



Rewarding Learning

**General Certificate of Secondary Education
2024**

Statistics

Unit 1
Calculator Paper
Higher Tier

[GST12]

TUESDAY 11 JUNE, AFTERNOON

**MARK
SCHEME**

General Marking Instructions

Introduction

The mark scheme normally provides the most popular solution to each question. Other solutions given by candidates are evaluated and credit given as appropriate; these alternative methods are not usually illustrated in the published mark scheme.

The marks awarded for each question are shown in the right hand column and they are prefixed by the letters **M**, **A** and **MA** as appropriate. The key to the mark scheme is given below:

M indicates marks for correct method.

A indicates marks for accurate working, whether in calculation, readings from tables, graphs or answers.

MA indicates marks for combined method and accurate working.

The solution to a question gains marks for correct method and marks for an accurate working based on this method. Where the method is not correct no marks can be given.

A later part of a question may require a candidate to use an answer obtained from an earlier part of the same question. A candidate who gets the wrong answer to the earlier part and goes on to the later part is naturally unaware that the wrong data is being used and is actually undertaking the solution of a parallel problem from the point at which the error occurred. If such a candidate continues to apply correct method, then the candidate's individual working must be **followed through** from the error. If no further errors are made, then the candidate is penalised only for the initial error. Solutions containing two or more working or transcription errors are treated in the same way. This process is usually referred to as "follow-through marking" and allows a candidate to gain credit for that part of a solution which follows a working or transcription error.

It should be noted that where an error trivialises a question, or changes the nature of the skills being tested, then as a general rule, it would be the case that not more than half the marks for that question or part of that question would be awarded; in some cases the error may be such that no marks would be awarded.

Positive marking

It is our intention to reward candidates for any demonstration of relevant knowledge, skills or understanding. For this reason we adopt a policy of **following through** their answers, that is, having penalised a candidate for an error, we mark the succeeding parts of the question using the candidate's value or answers and award marks accordingly.

Some common examples of this occur in the following cases:

- (a) a numerical error in one entry in a table of values might lead to several answers being incorrect, but these might not be essentially separate errors;
- (b) readings taken from candidates' inaccurate graphs may not agree with the answers expected but might be consistent with the graphs drawn.

When the candidate misreads a question in such a way as to make the question easier only a proportion of the marks will be available (based on the professional judgement of the examiner)

1 (a) **KEY**

0 | 7 represents 7 runs

0	7
1	2 8 9
2	1 3 4 4 6 9
3	0 2 5 7 8
4	0 3 8
5	2 5

MA1 A2

(b) (i) Median = $\frac{29+30}{2} = 29.5$

MA1

(ii) LQ = $\frac{21+23}{2} = 22$ UQ = $\frac{38+40}{2} = 39$

MA1

IQR = $39 - 22 = 17$

MA1

(c) (i) No change

A1

(ii) Decrease

A1

(iii) No change

A1

9

2 (a) The data from a census is more reliable as a census gathers data from all library users.

A2

(b) The response section is unbalanced, it should include an option to Strongly disagree.

A1

(c) Stratification allows proportions within the population to be preserved in the sample.

A1

(d) Number of members over 60 = $80 \times \frac{445}{1345}$
 $= 26.468\dots$
 $= 26$ (or 27)

MA1

A1

6

3 (a) 60

A1

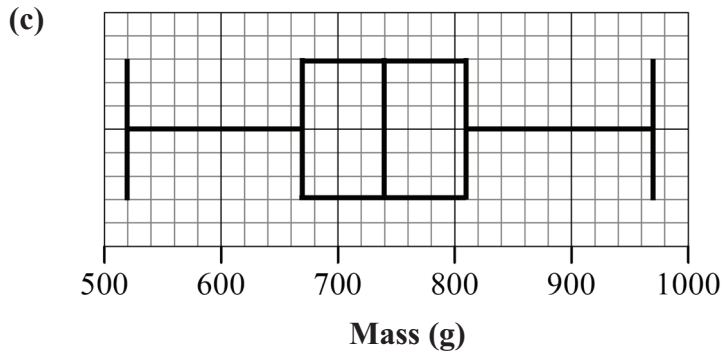
(b) (i) 740 g

MA1

(ii) IQR = $810 - 670$
 $= 140$ g

MA1

A1



MA2 A2

(d) The box plot is fairly symmetrical so a normal distribution model might be appropriate.

