



Mark Scheme (Results)

Summer 2013

International GCSE Mathematics
(4MA0) Paper 1F

Level 1/Level 2 Certificate in Mathematics
(KMA0) Paper 1F

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme.
- Examiners should also be prepared to award zero marks if the **candidate's response is not worthy of credit according to the mark scheme.**
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the **mark scheme to a candidate's response, the team leader must** be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.
- **Types of mark**
 - M marks: method marks
 - A marks: accuracy marks
 - B marks: unconditional accuracy marks (independent of M marks)
- **Abbreviations**
 - awrt – answers which round to.....
 - cao – correct answer only
 - ft – follow through
 - isw – ignore subsequent working

- SC - special case
- oe – or equivalent (and appropriate)
- dep – dependent
- indep – independent
- eeo – each error or omission

- **No working**

If no working is shown then correct answers normally score full marks

If no working is shown then incorrect (even though nearly correct) answers score no marks.

- **With working**

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

If it is clear from the working that the “correct” answer has been obtained from incorrect working, award 0 marks.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks.

If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.

If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

If there is no answer on the answer line then check the working for an obvious answer.

- **Ignoring subsequent work**

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: eg. Incorrect cancelling of a fraction that would otherwise be correct.

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

- **Parts of questions**

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

Apart from Question 15(c) (where the mark scheme states otherwise, the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.

| | | | | |
|---|-----|------------------------------------|---|----------------------|
| 1 | (a) | four thousand, six hundred and one | 1 | B1 |
| | (b) | thousand(s) | 1 | B1 accept 5000, 1000 |
| | (c) | 4770 | 1 | B1 cao |
| | (d) | 4874 | 1 | B1 accept Emily |
| | (e) | 4667 | 1 | B1 accept Jessica |
| | | | | Total 5 marks |

| | | | | |
|---|-----|--------------------------|---|----------------------|
| 2 | (a) | Egypt | 1 | B1 |
| | (b) | 250 | 1 | B1 cao |
| | (c) | Kenya | 1 | B1 |
| | (d) | $500 < \text{bar} < 750$ | 1 | B1 |
| | | | | Total 4 marks |

| | | | | |
|---|-----|--------|---|------------------------|
| 3 | (a) | 42, 50 | 2 | B2 B1 for 42 B1 for 50 |
| | (b) | 146 | 1 | B1 cao |
| | | | | Total 3 marks |

| | | | | | |
|---|-------|--|----|---|----------------------|
| 4 | (i) | | 27 | 5 | B1 cao |
| | (ii) | | 30 | | B1 cao |
| | (iii) | | 25 | | B1 cao |
| | (iv) | | 24 | | B1 cao |
| | (v) | | 29 | | B1 cao |
| | | | | | Total 5 marks |

| | | | | | |
|---|-----|------------------------------------|----------------|---|-----------------------|
| 5 | (a) | | equilateral | 1 | B1 |
| | (b) | | octagon | 1 | B1 |
| | (c) | | 0 | 1 | B1 accept 'none' oe |
| | (d) | | 3 | 1 | B1 cao |
| | (e) | | 380 | 1 | B1 cao |
| | (f) | | 0.3 oe | 1 | B1 |
| | (g) | | 10 | 1 | B1 cao |
| | (h) | | 18 00 | 1 | B1 |
| | (i) | | 0.16 | 1 | B1 cao |
| | (j) | $\frac{16}{100}$ or $\frac{8}{50}$ | | 2 | M1 |
| | | | $\frac{4}{25}$ | | A1 cao |
| | (k) | | 12 | 1 | B1 cao |
| | | | | | Total 12 marks |

| | | | | | |
|---|-----|---|--|---|--|
| 6 | (a) | | 4 35 pm | 1 | B1 |
| | (b) | | one hand \rightarrow 11 and $7 < \text{one hand} \leq 8$ | 1 | B1 Ignore lengths of hands |
| | (c) | 360×7 or 2520 | | 3 | M1 |
| | | $\frac{4500 - "2520"}{9}$ or $\frac{1980}{9}$ | | | M1 (dep) for subtraction from 4500 and division by 9 |
| | | | 220 | | A1 cao |
| | | | | | Total 5 marks |

| | | | | | |
|---|-----|----------------|-----|---|--------------------------------|
| 7 | (a) | | 115 | 1 | B1 cao |
| | (b) | | 23 | 1 | B1 cao |
| | (c) | 6.8×5 | | 3 | M1 |
| | | 34 | | | A1 May be implied by ans of 95 |
| | | | 95 | | A1 |
| | | | | | Total 5 marks |

| | | | | | |
|---|-----|--|--|---|--|
| 8 | (a) | | 0.375 | 1 | B1 |
| | (b) | $\frac{54}{6}$ or 9 or 5×54 or 270 or $5 \times 54 \div 6$ oe | | 2 | M1 |
| | | | 45 | | A1 cao |
| | (c) | $\frac{3}{5}, \frac{16}{25}, \frac{13}{20}, \frac{2}{3}$ in correct order or correct decimal equivalents in correct order eg 0.6, 0.64, 0.65, 0.66 or correct fraction equivalents in correct order | $\frac{3}{5}, \frac{16}{25}, \frac{13}{20}, \frac{2}{3}$ | 2 | B2 B1 for 3 fractions in correct order or for 2 fractions correctly converted to decimals or percentages (at least 2 sf rounded or truncated for $\frac{2}{3}$) or for 2 fractions expressed as equivalent fractions with a denominator of 300 or a multiple of 300 SC B1 for $\frac{2}{3}, \frac{13}{20}, \frac{16}{25}, \frac{3}{5}$ i.e. fractions reversed |
| | | | | | Total 5 marks |

