



H23-30min Pilot Surveys (Higher): 30-minute Pack

EDEXCEL 1ST0 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** A sports club is investigating how satisfied members are with a new training schedule. The investigation follows the statistical enquiry cycle: plan, collect, process, interpret.
- (a)** Which stage of the statistical enquiry cycle would a pilot survey normally be part of? **(1)**
- ☐ A) Collect
 - ☐ B) Plan
 - ☐ C) Process
 - ☐ D) Interpret
- (b)** The pilot reveals that several members misunderstood a question about training times. Explain how this finding should affect the collect stage, before the main survey of all members is carried out. **(2)**

(Total for Question 1 is 3 marks)

- 2 An online retailer pilots a customer questionnaire that asks shoppers to tick their annual household income, using the response options shown below.

Draft pilot questionnaire - Question 3

What is your annual household income?

☐ Under £20,000

☐ £20,000 - £40,000

☐ £40,000 - £60,000

☐ £60,000 and over

- (a) A pilot respondent with a household income of exactly £40,000 is unsure which box to tick. Identify the problem with the response options, and explain why it occurs. (2)
- (b) Rewrite the response options so that they no longer overlap, and still cover every possible income. (2)

(Total for Question 2 is 4 marks)

- 3** An energy supplier is planning a main survey of 8000 randomly selected customers, to find out their views on a new smart meter service. Before this, the supplier will run a pilot survey.
- (a) Suggest a suitable percentage of the main survey's sample size to use for the pilot survey, and explain why this percentage is sensible. (2)
- (b) Using a pilot size of 5% of the main survey's sample, work out the number of customers who should be given the pilot questionnaire. (2)
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- (c) State one problem that could occur if the supplier chose a pilot size that was much too small, for example only 10 customers. (1)

(Total for Question 3 is 5 marks)

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- 4** A supermarket wants to pilot a new customer satisfaction questionnaire before sending it to its 20,000 loyalty-card holders nationally. Two possible pilot designs are suggested.

Design A: give the questionnaire to 15 staff members' friends and family to complete.

Design B: select a random sample of 200 loyalty-card holders from across the country and post the questionnaire to them.

Compare Design A and Design B, and explain which would give a more useful pilot for testing the questionnaire before the main national survey.

(Total for Question 4 is 4 marks)

- 5** A regional airport pilots a passenger feedback survey by emailing a questionnaire to 60 passengers who were all on the same early-morning flight. Only 15 of the 60 passengers respond (a 25% response rate). The pilot also shows that one question was leading.

Recommend, with reasons, what the airport should do at the plan stage and the collect stage before running its main survey of all passengers.

(Total for Question 5 is 6 marks)

- 6** A town council is planning a main survey of a sample of 3000 residents, out of the 45,000 residents in the town, about a proposed new park. It is deciding how large to make its pilot survey.

- (a)** The council suggests using a pilot size equal to 6% of the main survey's sample. (2)
Work out this suggested pilot sample size.

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- (b)** Justify, with reference to both reliability and practicality, why a pilot size of 180 residents might be more appropriate than a pilot of just 15 residents, or a pilot of 2500 residents. (3)

(Total for Question 6 is 5 marks)

Mark scheme · H23-30min Pilot Surveys (Higher): 30-minute Pack

Question 1

- (a) **B1** B cao
- (a) **Answer: B) Plan**
- (b) **B1** identifies that the confusing question should be reworded/clarified at the plan stage before data collection begins
- (b) **B1** explains that the collect stage will then use the improved/corrected questionnaire on the full membership, producing clearer, more valid data
- (b) **Answer: The confusing question should be reworded and clarified before the collect stage starts. The collect stage will then use the improved questionnaire on all members, producing clearer, more valid responses than if the original wording had been used.**

Question 2

- (a) **B1** the response categories overlap
- (a) **B1** £40,000 appears in both the '£20,000-£40,000' box and the '£40,000-£60,000' box, so it is unclear which one to tick
- (a) **Answer: The categories overlap. A household income of exactly £40,000 could be ticked in either the '£20,000-£40,000' box or the '£40,000-£60,000' box, so it is not clear which one to choose.**
- (b) **B1** boundaries no longer shared between adjacent categories, e.g. Under £20,000, £20,000-£39,999, £40,000-£59,999
- (b) **B1** categories cover every income with no gaps, including an open-ended top category, e.g. £60,000 and over
- (b) **Answer: e.g. Under £20,000, £20,000-£39,999, £40,000-£59,999, £60,000 and over**

