

**Problem 1**

Before the distribution of a certain software, a CD is picked, periodically, at random and tested for accuracy. The testing process consists of running four independent programs and checking the results. The failure rates for the four testing programs are, respectively, (failed test 1) 0.01, (failed test 2) 0.03, (failed test 3) 0.02 and (failed test 4) 0.01

- (a) What is the probability that a CD failed at least one test?
- (b) Find the probability that a CD failed program 2 or 3 or both.

**Hint:** Define events

- $F_1, F_2, F_3, F_4$  : Failed test 1, 2, 3, 4, respectively

**Problem 2**

If an experiment consists of drawing a letter at random from the English alphabet and then throwing a die, how many points are there in the sample space?

**Problem 3**

- (a) In a college basketball practice session, the coach needs to have 10 players standing in a row. Among these 10 players, there is one first year student, 2 second year students, 4 third year students and 3 fourth year students. How many ways can they be arranged in a row if only their class level will be distinguished?
- (b) An urn contains 1 red ball, 2 green balls and 3 blue balls. Suppose three balls are taken at random from the urn. What is the probability that one is red, one is green, and one is blue?
- (c) A shipment of 12 TVs contains 3 that are defective. In how many ways can a hotel purchase 5 of these sets and receive at least 2 of the defective sets? **Hint: receive 2 or 3 defective sets.**

**Problem 4**

How many ways are there to select 3 candidates from 8 equally qualified recent graduates for openings in an accounting firm?

- (a) If order matter
- (b) If order does not matter

**Problem 2**

We have a music CD collection consisting of 5 Jazz CDs, 2 classical CDs and 3 rock CDs. Suppose we randomly select 4 CDs from the collection. Let random variable  $X$  represent the number of jazz CDs selected.

- (a) What is the expression for the PMF of the number of jazz CDs selected?
- (b) Calculate the values of the PMF and put them in tabular form.
- (c) Sketch the PMF.
- (d) Determine and sketch the CDF of the number of jazz CDs selected.