

Sampling and Populations

For Pearson Edexcel GCSE Mathematics (1MA1) • Higher tier

Name _____

Total marks: **22**

Answer **all** questions in the spaces provided. Show your working: marks are given for correct method.

1 Sophie wants to find out how the 900 students at her school travel to school.

- (a) Sophie asks the first 30 students to arrive at school one morning.
Explain why her sample might be biased.

(1)

- (b) Sophie then takes a random sample of 30 students.
12 of these students walk to school.
Work out an estimate for the number of students at the school who walk to school.

.....
(2)

- (c) Sophie wants a more reliable estimate.
She is going to take a new random sample of n students from the school.
Write down an inequality for n .

.....
(1)

(Total for Question 1 is 4 marks)

- 2** 750 students eat lunch in a school canteen on Fridays.
 Each student chooses one main meal.
 The canteen takes a sample of students.
 Each student in the sample is asked which main meal they will choose next Friday.
 The table shows information about the results.

Main meal	Number of students
pasta	24
curry	14
jacket potato	10
salad	12

- (a) Work out an estimate for the number of portions of pasta the canteen should make.

.....
 (2)

- (b) The canteen manager finds out that the sample was taken only from Year 7 students.
 Explain how this could affect your answer to part (a).

.....

 (1)

(Total for Question 2 is 3 marks)

- 3** Leon and Kaya each want to estimate the proportion of people in a town who own a dog.
Leon asks 20 people. 6 of them own a dog.
Kaya asks a random sample of 250 people. 70 of them own a dog.

- (a) Whose results are likely to give the better estimate?
Give a reason for your answer.

(1)

- (b) There are 16 000 people in the town.
Use Kaya's results to work out an estimate for the number of people in the town who own a dog.

.....
(2)
(Total for Question 3 is 3 marks)

- 4 Jo wants to find out how much exercise people in her town do.
She asks 50 people outside a sports centre.

(a) Explain why Jo's sample might be biased.

(1)

- (b) Jo then takes a random sample of 80 adults from the whole town.
26 of them say they exercise at least three times a week.
Her friend Amir takes a different random sample of 40 adults from the town.
10 of them say they exercise at least three times a week.

Amir says,

"Our results are different, so one of us must have made a mistake."

Explain why Amir is not correct.

(1)

- (c) Use all the results from both random samples to work out an estimate for the percentage of adults in the town who exercise at least three times a week.

..... %
(2)

(Total for Question 4 is 4 marks)

5 A garden centre sells three types of plant: roses, lilies and ferns.
Each week Jess takes a sample of 25 plants to check.
The proportion of each type of plant in her sample is the same as the proportion of that type of plant in the garden centre.

- (a) One week there are 400 plants in the garden centre.
144 of these plants are roses.
Work out the number of roses in Jess's sample that week.

.....
(2)

- (b) The next week there are 500 plants in the garden centre.
The number of lilies in Jess's sample is 7, correct to the nearest whole number.
Work out the least possible number of lilies in the garden centre that week.

.....
(2)
(Total for Question 5 is 4 marks)

- 6** A factory makes 12 000 light bulbs each day.
A random sample of 150 bulbs is tested.
4 of the bulbs in the sample are faulty.

(a) Work out an estimate for the number of faulty bulbs made each day.

.....
(2)

(b) State one assumption you made in working out your answer to part (a).

.....
.....
(1)

(c) The manager says,
 "Less than 2% of our bulbs are faulty."
Does the sample support what the manager says?
You must show how you get your answer.

.....
(1)

(Total for Question 6 is 4 marks)