

No.

## Chapter 5 C

- 1 The probability that a person living in a certain city owns a dog is estimated to be 20%. What is the probability that the 7th person interviewed randomly is the 3th to own a dog.

- 2 Demands for an item are a part of a Poisson process and are made on a warehouse 3 times per day. What is the probability that on a given day this item is requested:
- more than 4 times in a day?

- more than 4 times in 3 days ?

- 3 3 people toss a coin, with the odd man paying for coffee. If the coins all turn up the same they are tossed again. Find the probability that fewer than 3 tosses are needed.

Omit

The number of people tossing the coin is used to determine the probability, p

$$p(3 \text{ same}) = 2 \cdot (1/8) = 1/4$$

$$x \leq 2$$

$$k = 1$$

$$p = 0.25$$

$$P(X < 2) = \sum_{x=1}^{x=2} p q^{x-1}$$

$$= 0.25 \left\{ \begin{array}{ccc} x=1 & 2 & 3 \\ 0 & 1 & 2 \\ 75\% & 75\% & 0\% \end{array} \right\}$$

$$= 0.25 \{ 1.75 \} = \boxed{43.8\%}$$

- 4 The probability that test takers will pass on each trial is:  $p(\text{pass}) = 55\%$ . Assuming the probability does not increase with experience, find the probability that a test-taker will finally manage to pass:

a) On trial number 3 ?

b) Before trial number 3 ?

5 A secretary makes 1.2 errors per page on the average in a Poisson process. What is probability he will make:

a) 5 or more errors on 2 pages?

b) If there are no errors on 3 pages?

- 6 The probability is 58% that any given person will believe a particularly lame explanation for an embarrassing episode. What is the probability that the:
- a) 7th person to hear will be the 4th to believe?

- b) The 3rd person will be the first to believe?



8 Brakes for a model of automobile fail with a Poisson distribution at an annual rate of 4.4/yr.

a) What is the probability that  $\leq 6.6$  brakes will fail in one year ?

b) What is the probability that  $\geq 1$  brake will fail in 1 year ?

9 The number of customers arriving per hour is assumed to follow a Poisson distribution with a mean of 5/hr.

a) Find the probability of more than 8 customers arriving in 2 hrs.

b) What is expected (i.e., mean) number of customers during a 3 hr period?

10 The probability that a person dies when sick is 10%. Of the next 4000 people to get sick, what is the mean number that will die?

11 Copper wire has 1.7 flaws per mm. Assuming a Poisson distribution, what is the probability that:

a) 0 flaws occur in a wire that is 4 mm long?

b) What is the mean number of flaws in a mm length?

12 Considering traffic in emergency rooms. They cannot safely handle more than 12 patients in a given hour. Assuming patient arrivals follow a Poisson process, and the average patients in an hour is 7 :

a) What is the probability that in a given hour the staff will have too many to handle?

b) What is the probability that more than 20 patients will arrive in a 3 hr period?

- 13 Computer technology has produced an environment in which robots operate with the use of microprocessors. The probability that a robot fails during any 6 hr shift is 12%. What is the probability that a robot will operate at most 5 shifts before it fails?

1 4.92%

2

a) 8.4%

b) 94.5%

3 43.8%

a) 11.1%

b) 79.8%

5

a) 9.6%

b) 2.7%

6

a) 16.8%

b) 10.2%

7

a)

b)

c) 13.8%

8

a) 84.4%

b) 98.8%

9

a) 66.7%

b) 15

10      400

11

a) 0.11%

b) 10.2

12

a) 2.7%

b) 53%

13 53.6%