FOUNDATION & HIGHER

SAME AT BOTH TIERS

Name ..... Class .....

S1: Sampling

Solve problems using samples to estimate population properties

20 marks · 25 minutes · Calculator allowed

---

1) 60 fish are tagged and released. Later, 80 fish are caught and 12 are tagged. A week after that, 100 fish are caught and 14 are tagged. Use each sample to estimate the number of fish, and give a sensible estimate.

.....

[Question 1: 3 marks]

2) A school has 220, 200, 180, 160 and 140 students in Years 7 to 11. A sample of 80 is taken in proportion to the year sizes. How many students from Year 7 and from Year 11 should be in the sample?

.....

[Question 2: 3 marks]

3) In a sample of 50 of a school's 1200 students, 18 want a longer lunch. Estimate how many students in the school want a longer lunch. Does this suggest that most students do not? Explain.

.....

[Question 3: 3 marks]

4) A sample of 40 cars has a mean of 3.2 people per car. 1500 cars pass in an hour. Estimate how many people pass in an hour.

.....

[Question 4: 2 marks]

5) Sample A of 20 people gives 35% in favour. Sample B of 200 people gives 42% in favour. Which sample should be used? Estimate how many of 5000 people are in favour.

.....

[Question 5: 3 marks]

6) 3 of 150 bulbs tested are faulty. A batch has 10 000 bulbs. Each faulty bulb costs £1.50 to replace. Estimate the cost of replacing faulty bulbs in the batch.

£ .....

[Question 6: 3 marks]

7) A systematic sample takes every 25th name from a list of 1000. How many names are in the sample? Give one way this could be biased.

.....

[Question 7: 3 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	400 and 429; about 410	$\frac{60 \times 80}{12} = 400$ (P1); $\frac{60 \times 100}{14} = 428.6$ (P1); estimate between, e.g. about 410 (A1).
2	20 and 12	$\frac{220}{900} \times 80 = 19.6$ (P1); 20 (A1); $\frac{140}{900} \times 80 = 12.4$, 12 (A1).
3	432; yes	$\frac{18}{50} \times 1200$ (P1); 432 (A1); 36% so most do not (C1).
4	4800	3.2×1500 (P1); A1.
5	B; 2100	Larger sample (A1); 0.42×5000 (P1); A1.
6	£300	2% faulty (P1); 200 bulbs (P1); A1.
7	40	$1000 \div 25$ (P1, A1); e.g. list order follows a pattern (C1).