1. Explain what is meant by random variables and the types of random variables.

2. The probability of a student passing an exam is 0.2. Ten students took the exam.

(a) What is the probability that at least two students passed the exam?

(b) What is the expected number of students who passed the exam?

(c) How many students must take the exam to make the probability at least 0.99 that a student will pass the exam?

3. Let X be a binomial random variable with parameters (12, 0.5). Find the variance and the standard deviation of X.

4. Calculate the variance for these final exam scores.

24, 58, 61, 67, 71, 73, 76, 79, 82, 83, 85, 87, 88, 88, 92, 93, 94, 97

5. The number of life insurance policies sold per day by a life insurance salesman is Poisson distributed. The salesman sells on the average 3 life insurance policies per week. We assume five working days per week. Calculate the probabilities that the salesman will sell

(a) One or more policies in a week.

(b) 2 or more policies but less than 5 policies in a week.

(c) One policy in a day.

6. The number of vehicles passing per minute through a junction on a busy road is Poisson distributed, with the average rate being 300 per hour.

(a) Find the probability that none passes in a given minute.

(b) What is the expected number of vehicles passing in two minutes?

7. You roll two fair dice. Find the probability that the first die is a 4 given that the sum is 7.

8. At a certain university, 4% of men are over 6 feet tall and 1% of women are over 6 feet tall. The total student population is divided in the ratio 3:2 in favour of women. If a student is selected at random from among all those over six feet tall, what is the probability that the student is a woman?