

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 |
|------|---------------------------------------|------|--|
| 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 0.6 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 |
|---|--------|------|----------|
|---|--------|------|----------|

| 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 |
|--|---|

| Q | Answer | Mark | Comments |
|---|--------|------|----------|
|---|--------|------|----------|

| | | | |
|--------------|-----------------------------|----|--------------------------------|
| 16(a) | Point marked at (100, 0.18) | B1 | $\pm \frac{1}{2}$ small square |
|--------------|-----------------------------|----|--------------------------------|

| | | | |
|---|--|----|--|
| 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 | |