Rewarding Learning

General Certificate of Secondary Education
2018

Statistics

Unit 1

Foundation Tier

[GST11]

THURSDAY 21 JUNE, MORNING

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) 7   A1

(b) Dungannon: 💧 💧 💧   MA1

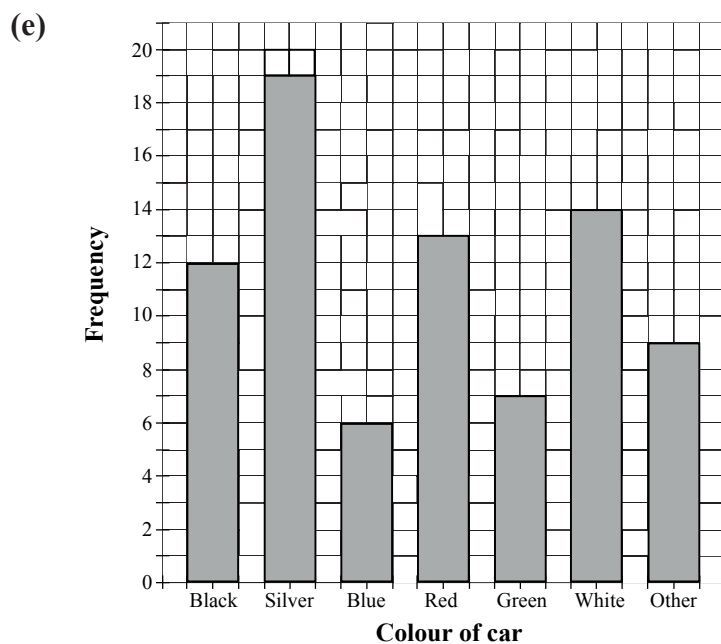**(c)** Disagree   A1
Any valid reason
- Raindrop symbol is symmetrical so can be easily adjusted to represent one day   A1   4

2 (a) $80 - (12 + 19 + 6 + 13 + 14 + 9)$ M1
$= 80 - 73$
$= 7$ A1

(b) Tally   ⑅‖   MA1

Frequency 7   A1

(c) Silver   A1

(d) Black   A1

(e)

      MA1

(f) Primary data   A1   8

3 (a)

	Biology	Chemistry	Physics	TOTAL
Boys	35	39	48	**122**
Girls	43	23	52	**118**
TOTAL	78	62	100	240

MA3

(b) $P(\text{Bio}) = \dfrac{78}{240} = \dfrac{13}{40} = 0.325$ MA1

(c) $P(\text{Not Chem} \mid \text{Girl}) = \dfrac{95}{118} = 0.805$ MA1 A1

(d) Expected No. of Pupils $= 24 \times \dfrac{100}{240}$ MA1

$= 10$ A1 8

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4 (a) The residents of the town A1

(b) 'Recently' not specific enough/open to interpretation as no time frame A1

No box for not visiting the library at all. A1

(c) Any valid advantage, e.g.
- Easy to analyse A1 4

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5 (a)

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

MA3

Key: 0|3 represents 3 text messages A1

(b) (i) Median $= \frac{1}{2}(17 + 21)$ M1

$= 19$ text messages A1

(ii) Range $= 41 - 3$ MA1
$= 38$ text messages

(c) Any valid comparison involving the medians
- Boys receive more messages than girls
- Girls receive fewer texts than boys A1

Any valid comparison involving the ranges
- Number of texts is more variable/less consistent among girls A1 9

6 (a) (i) £5.80   A1

(ii) £7.30 – £4.00   M1

= £3.30   A1

(b) Values in correct places (ft their values)   MA1

Correct shape (must have values marked)   MA1

(c) Negative skew   A1

Median closer to UQ (or equivalent)   A1

(d) Method which uses people available at a particular place/time.   A1   8

7 (a) 4 years   A1

(b) Negative correlation   A1

(c) £5800   MA1

(d) (i) £11 000 to £11 200   MA1

(ii) May not be reliable as straight line model may not apply in first year. A1   5

8 (a) (i) B   A1

(ii) C   A1

(iii) A   A1

(b) Coin is possibly biased as the number of 'heads' exceeds the expected number.   A2

(c) Repeat the experiment a larger number of times.   A1   6

9 (a) Any advantage, e.g.
- no need to have a column for every possible time   A1

Any disadvantage, e.g.
- accuracy is lost by grouping   A1

(b)

Time	Frequency, f	t	ft
$0 < t \leqslant 10$	343	5	1715
$10 < t \leqslant 20$	214	15	3210
$20 < t \leqslant 30$	197	25	4925
$30 < t \leqslant 40$	145	35	5075
$40 < t \leqslant 50$	72	45	3240
$50 < t \leqslant 60$	29	55	1595
TOTAL	**1000**		**19 760**

MA2

$$\bar{t} = \frac{19\,760}{1000}$$ M1

$$= 19.76 \text{ seconds}$$ A1

(c) Claim is justified because estimated mean is less than 20 seconds   A2

(d) (i) No   A1

(ii) Any unsatisfied property, e.g.
- distribution not symmetrical
- histogram has a positive skew   A1   10

10 (a) Mean $= \dfrac{3 + 8 + 9 + 5 + 12 + 4 + 2 + 1}{8}$ M1

$$= 5.5 \text{ times}$$ A1

(b) All the numbers have the same frequency so there is no mode.   A1

(c) Decrease   A1

(d) People living closer to the cinema go to it more often.   A1

(e) Quantitative   A1

Discrete   A1
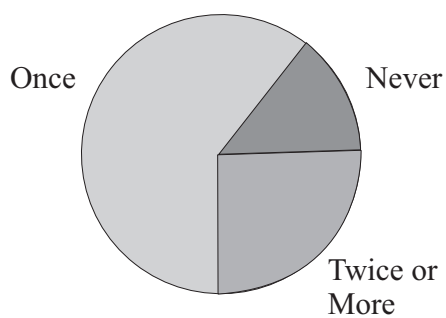
(f) Negative correlation, so people living closer to the cinema go more often. A2   9

11 **(a)** Statement B $\qquad$ A1

(b) % of people who prefer Running $= \dfrac{126}{360} \times 100$ $\qquad$ M1 MA1

$$= 35\% \qquad \text{A1}$$

(c)

No. of Times	No. of People	Angle
Never	17	51°
Once	72	216°
Two or more	31	93°

MA4

(d) Last row is open-ended $\qquad$ A1 | 9

Total | **80**