



S06-30min Sampling Methods: 30-minute Pack

EDEXCEL 1ST0 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Cranmoor Tennis Club has 60 members, numbered 1 to 60 in the membership register. The club wants to select a simple random sample of 8 members to ask about a new clubhouse.

(a) Describe a method the club could use to select a simple random sample of 8 members. (3)

(b) Explain what is meant by a random sample. (2)

(Total for Question 1 is 5 marks)

-
- 2** A researcher numbers all 250 members of a gym from 1 to 250 and uses a random number generator to select 20 members, so that every member has an equal chance of being chosen. Name this sampling method.

(Total for Question 2 is 1 mark)

-
- 3** Write down whether the following statement is True or False.
In systematic sampling, the sampling interval is found by dividing the population size by the desired sample size.

(Total for Question 3 is 1 mark)

- 4** A quality inspector checks every 25th item that comes off a production line. Name this sampling method.

(Total for Question 4 is 1 mark)

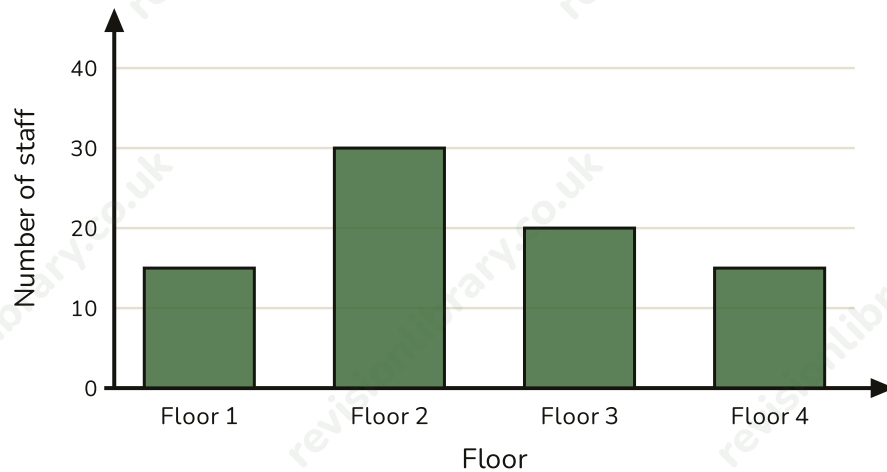
- 5** A market researcher stands outside a train station and asks the first 30 people who walk past to complete a survey. Name this sampling method.

(Total for Question 5 is 1 mark)

- 6** Write down whether the following statement is True or False.
A sampling frame is a list of every member of the population from which a sample can be drawn.

(Total for Question 6 is 1 mark)

- 7 An office building has staff working across 4 floors. The bar chart shows the number of staff working on each floor.



- (a) Write down the number of staff working on Floor 3. (1)
-
- (b) Work out the total number of staff working in the whole building. (2)
-
- (c) Describe a suitable method for choosing a sample of staff that includes people from every floor of the building, rather than just one floor. (2)
- (d) Give one problem that could occur if the manager only samples staff from Floor 1. (1)

(Total for Question 7 is 6 marks)

8 A phone manufacturer takes a random sample of 5% of the 8000 phones made in a batch, to test for faults.

(a) Work out how many phones are in this 5% sample. (2)

(b) In the sample, 6 phones were found to be faulty. Use this to estimate the number of faulty phones in the whole batch of 8000. (2)

(Total for Question 8 is 4 marks)

9 The table below compares three sampling methods.

Method	Advantage	Disadvantage
Simple random sampling	Every member of the population has an equal chance of being chosen	(a)
Systematic sampling	Quick and easy to select once the sampling interval is fixed	(b)
Stratified sampling	Every group in the population is represented in proportion to its size	(c)

(a) State one disadvantage of simple random sampling. (1)

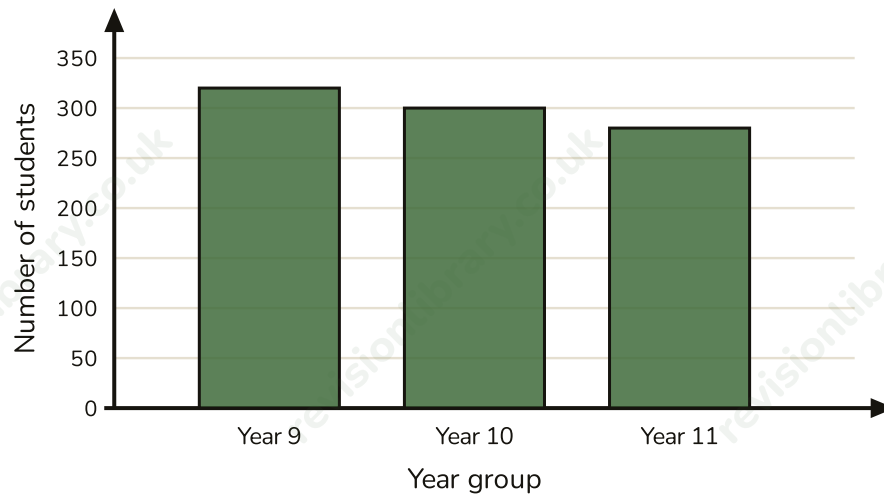
(b) State one disadvantage of systematic sampling. (1)

(c) State one disadvantage of stratified sampling. (1)

(d) A company's 500 staff are split unevenly across 5 very different-sized departments. State which of the three sampling methods above would be most suitable, and give a reason. (2)

(Total for Question 9 is 5 marks)

- 10** Millbrook Secondary School has 900 students split across three year groups. The bar chart shows the number of students in each year group. The school wants to take a stratified sample of 45 students across the three year groups.



