



Rewarding Learning

**General Certificate of Secondary Education
2023**

Statistics

Unit 1

Foundation Tier

[GST11]

MONDAY 12 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)

Type of bird	Tally	Frequency
Blackbird		2
Pigeon		3
Robin		6
Sparrow		5
Wren		8

A3

(b) 24

A1

(c) Wren

A1

(d)

Type of bird	
Blackbird	∩ ∩
Pigeon	∩ ∩ ∩
Robin	∩ ∩ ∩ ∩ ∩ ∩
Sparrow	∩ ∩ ∩ ∩ ∩
Wren	∩ ∩ ∩ ∩ ∩ ∩ ∩ ∩

A3

8

AVAILABLE
MARKS

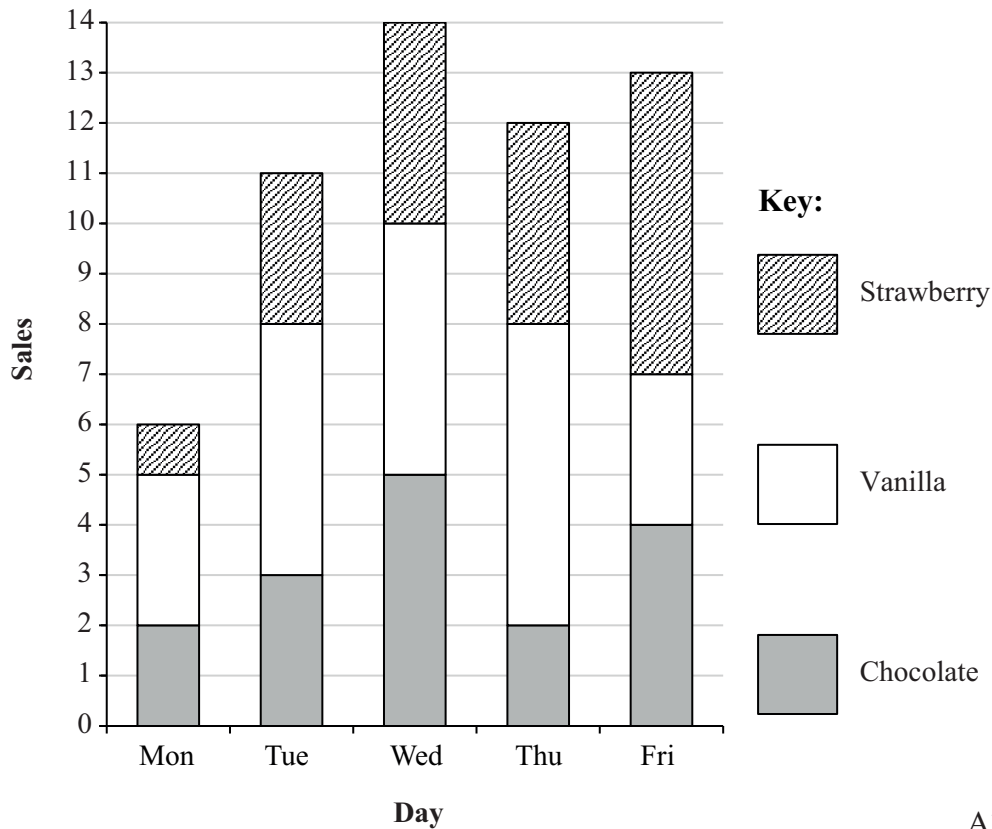
2 (a) 11

A1

(b) 5

A1

(c)



A3

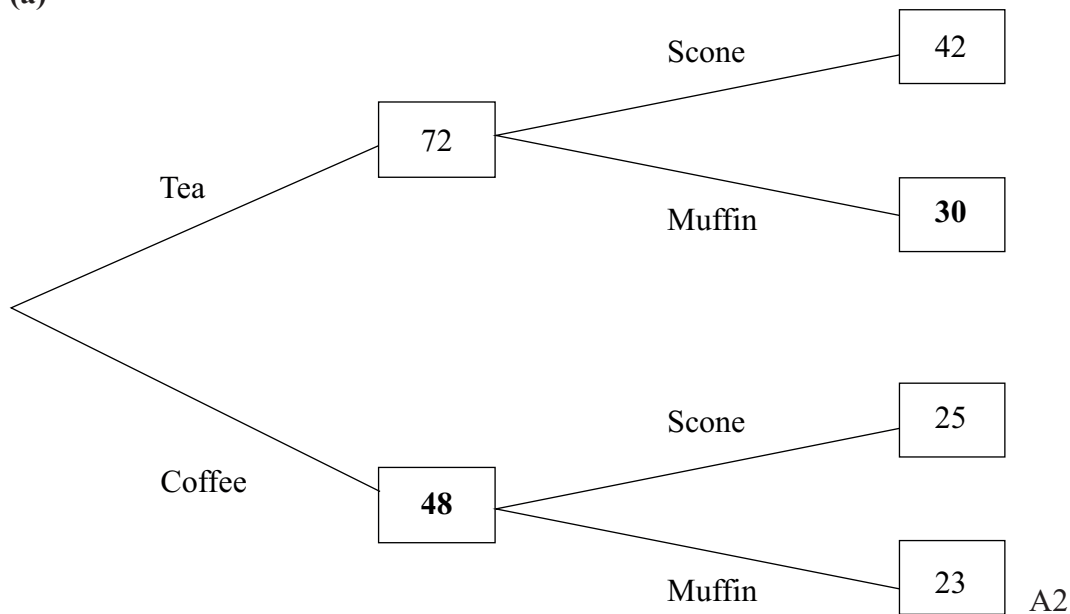
(d) Suitable valid comparisons, e.g.

