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Rewarding Learning

General Certificate of Secondary Education
2019

Statistics

Unit 1

Foundation Tier

[GST11]

THURSDAY 13 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)

					AVAILABLE MARKS
1	**(a)**	50		MA1	
	(b)	$\frac{13}{50} = 26\%$		MA1 A1	
	(c)	Any advantage, e.g. easy to interpret, modal category easily identified, etc.		A1	
		Any disadvantage, e.g. frequencies have to be calculated from a key		A1	5
2	**(a)**	**(i)**	19	MA1	
		(ii)	29	MA1	
		(iii)	50	MA1	
	(b)	**(i)**	Agree, because 31 adults visited the library compared to 19 children.	A2	
		(ii)	Agree, because 21 males visited the library compared to 29 females.	A2	
	(c)	**(i)**	Maybe	A1	
		(ii)	It is not possible to predict the pattern of visitors from one week to the next based on the results from just one morning.	A2	10

3 **(a)**

Number of children	Tally	Frequency
0	||	2
1	|||| |	6
2	||||	4
3	||	2
4	|	1
5		0
6	|	1

A2

(b) **(i)** Yes   A1

    (ii) The data is discrete   A1

(c) **(i)** Mean $= \dfrac{30}{16}$ MA1

         $= 1.875$ A1

    (ii) Range $= 6 - 0 = 6$ MA1

(d) Families in Magherafelt have, on average, more children since they have a larger mean.   A2
There is more dispersion among the number of children in families in Newtownards since their range is larger.   A2   11

4 **(a)** $\dfrac{3}{5}$ A1

(b) $\dfrac{1}{2}$ MA1

(c) **(i)** Expected frequency $= \dfrac{3}{5} \times 50$ MA1

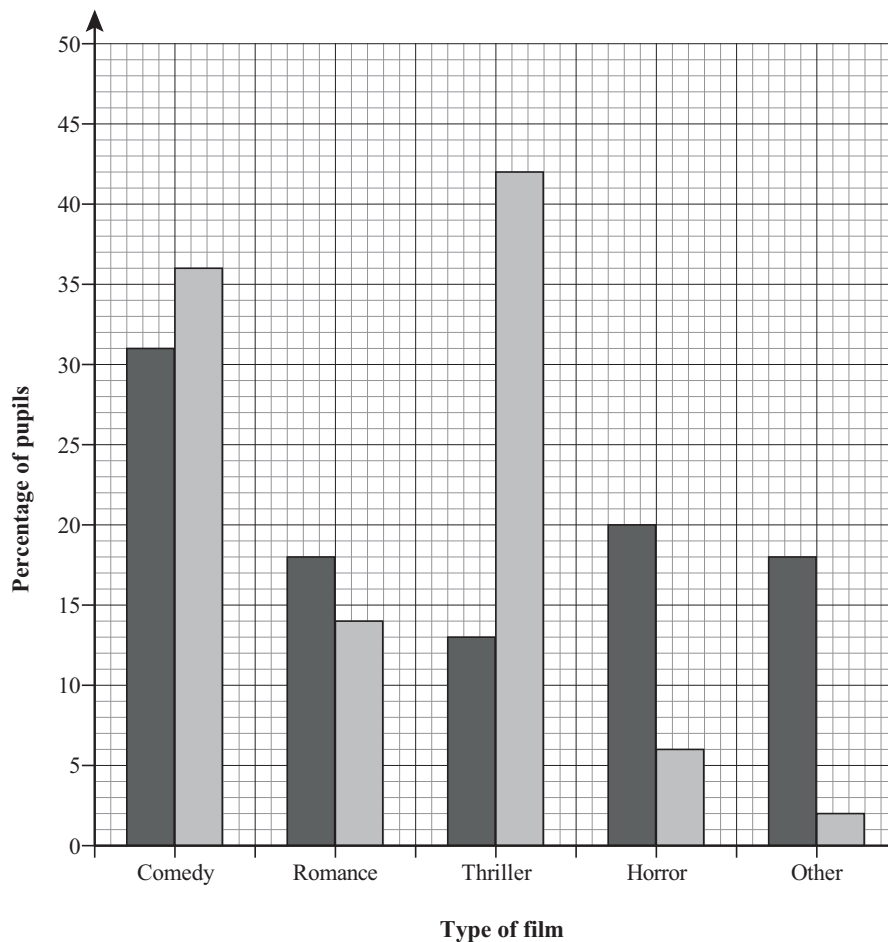 $= 30$ A1

    (ii) Expected frequency $= 20$ MA1   5

5 **(a)**

Type of film	Number of pupils		Percentage of pupils (%)	
	David	**Sarah**	**David**	**Sarah**
Comedy	14	18	31	36
Romance	8	7	18	14
Thriller	6	21	13	42
Horror	9	3	20	6
Other	8	1	18	2

A2

(b)

MA4

(c) There is less variation in the percentages for each category of film for David's data.

