

Section 1: Collecting data

Exercise level 3

1. The population of Tower Hamlets aged 16 and over is shown in the table below.

Age	Number
16 to 17	4,953
18 to 19	7,010
20 to 24	30,818
25 to 29	40,157
30 to 44	70,245
45 to 59	29,337
60 to 64	5,863
65 to 74	8,169
75 to 84	5,611
85 to 89	1,256
90 and over	534
Total	203,953

- (i) A researcher wants to take a sample of 200 people aged 16 and over from Tower Hamlets. Calculate how many should be taken from each of the 11 groups in the table to get a sample where the number in each group is proportional to the population.
- (ii) (A) Explain why the researcher might want to sample more people from each of the 85 to 89 and 90 and over groups than your figures in (i) suggest.
- (B) The researcher asks whether people are satisfied with recycling facilities in their area. She samples 5 people from each of the 85 to 89 and 90 and over groups. What should she multiply the number who say “yes” by in each of these groups to make the overall sample representative of the population?
2. A website which sells books allows customers to rate books from 1 star to 4 stars. 4 stars is the top rating. The ratings for the three books in a fiction series are shown below.

	Book 1	Book 2	Book 3
4 star	45	38	34
3 star	47	10	9
2 star	15	1	0
1 star	15	0	0

- (i) What type of sample of all readers of each book are those who rate the books online?
- (ii) Decide whether each of the following statements is true and justify your decisions.
- (A) The mean rating is increasing as the series goes on.

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(B) This shows that the books are getting better.

3. A researcher wants to find out the average number of occupants in a car on a particular road. Two different sampling methods are used to estimate this number.

Method 1: There are an estimated 10 000 cars on the road in a week. 500 random numbers from 1 to 10 000 are chosen. A camera photographs the cars corresponding to these random numbers. The researcher counts the occupants in each car and the average is taken.

Method 2: The road leads to a large shopping centre. At 15 different times in the week, people ask all those going into the shopping centre to tell them how many occupants were in the car they came in. The average is taken.

- (i) Method 2 produces a larger average than method 1. Explain why.
- (ii) Which method is likely to give the best estimate of the average number of occupants in a car on the road? Justify your choice.