Mock Exam 2

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

MATHEMATICS 9709

Paper 5 Probability & Statistics 1

1 hour 15 minutes

You must answer on the question paper.

You will need: List of formulae (MF19)

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- If additional space is needed, you should use the lined page at the end of this booklet; the question number or numbers must be clearly shown.
- You should use a calculator where appropriate.
- You must show all necessary working clearly; no marks will be given for unsupported answers from a calculator.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.

INFORMATION

- The total mark for this paper is **55**.
- The number of marks for each question or part question is shown in brackets [ ].

1 The salaries, in thousands of dollars, of 11 people, chosen at random in a certain office, were found to be:

$$40, \quad 42, \quad 45, \quad 41, \quad 352, \quad 40, \quad 50, \quad 48, \quad 51, \quad 49, \quad 47.$$

Choose and calculate an appropriate measure of central tendency (mean, mode or median) to summarise these salaries. Explain briefly why the other measures are not suitable. [3]

2 **(a)** The random variable X is normally distributed. The mean is twice the standard deviation. It is given that $P(X > 5.2) = 0.9$. Find the standard deviation. [4]

(b) A normal distribution has mean μ and standard deviation σ. If 800 observations are taken from this distribution, how many would you expect to be between $\mu - \sigma$ and $\mu + \sigma$? [3]

3 Each father in a random sample of fathers was asked how old he was when his first child was born. The following histogram represents the information.
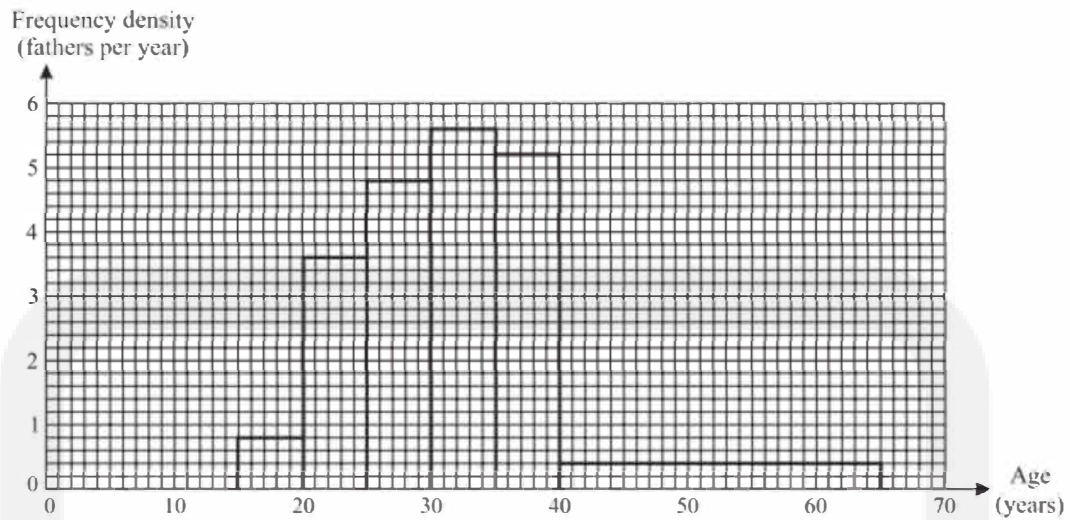
(i) What is the modal age group? [1]

(ii) How many fathers were between 25 and 30 years old when their first child was born? [2]

(iii) How many fathers were in the sample? [2]

(iv) Find the probability that a father, chosen at random from the group, was between 25 and 30 years old when his first child was born, given that he was older than 25 years. [2]

4 **(i)** Find the number of different ways that a set of 10 different mugs can be shared between Lucy and Monica if each receives an odd number of mugs. [3]

(ii) Another set consists of 6 plastic mugs each of a different design and 3 china mugs each of a different design. Find in how many ways these 9 mugs can be arranged in a row if the china mugs are all separated from each other. [3]

(iii) Another set consists of 3 identical red mugs, 4 identical blue mugs and 7 identical yellow mugs. These 14 mugs are placed in a row. Find how many different arrangements of the colours are possible if the red mugs are kept together. [3]

5 **(a)** Find how many numbers between 5000 and 6000 can be formed from the digits 1, 2, 3, 4, 5 and 6

      (i) if no digits are repeated, [2]

      (ii) if repeated digits are allowed. [2]

(b) Find the number of ways of choosing a school team of 5 pupils from 6 boys and 8 girls

      (i) if there are more girls than boys in the team, [4]

      (ii) if three of the boys are cousins and are either all in the team or all not in the team. [3]

6 In the holidays Martin spends 25% of the day playing computer games. Martin's friend phones him once a day at a randomly chosen time.

   (i) Find the probability that, in one holiday period of 8 days, there are exactly 2 days on which Martin is playing computer games when his friend phones. [2]

   (ii) Another holiday period lasts for 12 days. State with a reason whether it is appropriate to use a normal approximation to find the probability that there are fewer than 7 days on which Martin is playing computer games when his friend phones. [1]

   (iii) Find the probability that there are at least 13 days of a 40-day holiday period on which Martin is playing computer games when his friend phones. [5]

7 The probability that Sue completes a Sudoku puzzle correctly is 0.75.

(i) Sue attempts n Sudoku puzzles. Find the least value of n for which the probability that she completes all n puzzles correctly is less than 0.06. [3]

Sue attempts 14 Sudoku puzzles every month. The number that she completes successfully is denoted by X.

(ii) Find the value of X that has the highest probability. You may assume that this value is one of the two values closest to the mean of X. [3]

(iii) Find the probability that in exactly 3 of the next 5 months Sue completes more than 11 Sudoku puzzles correctly. [5]