

# **MAT3377**

**Mid-Term**

**Oct 28, 1999**

Time: 100 minutes

**Calculators are permitted. Test is open book.**

Make sure you have all 4 questions. Answer questions in the space provided for each question.

First Name:

Family Name:

Student number:

Total Mark: 25

1. [6] Assume that tests were carried out on the deflation time of 40 airbags produced by GM. They are classified as follows:

Time (seconds)	Frequency
0.8-0.85	4
0.85-0.9	7
0.9-0.95	9
0.95-1.0	11
1.0-1.05	5
1.05-1.1	4

Following the cum  $\sqrt{f}$  method determine the strata with  $L = 4$ .

2. [10] In a stratified sampling with two strata and the cost function

$$C = 5000 + 2n_1 + 2.2n_2$$

we have

$i$	$N_i$	$S_i$
1	1200	10
2	1300	14

(i) With a total cost of \$12000 how many sample can we have in this case by using the optimum allocation.

(ii) Find an appropriate size  $n$  and stratum sample sizes  $n_1$  and  $n_2$  if we desire to estimate the population mean with a bound on the error of estimation 2 by assuming  $c_1 = c_2$ .

3. [9] A simple random sample of size 15 households was drawn from a city containing 25,000 households. The number of people per household as follows

4, 3, 5, 6, 4, 7, 3, 2, 1, 6, 4, 3, 2, 3, 5.

(a) Estimate the population of that city and place a bound for your estimate

(b) Estimate the total number of households with at least three people in each household and place a bound on your estimate.