7

SAMPLING AND INTERVALS

QUESTION 1.

The reasons why samples are used a great deal in statistics are:

Samples are more reliable than the population	True/False/Not sure
Samples are easy to get	True/False/Not sure
Samples are error free	True/False/Not sure
Samples can provide all the needed information	True/False/Not sure
All samples are taken from the entire population	True/False/Not sure

QUESTION 2.

Each possible simple random sample of size n from a _____ population of size N has an _____ _____ of being selected.

QUESTION 3.

List and explain three methods of simple random sampling.

Method	Explanation
1)	
2)	
3)	

QUESTION 4.

Explain the following two terms:

Sampling with replacement means Sampling without replacement means	

QUESTION 5.

The following equation is used to calculate the standard deviation of $\bar{x}$ of a finite population:

$$\sigma_{\bar{x}} = \sqrt{\frac{N-n}{N-1}}\left(\frac{\sigma}{\sqrt{n}}\right)$$

If my sample size is less than 5% of the population, I can use the formula formula for a _____ population which is $\sigma_{\bar{x}} = \left(\frac{?}{?}\right)$.

QUESTION 6.

The point estimate for the amount of money people spend on make-up is £ 15.98 based on a sample of 300 shoppers. The standard deviation is 8.979. The null hypothesis is that the mean amount spent is £20 and the alternative is that it is not.

Calculate the test statistic (Z) Give an interpretation of the result Would you accept or reject the null hypothesis?	

QUESTION 7.

The confidence interval estimate is the term used to indicate the _____ above and below a _____ which we are confident the population parameter lies within.

QUESTION 8.

You are the Technical Director for a car manufacturing company. One of your suppliers has told you they have developed a headlight which they claim has a longer lifetime than a standard one. The downside, as far as you are concerned, is that it is more expensive.

A standard headlight has a mean lifetime of 2500 hours and the testing of a sample of 15 new headlights, gives a mean of 2836.93 and a standard deviation of 266.11.

The null hypothesis is	
The alternative hypothesis is	
The number of degrees of freedom is	
The lower 95% confidence limit is	
The upper 95% confidence is	
The p-value is	

The results show the null hypothesis should be _____.

QUESTION 9.

State the four possible ways of determining the planning value.

1	
2	
3	
4	

MINI PROJECT

A recent survey asked business travellers who frequently fly, what were the most important factors when they chose an airline. Schedules and cost were deemed important but the most important factor for this group of people seemed to be an airline's frequent flyer programme. This information was gathered from a sample of 1993 business travellers, 668 of whom stated a frequent flyer programme was the most important factor.

As a business analyst for a travel company specialising in providing travel for business people, you need to be confident that this information truly reflects the business community's attitude towards airlines.

You have been asked to produce a report for your Marketing Director on the possibility of using this information in a marketing campaign. In order to produce the report you would like to be at least 95% (preferably 99%) confident in the validity of the frequent flyer programme statement.

For your report you need to decide upon and develop confidence interval estimates and calculate sample sizes for the different margins of errors. The final part should be a recommendation, based on specific margins of errors as to your confidence that the statement is not misleading. You should also recommend an acceptable degree of precision given the size, and hence, cost of conducting another survey.

And finally...

Is it safe to assume that you can be 95% confident that the α male is the leader of the pack?