

爱德思
Statistics 3
分类真题
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A Level Clouds 出品

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Chapter 1

Sampling

1. A tennis club's committee wishes to select a sample of 50 members to fill in a questionnaire about the club's facilities. The 300 members, of whom 180 are males, are listed in alphabetical order and numbered 1 – 300 in the club's membership book.

The club's committee decides to use a random number table to obtain its sample. The first three lines of the random number table used are given below.

319 952 241 343 278 811 394 165 008 413 063 179 749
722 962 334 461 267 114 806 992 414 837 837 657 339
470 684 554 127 067 459 142 920 144 575 311 605 412

Starting with the top left-hand corner (319) and working across, the committee selects 50 random numbers. The first 2 suitable numbers are 241 and 278. Numbers greater than 300 are ignored.

- (a) Find the next two suitable numbers. (1)

When the club's committee looks at the members corresponding to their random numbers they find that only 1 female has been selected.

The committee does not want to be accused of being biased towards males so considers using a systematic sample instead.

- (b) (i) Explain clearly how the committee could take a systematic sample.

(ii) Explain why a systematic sample may not give a sample that represents the proportion of males and females in the club.

The committee decides to use a stratified sample instead.

- (c) Describe how to choose members for the stratified sample. (3)

(d) Explain an advantage of using a stratified sample rather than a quota sample. (1)

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1. The names of the 720 members of a swimming club are listed alphabetically in the club's membership book. The chairman of the swimming club wishes to select a systematic sample of 40 names. The names are numbered from 001 to 720 and a number between 001 and w is selected at random. The corresponding name and every x th name thereafter are included in the sample.
- (a) Find the value of w . (1)
- (b) Find the value of x . (1)
- (c) Write down the probability that the sample includes both the first name and the second name in the club's membership book. (1)
- (d) State one advantage and one disadvantage of systematic sampling in this case. (2)

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3. A company wants to survey its employees' attitudes to work. The company's workforce is located at three offices. The number of employees at each location is summarised in the table below.

Office location	Number of employees
Bristol	856
Dudley	429
Glasgow	1215

Each employee is located at only one office.

A personnel assistant plans to survey the first 50 employees who arrive for work at the Bristol office on a Monday morning.

- (a) Give two reasons why this survey is likely to lead to a biased response.

(2)

A personnel manager has access to the company's information system that holds details of each employee including their place of work.

The manager decides to take a stratified sample of 150 employees.

- (b) Describe how to choose employees for this stratified sample.

(3)

- (c) Explain an advantage of using a stratified sample rather than a quota sample.

(1)

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Answer All questions. Write your answers in the spaces provided.

1. A head teacher wants to find out the students' opinions about the length of lessons. The head teacher wishes to survey the students using the three groups in the table below.

	Number of students
Group 1 (Y7 – Y9)	432
Group 2 (Y10 – Y11)	360
Group 3 (Y12 – Y13)	108

She decides to take a stratified sample of 50 students.

- (a) Explain how to select the students for this stratified sample. (3)
- (b) Give one advantage of carrying out this survey using stratified sampling, rather than taking a simple random sample of the whole school. (1)

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1. A journalist is going to interview a sample of 10 players from the 60 players in a local football club. The journalist uses the random numbers on page 27 of the formula booklet and starts at the top of the 10th column, where the first number is 96

The journalist worked down the 10th column to select 10 numbers. The first 3 numbers selected were: 33, 15 and 23

- (a) Find the other 7 numbers to complete the sample of ten.

(2)

There are 24 girls and 36 boys who play football for the club.

The journalist labels the girls from 1 to 24 and the boys from 25 to 60

- (b) Show how the journalist can use her 10 random numbers to select a stratified sample of 10 players from the club to interview.

(2)

The club provided the journalist with a list of the players in ascending order of ages, numbered 1 to 60.

The journalist uses the 10 random numbers to select a simple random sample of the players.

- (c) State, giving a reason, a group of players who may not be represented in this sample.

(2)