounds of banana?
5. Find the expected profit if David's demand for the good bananas follows an exponential distribution with mean 7 and if he buys 7 pounds of banana.