

GCSE

Mathematics

Unit 1 43601F

Mark scheme

43601F
June 2015

Version 1: Final mark scheme

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

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' 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 from aqa.org.uk

Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Mathematics papers, marks are awarded under various categories.

If a student uses a method which is not explicitly covered by the mark scheme the same principles of marking should be applied. Credit should be given to any valid methods. Examiners should seek advice from their senior examiner if in any doubt.

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.
Q	Marks awarded for Quality of Written Communication
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.
M dep	A method mark dependent on a previous method mark being awarded.
B dep	A mark that can only be awarded if a previous independent mark has been awarded.
oe	Or equivalent. Accept answers that are equivalent. eg, accept 0.5 as well as $\frac{1}{2}$
[a, b]	Accept values between a and b inclusive.
3.14 ...	Accept answers which begin 3.14 eg 3.14, 3.142, 3.149.
Use of brackets	It is not necessary to see the bracketed work to award the marks.

Examiners should consistently apply the following principles

Diagrams

Diagrams that have working on them should be treated like normal responses. If a diagram has been written on but the correct response is within the answer space, the work within the answer space should be marked. 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.

Questions which ask candidates to show working

Instructions on marking will be given 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.

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.

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.

Work not replaced

Erased or crossed out work that is still legible should be marked.




Work replaced

Erased or crossed out work that has been replaced is not awarded marks.

Premature approximation

Rounding off too early can lead to inaccuracy in the final answer. This should be penalised by 1 mark unless instructed otherwise.

Q	Answer	Mark	Comments
1(a)	evens	B1	
1(b)	unlikely	B1	
1(c)	impossible	B1	

2	Key:  represents 10 people	B1	
	5 circles in Dance and $2\frac{1}{2}$ circles in Art	B2ft	B1 5 circles in Dance or $2\frac{1}{2}$ circles in Art ft their key Only award B2ft if Music is also changed to match their key B1ft both rows matching their key
	Additional Guidance		
	Mark intention for half circle ie any orientation and approximately half		
	Incorrect or no key given then 5 circles and 2.5 circles		B0B2
	Incorrect or no key given then 5 circles and 5 circles		B0B1
	Key:  represents 5 people 10 circles and 5 circles (but Music unchanged)		B0B1ft
	Key:  represents 5 people 10 circles and 5 circles and Music changed to 7 circles		B0B2ft
We're not testing their alignment of symbols			

Q	Answer	Mark	Comments
3(a)	4 (boys)	B1	
3(b)	Thursday	B1	
3(c)	Bars drawn at 12 and 6 in correct position	B2	<p>± ½ square B1 12 and 6 seen or bars drawn wrong way round or bars with boys twice girls or bars with boys = girls + 6</p>
			Additional Guidance
	Ignore width and position for B1, just check height	B1	
	Max B1 for bars in incorrect position and/or incorrect widths	B1 max	
	12 and 6 may be in working space or chart	B1	
	Accept 12 girls and 6 boys	B1 max	
	1 correct bar and 1 incorrect bar, e.g 12 boys and 4 girls (with 12 and 6 not seen in working)	B0	
	1 correct bar and 1 incorrect bar, e.g 12 boys and 4 girls (with 12 and 6 seen in working)	B1	
	Assume left hand bar is boys, right hand is girls ie ignore shading unless bars clearly intended to be other way round		
Mark intention for unruled lines			

Q	Answer	Mark	Comments									
4(a)	<table border="1" data-bbox="240 528 539 640"> <tr> <td>Y</td> <td>### IIII</td> <td>9</td> </tr> <tr> <td>N</td> <td>IIII</td> <td>4</td> </tr> <tr> <td>D</td> <td>III</td> <td>3</td> </tr> </table>	Y	### IIII	9	N	IIII	4	D	III	3	B3	B2 Two rows correct or Frequency/ tally columns swapped but otherwise correct B1 One row correct or Tallies correct or Frequencies correct
	Y	### IIII	9									
	N	IIII	4									
	D	III	3									
Additional Guidance												
Allow frequencies and tallies in either column for any of the B1 marks but do not allow a choice of frequencies or a choice of tallies			B1									
Must have correct use of the five bar gate for B3			B3									
4(b)	16×3 or 48 or $16 \div 2$ or 8	M1										
	their $48 \div 2$ or their 8×3 or 24	M1dep	M2 for $16 \times 3 \div 2$									
	33	A1ft	ft 24 + their 9 from part (a)									
	Additional Guidance											
	Answer of 24 (with no incorrect working)			M1M1A0								
5(a)	20 (+) 12 (+) 7 (+) 5	M1	Allow one error, omission or extra									
	44	A1	SC1 129 or 60									
	Additional Guidance											
SC1 is for working out the number of people (in 2+) rather than cars or for finding the total of all cars			SC1									

