STAT 2910 SAMPLE MIDTERM

October 13, 2023

Chapter 4

Probability and Probability Distributions

1. An experiment involves tossing a single die. These are some events:

   A: Observe a 2

   B: Observe an even number

   C: Observe a number greater than 2

   D: Observe both A and B

   E: Observe A or B or both

   F: Observe both A and C

   Question Key

   a. List the simple events in the sample space

   b. List the simple events in each of the events A through F

   c. What probabilities should you assign to the simple events

   d. Calculate the probabilities of the six events by adding the appropriate simple-event probabilities

2. A sample space S consists of five simple events with these probabilities:

$$P(E_1) = P(E_2) = 0.15$$

$$P(E_3) = 0.4$$

$$P(E_4) = 2P(E_5)$$

Question Key

a. Find the probability for the simple events E_4 and E_5

b. Find the probabilities for these two events:

$$A = (E_1, E_3, E_4)$$

$$B = (E_2, E_3)$$

c. List the simple events that are either in event A or event B or both

d. List the simple events that are either in both event A and event B

3. A sample space contains 10 simple events: $E_1, E_2, ..., E_10$. If $P(E_1) = 3P(E_2) = 0.45$ and the remaining simple events are equiprobable, find the probabilities of these remaining simple events

4. A basketball player hits 70% of her free throws. When she tosses a pair of free throws, the four possible simple events and three of their associated probabilities are given in the following list:

Simple Events	Outcome1	Outcome2	Probability1
1	Hit	Hit	0.49
2	Hit	Miss	?
3	Miss	Hit	0.21
4	Miss	Miss	0.09