

ECO 261- Fall 2009

Problem Set-3

**Due by October 20, Tuesday**

1) Students in a large accounting class were asked to rate the course by assigning a score of 1, 2, 3, 4 or 5 to the course. A higher score indicates that the students received a greater value from the course. The accompanying table shows proportions of students rating the course in each category.

Rating	1	2	3	4	5
Proportion	0.07	0.19	0.28	0.30	0.16

Find the mean and standard deviation of the ratings.

2) Travel Air has asked you to study flight delays during the week before the Christmas at Midway Airport. The random variable  $X$  is the number of flights delayed per hour.

$X$	0	1	2	3	4	5	6	7	8	9
$P(X)$	0.10	0.08	0.07	0.15	0.12	0.08	0.10	0.12	0.08	0.10

- a) What is the cumulative probability distribution?
- b) What is the probability of five or more delayed flights?
- c) What is the probability of three through seven (inclusive) delayed flights?

3) A professor teaches a large class and has scheduled an examination for 7:00 pm in a different classroom. She estimates the probabilities in the table for the number of students who will call her, in the hour before the examination, asking in which classroom it will be held.

Number of Calls	0	1	2	3	4	5
Probability	0.10	0.15	0.19	0.26	0.19	0.11

- a) What is the cumulative probability distribution?
- b) Find the mean and standard deviation of the number of calls.

4) A politician believes that 25% of all macroeconomists in senior positions will strongly support a proposal he wishes to advance. Suppose that this belief is correct and that five senior macroeconomists are approached at random.

- a) What is the probability that at least one of the five will strongly support the proposal?
- b) What is the probability that a majority of the five will strongly support the proposal?

5) The Cubs are to play a series of five games in St, Louis against the Cardinals. For any one game it is estimated that the probability of a Cubs win is 0.4. The outcomes of five games are independent of each other.

- a) What is the probability that the Cubs will win all five games?
- b) What is the probability that the Cubs will win a majority of the five games?
- c) If the Cubs win the first game, what is the probability that they will a majority of the five games?
- d) Before the series begins, what is the expected number of Cubs wins in these five games?

6) A family mutual funds maintains a service that allows clients to switch money among accounts through a telephone call. It was estimated that 3.2% of callers either gets a busy signal or are kept on hold so long that they may hang up. Fund management assesses any failure of this sort as a \$10 goodwill loss. Suppose that 2,000 calls are attempted over a particular period.

- a) Find the mean and standard deviation of the number of callers who will either get a busy signal or may hang up after being kept on hold
- b) Find the mean and standard deviation of the total goodwill loss to the mutual fund company from these 2,000 calls.

7) Records indicate that, on average, 3.2 breakdowns per day occur on an urban highway during the morning rush hour.

- a) Find the probability that on any given day there will be fewer than two breakdowns on this highway during the morning rush hour
- b) Find the probability that on any given day there will be more than four breakdowns on this highway during the rush hour

8) A professor receives, on average, 4.2 telephone calls from students the day before the exam. What is the probability of receiving at least three of these calls on such a day?

9) Explain briefly the following variables

- a) Random Variable
- b) Probability Distribution Function
- c) Cumulative Distribution Function