Version 1.0: 0905

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Statistics 3311/F

Mark Scheme

2005 examination - June series

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.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

Set and published by the Assessment and Qualifications Alliance.

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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.

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	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	Marks awarded independent of method.
M dep or **DM**	A mark that can only be awarded if a previous method mark has been awarded.
B dep or **DB**	A mark that can only be awarded if a previous independent mark has been awarded.
ft	Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
SC	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 eeoo 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 ¼ 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)	20 – 12 = 8	M1 A1	
(b)	3, 4, 13	B2	3 B1 4 and 13 B1

2 (a)	23, 28, 18, 6, 3, 2	B2	B1 for 4 correct 0 for cumulative frequencies
(b)	23 + 28 + 18 + 6 + 3 + 2 = 80	M1 A1	For addition ft
(c)	fx Σ fx = 184	M1 M1 A1	At least 3 from 23,56,54,24,15 and 12 Attempt to add at least 3 fx's cao
(d)	184 / 80 = 2.3	M1 A1	Their Σ fx / their total cao
(e)	2	B1	

3 (a) (i)	Diagram 2	B1	
(ii)	Diagram 1	B1	
(b)	Value of car	B1	

4 (a)	Green	B1	Not 20 on answer line
(b)	20 x 10 = 200	M1 A1	Some attempt at counting symbols x 10 cao
(c)	50 – 45 = 5	M1 A1	50,45 or 5,4.5 seen as pair M1 cao
(d) (i)	G = 1/10	B1	G in the range >1/20 and < 3/20
(ii)	B = 3/10	B1	B in the range >5/20 and < 7/20
(e) (i)	7/20 o.e.	B1 B1	Numerator Denominator
(ii)	0	B1	
(iii)	1 – ¼ = 0.75	M1 A1	Or counting ¾ or 15/20

5 (a)	More in 2001 than 1991 Peaks in the summer	B1 B1	Trend Reference seasonal pattern
(b)	4.5 million	B1	± 0.2 million
(c)	5.0 (5.0 – 2.7) / 2.7 x 100 = 85 %	B1 M1 dep M1 A1	1.85 or 185 give B1,M1 Evidence of x 100
(d)	6.0 million visitors in June 2001 This one week only represents approx 10% of total for month	B2	B1 – some reference to ¼ or 4 weeks/month and 6m or 600,000 B1 – conclusion

6 (a)	Bartley	B1	
(b)	6	B1	

7 (a)	55, 68, 87, 96, 100	B2	- 1 each error or omission
(b)	Horizontal plots Vertical plots Joined by line	B1 B1 B1	B1 ft on their c.f. Marks dependant on a cumulative function
(c) (i)	19	B1	ft from their cf polygon
(ii)	13	B1	± ½ square follow through on polygon
(iii)	34	B1	
(d)	54	B1	
(e) (i)	Plot of Median Quartiles Limits Box	B1 B1 B1 B1	ft ft
(ii)	Smaller range or I.Q.R Higher median	B1 B1	Younger people travel early B1

8 (a)	90 / 360 x 180 = 45	M1 A1	 cao
(b)	France: 72 / 180 x 360 = 144° Spain: 54 / 180 x 360 = 108° Others: 180 – 45 – 72 – 54 = 9	B1 B1	B1 for 108 or 144 144,108,9 in the table full marks any one of the figures in the table B1 All 3 in the body SC1 360 – 144 – 90 – 18 = 108 360 – 108 – 90 – 18 = 144 Or measurement
(c)	90, 144, 108, 18	B1 B1	± 2° acceptable Labels must be only 4 segments
(d)	Overlaps at 1500, 2000, 3500, 6000 No place for less than £1000	B1 B1	Any one overlap identified Uneven classes B0 Do not go abroad (each) year B1
(e)	Send out reminders Use another survey method	B1 B1	 Non postal, face to face, telephone, shorter questionnaire, free postage, reminders

9 (a)	Labels One branch with correct probabilities Second branch Third branch	B1 B1 B1 B1	At least one part of each branch labelled
(b)	0.8 x 0.9 = 0.72	M1 A1	 cao
(c)	0.2 x 0.3 + '0.72' = 0.78	M1 M1 A1	From their tree Add (b) ft but must be a correct probability form

10 (a)	29, 44, 56, 51, 38, 07	B1 x 3	Four correct B1, five correct B2, six correct B3 -1 for each extra
(b)	Boys: 48/72 x 6 = 4 Girls: 2	M1 A1 A1	 A correct expression for either boys or girls M1 only if wrong way round

11 (a)	Double mean point Line between (0,15) and (0,35)	B1 B1	Must see a dot oe Must be ruled (30,295),(30,315)
(b) (i)	Read from their line	B1	Penalise missing thousands once
(ii)	Read from their line	B1	Inconsistent on zeros lose one only
(c)	2200 other point extrapolation	B1	Closer to mean or closer to data

12 (a)	Cost or number of tracks	B1	
(b)	Length of time	B1	

13 (a)	7 / 20	B1	
(b)	Denominator 7 3 / 7	M1 A1	 oe

14 (a)	1999, 2001	B2	-1 for each error or omission
(b) (i)	6900 / 1.15 = £6000	M1 A1	or 6900 / 115
(ii)	£6000 x 1.13 = £6780	M1 A1 ft	Their (b) (i) x 1.13 or 113 or 6900 / 115 x 113
(c)	2000	B1	
(d)	3 / 110 x 100 = 2.73 %	M1 M1 A1	or 113 / 110 or 2.7% 102.7 M2,A0