Binomial Distribution 1

1.

A factory produces light bulbs, and it is known that 90% of the bulbs meet quality standards. A random sample of 10 bulbs is selected for inspection.

(a) What is the probability that exactly 3 of the 10 bulbs meet the quality standards?

(b) Work out the probability that fewer than 4 bulbs in the sample meet the quality standards.

(c) Determine the probability that more than 5 bulbs in the sample meet the quality standards.

2.

A basketball player successfully scores a free throw 70% of the time. In a practice session, she takes 12 free throws.

(a) Find the probability that she scores exactly 8 of them.

(b) Calculate the probability that she scores no more than 6.

(c) What is the probability that she scores at least 10?

3.

A particular seed has a 60% chance of germinating. A gardener plants 15 seeds in identical conditions.

(a) Calculate the probability that exactly 9 seeds germinate.

(b) What is the probability that fewer than 5 seeds germinate?

(c) Work out the probability that more than 12 seeds germinate.

4.

A multiple-choice quiz contains 10 questions, each with 4 options and only one correct answer. A student guesses each answer randomly.

(a) Determine the probability that the student gets exactly 2 questions right.

(b) Calculate the probability that the student gets at most 3 questions right.

(c) Find the probability that the student gets at least 1 question right.

5.

A machine produces metal rods, and 95% of them are within the acceptable length range. 20 rods are selected at random.

(a) What is the probability that all 20 rods are within the acceptable range?

(b) Calculate the probability that fewer than 18 rods are acceptable.

(c) Determine the probability that at least 19 rods are acceptable.

6.

There is a 25% chance of a customer leaving a review after an online purchase. Out of 12 customers,

(a) Work out the probability that exactly 4 leave a review.

(b) Calculate the probability that fewer than 3 leave a review.

(c) What is the probability that more than 6 leave a review?

7.

A school reports that 85% of students travel to school by bus. On a particular day, 10 students are chosen at random.

(a) Find the probability that exactly 7 travel by bus.

(b) Determine the probability that at least 8 travel by bus.

(c) Calculate the probability that fewer than 6 travel by bus.

8.

In a certain town, there is a 30% chance of a household recycling food waste. A survey is conducted on 14 households.

(a) Calculate the probability that 5 or fewer households recycle food waste.

(b) What is the probability that more than 8 households recycle food waste?

(c) Determine the probability that exactly 7 households recycle food waste.

9.

A call centre worker successfully resolves 80% of incoming calls on the first attempt. On a busy day, they take 25 calls.

(a) Work out the probability that 20 calls are resolved on the first attempt.

(b) What is the probability that no more than 18 calls are resolved on the first attempt?

(c) Calculate the probability that at least 22 calls are resolved on the first attempt.

10.

A bakery finds that 10% of its loaves are slightly underweight. A quality inspector checks 30 loaves.

(a) Determine the probability that exactly 3 loaves are underweight.

(b) Find the probability that more than 4 loaves are underweight.

(c) Calculate the probability that no more than 2 loaves are underweight.