Practice problems for Discrete Probability Distributions

Problem 1. In a certain city district the need for money to buy drugs is stated as the reason for 75% of all thefts. Find the probability that among the next 5 theft cases reported in this district,

(a) exactly 2 resulted from the need for money to buy drugs;

(b) at most 3 resulted form the need for money to buy drugs.

Problem 2. It is known that the percentage of wins for the Chicago Bulls basketball team going into the playoffs for the 1996-7 season was around 90%.

(a) What is the probability that the Bulls would sweep (4-0) in the initial best-of-7 playoff series?

(b) What is the probability that the initial best-of-7 playoff series will go to seven games?

(c) What very important assumption is made for answering parts (a) and (b)?

Problem 3. 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?

Problem 4. A nationwide survey of 17,000 seniors by the University of Michigan revealed that almost 70% disapprove of daily pot smoking. If 18 of these seniors are selected at random and asked their opinions, what is the probability that more than 9 but less than 14 disapprove of smoking pot?

Problem 5. A government task force suspects that some manufacturing companies are in violation of federal pollution laws with regard to dumping a certain type of product. Twenty firms are under suspicion but all cannot be inspected. Suppose that 3 of the firms are in violation.

(a) What is the probability that inspection of 5 firms finds no violations?

(b) What is the probability that the plan above will find two violations?

Problem 6. Suppose the probability is 0.8 that any given person will believe a tale about the transgressions of a famous actress. What is the probability that

(a) the sixth person to hear this tale is the fourth one to believe it?

(b) the third person to hear this tale is the first one to believe it?

Problem 7. Suppose that, on average, 1 person in 1000 makes a numerical error in preparing his or her income tax return. If 10,000 forms are selected at random and examined, find the probability that 6, 7 or 8 of the forms contain an error.

Problem 8. On average a certain intersection results in 3 traffic accidents per month. What is the probability that for any given month at this intersection

(a) exactly 5 accidents will occur?

(b) less than 3 accidents will occur?

(c) at least 2 accidents will occur?