



Foundation Certificate in Marketing - Stage 1

MARKETING INFORMATION ANALYSIS I

FRIDAY, AUGUST 20, 2004. TIME: 2.00 pm - 5.00 pm

Please attempt **FIVE** questions.

(If more than the specified number of questions are attempted, delete those you do not wish to have marked. Otherwise the Examiner will mark the **FIRST** five questions in your Answer Book).

All questions carry equal marks.

Do **NOT** repeat question in answer, but show clearly the number of the question attempted on the appropriate page of the Answer Book.

1. (a) The Quarterly National Household Survey for June 2003, which is based on a national sample of 39,000, reported that 42% of all Irish households had a home computer. Calculate the lower limit of a 99% confidence interval for the actual number of such households, if there are 1.288 million households in the country. (10 marks)
- (b) A researcher wishes to estimate household spending on the purchase of food away from home and wants this to be at 95% confidence. An investigation elsewhere showed the mean to be €900 with a standard deviation of €100. What sample size is required if the precision of the population mean is required to be within $\pm \text{€}$? (10 marks)
2. The following data relate to the monthly bills from a random sample of consumers who hold mobile phone accounts:

126	96	23	39	47	56	60	71	53	80
137	62	56	65	54	49	87	57	92	130
83	88	42	59	74	82	34	85	45	54
122	53	37	59	103	64	52	61	56	82
36	78	70	39	57	67	47	41	74	58
19	71	51	35	68	71	121	73	64	41
48	56	48	52	81	42	124	69	58	26
66	63	54	59	68	123	152	96	70	83

 - (a) Show this distribution by means of a histogram. (5 marks)
 - (b) Calculate the median for the sample. (5 marks)
 - (c) Of the 16,500 names listed on a database, 5,000 have not made a purchase in the past year, 4,500 have made one purchase, 3,300 have made two purchases, 2,500 have made three purchases and the balance have each made an average of 5 purchases. Calculate the mean and the standard deviation. (10 marks)

3. (a) Calculate whether or not money wages have risen more than the rate of inflation?

	2000	2001	2002	2003
Money wages index (2000 = 100)	100	105	110	115
Consumer Price Index (1990=100)	180	190	200	210

(5 marks)

- (b) Describe how the Consumer Price Index is calculated by the Central Statistics Office in Ireland, indicating the problems involved. (10 marks)
- (c) Briefly describe two industrial or business uses of index numbers. (5 marks)

4. The value of annual sales of a particular product (€000) are shown below.

Sales (€000)

YEAR	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TOTAL	2,626	2,904	3,981	4,629	4,736	5,296	5,848	6,453	6,994	7,534	7,835	9,010

- (a) Calculate the trend. (10 marks)
- (b) Assuming that past patterns continue, calculate a forecast of sales for 2004 and 2005. (5 marks)
- (c) Chart the original data and the trend on the same graph. (5 marks)
5. (a) The expenditure on security in thousands of euro (X) and the value of thefts in hundreds of thousands of euro (Y) from a chain of clothes stores are shown in the table.

X (€000)	100	150	160	10	40	60	180	120	140	70
Y (€00,000)	50	20	10	90	70	80	10	50	50	60

Use a least squares regression line to estimate the expected value of thefts if the expenditure on security is set at €10,000. (10 marks)

- (b) Draw a scatter diagram of about 10 points to illustrate the following degrees of linear association :-
- (i) perfect negative correlation
- (ii) $r = -0.09$ (4 marks)
- (c) Explain the meaning of the term “multiple regression”. Why do statisticians use it? (6 marks)

6. (a) A committee of three officers is to be chosen from a group of 7 elected members. What is the total number of different committees that can be selected, if account must be taken of who is to be appointed as President, Secretary and Treasurer? (5 marks)
- (b) Suppose that the probability of getting through to an agent within a half minute is 0.4 when using a particular customer help-line. If a customer makes 5 random calls to the help-line, what is the probability that the call is never answered within half a minute? (5 marks)
- (c) Data relating to the call-out time within a city for an emergency IT service showed that technical support arrived within a mean of 3 hours with a standard deviation of 50 minutes. What percentage of emergencies are not attended to within four and a half hours? (5 marks)
- (d) Use of an ambulance followed a Poisson distribution with a mean of 1 call per hour. What is the probability that there will be more than 1 call in a particular hour? (5 marks)
7. (a) In a sample of 2000 households in Ireland, access to the internet was found in 40% of homes, while in the UK another sample of 1500 showed that 570 had such access. Use a suitable hypothesis test at the 5% level to determine whether or not this difference is statistically significant. (10 marks)
- (b) A recent report contains the following data.
- | Age Group | Favour electronic voting | |
|-------------|--------------------------|-----|
| | Yes | No |
| 15-24 | 174 | 226 |
| 25-54 | 298 | 702 |
| 55 and over | 162 | 438 |
- (i) Calculate a 95% confidence interval for the overall percentage that favour electronic voting. (2 marks)
- (ii) Conduct a formal hypothesis test to determine whether or not these figures indicate a statistically significant difference in opinion across the various age groups (8 marks)
8. Design a research programme to investigate the behaviour and attitudes of Irish adults to the ban on smoking in pubs and other designated places. (20 marks)