Write your name here

Surname	Other names

Edexcel GCSE

Centre Number	Candidate Number

Mathematics B

Unit 1: Statistics and Probability (Calculator)

Higher Tier

Sample Assessment Material
Time: 1 hour 15 minutes

Paper Reference
5MB1/1H

You must have:
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

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**.
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Information

- The total mark for this paper is 60.
- 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.

Turn over ▶

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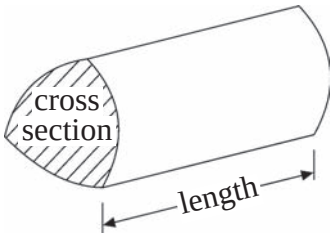
GCSE Mathematics 2MB01

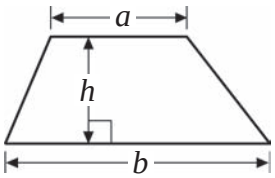
Formulae – Higher Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of prism = area of cross section × length

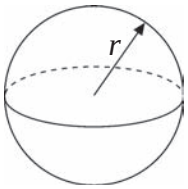


Area of trapezium = $\frac{1}{2}(a+b)h$



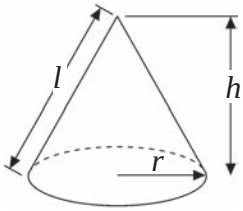
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$

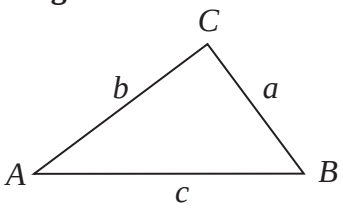


Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl



In any triangle *ABC*



Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc\cos A$

Area of triangle = $\frac{1}{2}ab\sin C$

The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 The table shows some information about the ages, in years, of 80 people.

Age (a years)	Frequency
$20 \leqslant a < 30$	19
$30 \leqslant a < 40$	22
$40 \leqslant a < 50$	24
$50 \leqslant a < 60$	10
$60 \leqslant a < 70$	5

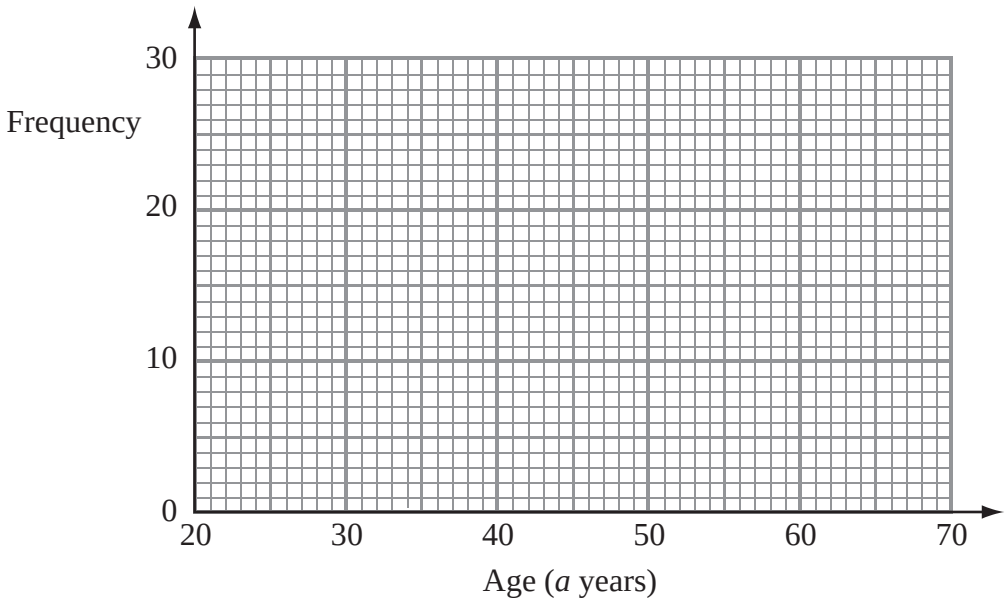
(a) Find the class interval that contains the median.

(1)

.....

(b) Draw a frequency polygon to show this information.

(2)



(Total for Question 1 = 3 marks)

***2** Harry and Edith are planning their holiday.

They want to travel by airplane.

They can travel with one of three airplane companies, Aireways, King Lingus or Easy Plane.

The tables show the cost per adult and the cost per child to travel with each airplane company.

