Edexcel GCSE
Mathematics (Linear) – 1MA0

STRATIFIED SAMPLING

Materials required for examination
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.
Tracing paper may be used.

Items included with question papers
Nil

Instructions

Use black ink or ball-point pen.
Fill in the boxes at the top of this page with your name, centre number and candidate number.
Answer all questions.
Answer the questions in the spaces provided – there may be more space than you need.
Calculators may be used.

Information

The marks for each question are shown in brackets – use this as a guide as to how much time to spend on **each** question.
Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

Advice

Read each question carefully before you start to answer it.
Keep an eye on the time.
Try to answer every question.
Check your answers if you have time at the end.

1. The grouped frequency table shows information about the weights, in kilograms, of 20 students, chosen at random from Year 11.

Weight (w kg)	Frequency
$50 \leq w < 60$	7
$60 \leq w < 70$	8
$70 \leq w < 80$	3
$80 \leq w < 90$	2

There are 300 students in Year 11.

Work out an estimate for the number of students in Year 11 whose weight is between 50 kg and 60 kg.

.....

(Total 3 marks)

2. The table shows the number of students in each year group at a school.

Year group	7	8	9	10	11
Number of students	190	145	145	140	130

Jenny is carrying out a survey for her GCSE Mathematics project.
She uses a stratified sample of 60 students according to year group.

Calculate the number of Year 11 students that should be in her sample.

.....

(Total 3 marks)

3. A school has 450 students.
Each student studies one of Greek or Spanish or German or French.
The table shows the number of students who study each of these languages.

Language	**Number of students**
Greek	145
Spanish	121
German	198
French	186

An inspector wants to look at the work of a stratified sample of 70 of these students.

Find the number of students studying each of these languages that should be in the sample.

Greek .....

Spanish .....

German .....

French .....

(Total 3 marks)

4. There are three age groups in a competition.
The table shows the number of competitors in each age group.

16-18 years	19-24 years	25+ years
120	250	200

John wants to do a survey of the competitors.
He uses a stratified sample of exactly 50 competitors according to each age group.

Work out the number of competitors in each age group that should be in his stratified
sample of 50.

16-18 years: .....

19-24 years: .....

25+ years: .....

(Total 3 marks)

5. The table shows the number of boys and the number of girls in each year group at
Springfield Secondary School.

There are 500 boys and 500 girls in the school.

Year group	**Number of boys**	**Number of girls**
7	100	100
8	150	50
9	100	100
10	50	150
11	100	100
Total	500	500

Azez took a stratified sample of 50 girls, by year group.

Work out the number of Year 8 girls in his sample.

.....

(Total 2 marks)

6. The table gives information about the numbers of students in the two years of a college course.

	Male	**Female**
First year	399	602
Second year	252	198

Anna wants to interview some of these students.
She takes a random sample of 70 students stratified by year and by gender.

Work out the number of students in the sample who are male and in the first year.

.....

(Total 3 marks)

7. 258 students each study one of three languages.
The table shows information about these students.

	Language studied		
	German	**French**	**Spanish**
Male	45	52	26
Female	25	48	62

A sample, stratified by the language studied and by gender, of 50 of the 258 students is taken.

(a) Work out the number of male students studying Spanish in the sample.

.....

(2)

(b) Work out the number of female students in the sample.

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(2)

(Total 4 marks)

8. (a) Explain what is meant by

(i) a random sample,

.....

(ii) a stratified sample.

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(2)

The table shows some information about the members of a golf club.

Age range	Male	Female	Total
Under 18	29	10	39
18 to 30	82	21	103
31 to 50	147	45	192
Over 50	91	29	120
Total number of members			454

The club secretary carries out a survey of the members.

He chooses a sample, stratified both by age range and by gender, of 90 of the 454 members.

(b) Work out an estimate of the number of male members, in the age range 31 to 50, he would have to sample.

.....

(2)

(Total 4 marks)

9. Hamid wants to find out what people in Melworth think about the sports facilities in the town.
Hamid plans to stand outside the Melworth sports centre one Monday morning.
He plans to ask people going into the sports centre to complete a questionnaire.

Carol tells Hamid that his survey will be biased.

(i) Give **one** reason why the survey will be biased.

……

…..……....……

……...……

(ii) Describe **one** change Hamid could make to the way in which he is going to carry out his survey so that it will be less biased.

……

……

……

(Total 2 marks)

10. There are 970 students in Bayton High School.
Brian takes a random sample of 100 students.
He asks these 100 students which subject they like best.
They can choose English or Maths or Science.
Brian is going to use his results to work out an estimate of how many of the 970 students like English best.

Explain how.

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.....

(Total 2 marks)

11. 340 475 people live in Brinton.
A company carried out a survey.
It used a random sample of 1500 of the 340 475 people.
870 of this sample of 1500 people were male.

Work out an estimate for the number of **females** living in Brinton.

……

(Total 3 marks)

12. The table shows some information about the pupils at Statson School.

Year group	Boys	Girls	Total
Year 7	104	71	175
Year 8	94	98	192
Year 9	80	120	200
Total	278	289	567

Kelly carries out a survey of the pupils at Statson School.
She takes a sample of 80 pupils, stratified by both Year group and gender.

(a) Work out the number of Year 8 boys in her sample.

……

(2)

(b) Describe a method that Kelly could use to take a random sample of Year 8 boys.

……

……

……

(2)

(Total 4 marks)

13. The table gives information about the number of girls in each of four schools.

School	A	B	C	D	Total
Number of girls	126	82	201	52	461

Jenny did a survey of these girls.
She used a stratified sample of exactly 80 girls according to school.

Work out the number of girls from each school that were in her sample of 80.
Complete the table.

School	A	B	C	D	Total
Number of girls					80

(Total 3 marks)

14. The table shows the number of boys in each of four groups.

Group	A	B	C	D	Total
Number of boys	32	43	38	19	132

Jamie takes a sample of 40 boys stratified by group.

Calculate the number of boys from group B that should be in his sample.

.....

(Total 2 marks)

15. Melanie wants to find out how often people go to the cinema.

She gives a questionnaire to all the women leaving a cinema.

Her sample is biased.
Give **two** possible reasons why.

1 .....

.....

.....

2 .....

.....

.....

(Total 2 marks)

16. The two-way table shows information about the number of students in a school.

	Year Group					Total
	7	**8**	**9**	**10**	**11**	
Boys	126	142	140	135	125	670
Girls	134	140	167	125	149	715
Total	260	282	307	260	276	1385

Robert carries out a survey of these students.
He uses a sample of 50 students stratified by gender and by year group.

Calculate the number of girls from year 9 that are in his sample.

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(Total 2 marks)