1. A power supply unit for a computer component is assumed to follow an exponential distribution with a mean life of 1,400 hours. What is the probability that the component will:

   (a) fail in the first 700 hours?

   (b) survive more than 1,750 hours?

   (c) last between 1,050 hours and 1,750 hours?

2. Flaws occur in an LCD display at the rate of 0.5 per square mm. Calculate the probability that:

   (i) exactly 2 flaws will occur in a square mm section,

   (ii) exactly 3 flaws will occur in a 5 square mm section,

   (iii) 5 or more flaws will occur in a 10 square mm section.

3. The average lifespan of a PC monitor is 6 years. You may assume that the lifespan of monitors follows an exponential probability distribution.

   (i) What is the probability that the lifespan of the monitor will be at least 5 years?

   (ii) What is the probability that the lifespan of the monitor will not exceed 4 years?

   (iii) What is the probability of the lifespan being between 5 years and 7 years?

4. A machine is used to package bags of potato chips. Records of the packaging machine indicate that its fill weights are normally distributed with a mean of 455 grams per bag and a standard deviation of 10 grams.

   (i) What proportion of bags filled by this machine will contain more than 470 grams in the long run?

   (ii) What proportion of bags filled by this machine will contain less than 445 grams in the long run?

   (iii) What proportion of bags filled by this machine will be between 465 grams and 475 grams in the long run?

5. Telephone calls arrive at a switchboard at a rate of 30 per hour. Assume that the switchboard operators take 2 minutes to deal with a customer query. Calculate the following:

   (a) The probability of 2 or more calls arriving in any 4 minute period,

   (b) The probability of no phone calls arriving in a 4 minute period,

   (c) The probability of exactly three phone call arriving in a 10 minute period.

6. Under what circumstances is it appropriate to use the binomial distribution when calculating probabilities?

7. Flextronics supply PCB boards to Dell. You are a production manager with Dell. There is a constant probability of 0.01 that a board will be defective. You select 20 boards at random. What is the probability that:

(a) 0 boards will be defective

(b) 1 or more boards will be defective

(c) 2 or less boards will be defective

8. Flaws occur in an LCD display at the rate of 0.5 per square mm. Calculate the probability that:

   (a) exactly 2 flaws will occur in a square mm section

   (b) exactly 3 flaws will occur in a 5 square mm section

   (c) 5 or more flaws will occur in a 10 square mm section

9. There is a constant probability of 0.05 that the power supply in a server network will fail. You are required to calculate the probability that the power supply will fail the 4th time it is switched on.