Aireways

		July				August			
Week		1 – 8	9 – 15	16 – 22	23 – 31	1 – 12	13 – 19	20 – 26	27 – 31
Adult	AM	£197	£200	£215	£215	£224	£209	£199	£188
	PM	£174	£177	£192	£192	£201	£186	£176	£165
Child	AM	£110	£113	£128	£128	£137	£122	£112	£101
	PM	£87	£90	£105	£105	£114	£99	£89	£78

King Lingus

		July				August			
Week		1 – 8	9 – 15	16 – 22	23 – 31	1 – 12	13 – 19	20 – 26	27 – 31
Adult	AM	£193	£195	£197	£211	£220	£213	£208	£204
	PM	£176	£178	£180	£191	£203	£196	£191	£187
Child	AM	£119	£121	£123	£134	£146	£139	£134	£130
	PM	£102	£104	£106	£117	£129	£122	£117	£113

Easy Plane

		July				August			
Week		1 – 8	9 – 15	16 – 22	23 – 31	1 – 12	13 – 19	20 – 26	27 – 31
Adult	AM	£198	£206	£213	£223	£232	£214	£210	£205
	PM	£181	£189	£196	£206	£215	£197	£193	£188
Child	AM	£94	£102	£109	£119	£128	£110	£106	£101
	PM	£77	£85	£92	£102	£111	£93	£89	£84

Harry and Edith have 3 children.
They want to travel on the morning of 27th July.

Work out the cheapest cost.

.....

(Total for Question 2 = 6 marks)

***3** Some students did a test.

This back-to-back stem and leaf diagram shows information about their scores.

Boys' scores		Girls' scores
8 2	2	7 8
9 6 5 2	3	0 4 7 8
9 5 4 3 2 1 0	4	3 5 5 7 8
7 7 7 6 5 4	5	0 1 3 5 7 7 7 9 9
5 3 2 1	6	0 3 6

Key for boys' scores
8 | 2 means 28

Key for girls' scores
2 | 7 means 27

Compare and contrast the scores of these students.

(Total for Question 3 = 6 marks)

4 Charles wants to find out how much people spend on sweets.

He will use a questionnaire.

(a) Design a suitable question for Charles to use in his questionnaire.

(2)

Charles asks the people in his class to do his questionnaire.

(b) Give a reason why this may not be a suitable sample.

(1)

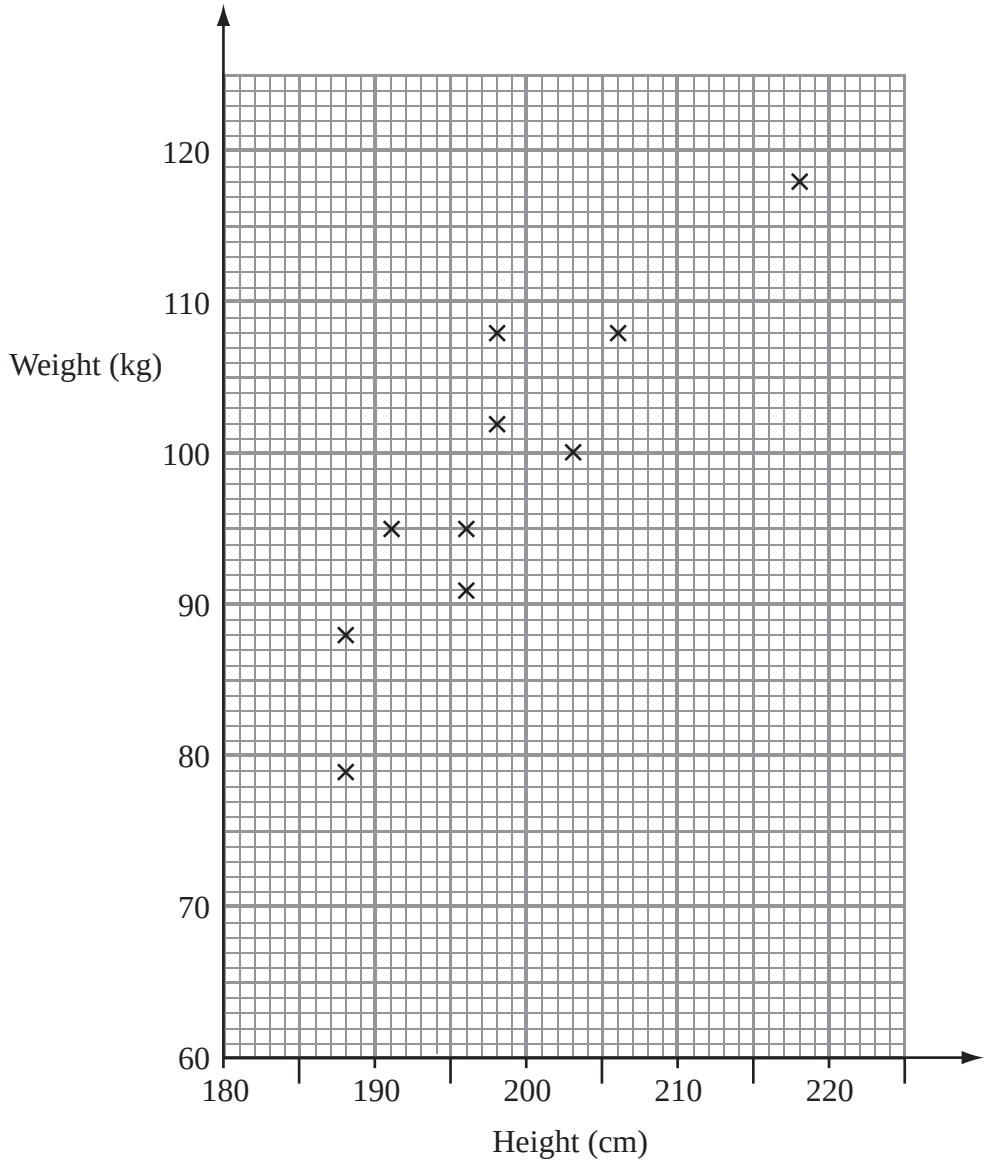
.....