A2

10

4 (a) Secondary, quantitative

A2

(b) (i) Decrease

A1

(ii) The index number is less than 100

A1

(c) Cost in 2023 = $53 \times \frac{113.2}{100}$
= £60

M1 MA1

A1

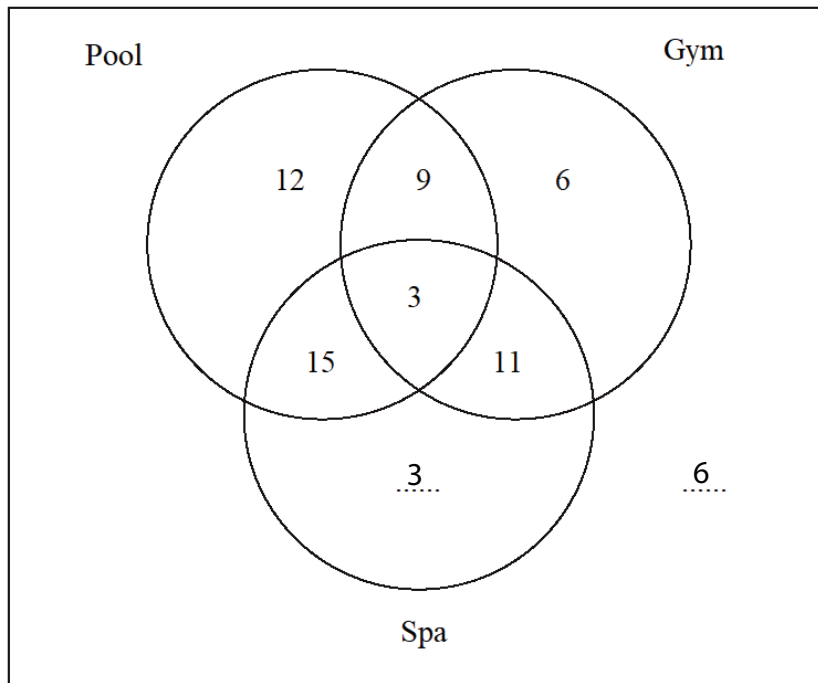
(d) Index number for 2021 = $\frac{54}{53} \times 100$
= 101.9

M1 MA1

A1

10

5 (a)



A2

(b) (i) $\frac{11}{65}$

MA2

(ii) $\frac{12+6+3}{65} = \frac{21}{65}$

MA2

(c) $\frac{9+3}{12+9+15+3} = \frac{4}{13}$

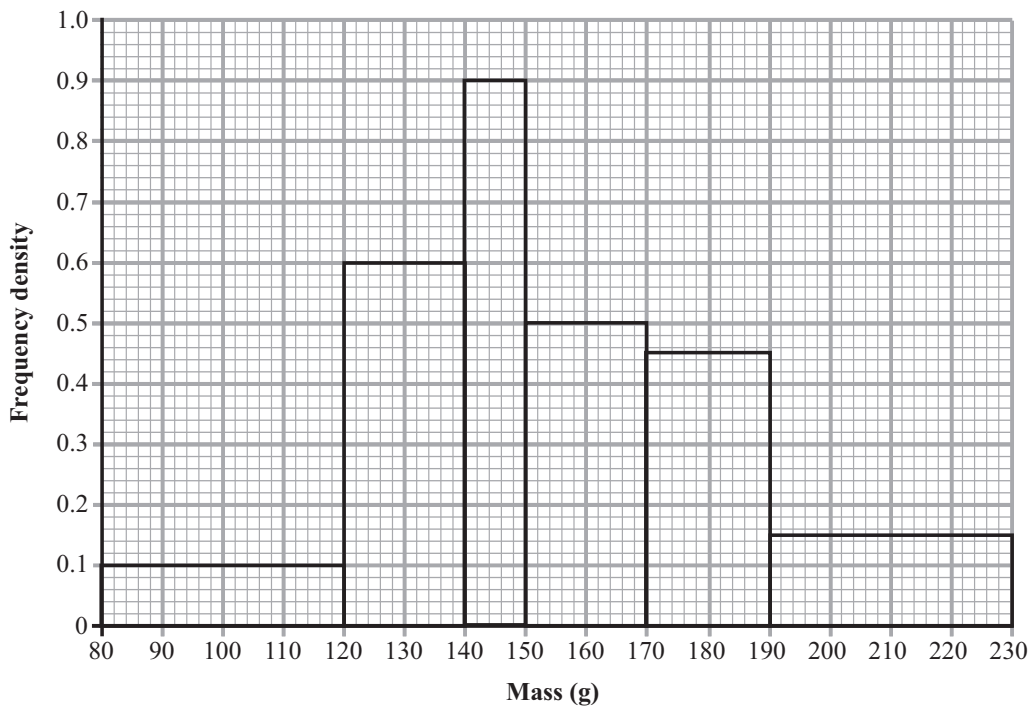
MA2

8

6 (a)