Question 3

- (a) **B1** gives a reasonable percentage, e.g. between 5% and 10% (accept any sensible value in this range), oe
- (a) **B1** justifies the choice: large enough to reveal problems with the questionnaire and give a reasonable estimate of the response rate, but small enough not to use up too much of the time/budget intended for the main survey
- (a) **Answer: e.g. Around 5% to 10% of the main sample. This is large enough to reveal wording or logistical problems and to estimate the likely response rate, but small enough to avoid using up too much of the time and budget meant for the main survey.**
- (b) **M1** 8000×0.05 , oe
- (b) **A1** 400 cao
- (b) **Answer: 400**
- (c) **B1** with so few responses, any problems found (or the response rate estimate) could occur by chance and might not reliably represent what would happen with the full 8000 customers, oe
- (c) **Answer: With only 10 customers, any problems found (or not found) could just be due to chance, and might not reliably predict what happens across all 8000 customers.**

Question 4

- **B1** an overall judgement that Design B is more useful/appropriate
- **B1** explains that Design A's sample (staff friends/family) is unlikely to be representative of loyalty-card holders nationally, e.g. they may share similar ages, locations or views to staff, so problems affecting the wider population might not be revealed
- **B1** explains that Design B's random national sample is more representative of the population targeted by the main survey, so issues found (e.g. with wording or response rate) are more likely to also apply to the main survey
- **B1** notes that Design B's larger sample size (200 compared with 15) also gives a more reliable early estimate of things such as response rate, before the expense of the full national rollout
- **Answer: Design B is more useful. A random national sample of 200 loyalty-card holders is far more representative of the people who will receive the main survey than 15 staff friends and family, who are likely to share similar characteristics to staff. Design B's larger, representative sample also gives a more reliable early estimate of the response rate before the costly national rollout.**

Question 5

- **B1** a clear overall recommendation is given, e.g. revise both the questionnaire and the sampling method before proceeding to the main survey
- **B1** plan-stage point: reword the leading question identified in the pilot so it no longer suggests an expected answer
- **B1** a different plan-stage point: redesign the sampling method so future samples are drawn from passengers on a range of flights, times and destinations, not just one early-morning flight
- **B1** collect-stage point: take steps to improve the response rate for the main survey (e.g. sending reminder emails, or offering a paper option at the gate), since a 25% pilot response rate is low
- **B1** a different collect-stage point: use a broader/more representative method of contacting passengers for the main data collection, so as not to under-represent passengers on other flights or those less likely to check email
- **B1** explicitly links recommendations to the pilot evidence given (the 25% figure and the single-flight sample), rather than giving generic advice
- **Answer: The airport should reword the leading question and, at the plan stage, redesign the sampling method to draw future samples from a range of flights and times, not just one early-morning flight. At the collect stage, it should take steps to improve on the low 25% pilot response rate, for example by sending reminder emails or offering a paper option at the gate, and should contact passengers by more than one method so that those on other flights, or less likely to check email, are not under-represented in the main survey.**

Question 6

- (a) **M1** 3000×0.06 , oe
- (a) **A1** 180 cao
- (a) **Answer: 180**
- (b) **B1** explains that 15 is too small: too few responses to reliably reveal problems or estimate a response rate, since results could easily happen by chance
- (b) **B1** explains that 2500 is too large relative to the 3000 target: it would leave very few new residents for the main survey and would use up much of the time/cost that piloting is meant to save
- (b) **B1** explains that 180 gives a reasonable balance: large enough to reveal wording/logistical problems and give a reasonably reliable response-rate estimate, while still leaving the great majority of the 3000 target sample available for the main survey
- (b) **Answer: A pilot of 15 is too small to reliably reveal problems or estimate a response rate, since results could easily be due to chance. A pilot of 2500 is too large, since it would leave very few new residents out of the 3000 target for the main survey and would waste much of the time and cost piloting is meant to save. A pilot of 180 strikes a reasonable balance: large enough to reveal genuine problems and give a fairly reliable response-rate estimate, while leaving most of the 3000 target sample for the main survey.**