

# GCSE 2004

## *June Series*



# Mark Scheme

## Statistics

### *(3311/F)*

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Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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*Dr Michael Cresswell Director General*

## AQA GCSE Statistics

### Notes for Examiners

In general if a response is fully correct then it is sufficient to tick the final answer and put the mark for that part in the margin. Parts not attempted or totally incorrect must have 0 for that part in the margin. Negative marks must not be used.

Errors **must** be crossed, underlined or ringed.

Responses that are partly correct will generally be awarded marks for method or partial working. In that case the following should appear **in the margin** to indicate what the marks have been awarded for. These are detailed in the mark scheme.

- |                              |  |
|------------------------------|--|
| <b>M</b>                     | Method marks are awarded for a correct method which could lead to a correct answer.  |
| <b>A</b>                     | Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied. |
| <b>B</b>                     | Marks awarded independent of method.   |
| <b>M dep</b><br>or <b>DM</b> | A mark that can only be awarded if a previous method mark has been awarded.  |
| <b>B dep</b><br>or <b>DB</b> | A mark that can only be awarded if a previous independent mark has been awarded.   |
| <b>ft</b>                    | Follow through marks. Marks awarded for correct working following a mistake in an earlier step.  |
| <b>SC</b>                    | Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.                        |

Within the script the following notations can be used to explain the decision further. These should appear next to the place in the script where the error or omission is made.

- ft**  
or ✓ Follow through marks. Wrong working should not be penalised more than once so that positive achievement later in the question can be recognised.
- ✗** An answer that does not follow through from previous working.
- MR**  
or **MC** Misread or miscopy. Candidates often copy values from a question incorrectly. If the examiner thinks that the candidate has made a genuine misread, then only the accuracy marks (A or B marks), up to a maximum of 2 marks are penalised. The method marks can still be awarded.
- fw** Further work. Once the correct answer has been seen, further working may be ignored unless it goes on to contradict the correct answer.
- Choice** When a choice of answers and/or methods is given, mark each attempt. If both methods are valid then M marks can be awarded but any incorrect answer or method would result in marks being lost.
- wnr** Work not replaced. Erased or crossed out work that is still legible can be marked.
- wr** Work replaced. Erased or crossed out work that has been replaced is not awarded marks.
- ^** Work incomplete or method missing.
- allow** In general decisions should support the candidate. If an examiner feels that work is worthy of a mark then it can be allowed.
- BOD** Benefit of the doubt should only be given in cases where evidence is not secure. For example overwriting numbers. It should not be used to avoid making a decision. Examiners are expected to make decisions based on the scheme.
- seen**  
or ✓ Every page containing working should be annotated to show it has been considered.
- oe** Or equivalent.  
Accept answers that are equivalent. eg accept 0.5 instead of  $\frac{1}{2}$
- From page 23** ↘ Marks transferred from another part of the paper. Candidates often make a mistake in their original work and do the question on the back page or another page with some space. The part marks

should be credited there **within the script** and the marks transferred to the margin by the printed question.

- Wrong method** Candidates sometimes obtain the correct answer via a completely wrong method. If an examiner is sure that this is the case then the method mark should not be awarded and subsequently the accuracy mark cannot be awarded. This notation should also be used when candidates ‘fiddle’ algebra to demonstrate a given result.
- pa** Premature approximation. Rounding off too early can lead to inaccuracy in the final answer. This should be penalised by 1 mark unless instructed otherwise at the standardisation meeting.

Examiners are asked not to use any other abbreviations.

Within the mark scheme other abbreviations may be seen:

- 1 eoo** Deduct 1 mark for each error or omission down to zero.
- eg  
3.14...** Allow answers which begin 3.14 eg 3.14, 3.142, 3.149.
- Use of  
brackets  
eg  
( $x =$ )** It is not necessary to see the bracketed work to award the marks.

### **Unusual responses**

Very occasionally situations may occur which are not covered by the above notations. In these rare cases examiners should write brief comments in the script to explain their decision, such as ignore, irrelevant etc.

### **Blank answer spaces and blank pages**

Blank answer spaces should be crossed through to show that they have been seen. Blank pages at the end of a paper should also be crossed through to indicate that they have been seen. Any working on these pages must be marked.

### **Diagrams**

Diagrams that have working on them should be treated like normal responses and marked with the same notations as above. If a diagram is written on but the correct response is within the answer space the work within the answer space should be marked and the diagram ticked to indicate that the examiner has seen it. Working on diagrams that contradicts work within the answer space is **not** to be considered as choice but as working, and is not, therefore, penalised.

