



AQA Qualifications

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# GCSE

# M

Unit 3 43603F

Mark scheme

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43603F  
June 2014

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Version/Stage: 1.0 Final

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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](http://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.

|                        |  |
|------------------------|--|
| <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>Q</b>               | Marks awarded for Quality of Written Communication   |
| <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.                        |
| <b>Mdep</b>            | A method mark dependent on a previous method mark being awarded.   |
| <b>Bdep</b>            | A mark that can only be awarded if a previous independent mark has been awarded.   |
| <b>oe</b>              | Or equivalent. Accept answers that are equivalent.<br>eg, accept 0.5 as well as $\frac{1}{2}$  |
| <b>[a, b]</b>          | Accept values between <i>a</i> and <i>b</i> inclusive.   |
| <b>3.14...</b>         | Allow answers which begin 3.14 eg 3.14, 3.142, 3.149.  |
| <b>Use of brackets</b> | 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) | 30  | B1   |   |
| 1(b) | Hexagon   | B1   |   |
| 2    | $\frac{20}{100} \times 320$<br>or $320 \div 5$<br>or $32 (\times 2)$ seen | M1   | oe<br>or 10% is 32  |
|      | 64  | A1   |   |
|      | 65  | B1   |   |
|      | $\frac{1}{2}$ of 130 miles  | Q1ft | Strand (iii) Correct conclusion from their answers<br><br>ft their 64 and 65<br>Allow ft only if M1 awarded<br>oe |
| 3(a) | Fully correct constructed circle drawn with radius [5.9, 6.1]             | B2   | B1 for any circle centre $P$ (must be constructed and not freehand)   |
| 3(b) | Sector drawn [58°, 62°] degrees   | B2   | B1 for any sector   |

|          |   |       |  |
|----------|---|-------|--|
| <b>4</b> | $64 \times 2.5$ or 160<br>or $93 \times 2.5$ or 232.5 or 232.50       | M1    | oe<br>$93 - 64$ or 29  |
|          | $64 \times 2.5 + 152$ or 312<br>or<br>$93 \times 2.5 + 137$ or 369.5  | M1dep | oe<br>$29 \times 2.5$ or 72.5 or 72.50<br>or<br>$152 - 137$ or 15  |
|          | $64 \times 2.5 + 152$ or 312<br>and<br>$93 \times 2.5 + 137$ or 369.5 | M1dep | oe<br>$29 \times 2.5$ or 72.5 or 72.50<br>and<br>$152 - 137$ or 15 |
|          | their 369.5 – their 312   | M1dep | oe<br>$72.5 - 15$  |
|          | 57.50   | Q1    | Strand (i)<br>57.5 implies M4Q0                                    |

|             |  |    |  |
|-------------|--|----|--|
| <b>5(a)</b> | Either correct rectangle drawn<br><br>$A, B, (7, 2)$ and $(3, 2)$<br>or $A, B, (7, 8)$ and $(3, 8)$<br>(ignore labels) | B2 | B1 for $(7, 2)$ and $(3, 2)$ plotted<br>or for $(7, 8)$ and $(3, 8)$ plotted<br>B1 for any rectangle with area $12 \text{ cm}^2$<br>B1 for any rectangle with vertices $A$ and $B$ . |
|-------------|--|----|--|

|             |   |      |   |
|-------------|---|------|---|
| <b>5(b)</b> | $C(7, 2)$ and $D(3, 2)$<br>or $C(7, 8)$ and $D(3, 8)$ | B2ft | B1 for correct coordinates with incorrect order ie $D$ and $C$ reversed<br>ft their rectangle or square $ABCD$ for up to B2<br>ft their rectangle or square $ABDC$ for up to B1 |
|-------------|---|------|---|

|             |                |    |                                   |
|-------------|----------------|----|-----------------------------------|
| <b>6(a)</b> | $A, B$ and $D$ | B2 | B1 for 2 correct and no incorrect |
|-------------|----------------|----|-----------------------------------|

|             |         |    |                                   |
|-------------|---------|----|-----------------------------------|
| <b>6(b)</b> | C and D | B2 | B1 for 1 correct and no incorrect |
|-------------|---------|----|-----------------------------------|

|             |            |    |  |
|-------------|------------|----|--|
| <b>7(a)</b> | South or S | B1 |  |
|-------------|------------|----|--|

|             |                  |    |  |
|-------------|------------------|----|--|
| <b>7(b)</b> | North-East or NE | B1 |  |
|-------------|------------------|----|--|

|             |                |    |    |
|-------------|----------------|----|----|
| <b>8(a)</b> | 360 – 108 – 90 | M1 | oe |
|             | 162            | A1 |    |

