

This homework runs from Thursday 31 October 2024 until 12 noon on Thursday 7 November 2024. Submission is to Gradescope Homework 4.

You should aim to write out solutions that someone who does not already know the answer could follow and understand. **Just writing down an answer will not get you any marks.**

Please remember the good scholarly practice requirements of the University regarding work for credit. You can find guidance at the School page <https://web.inf.ed.ac.uk/infweb/admin/policies/academic-misconduct>. This also has links to the relevant University pages.

Question 1

- (a) In how many ways can the letters of the word INFORMATION be arranged?

Note: you may leave factorials in your answer

[1 mark]

- (b) If the letters of the word MEMORANDUM are arranged in a random sequence, what is the probability that the arrangement begins with MMM?

[1 mark]

Question 2

Four sim cards are taken at random from a box of 9 sim cards and inspected as a quality assurance test in a factory.

- (a) How many possible selections of the four sim cards are there?

The box is rejected if **more than 1 sim card** in the four that are selected is found to fail automated tests which makes the sim card poor quality.

- (b) If the box actually has 3 poor quality sim cards, find the probability that the box is accepted.

[3 marks]

Question 3

Two whiteboard pens are drawn at random without replacement from a box containing 4 red pens and 6 black pens.

Let X be the random variable “the number of red pens drawn”.

- (a) Fill in the probability distribution for X in the table.

x	0	1	2
$P(X = x)$			

Work out

- (b) the expected number of red pens $E(X)$
(c) the standard deviation of X .

[5 marks]