



Rewarding Learning

**General Certificate of Secondary Education
2023**

Statistics

Unit 2

Foundation Tier

[GST21]

MONDAY 19 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) 46 000 hectares A2
- (b) Grass under 5 years old and rough grazing A1
- (c) (i) Grass over 5 years old A1
- (ii) It occupies the largest portion of the diagram A1

- 2 (a) Data logging A1

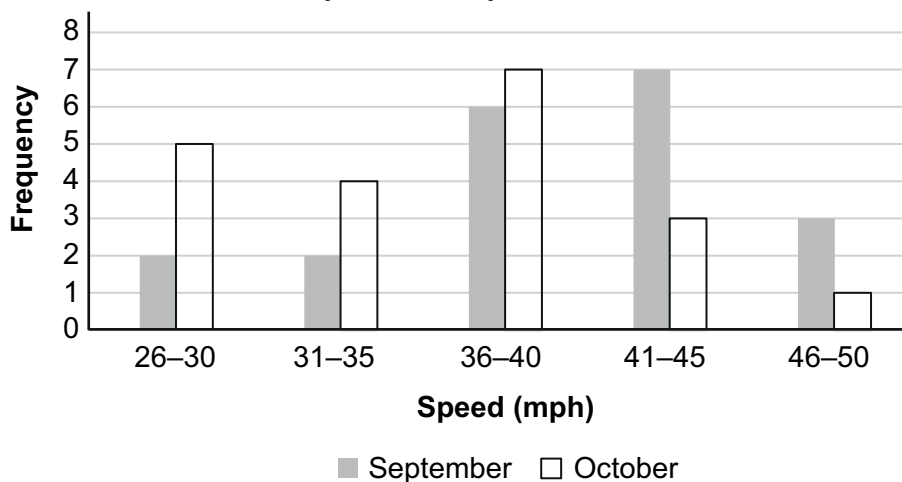
(b)

Speed in miles per hour	Tally	Frequency
26 – 30		2
31 – 35		2
36 – 40		6
41 – 45		7
46 – 50		3

A2

- (c) 40mph A1

(d) **Vehicle speeds in September and October**



A2

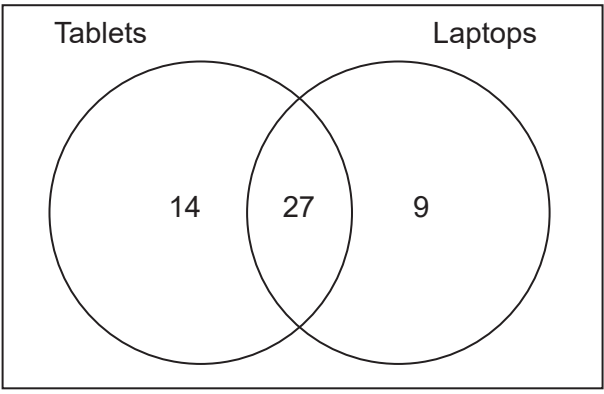
- (e) (i) Yes A1

- (ii) In October there are fewer cars which are travelling above 40 (or 45) mph. A1

AVAILABLE MARKS

5

8

			AVAILABLE MARKS
3	(a) Medium	A1	7
	(b) The figures have been rounded to the nearest whole number.	A1	
	(c) $\frac{2850}{25896} \times 100 = 11.00556\dots$	MA2	
	Small farms	A1	
	(d) Yes as 79% is greater than 75% which is equal to $\frac{3}{4}$	A2	
4	(a) Number all the pupils from 1–180, pick a random starting point, pick every ninth pupil on the list.	A3	
	(b) She may get very few of one gender.	A1	
	(c) Quota sample.	A1	
	(d) (i) Correct order	MA1	
	$\frac{3.4\% + 4.2\%}{2} = 3.8\%$	MA1	
	(ii) LQ = 0.5	A1	
	UQ = 5.5	A1	
	IQR = 5.5 – 0.5 = 5%	MA1	
	(e) The median for the boys is higher so on average their scores increased by more. The boys' IQR is also higher, so their percentage increase was less consistent than the girls'.	A2 A2	14
5	(a) A list of all the schools in the county.	A1	9
	(b) Postal advantage – It is quicker to carry out. Telephone advantage – You may get a better response rate.	A1 A1	
	(c) Provide an incentive such as entry into a competition to win a prize.	A1	
	(d) Primary	A1	
	(e) (i) $41 + 36 - 50 = 27$	MA1 A1	
	(ii)		
	 <p>A Venn diagram with two overlapping circles. The left circle is labeled 'Tablets' and contains the number 14. The right circle is labeled 'Laptops' and contains the number 9. The overlapping region between the two circles contains the number 27.</p>		
		MA2	