Q	Answer	Mark	Comments
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5(b)	16 chosen or $[15, 20] \times 65$	M1	Condone $(60 - \text{their } 44 \text{ from part (a)}) \times 65$ Implied by digits 104
	1040	A1	SC1 2860 or their 44 (from part (a)) $\times 65$ correctly evaluated
	Additional Guidance		
	SC1 for working out fines for 2+ cars		SC1
	1040p		M1A0

6	$44 + 50 + 44 + 48 + 43$ or 229	M1	Allow one error or omission
	$(44 + 50 + 44 + 48 + 43) \div 5$ or 45.8 or $(44 + 50 + 44 + 48 + 43)$ and 47×5 or their 229 and 235	M1dep	Allow one error or omission in brackets Condone missing brackets Accept 46 for 45.8 with working
	45.8 and Adam or 229 and 235 and Adam	Q1	oe Strand (ii) Accept 46 for 45.8 with working
	Additional Guidance		
	Ignore further working if they quote the difference in the means or totals		
	Missing brackets $44 + 50 + 44 + 48 + 43 \div 5 = 194.6$		M1M1Q0
	Adam & his mean is 1.2 lower		M1M1Q1
	Adam & his mean is 1 minute 12 seconds lower		M1M1Q1
	Adam & 45 minutes 48 seconds		M1M1Q1
	Any incorrect conversion of 45.8, e.g. 45 minutes 8 seconds		M1M1Q0
For full marks must clearly select and write 'Adam'			

Q	Answer	Mark	Comments
7	Lowest 66(%) $\frac{2}{3}$ Highest 0.7	B1	oe eg 0.66 oe eg 0.666(...) or 0.667 or 0.67 or 0.6̇ or $66\frac{2}{3}$ (%) or 66.6(...)(%) or 66.7 (%) or 67 (%) oe eg 70(%)
8(a)	(EAC) EAW EBC EBW HAC HAW HBC HBW	B2	B1 for all 7 new combinations with repeated and/or incorrect combinations, eg EAC repeated or 4, 5 or 6 new combinations with or without repeated combinations and/or incorrect combinations Combinations can be listed in any order
Additional Guidance			
Each combination can be written in any order eg accept BHW for HBW			B2
8(b)	$\frac{1}{2}$ or $\frac{4}{8}$	B1ft	oe fraction ft their combinations if not all have an apple
Additional Guidance			
correct or ft			
EAC repeated in part (a) leading to $\frac{5}{9}$ in part (b)			B1ft
Ignore incorrect cancelling or change of form once correct fraction seen			

Q	Answer	Mark	Comments
9(a)	25	B1	
9(b)	65	B1	
9(c)	Cannot tell, median is only the middle value or Yes and median is higher	Q1ft	Strand (iii) oe ft their median from (b)
	Additional Guidance		
	Ignore any non-contradictory reference to range, or number of guests, alongside a correct use of median		
	Must state average or median and make a comparative statement for a Yes/No response		
	No can only be a correct response if their median ≥ 68		
	Excuse poor spelling of median if the meaning is unambiguous; including 'medium'		
	May refer to the median as the 'middle number' or the 'average', but not the mean or the mode		
	If the increase in the median is not mentioned then it is unlikely to score the mark. However if <u>both</u> 65 and 68 are quoted and the chronological order in which they occur is made clear then the mark can be scored. For example, 'Yes, median 65 <u>goes to</u> 68' scores Q1.		
Cannot tell must include mention of unsuitability of median or comment that the mean would be a more useful average eg cannot tell, the median doesn't use all the values			