A1

(d) Categorical

A1   8

6 **(a)** London and Yorkshire and the Humber   A1

  (b) No   A1

  (c) The average starting salary for graduates in London is £29,500 and 50% of graduates earn this amount or less.   A2

  (d) Identified area, e.g. South West

  Reason, e.g. lowest unemployment rate   A2   6

7 **(a)** Cluster sampling   A1

  (b)

Number	Town
08	Bangor
22	Larne
34	Strabane
14	Cookstown
16	Downpatrick

          MA4   5

8 **(a)**

		Saturday					**Sunday**		

7|**8** means 87   **8**|7 means 87

9	9	8	7	**8**	7				
		6	4	**9**	0	1	6		
6	5	2	1	**10**	2	5	8		
	9	3	1	**11**	0	0	2	3	3
		8	6	**12**	3	4	8		

          A4

  (b)

	Minimum	LQ	Median	UQ	Maximum
Saturday	87	89	102	113	128
Sunday	87	96	110	113	128

          MA3

  (c) The median number of customers is greater for a Sunday than a Saturday, so on average there are more customers on a Sunday.
  The interquartile range of the number of customers was smaller on Saturday than on Sunday so the data for Saturday was less dispersed.   A4   11
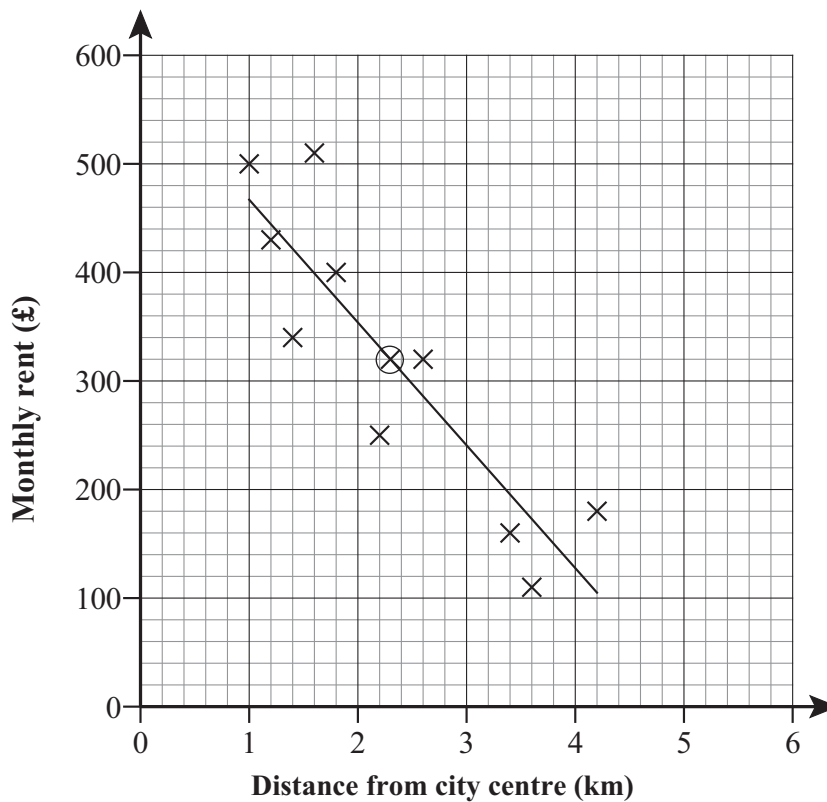
9 **(a)** Mean = $\dfrac{1.0 + 1.2 + 1.4 + 1.6 + 1.8 + 2.2 + 2.6 + 3.4 + 3.6 + 4.2}{10}$ MA1

      = 2.3 km   A1

(b)

MA2

(c) **(i)** Negative correlation   A1

    (ii) Apartments further away from the city centre have cheaper rent.   A1

(d) **(i)** Yes   A1

    (ii) The given distance falls within the range of values for which the line
of best fit was drawn.   A1   8

AVAILABLE MARKS

10 (a) Obtain a list of all pupils in the school.
Start at a random place on the list.

Select every $\dfrac{1400}{50} = 28^{th}$ name. 　　　　　　A3

(b) Opportunity sampling 　　　　　　A1

(c) (i) $8 \leqslant t < 11$ 　　　　　　MA1 A1

　　(ii) $11 \leqslant t < 14$ 　　　　　　A1

(d) Helen's results follow a more uniform distribution than Peter's.
The modal class for the results in Helen's sample was greater than
the modal class for the results in Peter's sample. 　　　　　　A2

(e) (i) Peter 　　　　　　A1

　　(ii) The results from Peter's sample are more likely to be representative
of the whole school. 　　　　　　A1

11

Total 　　　　**80**