|             |                |    |   |
|-------------|----------------|----|---|
| <b>8(b)</b> | Correct reason | B1 | eg $137 + 43 = 180$<br>$180 - 137 = 43$<br>$180 - 43 = 137$<br>or Angles (on a straight line) add up to 180<br>or Supplementary |
|-------------|----------------|----|---|

|          |   |    |           |
|----------|---|----|-----------|
| <b>9</b> | $(180 - 70) \div 2$ or 55<br>or $180 - 70 - 70$ or 40 | M1 | oe        |
|          | 70, 40  | A1 | any order |
|          | 55, 55  | A1 |           |

|              |  |       |    |
|--------------|--|-------|----|
| <b>10(a)</b> | 26 ÷ 4 or 6.5<br>or $26 \times 20 \times \frac{1}{4}$ or 130   | M1    |    |
|              | 26 – their 6.5<br>or $26 \div 4 \times 3$<br>or $(520 - 130) \div 20$ or $390 \div 20$<br>or $(520 - \text{their } 130) \div 20$<br>or their $390 \div 20$ | M1dep | oe |
|              | 19.5   | A1    |    |

|              |   |       |   |
|--------------|---|-------|---|
| <b>10(b)</b> | Any trial with correct factors giving 168<br>except $1 \times 168$<br><br>or any correctly evaluated product<br>such that $10 \leq \text{rows} \leq 13$ and<br>$10 \leq \text{seats} \leq 16$             | M1    | 2 (×) 84 or $168 \div 2 = 84$<br>3 (×) 56 or $168 \div 3 = 56$<br>4 (×) 42 or $168 \div 4 = 42$<br>6 (×) 28 or $168 \div 6 = 28$<br>7 (×) 24 or $168 \div 7 = 24$<br>8 (×) 21 or $168 \div 8 = 21$<br>12 (×) 14 or $168 \div 12 = 14$<br>oe |
|              | A different trial with correct factors<br>giving 168 except $1 \times 168$<br>or a different correctly evaluated<br>product such that $10 \leq \text{rows} \leq 13$ and<br>$10 \leq \text{seats} \leq 16$ | M1dep |   |
|              | 12 rows<br>14 seats   | A1    | SC2 for 12 seats and 14 rows<br>SC2 for 12 and 14 as final working  |



|              |    |    |  |
|--------------|----|----|--|
| <b>11(a)</b> | 46 | B1 |  |
|--------------|----|----|--|

|              |                                   |    |  |
|--------------|-----------------------------------|----|--|
| <b>11(b)</b> | 1.5 seen or implied<br>or 14 seen | B1 | oe   |
|              | $28 \times 1.5$<br>or $28 + 14$   | M1 | Attempt to multiply speed by time<br>eg $28 \times 1.3$ or 36.4<br>or $90 \times 28$ or 2520<br>or $130 \times 28$ or 3640 |
|              | 42                                | A1 |  |

|              |          |    |  |
|--------------|----------|----|--|
| <b>12(a)</b> | Equation | B1 |  |
|--------------|----------|----|--|

|              |         |    |  |
|--------------|---------|----|--|
| <b>12(b)</b> | Formula | B1 |  |
|--------------|---------|----|--|

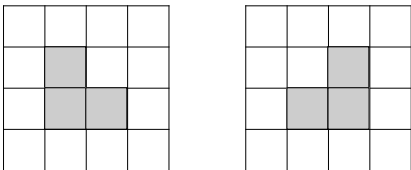
|              |            |    |  |
|--------------|------------|----|--|
| <b>12(c)</b> | Expression | B1 |  |
|--------------|------------|----|--|

|              |            |    |  |
|--------------|------------|----|--|
| <b>12(d)</b> | Expression | B1 |  |
|--------------|------------|----|--|

|           | <b>Alternative Method 1</b>  |      |   |
|-----------|--|------|---|
| <b>13</b> | $\sqrt{64}$ or 8 seen  | B1   |   |
|           | $5x - 2 = \text{their } 8$<br>or $9 - y = \text{their } 8$   | M1   |   |
|           | $x = 2$  | A1ft |   |
|           | $y = 1$  | A1ft | SC2 for $x = 13.2$ and $y = -55$<br>SC1 for $x = 13.2$ or $y = -55$ |
|           | <b>Alternative Method 2</b>  |      |   |
|           | $(5x - 2)(9 - y) = 64$   | B1   |   |
|           | $5x - 2 = 9 - y$<br>or $y = 9 - (5x - 2)$  | M1   | oe  |
|           | $(5x - 2)(9 - (9 - (5x - 2))) = 64$<br>or $(5x - 2)^2 = 64$<br>or $25x^2 - 20x - 60 = 0$<br>or $x = 2$ | M1   | oe  |
|           | $x = 2$ and $y = 1$  | A1   |   |