.....

(Total for Question 4 = 3 marks)

5 The scatter graph shows some information about a random sample of ten male players at a basketball club.

For each player it shows his height and his weight.



(a) (i) On the scatter graph, draw a line of best fit.

(1)

(ii) Work out the gradient of your line of best fit.

(2)

.....

(iii) Write down a practical interpretation of this gradient.

(2)

.....

.....

Some of the male players at the basketball club have a weight greater than 99 kg.

(b) Estimate the proportion of these players who have a height less than 200 cm.

(2)

.....

(Total for Question 5 = 7 marks)

6 Jenny uses her mother's recipe to make cheese scones.

Her recipe uses a mixture of self-raising flour, butter and cheese in the ratio 6 : 2 : 1 by weight.

In her kitchen, Jenny has
2 kg of self-raising flour
500 grams of butter
200 grams of cheese

When Jenny makes cheese scones each scone weighs about 45 grams.

Work out the largest number of cheese scones that Jenny can make.

.....

(Total for Question 6 = 4 marks)

7 A bag contains only red counters, blue counters, green counters and yellow counters.
Rachel is going to take at random a counter from the bag.

The table shows each of the probabilities that Rachel will take a red counter or a blue counter or a green counter or a yellow counter.

Colour	Red	Blue	Green	Yellow
Probability	0.15	$2x$	x	0.1

(a) Work out the probability that Rachel will take a green counter.

(2)

.....

Rachel says that there are exactly 9 blue counters in the bag.
Rachel is wrong.

(b) Explain why there cannot be exactly 9 blue counters in the bag.

(1)

.....

.....

(Total for Question 7 = 3 marks)

8 A book has 120 pages.

The mean number of words per page for the whole book is 231
The mean number of words per page for the first 20 pages is 236

Calculate the mean number of words per page for the other 100 pages.

.....

(Total for Question 8 = 3 marks)

***9** Kylie wants to invest £20 000 for 3 years.
She considers two investments, Investment A and Investment B.

Investment A	**Investment B**
£20 000	£20 000
Earns 3.02% interest per annum	Earns 2.98% compound interest per annum
Interest paid yearly by cheque	

Kylie wants to get the greatest return on her investment.

Which of these investments should she choose?