Mass (g)	Frequency	Class Width	FD
$80 < x \leq 120$	4	40	0.1
$120 < x \leq 140$	12	20	0.6
$140 < x \leq 150$	9	10	0.9
$150 < x \leq 170$	10	20	0.5
$170 < x \leq 190$	9	20	0.45
$190 < x \leq 230$	6	40	0.15

MA1



A3

(b) Hugh may not be correct as the data in the histogram reflects the results of a sample of oranges from the supermarket, not all of them.

A2

6

7 (a) (i) Cinemas with more visitors charge more for entry tickets

A1

(ii) This is a statement connecting the variables and not a question

A1

(b) (i)

V	110	323	770	64	501	447	882	269
P	5.75	4.75	8.00	6.80	3.20	7.40	6.15	5.45
R _V	7	5	2	8	3	4	1	6
R _P	5	7	1	3	8	2	4	6
d	2	-2	1	5	-5	2	-3	0
d ²	4	4	1	25	25	4	9	0

MA1

$$\begin{aligned} \Sigma d^2 &= 72 && \text{A1} \\ r_s &= 1 - \left(\frac{6 \Sigma d^2}{n(n^2 - 1)} \right) \\ &= 1 - \left(\frac{6 \times 72}{8 \times 63} \right) && \text{MA1} \\ &= 0.143 && \text{A1} \end{aligned}$$

(ii) Since the value of r_s is close to 0, there is unlikely to be any correlation between the number of visitors to the cinema and the average ticket price, so Hope's hypothesis is not correct. A2

8

8 (a) $\frac{35}{31} \times 100 = 112.9$ MA1 A1

(b) The cost of the ingredients increased by 14.3% between 2021 and 2022 A3

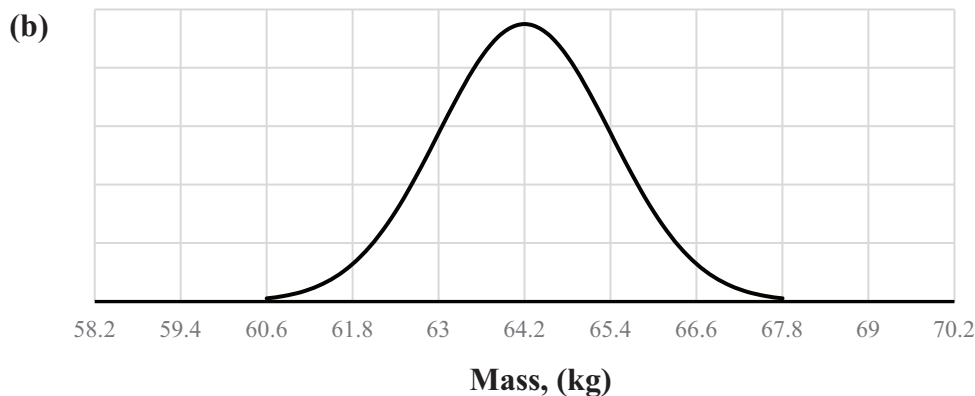
(c) $\sqrt[5]{100 \times 129.2 \times 112.9 \times 114.3 \times 107.5} = 112.4$ MA1
A1

(d) On average, the cost of the ingredients increased by 12.4% over the 5-year period. A2

(e) $\left(\frac{232}{200} \times 50 \right) + \left(\frac{297}{270} \times 37.5 \right) + \left(\frac{18}{16} \times 12.5 \right)$ M1
 $= 58 + 41.25 + 14.0625 = 113.3$ MA2 A1

13

9 (a) Lower boundary = $64.2 - 1.2 = 63.0$ kg MA1
Upper boundary = $64.2 + 1.2 = 65.4$ kg MA1



(c) Lower outlier < $64.2 - 3 \times 1.2 = 60.6$ kg M1MA1
 $60.8 > 60.6$ so 60.8 kg is not an outlier A2

