Sampling

GCSE Maths · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Ms Okafor asks 60 of the 900 pupils in her school about homework. Identify the population and the sample.

Step 1 · Everyone she wants to find out about

Population: all 900 pupils

Step 2 · Those she actually asks

Sample: the 60 pupils

Answer: Population 900 pupils; sample 60 pupils

Check: The sample is part of the population ✓

2. Now try one with the steps

Leo wants to know how often adults in his town exercise. He asks 50 people at the leisure centre. Explain why the sample may be biased.

Step 1 · Who is at a leisure centre?

Step 2 · So the sample is not representative

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. What is meant by the population in a statistical survey? [1]

2. Give one advantage of using a sample instead of the whole population. [1]

3. Give one disadvantage of using a sample. [1]

4. To find out what the whole school thinks of the lunches, Amy asks only Year 11. Is this a fair sample? Explain. [1]

5. Describe how to take a random sample of 50 people from a list of 800. [2]

6. In a random sample of 40 pupils, 12 are left-handed. Estimate how many of the 900 pupils in the school are left-handed. [2]

7. In a sample of 80 light bulbs, 3 are faulty. Estimate the number of faulty bulbs in a batch of 2000. [2]

8. A club has 120 juniors and 80 seniors. A stratified sample of 25 members is taken. How many juniors should be in it? [2]

9. Using question 8, how many seniors should be in the sample? [1]

10. A factory has 450 men and 550 women. A stratified sample of 80 workers is taken. How many women should be chosen? [2]

11. Why does a larger random sample usually give a more reliable estimate? [1]

12. 30 birds are ringed and released. Later 60 birds are caught and 9 have rings. Estimate the size of the population. [2]

13. 50 rabbits are tagged. Later 40 are caught, of which 5 are tagged. Estimate the number of rabbits. [2]

14. State one assumption made when using capture–recapture. [1]

15. A survey asks: 'Don't you agree that the canteen is too expensive?' What is wrong with this question? [1]

4. Before you hand it in

'I asked my 10 friends, so 70% of the school likes the new timetable'
Friends are not random and 10 is small. Use a larger random sample before generalising.

Stratified sample: 60 ÷ 3 = 20 from each year
Each group's share of the sample matches its share of the population: 180/600 × 60 = 18 for Year 8.

Capture–recapture: N = 8 × 50 ÷ 40 = 10
Set the proportions equal: 8/50 = 40/N, so N = 40 × 50 ÷ 8 = 250. A sensible answer is bigger than both catches.

Rounding a stratified sample so the groups no longer add up to the sample size
Round sensibly and check the total. Adjust the group with the largest rounding error if needed.