|              |  |    |  |
|--------------|--|----|--|
| <b>14(a)</b> | $4 \times 5.1$ or 20.4<br>or $4 \times 9.4$ or 37.6<br>or $4 \times 3.7$ or 14.8 | M1 |  |
|              | 20.4 and 37.6 and 14.8   | A1 | Any order<br>SC1 for 1.275, 2.35 and 0.925 |

|              |   |    |  |
|--------------|---|----|--|
| <b>14(b)</b> | $4 \times 4 \times 4$ or $4^3$<br>or $5.1 \times 9.4 \times 3.7$ or 177(.378)<br>or their ( $20.4 \times 37.6 \times 14.8$ )<br>or 11 352(.192) | M1 |  |
|              | 64  | A1 |  |

|              |   |    |   |
|--------------|---|----|---|
| <b>15(a)</b> |  | B2 | Drawings can be anywhere on the grids           |
|              |   |    | B1 for shapes reversed<br>or B1 for one correct |

|              |  |    |            |
|--------------|--|----|------------|
| <b>15(b)</b> | $6 \times 2 + 3$<br>or $4 + 7 + 4$<br>or $2 + 2 + 2 + 2 + 7$<br>or 28<br>or 13 | M1 |            |
|              | 15   | A1 | SC1 for 17 |

|           |              |    |  |
|-----------|--------------|----|--|
| <b>16</b> | Equilateral  | B1 |  |
|           | Valid reason | B1 | eg $6x + 4$ is the same as $2(3x + 2)$<br>or $6x + 4 = 2(3x + 2)$<br>or $AB = AC = BC$<br>or three sides equal<br>or all sides equal |

|           |                                   |    |    |
|-----------|-----------------------------------|----|----|
| <b>17</b> | $2 \times \pi \times 3$ or $6\pi$ | M1 | oe |
|           | 18.(...) and yes                  | A1 |    |

|           |            |    |                             |
|-----------|------------|----|-----------------------------|
| <b>18</b> | Reflection | B1 | Accept Reflect or Reflected |
|           | $x = 5$    | B1 |                             |

|              |               |    |   |
|--------------|---------------|----|---|
| <b>19(a)</b> |               |    | oe  |
|              | $x + y = 180$ | B1 | $y = 180 - x$<br>or $x = 180 - y$<br>or $2x + 2y = 360$ |

|              |            |    |   |
|--------------|------------|----|---|
| <b>19(b)</b> |            |    | oe  |
|              | $y = 1.5x$ | B1 | $2y = 3x$<br>or $y = \frac{3}{2}x$<br>or $x = \frac{2}{3}y$<br>or $\frac{x}{y} = \frac{2}{3}$<br>or $\frac{y}{x} = \frac{3}{2}$ |

|              |   |       |  |
|--------------|---|-------|--|
| <b>20(a)</b> | $10 \times 10$ or 100   | M1    | $4 \times 10$ or 40  |
|              | $\frac{1}{2} \times 3 \times 3$ or 4.5<br>or $3 \times 3$ or 9                      | M1    | $4 \times 3$ or 12<br>or $\frac{1}{2} \times 3 \times 3$ or 4.5<br>oe  |
|              | $\frac{1}{2} \times 3 \times 3 \times 4$ or $4.5 \times 4$<br>or $9 \times 2$ or 18 | M1dep | $\frac{1}{2} \times (10 + 4) \times 3$ or 21<br>or $12 + 4.5 + 4.5$ or 21<br>oe<br>dependent on 2 <sup>nd</sup> M1 |
|              | $100 - 18 = 82$   | A1    | $40 + 21 + 21 = 82$<br>oe  |

|              |  |    |  |
|--------------|--|----|--|
| <b>20(b)</b> | 82% of £750 seen or implied<br>or (£) 615        | M1 |  |
|              | their $615 \times 0.9$ or 553.5                  | M1 | oe<br>multiplier 1.9 seen                          |
|              | their $615 + 553.5$<br>or their $615 \times 1.9$ | M1 |  |
|              | 1168.50 or 1169 or 1170                          | A1 | 1168.5 implies M3A0<br>SC2 (£) 1425<br>SC1 (£) 675 |

|           |  |       |  |
|-----------|--|-------|--|
| <b>21</b> | $5^2 + 9^2$<br>or $25 + 81$<br>or $106$                      | M1    |  |
|           | $\sqrt{5^2 + 9^2}$<br>or $\sqrt{25 + 81}$<br>or $\sqrt{106}$ | M1dep |  |
|           | 10.29 ...  | A1    | Allow 10 or 10.2 if correct working shown  |
|           | 10.3   | B1ft  | ft their 2 d.p. answer   |
| <b>22</b> | Fully correct locus  | B3    | B2 for two correct straight lines or two correct semi-circles<br>or one correct straight line and one correct semicircle<br>B1 for one correct straight line<br>or one correct semicircle<br>B1 for correct shape but incorrect size |