**Responses which appear to come from incorrect methods.**

Whenever there is doubt as to whether a candidate has used an incorrect method to obtain an answer, as a general principle the benefit of doubt must be given to the candidate. In cases where there is no doubt that the answer has come from incorrect working then the candidate should be penalised as directed at the standardising meeting.

**Questions which ask candidates to show working**

Instructions on marking will be given at the standardising meeting but usually marks are not awarded to candidates who show no working.

**Questions which do not ask candidates to show working**

As a general principle a correct response is awarded full marks.

**Probability**

Answers should be written as fractions, decimals or percentages. If a candidate uses an incorrect notation such as ‘1 out of 4’ for  $\frac{1}{4}$  consistently throughout the paper, penalise the first occurrence but allow any following answers. Do **not** accept Ratio.

**Recording Marks**

Part marks for a question should be shown in the margin at the side of the work. The totals should be shown in the oval either at the end of each question or after each double page. These marks should be transferred to the appropriate box on the front of the paper. The grand total for the paper should also be shown in the appropriate box on the front of the paper. This total should agree with the total of the part marks within the paper.

Examiners are responsible for checking the totalling and transfer of marks although clerical checking may be delegated. Checkers at AQA will first check that the part marks agree with the ringed totals, either at the end of each question or after each double page. They will then check that these marks have been transferred correctly and finally that the total on the front cover is correct. Papers that contain clerical errors may be returned to examiners.

## Foundation Tier

1 (a)	80	B1	
(b)	$70 + 40$ $= 110$	M1 A1ft	$5 \times 20 + 10$ tolerance +/- 2 on 70 Same tolerance
(c)	Equivalent picture $\left(\frac{3}{4}\right)$	B1	
(d)	$17.5 \times 20$ $= 350$	M1 A1	$(17 \times 20) + \left(\frac{1}{2} \times 20\right)$

2 (a)	3 correct rectangles	B1 x 3	
(b) (i)	80	B1	
(ii)	$500 - 350$ $= 150$	M1 A1	
(c)	Toasters increase Irons decrease	B1 B1	Kettles increase Accept comments on intermediate year

3 (a) (i)	10	B1	
(ii)	194	B1	SC1: 125
(iii)	139 + 194 + ... = 413	M1 A1	
(b)	7	B2	SC2: 3 adults + 4 children
(c)	Please tick one box:  0 – 2 hours <input type="checkbox"/>  3 – 5 hours <input type="checkbox"/>  6 – 8 hours <input type="checkbox"/>  over 8 hours <input type="checkbox"/>	B1  B1	Suitable classes  Boxes and instruction  At least 4 classes  Can be open-ended at either/both ends  No overlaps or gaps  Accept discrete values e.g. 0 1 2 ..... 6 +

4 (a)	Correct heights within intervals  Mid points  Linked	B1  B1  B1	Allow if not joined to horizontal
(b)	$6 \leq t < 7$	B1	
(c) (i)	10	B1	
(ii)	15 + 17 + 2  = 34	M1  A1	For two correct and third a clear misread, plus addition
(d)	Positive	B1	



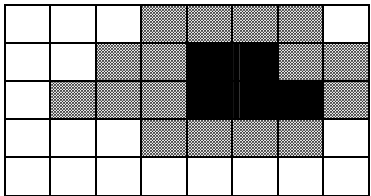
5 (a)	$360 - 160$ $= 200$	M1 A1	
(b) (i)	$10 \times \text{£}2 \text{ million}$  $= \text{£}20 \text{ million}$	M1  A1	$\frac{2}{36} \times 360$ rounding gives 20.16 / 21.6  Alternative: attempt to add four relevant values  Alternative: (IT + Catering) $\times 4$  - 1 if 'million' not shown <u>once</u>
(ii)	$\frac{54}{360}$  $\times \text{£}20 \text{ million}$  $= \text{£}3 \text{ million}$	M1  M1  A1 ft	$54 \div$ 'their' total  $\frac{3}{2} \times 2$ for M2  $\text{£}3.024 \text{ m}$ or $\text{£}3.24 \text{ m}$ for M2 A1 ft