- (a) State the formula used to work out how many students to sample from a given year group in stratified sampling. (1)
- (b) Work out the number of Year 9 students that should be in the sample. (2)
-
- (c) Work out the number of Year 10 students that should be in the sample. (2)
-
- (d) Given that the Year 11 sample size is 14, show that the three sample sizes together total 45. (1)

(Total for Question 10 is 6 marks)

- 11** A school wants to find out students' opinions on a new lunch menu. The head teacher surveys the first 30 students to arrive at school each day for a week.
- (a) Give a reason why this sample might not be representative of the whole school.
 - (b) Suggest a more appropriate method to select a representative sample of 30 students from the school's 900 students, giving one advantage of your method.

(Total for Question 11 is 3 marks)

Mark scheme · S06-30min Sampling Methods: 30-minute Pack

Question 1

- (a) **B1** uses the existing numbers 1 to 60 already assigned to members, oe
- (a) **B1** a genuine random method is used to generate the numbers, e.g. a lottery draw from identical tickets or a random number generator, oe
- (a) **B1** continues until 8 different members are chosen, ignoring any repeated numbers, oe
- (a) **Answer: Use the numbers 1 to 60 already given to members; generate random numbers (e.g. with a random number generator or by drawing tickets from a bag) and select the matching members, ignoring repeats, until 8 different members have been chosen.**
- (b) **B1** every member of the population has an equal chance of being selected, oe
- (b) **B1** each member is selected independently of any other, oe
- (b) **Answer: A random sample is one where every member of the population has an equal chance of being chosen, independently of any other member.**

Question 2

- **B1** Simple random sampling cao
- **Answer: Simple random sampling**

Question 3

- **B1** True cao
- **Answer: True**

Question 4

- **B1** Systematic sampling cao
- **Answer: Systematic sampling**

Question 5

- **B1** Convenience sampling (or opportunity sampling) cao
- **Answer: Convenience (opportunity) sampling**

Question 6

- **B1** True cao
- **Answer: True**

Question 7

- (a) **B1** 20 cao
- (a) **Answer: 20**
- (b) **M1** $15+30+20+15$, oe
- (b) **A1** 80 cao
- (b) **Answer: 80**
- (c) **B1** the number of staff chosen from each floor reflects how many staff work on that floor, oe
- (c) **B1** within each floor, the individuals are chosen using a random method, oe
- (c) **Answer: Choose a number of staff from each floor in proportion to how many work there, then select those individuals at random within each floor.**
- (d) **B1** staff on Floors 2, 3 and 4 have no chance of being selected, so their views/characteristics are missed and the sample is unrepresentative, oe
- (d) **Answer: Staff on the other three floors would have no chance of being included, so the sample would not represent the whole building.**

Question 8

- (a) **M1** 0.05×8000 , oe
- (a) **A1** 400 cao
- **(a) Answer: 400**
- (b) **M1** $6/400 \times 8000$, oe
- (b) **A1** 120 cao
- **(b) Answer: 120**

Question 9

- (a) **B1** a complete, up-to-date list of the whole population (a sampling frame) is needed before sampling can start, and this can be impractical for very large populations, oe
- **(a) Answer: A complete list of the whole population is needed first, which can be impractical for very large populations.**
- (b) **B1** if there is a hidden pattern in the list that matches the sampling interval, the sample could be biased, oe
- **(b) Answer: If the list has a hidden repeating pattern that matches the interval used, the sample could be biased.**
- (c) **B1** the population must be accurately divided into groups (strata) before sampling, which takes extra time and information to organise, oe
- **(c) Answer: The population must first be accurately split into groups, which takes extra time and information to arrange.**
- (d) **B1** Stratified sampling
- (d) **B1** because it guarantees every department, however small, is represented in the sample in proportion to its size, oe
- **(d) Answer: Stratified sampling, because it makes sure every department - even a small one - is represented fairly in proportion to its size.**

Question 10

- (a) **B1** (number of students in the year group / total number of students) $\times$ overall sample size, oe
- **(a) Answer: (stratum size / population size) $\times$ sample size**
- (b) **M1** $320/900 \times 45$, oe
- (b) **A1** 16 cao
- **(b) Answer: 16**
- (c) **M1** $300/900 \times 45$, oe
- (c) **A1** 15 cao
- **(c) Answer: 15**
- (d) **B1** $16 + 15 + 14 = 45$
- **(d) Answer: $16 + 15 + 14 = 45$**

Question 11

- **B1** valid reason, e.g. students who arrive early may not represent all year groups or travel habits oe
- **B1** valid named method, e.g. simple random sampling using a numbered list of all 900 students oe
- **B1** valid advantage of the named method, e.g. every student has an equal chance of being chosen, reducing bias oe
- **Answer: (a) Early arrivals may not represent the whole school, e.g. by year group or how they travel to school. (b) Number all 900 students and use simple random sampling; every student then has an equal chance of selection, which reduces bias.**