

Assignment 1, PME, 4th Semester, Spring

Deadline: Monday, 6 July 2020, 3 pm

Assignment should be hand written.

Write your name, registration No. and section; else your assignment may not be marked.

Copying is not allowed.

Properly staple your pages (binding is not required).

1. Let A , B , and C be events that cannot occur simultaneously as pairs or triplets, and let D be the event “ A or B or C occurs.” Show that

$$f_D(n) = f_A(n) + f_B(n) + f_C(n)$$

2. A fair dice is rolled thrice and the outcome of this experiment is recorded.
 - a. What is the size of the sample space for this experiment?
 - b. What is the probability that the sum of first and second outcomes is equal to the third outcome?
3. A number X is selected at random from the unit interval. Let the events A and B be:

$A = \text{“}X \text{ differs from } 1/2 \text{ by more than } 1/4\text{”}$

$B = \text{“}1 - X \text{ is less than } 1/2\text{.”}$

Find the events $A \cap B$, $A^c \cap B$, $A \cup B$.

4. Among seven cards numbered 1, 2, ..., 7, two are drawn with replacement. What is the probability that
 - a. Both cards are different?
 - b. Second card has a number larger than first card?
5. A team of 3 players has to be selected from among 9 players. What is the probability that two particular players will be included in the team?
6. An urn consists of 8 balls including 5 white balls and 3 black balls. 4 balls are drawn at random. What is the probability that exactly 2 balls are black?
7. A multiple choice test has 5 questions with 3 choices each. How many ways are there to answer the test? What is the probability that all answers are the same (e.g. 1, 1, 1, 1, 1)?
8. An urn contains 5 balls labeled 1, 2, ..., 5. From the urn, 6 balls are drawn with replacement and the numbers on the balls drawn are noted down on six tokens (a separate token for each draw). All six tokens are placed in a jar. What is the probability that all numbers on tokens in the jar are the same? Consider the case of sampling with replacement without ordering.