

Questionnaires, interviews and data collection sheets

About 50 minutes Calculator allowed 43 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/stats-questionnaires-interviews-and-data-collection-sheets/

Date _____

A Do Now

The first question is what today's lesson needs. The others bring back earlier topics.

A1

Needed today

[2 marks]

Hypothesis: a greater proportion of adults in a town than adults in a village cycle to work. In a survey, 24 of 60 adults in a town and 70 of 200 adults in a village cycle to work. Use percentages to decide whether this supports the hypothesis.

Answer

A2

Last lesson

[2 marks]

161 snails in a garden are marked and released. Later 64 snails are caught, and 21 of them are marked. Estimate the number of snails in a garden.

Answer

A3

Maths skill

[2 marks]

Work out $\sqrt[3]{-\frac{1}{512}}$.

Answer

A4

Maths skill

[2 marks]

The point $(4, -5)$ is reflected in the line $y = -1$. Find the coordinates of its image.

Answer

B Example, then your turn

Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

A cinema asks customers, "How often do you visit the cinema?" Give three criticisms of the question and its response boxes.

0 to 2 times	2 to 4 times	4 to 6 times

Hint Look for a time frame, boxes that overlap and a missing box.

B1

A library asks members, "How many books did you borrow last month?" Give two criticisms of the response boxes.

1 to 3	4 to 6	7 to 9

EXAMPLE 2

Rewrite "Don't you agree that the school day is too long?" as a fair question with response boxes.

Hint Remove the words that push towards one answer.

B2 A café owner wants to know how much customers spend. [2 marks]

Write a suitable question with at least four response boxes.

EXAMPLE 3

A council asks residents about a new park. Give one advantage of an open question and one advantage of a closed question.

Hint What can a resident say? What can the council count?

B3 A dentist asks patients how often they brush their teeth. [2 marks]

Give one advantage and one disadvantage of an interview rather than a questionnaire.

EXAMPLE 4

Design a data collection sheet to record how Year 7 and Year 11 students travel to school: walk, car, bus or cycle.

Hint A row for each method and one for anything else.

B4 A coach records the number of goals his team scores in each match of a season. [2 marks]

Design a data collection sheet he could use.

EXAMPLE 5

Each of 300 workers throws a coin in private. Heads: tick Yes. Tails: answer truthfully, "Have you ever taken a day off sick when you were not ill?" 186 tick Yes. Estimate how many workers have done this.

Hint About half get heads and tick Yes whatever the truth.

B5 240 students each roll a fair dice in private. 1 or 2: tick Yes. [3 marks]

3 to 6: answer truthfully, "Have you copied homework from a friend?" 116 tick Yes. Estimate how many have.

Answer

EXAMPLE 6

Drivers are asked, "Have you used a mobile phone while driving in the last month?"
 Explain why random response is appropriate, and what the random event must tell a driver to do.

Hint Would a driver answer honestly if asked directly?

B6 Lucy's random response design: throw a coin; heads, tick No; tails, answer "Have you ever cheated in a test?" [2 marks]

Explain why Lucy's design is not suitable.

c Practice

C1 A gym manager asks members, [2 marks]

"What do you think of the gym?"
 Give one disadvantage of this open question, and write a closed question she could ask instead.

C2 A doctor plans to ask patients [2 marks]

face to face how much alcohol they drink each week. Explain why the answers may not be accurate, and suggest a better method.

C3 Hamid's hypothesis: "Older [2 marks]

students are more likely to cycle to school." Give two criticisms of his data collection sheet.

Method of travel	Tally	Frequency
Walk		
Car		
Bus		

C4 A manager's random response [2 marks]

design: think of a whole number from 1 to 10; if it is odd, tick Yes; if it is even, answer "Have you taken stationery home from work?" Give two criticisms of the design.

D Exam-style questions

D1 Ellie writes this question for a survey of her town: "Do you agree that our town [2 marks]

needs a new swimming pool?" with two boxes, Yes and No. She says, "It is a good question because it is closed, so the answers are easy to count."

Is Ellie correct? Give reasons for your answer.

D2 Kara's plan to find out how much time Year 10 students spend on social media: give [4 marks]
 a questionnaire to 15 of her friends in Year 10, asking "How much time do you
 spend on social media?" with the boxes shown, and ask each to write their name
 on it. Assess Kara's plan.

0 to 1 hour	1 to 2 hours	2 to 3 hours

D3 A company asks its 400 staff, "Have you used a work computer for personal shopping?"
 Each takes a card at random from ten cards numbered 1 to 10: 1 to 3 means tick Yes; 4 to 10
 means answer truthfully.

- (a) Explain why the random response method is appropriate here. [1 mark]
- (b) Show that about 120 staff would be expected to tick Yes because of their card. [1 mark]
- (c) 176 staff tick Yes. Estimate the number of staff who have used a work computer [3 marks]
 for personal shopping.

Answer

Total for D3: 5 marks

E Extension

No route is given. The hints are at the end of the sheet. Use one at a time.

E1
In a survey, each of 640 people throws two fair coins in private. Two heads: tick [3 marks]
Yes. Two tails: tick No. One head and one tail: answer the question truthfully.
248 people tick Yes. Estimate the proportion of people who would truthfully
answer Yes.

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1**

Hint 1
Work out how many people throw two heads, two tails, and one of each.

Hint 2
 $\frac{1}{4} \times 640 = 160$ throw two heads and tick Yes;
 $\frac{1}{2} \times 640 = 320$ answer truthfully.

Hint 3
 $248 - 160 = 88$ truthful Yes answers out of 320, so the proportion is $\frac{88}{320} = 0.275$.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

- I can criticise a question and its response boxes, and write a fair one.

☐
☐
☐
- I can design and judge a data collection sheet.

☐
☐
☐
- I can explain and use the random response method for a sensitive question.

☐
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