GEOMETRIC

DIST^n

Nutty produces 200 000 jars of peanut butter for the promotion. To cover the costs of the promotion, Nutty increases the price on a jar by an amount equal to the expected prize money per jar. What is the price of the peanut butter during the promotion if it normally sells for $2.79 per jar?

7. From Canadian statistics based on the 1976 census, 18.8 percent of the population over the age of 15 has a secondary school graduation certificate. If a random survey is taken of 20 employed individuals, what is the probability that:
   (a) exactly three have a secondary school graduation certificate?
   (b) at least two have a graduation certificate?

8. A quality control inspector uses the rule that if in a random sample of ten products from a large batch, two or more are defective, then the batch is rejected. If the probability of a defective product in the production process is 0.03, what is the probability that a batch gets rejected?

9. A child removes the name cards on ten wrapped Christmas gifts of which six are for the Changs and four are for the Andersens. If the presents are distributed to the two families without reopening the packages,
   (a) what is the probability that the Changs get five of the presents originally intended for them?
   (b) what is the expected number of correct presents distributed to the Changs?

10. A fast-food outlet has 12 young employees, five of whom are female. If four of the employees are selected at random to work the counter rather than the hot kitchen, what is the probability that at least two of the girls are chosen?

11. The DJ of a local radio show conducts a contest in which the listeners phone in the answer to the contest question. If the DJ estimates that the probability of a caller giving the correct answer is 0.24,
   (a) what is the probability that the third caller is the winner?
   (b) what is the expected number of calls before a correct answer is received?

12. A lottery has 1 000 000 tickets and draws 100 tickets to award prizes. How many tickets would you expect to have to purchase before you would win a prize?

13. Lesley claims she can roll triples with three dice in fewer than 20 rolls?
   (a) What is the expected number of rolls that it would take to roll the first set of triples?
   (b) What is the probability that she will roll the triples in fewer than five rolls?

CHAPTER 6 TEST

HYPER GEO.

DIST⁻

1. Graph the given binomial probability distribution whose defining statement is

$$P(X=x) = \binom{n}{x} p^x q^{n-x} \quad \text{where } n=3, p=\tfrac{1}{4}$$

2. Show that the expectation of a uniform distribution of an experiment with n outcomes is given by

$$E(X) = \frac{1}{n}\left(\sum_x x\right)$$

3. A quiz is given to a Finite Mathematics class and each question requires one of these responses: true, false, or cannot tell from the given information. If the quiz has ten questions in it,
   (a) what is the probability that Mustafa will get exactly six questions correct if he merely guesses?
   (b) what is the probability that the first question he gets correct (by guessing) is the third question?
   (c) what is the expected number of correct questions that Mustafa will guess?

4. In a political science class, seven of the 18 students have strong socialist views. If a random selection of four of them is chosen to represent the class in a debate, what is the probability that
   (a) half of the debaters will be socialists?
   (b) none of the debaters will be socialists?
   (c) there will be a majority of socialists on the debating team?

5. One year the Department of Fisheries tagged 300 bass in a lake. The bass were released and given time to mix with the fish population of the lake. Then 200 bass were caught, of which 20 were found to be tagged. What is estimate of the size of the bass population in this lake?

6. Prove that the expectation of the binomial distribution is np.

PROBLEMS PLUS

In the seventeenth century, probability theory received a boost when a French nobleman, the Chevalier de Méré, asked Blaise Pascal to analyze some gambling problems. One problem involved obtaining repetitions in throws of dice. The chevalier believed it was equally likely to get at least one ''one'' with the roll of four dice as to get at least one ''double ones'' with 24 rolls of two dice.
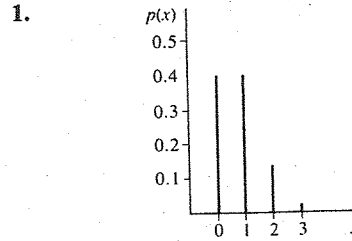(a) Find the true probabilities of each event.
(b) Why might he have thought the events to be equally likely?

(d)
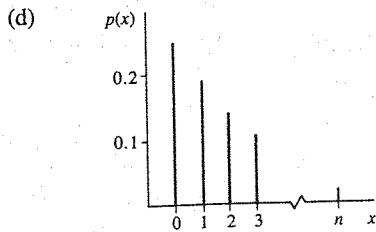
4. (a) $\frac{3}{4}$ (b) 12.96   **5.** $7.00   **6.** $3.39

7. (a) 0.220   (b) 0.912

8. 0.035   **9.** (a) $\frac{12}{105}$ (b) 3.6

10. 0.576   **11.** (a) 0.139   (b) 3

12. 9999   **13.** (a) 35   (b) 0.107

6.7 CHAPTER 6 TEST

1.

3. (a) 0.057   (b) $\frac{4}{27}$ (c) 3

4. (a) 0.377   (b) 0.108   (c) 0.412

5. 3000

CHAPTER 7 STATISTICS

REVIEW AND PREVIEW TO CHAPTER 7
EXERCISE 1
1. (a) 4.2   (b) 3.6   (c) 1   (d) 12   (e) 1.2

2. (a) 3   (b) 6   (c) 2

EXERCISE 2
1. (a) (i) 2   (ii) 6   (iii) $\frac{2}{3}$

2. (a) (i) 55 − 72   (ii) 43 − 57   (iv) 12 − 15
(v) 1985   (vi) less than   (vii) 4
(b) (i) 2.52 per 100 000
(ii) 1974, 1979, 1981, 1983, 1984
(iii) 64–66, 74–76, 77–80, 83–84
(iv) 1979   (v) increase
(c) (i) 3885   (ii) February, March   (iii) 36.3
(iv) 6   (v) August, July

EXERCISE 7.1
2. (i)

Age	Frequency	Relative Frequency	Relative Frequency %	Cumulative Frequency
12	15	$\frac{15}{570}$	2.6	15
13	25	$\frac{25}{570}$	4.4	40
14	123	$\frac{123}{570}$	21.6	163
15	136	$\frac{136}{570}$	23.9	299
16	101	$\frac{101}{570}$	17.7	400
17	87	$\frac{87}{570}$	15.3	487
18	71	$\frac{71}{570}$	12.4	558
19	12	$\frac{12}{570}$	2.1	570