

CAMBRIDGE A LEVEL PROGRAMME
AS TRIAL EXAMINATION MARCH/APRIL 2008
(July 2007 Intake)

Wednesday

2 April 2008

1.30 pm – 2.45 pm

MATHEMATICS

9709/6

PAPER 6 Probability & Statistics 1 (S1)

1 hour 15 minutes

Additional materials: Answer Booklet/Paper
Graph Paper
List of formulae (MF9)

READ THESE INSTRUCTIONS FIRST

If you have been given an Answer Booklet, follow the instructions on the front cover of the Booklet.
Write your name and class on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use a soft pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** the questions.

Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.
At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

The total marks for this paper is 50.

Questions carrying smaller numbers of marks are printed earlier in the paper, and questions carrying larger numbers of marks later in the paper.

The use of an electronic calculator is expected, where appropriate.

You are reminded of the need for clear presentation in your answers.

This document consists of 3 printed pages.

1. In how many ways can the letters of the words

a) TSUNAMI
b) ANALYSIS'
be arranged?

[2]

[2]

2. The table below shows the number of cars owned by families in Subang Jaya.

Number of cars	0	1	2	3	4	5	6
Number of families	4	6	13	10	5	3	5

a) Find the median number of cars owned by each family in Subang Jaya.

[2]

b) Find the interquartile range of number of cars owned by each family in Subang Jaya.

[3]

3. Potatoes are packed in sacks which it is claimed contain 25kg. In fact the mean mass of the sacks is 25.14kg with a standard deviation of 0.15kg. You may assume that the masses are normally distributed. A sack of potatoes is considered underweight if its mass is less than 25kg.

a) Calculate the proportion of sacks which are underweight.

[3]

b) Assuming that standard deviation remains unchanged calculate, correct to 2 decimal places, to what value must the mean be adjusted if only 5% of the potato sacks are allowed to be underweight?

[3]

4. A discrete random variable X takes the values 0, 1 and 2 with probabilities a , b , and c respectively. If expectation and variance of X are $4/3$ and $5/9$ respectively, find the values of a , b , and c .

[7]

5. In a game, a turn involves rolling two fair dice. Each dice having faces marked 0, 1, 2, 3, 4, and 5. The score for each turn is obtained by multiplying the two numbers uppermost on the dice.

a) What is the probability of scoring zero on the first turn?

[2]

b) What is the probability of scoring 15 or more on the first turn?

[2]

c) What is the probability that the sum of the score on the first two turns is exactly 40?

[4]

6. The number of errors, x , on each of 200 pages of a typescript was monitored. The results when summarized showed that $\sum x = 920$ and $\sum x^2 = 5032$.

a) Calculate the mean and standard deviation of the number of errors per page.

[3]

b) A further 50 pages were monitored and it was found that the mean was 4.4 errors and the standard deviation was 2.2 errors per page. Find the mean and standard deviation of the number of errors per page for the 250 pages.

[6]

7. A farmer uses a machine to dig up potatoes and the probability that a potato will be damaged by the machine is 0.1.
- a) Find the probability that a random selection of 12 potatoes will include 3 damaged potatoes. [3]
- b) A random sample of n potatoes is selected. Let X be the random variable representing the number of damaged potatoes from this selection.
- i) Write down, in terms of n , the mean and standard deviation of X . [2]
- ii) Use the normal approximation to show that for $P(X \geq 3)$ to exceed 0.95, the sample size, n , must satisfy the (approximate) inequality $n - 25 > 4.935\sqrt{n}$. Hence show that the smallest value of n is 65. [6]