

Wedlock council is responsible for three villages: Lower Wedlock, Middle Wedlock and Upper Wedlock. A recent census has shown that the adult populations of the three villages are as in the table.

	Male	Female
Lower Wedlock	254	327
Middle Wedlock	844	897
Upper Wedlock	1185	1243

The council has to consider a proposal for a supermarket to be built somewhere near the three villages and wishes to discover the opinions of the residents.

- (a) Other than bias introduced by the difference in the sizes of the populations of the three villages, give a reason why a questionnaire delivered to each household would be likely to give a biased view of the residents' opinions.

[1 mark]

- (b) The council considers conducting interviews with a sample of 80 residents to determine their opinions. The electoral register, which lists the residents of the three villages separately by household, would be used as the sampling frame.

- (i) Describe, in detail, how the table of random numbers in the booklet of formulae and statistical tables (Table 13) could be used to select the sample of 80 residents from the electoral register.

[4 marks]

- (ii) Explain why a random sample from this register may not provide a representative view of the residents' opinions.

[1 mark]

- (iii) Explain why a sample selected systematically from this register may be more representative than a random sample, but may not be completely representative.

[2 marks]

- (c) In fact, the council decides to conduct interviews with a stratified sample of 80 residents, reflecting the proportions of males and females and the populations of the three villages. The sample will be collected by quota sampling of residents as they visit the post office in each village.

Describe, in detail, how this sample could be chosen, including the numbers of residents in the various quotas.

[5 marks]

JUNE 2016

Padraig is a student investigating the effects of running, on people who do not exercise regularly but are taking part in a fun run organised by 12 charities. He plans to select a sample of 40 runners out of 2000 taking part.

The organisers have given Padraig a list of the runners, numbered from 0001 to 2000, and stating the charity supported by each runner.

Padraig plans to measure the pulse rate of each person in his sample at the end of the run. He wants to investigate how the pulse rate is associated with the sex and age of the runner.

- (a) Explain why the list given to Padraig is insufficient to allow him to select a sample stratified to help his investigation.

[2 marks]

- (b) (i) Explain how Padraig could use the numbers on the list to select a simple random sample.

- (ii) State, in this context, one practical disadvantage of using this sampling method to collect his data.

[4 marks]

- (c) Padraig considers selecting his sample of 40 systematically from the runners in the order that they finish the run.

- (i) Explain in detail how Padraig would do this.

- (ii) State, in this context, one advantage and one disadvantage of using this sampling method to collect his data, compared to using a random sample.

[4 marks]

- (d) Runners from each charity taking part will wear T-shirts with the name of their charity clearly printed on the front and back. Padraig decides to obtain his sample by selecting 4 charities at random and then selecting 10 runners who finish the run from each of those charities.

- (i) Name this method of sampling.

- (ii) State, in this context, one advantage and one disadvantage of using this sampling method to collect his data, compared to using a sample selected systematically.

[3 marks]

JUNE 2018

Bronwyn wants to conduct a survey of a sample of 50 pupils in her school in order to collect information about the ways they travel to school. She plans to use a stratified sample to reflect the proportions of boys and girls and also the number of pupils in each year.

The data for the whole school are given in Table 1.

Table 1

	Year 7	Year 8	Year 9	Year 10	Year 11
Boys	66	71	75	84	87
Girls	61	72	75	80	79

- (a) Calculate the numbers of boys and girls from each year that Bronwyn should have in her sample and enter them in Table 2, below.

[4 marks]

- (b) Bronwyn plans to use systematic sampling to select her sample of pupils from each year. She can produce, on the school computer system, a list of the pupils by year which also identifies them as boy or girl.

For Year 9:

- (i) state how the list should be arranged so that the systematic sample will be stratified for gender;

- (ii) describe in detail how Bronwyn selects the pupils to be in her sample.

[4 marks]

- (c) Bronwyn might have chosen to select her sample using quota sampling of pupils as they arrive at school.

Give one advantage and one disadvantage of quota sampling in the context of this question.

[2 marks]

JUNE 2014

A gym has 800 members, of whom 460 are men and 340 are women. Half of the men are under 30 years old and 55 per cent of the women are under 30 years old.

The manager, James, wants to survey a sample of 80 gym members to find out what developments they think the gym should undertake.

James considers three options for how he might obtain his sample.

- (a) In Option 1, James will calculate, for each combination of age and sex, the number for his sample that is in proportion to the corresponding age and sex for gym members. He will then select gym members at random, until he has the required numbers for his survey.

[1 mark]

- (i) Name this sampling method.

- (ii) For each combination of age and sex, calculate the number of gym members that James should have in his sample.

[3 marks]

- (b) In Option 2, James will wait in the gym cafeteria and select groups of gym members there until 80 have been selected.

- (i) Name this sampling method.

[1 mark]

- (ii) State one advantage and one disadvantage of Option 2 compared with Option 1.

[2 marks]

JUNE 2017

Random Sampling

A random sample of size n is a sample selected in such a way that all possible samples of size n have an _____ of being chosen.

A random sample chosen without replacement is called a _____ random sample.

A random sample chosen with replacement is called an _____ random sample

Examiners look for 4 things in your answer to 'how to find a random sample of x from a population of n '

1)

2)

3)

4)

Sampling

The _____ is everyone or everything that could possibly be tested in the investigation The purpose of sampling is to obtain information about a _____ by examining only a part of it

Snowball Sampling

A snowball sample is obtained when members of the sample _____ new sample members into the sample.

It is used when it is _____ to locate members of the population of interest.

Stratified Sampling

A stratified sample requires prior knowledge to be used to divide the _____ into strata _____ samples are then taken from each of these strata, usually in proportion to the size of each strata

To calculate the number needed for each strata in the sample:

X

Examiners look for 6 things in your answer to 'how to find a stratified sample of x from population of n '

A)

1)

2)

3)

4)

B)

Quota Sampling

A quota sample is similar to a _____ sample BUT the samples from each of the strata are chosen for _____ and there is no attempt at random sampling

SAMPLING
METHODS
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Judgmental Sampling

A judgemental sample is obtained when members of the population are selected according to _____ based on the judgement of the _____

Systematic Sampling

In a systematic sample, members of the population are chosen at _____

To decide on what the 'regular interval' should be you divide the total by the number you want in the sample

To select the regular interval:

÷

Examiners look for 4 things in your answer to 'how to find a systematic sample of x from a population of n '

A)

1)

2)

3)

Cluster Sampling

A cluster sample uses randomly chosen clusters of the _____

Examiners look for 4 things in your answer to 'how to find a cluster sample of x from a population of n '

1)

2)

3)

4)

Advantages / Disadvantages

Complete the table below with one advantage and one disadvantage of each sampling method

Sampling Method	Advantage	Disadvantage
Simple Random Sampling		
Stratified Sampling		
Systematic Sampling		
Cluster Sampling		
Judgemental Sampling		
Snowball Sampling		