

Exercise Set V.1

1. A manufacturing process results in 5% defective products. If we select 3 products from this manufacturing process and inspect them, what are the probabilities for the different numbers of defective products?
2. (5.5) According to Chemical Engineering Progress (Nov. 1990), approximately 30% of all pipe work failures in chemical plants are caused by operator error.
 - (a) What is the probability that out of the next 20 pipe work failures at least 10 are due to operator error?
 - (b) What is the probability that no more than 4 out of 20 such failures are due to operator error?
 - (c) Suppose, for a particular plant, that, out of the random sample of 20 such failures, exactly 5 are operational errors. Do you feel that the 30% figure stated above applies to this plant? Comment.

Exercise Set V.2

- 3 (5.10) A nationwide survey of seniors by the University of Michigan reveals that almost 70% disapprove of daily pot smoking, according to a report in Parade. If 12 seniors are selected at random and asked their opinion, find the probability that the number who disapprove of smoking pot daily is
- (a) anywhere from 7 to 9:
 - (b) at most 5;
 - (c) not less than 8.
- 4 (5.15) It is known that 60% of mice inoculated with a serum are protected from a certain disease. If 5 mice are inoculated, find the probability that
- (a) none contracts the disease;
 - (b) fewer than 2 contract the disease;
 - (c) more than 3 contract the disease.
- 5 (5.29) If 7 cards are dealt from an ordinary deck of 52 playing cards, what is the probability that
- (a) exactly 2 of them will be face cards?
 - (b) at least 1 of them will be a queen?

Exercise Set V.3

- 6 (5.31) A home-owner plants 6 bulbs selected at random from a box containing 5 tulip bulbs and 4 daffodil bulbs. What is the probability that he planted 2 daffodil bulbs and 4 tulip bulbs?
- 7 (5.45) A foreign student club lists as its members 2 Canadians, 3 Japanese, 5 Italians, and 2 Germans. If a committee of 4 is selected at random, find the probability that
- (a) all nationalities are represented;
 - (b) all nationalities except the Italians are represented.
- 8 (5.52) A scientist inoculates several mice, one at a time, with a disease germ until he finds 2 that have contracted the disease. If the probability of contracting the disease is $1/6$, what is the probability that 8 mice are required?
- 9 (5.59) A secretary makes 2 errors per page, on average. What is the probability that on the next page he or she will make
- (a) 4 or more errors?
 - (b) no errors?