

Tutorial 5

Qn 1

In Hong Kong, criminal cases are tried usually with a 7 person jury. In a particular case, suppose that the jurors are independent and based on the evidence, each is inclined to give a verdict of “innocent” with a probability of 0.75 in a vote, what is the probability that the vote will be a majority verdict of “innocent”?

A majority verdict is 7 – 0, 6 – 1 or 5 – 2.

Qn 2

The following web site tests your typing speed: <https://www.typingtest.com/test.html>

Set up a probability model for the occurrence of mistyped words. What are your underlying assumptions?

Qn 3

Suppose the average number of accidents occurring weekly on a particular stretch of a highway equals 3. Calculate the probability that there is at least one accident this week.

Qn 4

Buses arrive at a specified stop at 15-minute intervals starting at 7 a.m. If a passenger arrives at the stop at a time that is uniformly distributed between 7 and 7:30, find the probability that he waits

- a) less than 5 minutes for a bus;
- b) at least 12 minutes for a bus

Qn 5

A tennis player has a probability of winning a tournament of 0.1. Assume that the probability of winning remain unchanged for each tournament.

- a) What is the probability that he wins 5 tournament titles after playing 20 tournaments?
- b) What is the probability that he wins the 5th tournament title at the 20th tournament he enters?
- c) How many matches is he expected to play before winning 5 tournaments?

Qn 6

A buyer of components buys them in lots of size 100. It is his policy to inspect 3 components randomly from a lot and to accept the lot only if all 3 are non-defective. Suppose the manufacturing process has some systematic error such that in every lot, there is 1 defective component, what proportion of lots does the buyer reject?