6 (a)	First branch = $\frac{1}{4}$  Second branch = $\frac{1}{5}, \frac{4}{5}, \frac{4}{5}$	B1  B2	  - 1 for each error
(b) (i)	$\frac{1}{4} \times \frac{1}{5}$  $= \frac{1}{20}$	M1  A1 ft	  If clear
(ii)	$\left(\frac{1}{4} \times \frac{4}{5}\right) + \left(\frac{3}{4} \times \frac{1}{5}\right)$  $= \frac{7}{20}$	M1 + M1  A1	M1 for either product, M1 for addition

7 (a)	Data logging	B1	
(b) (i)	$77 - 5 = 72$	B1	
(ii)	14 <sup>th</sup> point = 34	M1 A1	
(iii)	7 <sup>th</sup> point = 23, 21 <sup>st</sup> point = 45  45 – 23  = 22	M1  M1  A1	Either quartile

8 (a)	4, 11, 9, 1	B2	- 1 for each independent error  Tallies not enough
(b) (i)	1	B1	
(ii)	fx = 0, 11, 18, 3  $\frac{\sum fx}{\sum f} = \frac{32}{25}$  = 1.28	M1  M1  A1	Or $\frac{\sum x}{n} = \frac{32}{25}$ for M2

9 (a)	Inconsistent x axis or x axis not labelled	B1	Or acceptable alternative e.g. 3D, difficult to read off – not just inaccurate
(b)	12 %	B1	+1% tolerance
(c)	1981	B1	
(d)	Census – full coverage of population  Sample – part coverage	B1	Must refer to both census and sample

10 (a)		B2	All correct for B2  One error for B1
(b)	Bottom left corner, no pupils <b>or</b> in darkest shaded area, middle of pupils	B1	Any position with supported comments

11	Attempt at all pairs:  1 & 2; 1 & 3; 1 & 4; 1 & 5;  2 & 3; 2 & 4; 2 & 5;  3 & 4; 3 & 5; 4 & 5  Selecting those totalling 5  $\frac{2}{10}$	M1  A1  M1  A1	Could include reversals e.g. 1 & 2 and 2 & 1  All 20 if reversals attempted  Sight of 20 or 10 M1 A1  $\frac{1}{5} \times \frac{1}{4}$ M1 A1  Sight of 4 or 2  $\frac{4}{5} \times \frac{1}{4}$ M1 A1 M1  Or equivalent
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12 (a)	$\frac{55}{40}$  x 100 (= 137.5)	M1  A1	
(b)	$\frac{Q}{64} = 1.25$  Q = 64 x 1.25  Q = 80	M1  M1  A1	64 x 125 M0 M1  8000 M0 M1 A0

13 (a)	Response rates, testing questionnaire etc	B1	Or equivalent – time constraints, results, but not to imply fixing
(b) (i)	Missing part of population e.g. absentees, those that don't go to canteen	B1	Or equivalent
(ii)	Excludes those with non S surnames	B1	Or equivalent - random selection of initial letter, siblings, specific set of people
(c)	Listings then use of random numbers	B1 B1	Or equivalent - names in hat B1 Pick names out of a hat B2
(d) (i)	Discrete	B1	
(ii)	Continuous	B1	

14 (a)	Correct plot	B2	- 1 for each error; tolerance +/- ½ square
(b)	$\frac{176}{8}$  = 22	M1  A1	Indication of addition / 8 M1
(c)	Positive and through their <u>plotted</u> double mean point  Ruled within tolerance	B1 ft  B1	Within tolerance between (1,4) and (1,8) & (12,38) and (12,44)  Line extended to cover their plotted points
(d) (i)	41 minutes	B1 ft	From candidates attempt at a straight line extending to 12
(ii)	18.5 minutes	B1	Accept 18 to 19 inclusive
(e)	Bus estimate  Interpolation	B1  B1	<b>Or</b> car journeys  More strongly correlated  No reason B0 B0

(f)	8 miles	B1 ft	Follow through on suitable lines Their intersection up to the next integer Could be a curve
	Identify intersection	B1	

15 (a)	(G) (G) (R) B R B Y R R G B B Y P P R Y B B Y	B2	B1 for one error or omission
(b) (i)	$\frac{5}{20}$	B1 ft	Or equivalent
(ii)	$\frac{5}{20} \times 100$  = 25	M1  A1	Can be implied by b (i) x 100
(c)	Probability settles down  Probability tends to $\frac{3}{10}$	B1  B1	About 300 reds  Increase / change to $\frac{3}{10}$ B1 B1