- same number of chocolate doughnuts sold on each day.
- twice as many doughnuts sold overall on Thursday than Monday.

A2

7

3 (a)



A2

(b) Total customers = 72 + 48 = 120

MA1

$$\frac{23}{120}$$

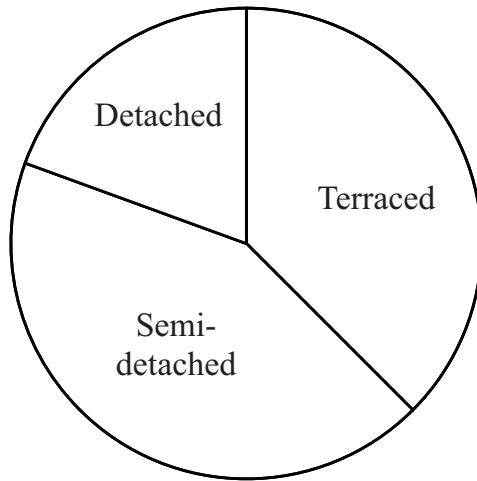
MA1

4

			AVAILABLE MARKS
4	(a) All employees of the hospital.	A1	9
	(b) Appropriate advantage, e.g. <ul style="list-style-type: none"> • a sample survey would be quicker/cheaper as it only requires some employees of the hospital to be questioned. 	A1	
	Appropriate disadvantage, e.g. <ul style="list-style-type: none"> • a sample survey does not include the opinion of every hospital employee and so may not be as accurate. 	A1	
	(c) Opportunity sampling	A1	
	(d) Simple random sampling	A1	
	(e) Every member of the population has an equal probability of being chosen.	A1	
	(f) 246, 025, 179, 395, 014	MA3	
5	(a) (i) $\frac{5 \times 2 + 6 \times 3 + 7 \times 7 + 8 \times 11 + 9 \times 4 + 10 \times 3}{30}$ = 7.7	MA2 A1	
	(ii) 5	A1	
	(b) $2 + 3 + 7$ = 12	MA1	
	(c) Class 10B had a larger mean and a smaller range which means their scores were higher and more consistent overall.	A1 A1	7

6 (a)

Type of property	Number	Angle
Terraced	27	135°
Semi-detached	31	155°
Detached	14	70°



MA4

(b) (i) Maybe

A1

(ii) It depends on how many people live in each house.

A1

6

7 (a) Data logging

A1

(b) Appropriate advantage, e.g.

- saves time/money

A1

Appropriate disadvantage, e.g.

- data may be missing due to vehicles being obscured from the camera

A1

(c) Negatively skewed

A1

There is a longer tail to the left.

A1

(d) (i) $16 \leq x < 20$ minutes

A1

(ii) The modal visiting times for the vans is greater which means vans spend longer, on average, in the recycling centre than cars.

A1

(iii) Vans will be likely to carry more than cars and so take longer to unload.

