

## Discrete Probability Distributions

1. The probability that at least one computer is available at any time in an “Internet Café” is 0.75

a) You make 16 visits to the café. What is the probability that, on entry, at least one computer is available on exactly 10 occasions?

b) You make 30 visits to the café. Determine the probability that, on entry, a computer is available on 20 or more occasions.

2. A manufacturer of balloons produces 40 per cent that are oval and 60 per cent that are round. Packets of 20 balloons are assumed to contain random samples of balloons. Determine the probability that such a packet contains

a) an equal number of oval balloons and round balloons

b) fewer oval balloons than round balloons

3. The proportions of people with blood groups  $O$ ,  $A$ ,  $B$  and  $AB$  in a particular population are in the ratio 48:35:12:5 respectively.

Determine the probability that a random sample of 20 people from the population contains

a) exactly 10 with blood group  $O$

b) at most 2 with blood group  $AB$

c) at least 8 with blood group  $A$

4. A study undertaken by a certain hospital found that the number of patients,  $X$ , each month, contracting a particular virus can be modeled by a Poisson distribution with a mean of 1.5.

a) Calculate  $P(X = 2)$

b) Determine the probability that more than 4 patients will contract this virus in a given month.

c) Find the probability that at least 12 patients will contract this virus in a given 6-month period.

5. The number of telephone calls per day,  $X$ , received by Candice may be modelled by a Poisson distribution with mean 3.5.

The number of e-mails per day,  $Y$ , received by Candice may be modelled by a Poisson distribution with mean 6.0.

For any particular day, find:

a)  $P(X = 3)$

b)  $P(Y \geq 5)$

c)  $P(7 \leq Y \leq 10)$