MATHEMATICS **9709/06**

Paper 6 Probability & Statistics 1 **(S1)** **October/November 2008**

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 Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

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.

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

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

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 number of 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.

This document consists of **3** printed pages and **1** blank page.

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1 Rachel measured the lengths in millimetres of some of the leaves on a tree. Her results are recorded below.

$$32 \quad 35 \quad 45 \quad 37 \quad 38 \quad 44 \quad 33 \quad 39 \quad 36 \quad 45$$

Find the mean and standard deviation of the lengths of these leaves. [3]

2 On a production line making toys, the probability of any toy being faulty is 0.08. A random sample of 200 toys is checked. Use a suitable approximation to find the probability that there are at least 15 faulty toys. [5]

3 **(i)** The daily minimum temperature in degrees Celsius (°C) in January in Ottawa is a random variable with distribution N(−15.1, 62.0). Find the probability that a randomly chosen day in January in Ottawa has a minimum temperature above 0 °C. [3]

(ii) In another city the daily minimum temperature in °C in January is a random variable with distribution N(μ, 40.0). In this city the probability that a randomly chosen day in January has a minimum temperature above 0 °C is 0.8888. Find the value of μ. [3]

4 A builder is planning to build 12 houses along one side of a road. He will build 2 houses in style *A*, 2 houses in style *B*, 3 houses in style *C*, 4 houses in style *D* and 1 house in style *E*.

(i) Find the number of possible arrangements of these 12 houses. [2]

(ii)
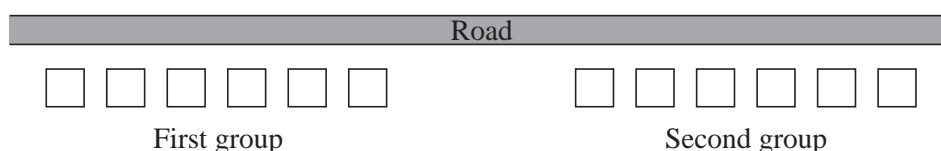
The 12 houses will be in two groups of 6 (see diagram). Find the number of possible arrangements if all the houses in styles *A* and *D* are in the first group and all the houses in styles *B*, *C* and *E* are in the second group. [3]

(iii) Four of the 12 houses will be selected for a survey. Exactly one house must be in style *B* and exactly one house in style *C*. Find the number of ways in which these four houses can be selected. [2]

5 The pulse rates, in beats per minute, of a random sample of 15 small animals are shown in the following table.

$$
\begin{array}{ccccc}
115 & 120 & 158 & 132 & 125 \\
104 & 142 & 160 & 145 & 104 \\
162 & 117 & 109 & 124 & 134 \\
\end{array}
$$

(i) Draw a stem-and-leaf diagram to represent the data. [3]

(ii) Find the median and the quartiles. [2]

(iii) On graph paper, using a scale of 2 cm to represent 10 beats per minute, draw a box-and-whisker plot of the data. [3]

6 There are three sets of traffic lights on Karinne's journey to work. The independent probabilities that Karinne has to stop at the first, second and third set of lights are 0.4, 0.8 and 0.3 respectively.

  (i) Draw a tree diagram to show this information. [2]

 (ii) Find the probability that Karinne has to stop at each of the first two sets of lights but does not have to stop at the third set. [2]

(iii) Find the probability that Karinne has to stop at exactly two of the three sets of lights. [3]

(iv) Find the probability that Karinne has to stop at the first set of lights, given that she has to stop at exactly two sets of lights. [3]

7 A fair die has one face numbered 1, one face numbered 3, two faces numbered 5 and two faces numbered 6.

  (i) Find the probability of obtaining at least 7 odd numbers in 8 throws of the die. [4]

The die is thrown twice. Let X be the sum of the two scores. The following table shows the possible values of X.

		Second throw					
		1	3	5	5	6	6
	1	2	4	6	6	7	7
	3	4	6	8	8	9	9
First	5	6	8	10	10	11	11
throw	5	6	8	10	10	11	11
	6	7	9	11	11	12	12
	6	7	9	11	11	12	12

 (ii) Draw up a table showing the probability distribution of X. [3]

(iii) Calculate $E(X)$. [2]

(iv) Find the probability that X is greater than $E(X)$. [2]

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