Q	Answer	Mark	Comments
10(a)	$0.56 + 0.19 + 0.14 + 0.08$ or 0.97 or $1 - 0.56 - 0.19 - 0.14 - 0.08$ or $100 - 56 - 19 - 14 - 8$ or $100 - 97$	M1	
	0.03 or 3% or $\frac{3}{100}$	A1	
	Additional Guidance		
	3 without %		M1A0
	Embedded answer: $0.97 + 0.03 = 1$ (table blank)		M1A0
	Table wins unless blank		
10(b)	$0.56 \times 9\,400\,000$	M1	oe Digits 5264 imply M1 Condone 0.56×9.4
	$5\,264\,000$ or 5.264 m(illion) or $5\,260\,000$ or 5.26 m(illion) or $5\,300\,000$ or 5.3 m(illion)	A1	
	Additional Guidance		
	5.264		M1A0
	Condone incorrect number of (or no) zeros on million for M1		M1A0
	5.2(million) with no working		M0A0
	9.4(million) \times 56%		M1A0

Q	Answer	Mark	Comments	
11(a)	45 or 45% seen	B1	oe May be on chart Condone [44, 46] or [44%, 46%]	
	$\frac{\text{their } 45}{100} \times 8200$	M1	oe their 45 must be (40, 50)	
	3690	A1	Condone [3608, 3772] SC2 answer of [4428, 4592] or [1968, 2132] or 2460	
	Additional Guidance			
	For the A mark the answer must match the percentage (if given)			
	Note: SC2 must not come from incorrect working. [4428, 4592] comes from [54%, 56%] [1968, 2132] comes from [24%, 26%] 2460 comes from 30% Example: 54.5% leading to 4480 (ie not 54.5%) scores B0M0A0			
	42% \times 8200 with no working or no answer or an incorrect answer			B0M0A0
	42% \times 8200 with answer of 3444 but no method shown scores the M as a correct method is implied			B0M1A0
Students using a build-up method must show a complete and correct method (or correct values). For example, a build-up method for 45% of 8200 could be: (i) 10% = 820 (value correct so method not needed) 5% = 410 (value correct so method not needed) 40% = 820 \times 4 = 3820 (wrong value but correct method shown) 45% = 4230 (correct ft for their values so M1) (ii) 10% = 820 (value correct so method not needed) 5% = 410 (value correct so method not needed) 40% = 3820 (value wrong and no method shown) 45% = 4230 (value wrong so M0)				

Q	Answer	Mark	Comments
11(b)	$\frac{3000}{6000} \times 100$ or $\frac{1800}{6000} \times 100$ or $\frac{1200}{6000} \times 100$	M1	oe $\frac{50}{100}$ or $\frac{30}{100}$ or $\frac{20}{100}$ or 50 (white) or 30 (brown) or 20 (granary) seen or implied
	50 (white) and 30 (brown) and 20 (granary) seen or implied	A1	
	Bar drawn in correct position and shaded (in correct order) with correct length, divisions and width	B1ft	$\pm \frac{1}{2}$ small square ft their 50, 30 and 20 with bar total 100%
	Additional Guidance		
	Mark the graph first: a correct bar implies all 3 marks	M1A1B1	
	Shading can be incomplete (eg only two parts shaded) as long as unambiguous or can use labelling eg white/ brown/ granary or W/B/G		
	A bar drawn in the wrong order must have the correct shading	M1A1B0	
	Correct bar with incorrect width or position	M1A1B0	
	Condone a bar in the wrong position if it is a replacement for an incorrect bar in the right position		
	30, 18, 12 (30 is for white)	M0A0B0ft	
Any correct section in the graph can imply M1 but you must check it is not from incorrect working eg $6000 \div 3000 = 2 \rightarrow 20\%$, $6000 \div 1800 = 3 \rightarrow 30\%$, $6000 \div 1200 = 5 \rightarrow 50\%$ Then bar drawn 20 : 30 : 50 Do not award M1 for brown = 30 if this method is seen but they can have B1ft if their bar follows through from their working and totals 100		M0A0B1ft	

