1. Decide whether the experiment is a binomial experiment. If it is not explain why.
   (a) Rolling a die many times and observing the number of spots.
   (b) Rolling a die and observing the number obtained is even or odd.
   (c) Drawing 3 balls with replacement from a box that contains 10 balls, 6 of which are red and 4 blue, and observing the colors of the drawn balls.

2. Car color preferences change over the years and according to the particular model that the customer selects. In a recent year, suppose that 10% of all luxury cars sold were black. If 25 cars of that year and type are randomly selected, find the following probabilities:
   (a) At least 5 cars are black
   (b) At most 6 cars are black
   (c) More than 4 cars are black
   (d) Exactly 4 cars are black
   (e) Between 3 and 5 cars (inclusive) are black
   (f) More than 20 cars are not black

3. Forty percent of all families own two or more cars. Let x be the number of families in a random sample of 15 families who own two or more cars. Find the mean and standard deviation of the probability distribution of x.

4. A fabric contains on average 2.2 defects per 200 yards. Using Poisson probability distribution formula, find the probability that a given piece of 200 yards of this fabric will contain no defects.

5. An average of 0.8 accidents occurs per day in a large city.
   (a) Let x denotes the number of accidents that will occur in this city on a given day. Write the probability distribution of x.
   (b) Find the mean, variance, and standard deviation of the probability distribution developed in part (a).
   (c) Find the probability that no accident will occur in this city on a given day

6. We have 100 items of which 12 are defectives. What is the probability that in a sample of 10, three are defectives?
7. A company has five applicants for two positions, two women and three men. Suppose that the five applicants are equally qualified and that no preference is given for choosing either gender. Let \( x \) equal to the number of women chosen to fill the two positions.
   (a) Write the formula for \( p(x) \), the probability distribution of \( x \).
   (b) What are the mean and variance of probability distribution in (a)?
   (c) Find the probability that at most one the applicant is female.

8. Find the following probability for the standard normal distribution;
   (a) \( P(z < 2.14) \)  
   (b) \( P(0.67 \leq z \leq 2.49) \)  
   (c) \( P(-2.07 \leq z \leq -0.93) \)  
   (d) \( P(z > 1.78) \)

9. A normal random variable \( x \) has mean \( \mu = 10 \) and standard deviation \( \sigma = 2 \). Find the probabilities of these \( x \) values:
   (a) \( x > 13.5 \)  
   (b) \( x < 8.2 \)  
   (c) \( 9.4 < x < 10.6 \)

10. A normal variable \( x \) has an unknown mean \( \mu \) and standard deviation \( \sigma = 2 \). If the probability that \( x \) exceeds 7.5 is 0.8023, find \( \mu \).

11. CIMB Bank issues Visa and Master Card credit cards. It is estimated that the balances on all credit cards issued by the CIMB Bank have a mean of RM845 and a standard deviation of RM270. Assume that the balances on all these visa cards follow a normal distribution.
   (a) What is the probability that a randomly selected Visa card issued by this bank has a balance between RM1000 and RM1400?
   (b) What percentage of the Visa cards issued by this bank has a balance of RM750 or more?

12. A factory manufactures computer and 100 computers are packed in a box. The probability that a computer is defective is 0.005. Find the probability that there are 2 defective computers in a box.

13. Based on the previous semester, about 40% of the students who took subject MTH3003 got grade C. If 100 students are choosing at random, what is the probability that more than 30 students will get C?