A1

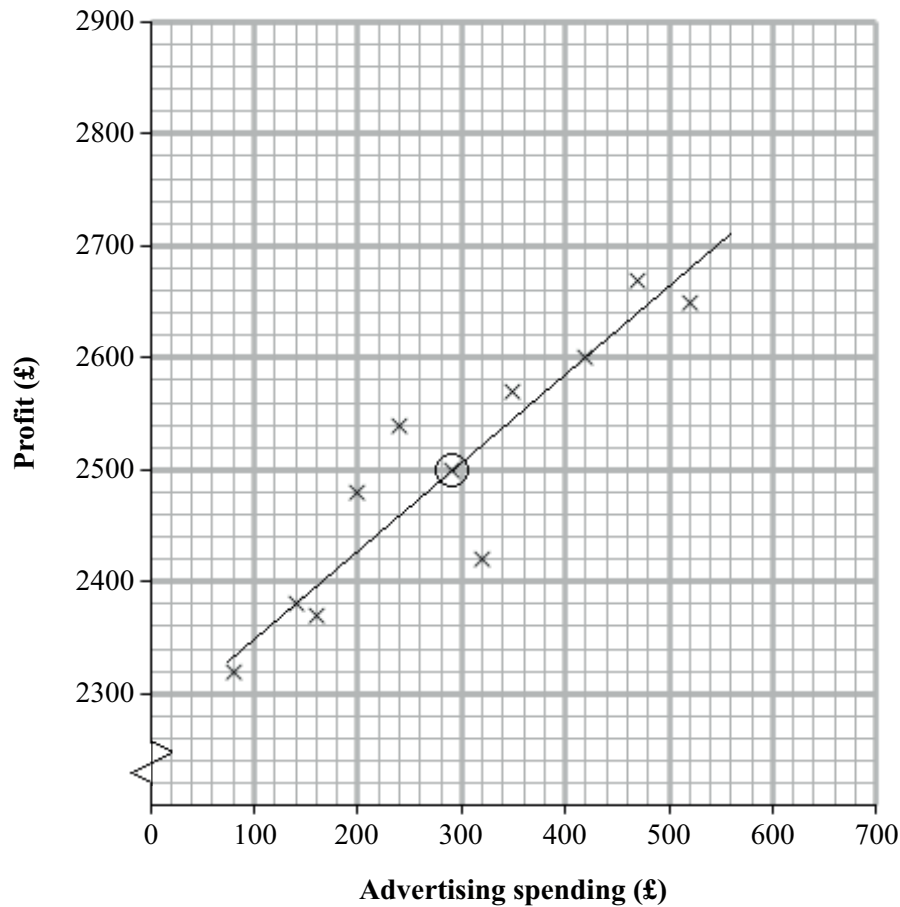
(e) It is not possible to identify the minimum and maximum visiting times because the data is grouped.

A2

10

AVAILABLE
MARKS

8 (a)



MA2

(b) Positive correlation

A1

As advertising spending increases, profit increases.

A1

(c) The estimate may not be reliable as the given advertising spending lies outside the range of values for which the line of best fit was drawn.

A2

6

9 (a) $\frac{60}{8000} \times 100$
 $= 0.75\%$

MA1

A1

(b) 60×140
 $= \text{£}8400$

MA1

A1

(c) $\frac{0.75}{100} \times 12\,800$
 $= 96$

MA1

A1

(d) Any valid reason, e.g.

- changing to more reliable machinery.
- staff may become more/less reliable from one year to the next.

A1

7

AVAILABLE
MARKS

10 (a)

Minimum	Lower quartile	Median	Upper quartile	Maximum
19	31	45	54	69

AVAILABLE MARKS

MA3

(b) $54 - 31 = 23$

MA1
A1

(c) The middle 50% of the data has a range of 23 years.

A1

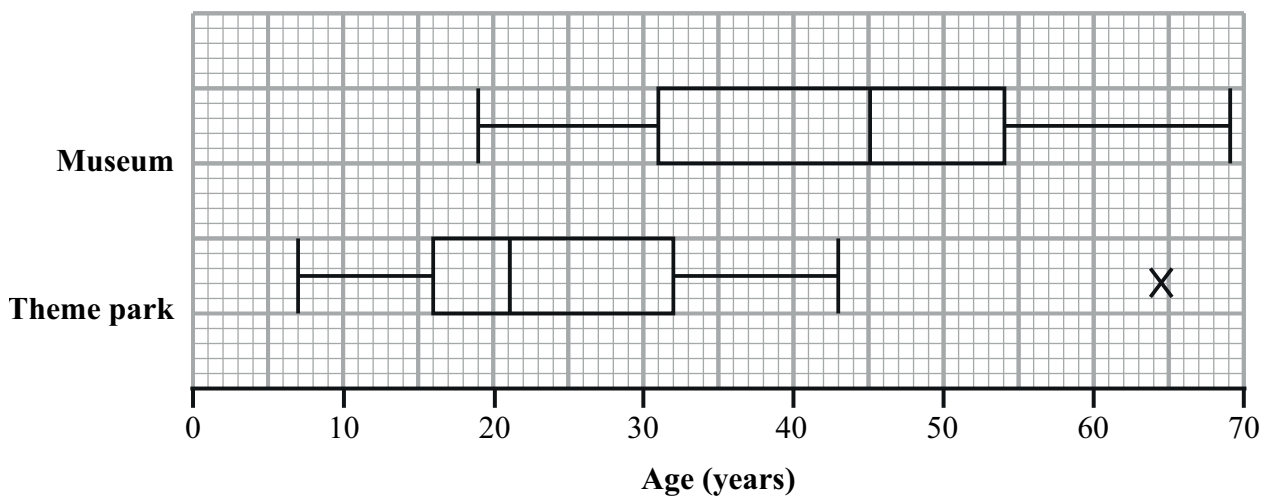
(d) There is no mode for this data as each value occurs only once.

A2

(e) It represents an outlier which is an extreme value in the dataset.

A2

(f)



MA2

(g) The museum has a higher median age so visitors to the museum are older on average.

A2

The museum has a larger range/interquartile range so the ages of visitors to the museum are more varied.

A2

16

Total

80