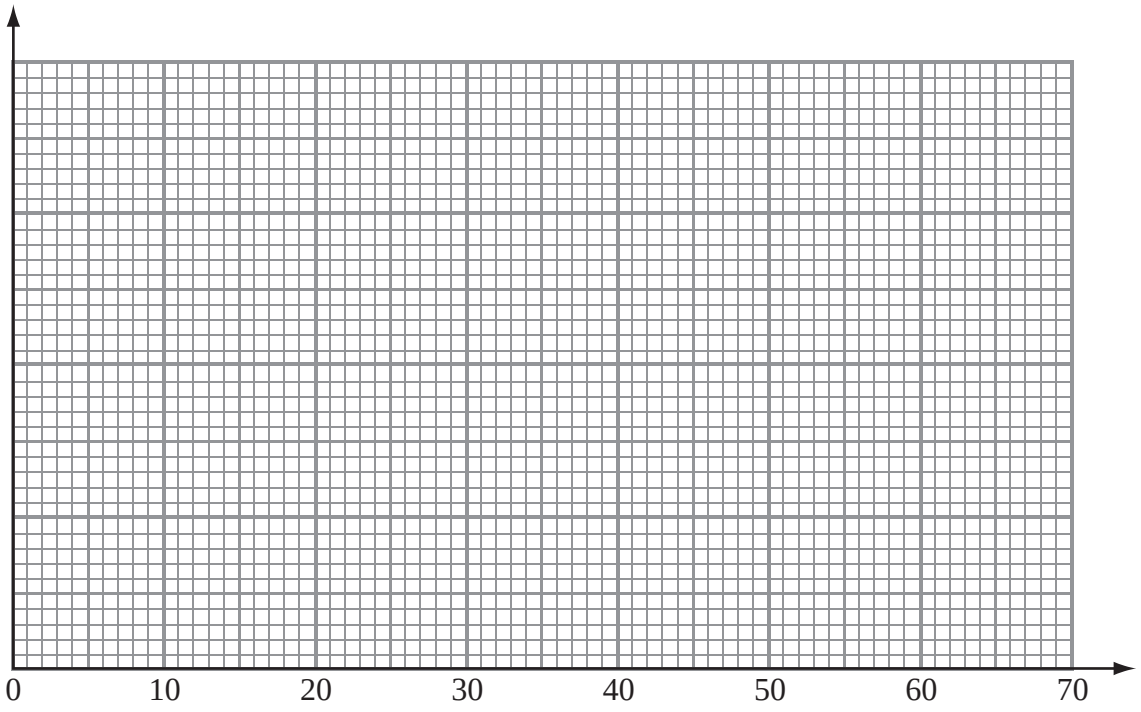
.....

(Total for Question 9 = 6 marks)

10 The table gives some information about the lengths of time, in hours, that some batteries lasted.

Time (h hours)	Frequency
$0 \leqslant h < 10$	5
$10 \leqslant h < 20$	18
$20 \leqslant h < 25$	15
$25 \leqslant h < 40$	12
$40 \leqslant h < 60$	10

Draw a histogram for the information in the table.



(Total for Question 10 = 3 marks)

11 (a) Explain what is meant by

(i) a random sample,

(1)

.....

.....

(ii) a stratified sample.

(1)

.....

.....

A Sixth Form College has 850 students.
The table shows some information about these students.

	Number of female students	**Number of male students**
Year 12	184	241
Year 13	222	203

Linda is going to do a survey of the students in the college.
She uses a sample of 50 students stratified by year group and by gender.

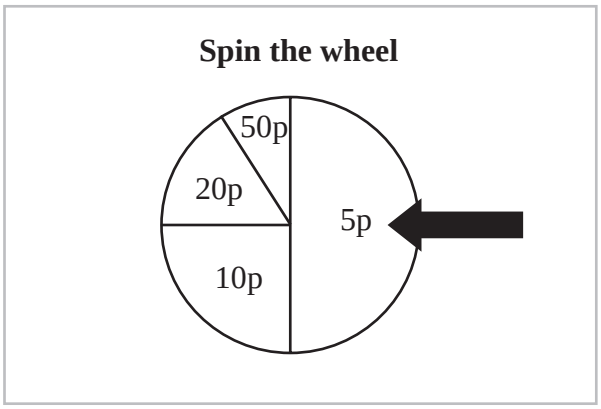
(b) Work out the number of Year 12 female students in her sample.

(2)

.....

(Total for Question 11 = 4 marks)

12



Bert has a game at a fair.

In the game players pay to spin a wheel.

When the wheel stops, the amount shown by the arrow is given to the player.
The table shows the probabilities that the wheel will stop on 5p, on 10p, on 20p and on 50p.

	5p	**10p**	**20p**	**50p**
Probability	0.5	0.25	0.15	0.1

Bert wants to make a profit from the game.

Work out the minimum he can charge players to spin the wheel.

.....

(Total for Question 12 = 4 marks)

13 In a bag there are 5 red counters and 4 blue counters.

Suki takes at random two counters from the bag.

Work out the probability that the counters will each have a different colour.

.....

(Total for Question 13 = 4 marks)

***14**

Angling Chronicle

Anglers dismayed at falling fish numbers!

A scientist wants to estimate the number of fish in a lake.
He catches 50 fish from the lake and marks them with a dye.
The fish are then returned to the lake.
The next day the scientist catches another 50 fish.
4 of these fish are marked with the dye.

Work out an estimate for the total number of fish in the lake.
You must write down any assumptions you have made.

.....

(Total for Question 14 = 4 marks)

TOTAL FOR PAPER = 60 MARKS