Q	Answer	Mark	Comments
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12	360 in B	B1	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">120</td> <td style="text-align: center;">360</td> <td style="text-align: center;">60</td> <td style="text-align: center;">60</td> </tr> </tbody> </table>	A	B	C	D	120	360	60	60
	A	B	C	D							
	120	360	60	60							
	C = D and B + C + D = 480	B1	scores B1B1								
	Additional Guidance										
	Mark the table										
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">120</td> <td style="text-align: center;">90</td> <td style="text-align: center;">195</td> <td style="text-align: center;">195</td> </tr> </tbody> </table>	A	B	C	D	120	90	195	195		B1	
A	B	C	D								
120	90	195	195								
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">120</td> <td style="text-align: center;">40</td> <td style="text-align: center;">220</td> <td style="text-align: center;">220</td> </tr> </tbody> </table>	A	B	C	D	120	40	220	220		B1	
A	B	C	D								
120	40	220	220								

13(a)	Suitable hypothesis	Q1	Strand (i) eg Girls are more likely to study Economics More boys study Economics Girls are less likely to study Economics than boys
	Additional Guidance		
	Must mention girls/boys and studying Economics		
	Must be a suggested outcome and not a question		
	Condone a correct hypothesis followed by a reason why it may be true		
	May start 'I think', 'I predict', 'I believe' and condone 'should be'		
	Condone 'home economics'		

Q	Answer	Mark	Comments
13(b)	Two-way table with boys/ girls as row/ column and Yes/ No as column/ row	B2	oe B1 boys/ girls or Yes/ No B0 questionnaires intended for individuals to complete
	Additional Guidance		
	Condone a list where all four options can be worked out ie you can tell how many: (1) boys planning E, (2) boys not planning E, (3) girls planning E, (4) girls not planning E This may also be seen as two separate lists/ tally charts		
	Condone questions as headings		
	Ignore any attempt to fill in cells and allow any extra rows/columns eg Don't know or Frequency		
	If the student gives a data collection sheet and a questionnaire, ignore the questionnaire		
	Yes/ No could be indicated by a tick or cross		
14(a)	Positive	B1	Ignore any other description Accept eg strong positive, weak positive correlation

Q	Answer	Mark	Comments
14(b)	[28, 29] seen or $40 + [24, 30]$ or [64, 70]	M1	[28, 29] may be seen on graph
	[68, 69]	A1	SC1 Answer [78, 79] with correct point or line(s) marked on graph SC1 Answer [91, 92]
	Additional Guidance		
	[28, 29] seen even with other values or different answer given		M1A0
	Correct working up to [68, 69] but then gives the answer 70		M1A1
	$\frac{68}{90}$		M1A0
	$\frac{68}{170}$ or $\frac{68}{180}$ or $\frac{68}{200}$		M1A1

15	40 – 22 or 18 (female) or $(40 - 10) \div 2$ or 15 (male or female)	M1	Condone $\frac{18}{40}$ or $\frac{15}{30}$
	their 18 – their 15 or 22 – their 15 or 7 (males sold) or $(10 - (22 - \text{their } 18)) \div 2$ or $\frac{10 - 4}{2}$	M1dep	Condone $\frac{7}{30}$ or $\frac{3}{30}$
	3	A1	
	Additional Guidance		
	Answer 13 often comes from 18 – 5 so if 18 is seen award the first mark		M1M0A0

	3 should not be awarded full marks if it comes from an incorrect method
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Q	Answer	Mark	Comments
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16(a)	Point marked at (100, 0.18)	B1	$\pm \frac{1}{2}$ small square
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16(b)	500	B2	B1 0.1×5000 oe or answer of 900 or 850 or 750 or 700 or 640 or 600 or 575 or 550 or 475
	Additional Guidance		
	A correct answer using any relative frequency from the graph or using the average of all of them		B1
	Answer of 500 out of 5000		B2
	Answer $\frac{500}{5000}$		B1
The calculation for B1 may be seen in stages eg 100 per 1000 and 100×5		B1	