

1. A researcher wants to find out how many adults in a large town use the internet at least once a week. The researcher has formulated a suitable question to ask. For each of the following methods of taking a sample of the adults in the town, give a reason why it may be biased.

Method A: Ask people walking along a particular street between 9 am and 5 pm on one Monday.

Method B: Put the question through every letter box in the town and ask people to send back answers.

Method C: Put the question on the local council website for people to answer online.

[3]

2. In a certain school there are 273 boys and 327 girls. A proportional stratified sample of 50 pupils is required.

How many girls should be in the sample?

[2]

3. A class representative is investigating whether pupils at his school believe that school meals are satisfactory. The class representative has an alphabetical list of all 619 pupils in the school saved on a spreadsheet. He decides to select a sample of 50 pupils, and considers two different sampling procedures.

Procedure A.

Assign a distinct random number to each pupil. Select the 50 pupils with the smallest random numbers.

Procedure B.

Generate a 2-digit random number. Use this random number to select a starting point on the list according to the rule shown in Fig. 8. Select the pupil identified by this rule, and then select every 12th pupil on the list after this, stopping when a sample of 50 has been obtained.

Random number	00–10	11–20	21–30	31–40	41–50	51–70	71–80	81–99
Starting point	1	2	3	4	5	6	7	8

Fig. 8

- (a) Explain why procedure **A** will generate a simple random sample. [1]
- (b) Identify **two** features of procedure **B** that prevent it from generating a simple random sample. [2]
- (c) Describe how you could generate a random sample of size 50 from the 619 pupils using systematic sampling. [1]

END OF QUESTION paper

Mark scheme

Question			Answer/Indicative content	Marks	Guidance		
1			<p>Method A - E.g. Will not sample people who work then / people who do not walk down that street.</p> <p>Method B - E.g. This will only get answers from those who want to send in an answer.</p> <p>Method C - E.g. This will only get answers from those who use the council website.</p> <p>E.g. Those who use the internet more frequently are more likely to see the question.</p>	<p>B1(AO2.4)</p> <p>B1(AO2.4)</p> <p>B1(AO2.4)</p> <p>[3]</p>	Enter text here.		
			Total	3			
2			$\frac{327}{600} \times 50$ <p>27 cao</p>	<p>M1(AO1.1b)</p> <p>A1(AO1.1b)</p> <p>[2]</p>	<table border="1"> <tr> <td>may be implied by 27.25</td> <td></td> </tr> </table>	may be implied by 27.25	
may be implied by 27.25							
			Total	2			
3	a		Each possible group of [pupils] (of size n) which could be taken from the population has the same chance of being picked	E1 (AO2.4) [1]	<table border="1"> <tr> <td>allow each pupil has equal chance of being sampled AND choosing one [pupil] to be sampled does not affect another being sampled</td> <td></td> </tr> </table>	allow each pupil has equal chance of being sampled AND choosing one [pupil] to be sampled does not affect another being sampled	
allow each pupil has equal chance of being sampled AND choosing one [pupil] to be sampled does not affect another being sampled							
	b		<p>eg It is not possible to select the last 23 pupils on the list.</p> <p>eg The different starting points on the list do not all have the same probability of being selected</p> <p>eg It is not possible to select some samples eg the first 50 on the list</p>	<p>E1 (AO2.4)</p> <p>E1 (AO2.4)</p> <p>[2]</p>	<table border="1"> <tr> <td>accept any two valid reasons</td> <td></td> </tr> </table>	accept any two valid reasons	
accept any two valid reasons							
	c		eg Randomly select a starting point on the list between 1 and 31. Select every 12 th item on the list after that.	E1 (AO2.4) [1]	<table border="1"> <tr> <td>Accept any coherent statement which involves</td> <td></td> </tr> </table>	Accept any coherent statement which involves	
Accept any coherent statement which involves							

					<div style="border: 1px solid black; padding: 5px;"> <p>the selection of a random starting point, values being selected at regular intervals and results in all values being available for selection</p> </div>
			Total	4	