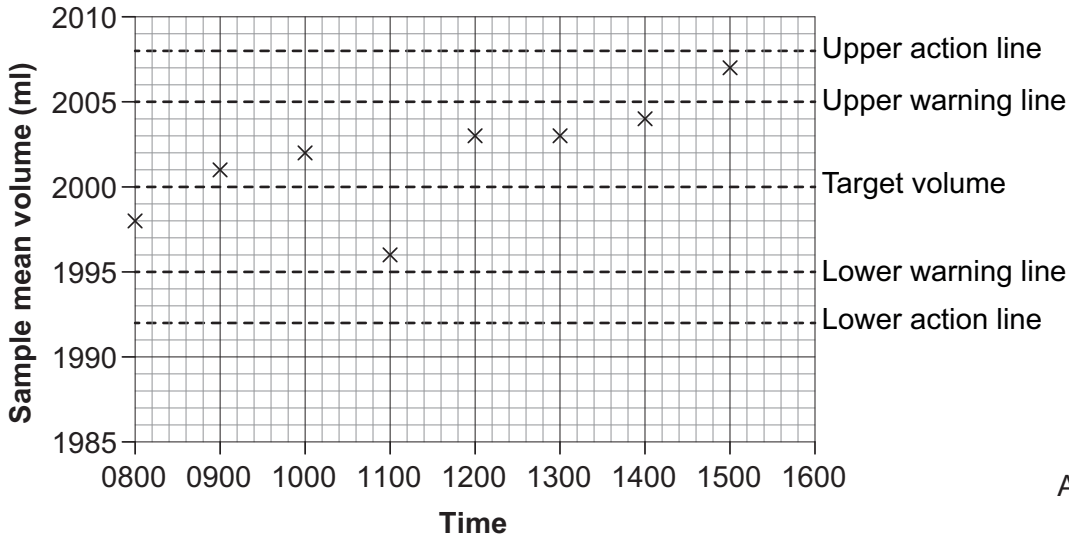
- 6** (a) Large farms are more likely to keep dairy cows than small farms or small farms are more likely to keep beef cows. A1
- (b) Anne would need to collect data on how many cows each farm keeps and whether the farms use the cows for beef or dairy. A2
- (c) NISRA – Agricultural Census. A1
- (d) A dual bar chart A1
- (e) The diagram would show clearly the size of the farm and how many dairy and beef cows are kept. A2
- 7** (a) $\frac{360}{100} \times 5$ MA1
= 18 sheep A1
- (b) $\frac{1}{200} \times 100$ MA1
0.5% A1
- (c) $\frac{360}{100} \times 0.5 = 1.8$ MA1
2 sheep A1

AVAILABLE
MARKS

7

6

8 (a)



A2

- (b) Target line drawn at 2000
Warning lines drawn and labelled at 2005 and 1995
Action lines drawn and labelled at 2008 and 1992 A3
- (c) The shift manager should take another sample straight away as the sample mean is above the warning limit. If the new sample mean taken is also high, he should reset the machine. A3
- (d) GM Advantage – If they do the process more often, they could pick up machine errors more quickly.

GM Disadvantage – This would take more time to carry out. A2
- (e) PM Advantage – They would ensure that the lemonade bottles are filled more accurately as they would get more frequent warnings and actions.

PM Disadvantage – They may have to stop production and reset the machines more often if they reduce the limits. A2
- (f) The range would show if there is consistency within the sample. The mean could be on target but some of the bottles could be too high or too low. A2

AVAILABLE MARKS

14

9	(a) Read 1 000 000 and 25 000 from graph	MA1	AVAILABLE MARKS
	$\frac{1\,000\,000}{25\,000}$	MA1	
	40 hectares	A1	
	(b) The number of hectares farmed stays very consistent, but the number of farms decreases over the time period.	A2	
	(c) There are fewer farms as smaller farms may have been bought over by bigger farms or combined with other small farms.	A1	
	(d) 0.933	A2	
	(e) (i) Positive correlation	A1	
	(ii) As the number of large farms increases the total number of pigs increases		
	or Large farms are more likely to keep more pigs.	A1	10
	Total		80