| | | | | | |
|---|-----|--|-----------|---|------------------------------------|
| 9 | (a) | | $7c^2$ | 1 | B1 Accept $7 \times c^2, c^27$ etc |
| | (b) | | $9x - 5y$ | 2 | B2 B1 for $9x$ B1 for $-5y$ |
| | | | | | Total 3 marks |

| | | | | | |
|----|-----|--|------------------|---|--|
| 10 | (a) | | $\frac{1}{5}$ oe | 1 | B1 |
| | (b) | | 1 | 1 | B1 Accept $\frac{5}{5}$ or $\frac{1}{1}$ or 100% |
| | (c) | | $\frac{2}{5}$ oe | 2 | M1 for a fraction with a denominator of 5 for or for correct probability with incorrect notation A1 $\frac{2}{5}$ oe |
| | | | | | Total 4 marks |

| | | | | | |
|----|--|-----|--|----|---|
| 11 | $\angle ABD = 60^\circ$ or $\angle BAD = 60^\circ$ or $\angle ADB = 60^\circ$ or $180 \div 3$ | | | M1 | Angles may be unambiguously stated eg C or A but ABD etc or marked on diagram. |
| | $\angle BCD = 65^\circ$ or $(\angle CBD =) 180 - 2 \times 65$ | | | M1 | |
| | $(\angle CBD =) 50^\circ$ | | | A1 | |
| | $\angle ABC = 60^\circ + 50^\circ$ | 110 | | A1 | Award 4 marks for an answer of 110 |
| | | | | | Total 4 marks |

| | | | | | |
|--------|--|---------------------|---|---|---|
| 12 (a) | $12 \times 3 + 2 \times 7 = 36 + 14$ | | 2 | M1 for $12 \times 3 + 2 \times 7$ or for either 36 or 14 | |
| | | 50 | | A1 cao | |
| (b) | $43 = 12x + 2 \times 6.5$ or $43 = 12x + 13$ or $P - 2y = 12x$ (oe with $\pm 12x$ or $\pm x$ as the subject) | | 3 | M1 for correct rearrangement of original equation or substitution | M2 for $43 - 2 \times 6.5 (= 12x)$ or $30 (= 12x)$ |
| | $12x = 43 - 13$ or $12x = 30$ or $-12x = 13 - 43$ or $-12x = -30$ | | | M1 for correct rearrangement and substitution | |
| | | 2.5 oe | | A1 Correct answer scores full marks | |
| (c) | $4xy + \frac{1}{2} \times 3x \times 4x$ or $\frac{3x+y+y}{2} \times 4x$ | | 2 | M1 for any one correct area eg. $4xy$ oe or $\frac{1}{2} \times 3x \times 4x$ oe or $4x(3x + y)$ | |
| | | $4xy + 6x^2$ etc | | A1 for $4xy + 6x^2$ or $4yx + 6x^2$ or $2x(3x + 2y)$ or $2(3x^2 + 2xy)$ (No fractions or uncollected terms but could be multiplication signs and/or brackets present) | |
| | | | | Total 7 marks | |

| | | | | | |
|----|-----|---|-----|---|---|
| 13 | (a) | | 4 | 1 | B1 cao |
| | (b) | $\frac{40}{2}$ or 20 or $\frac{40+1}{2}$ or $20\frac{1}{2}$ or for clear attempt to list all marks | | 2 | M1 |
| | | | 3 | | A1 cao |
| | (c) | $(0 \times 13) + 1 \times 2 + 2 \times 3 + 3 \times 8 + 4 \times 14$ or $(0) + 2 + 6 + 24 + 56$ or 88 | | 3 | M1 for sum of at least 3 products (products may or may not be evaluated) |
| | | "88" \div 40 | | | M1 (dep) for division by 40 (or by their 40) |
| | | | 2.2 | | A1 accept 2.2 or $\frac{11}{5}$ or $2\frac{1}{5}$ Also accept 2 if both method marks are scored. |
| | | | | | Total 6 marks |

| | | | | | |
|----|-----|---------------------------|---------------|---|---|
| 14 | (a) | $\frac{2.720294102}{7.7}$ | | 2 | M1 for 2.7202(9...) if first 5 figures correct (rounded or truncated) or for 7.7 or for $\frac{2\sqrt{185}}{77}$ |
| | | | 0.35328(4948) | | A1 Accept if first 5 figures correct |
| | (b) | | 0.35 | 1 | B1 ft from (a) only if more than 2 sig figs given in (a) |
| | | | | | Total 3 marks |

| | | | | | |
|----|-----|---------------------------|------------------|---|---|
| 15 | (a) | | $6n - 12$ | 1 | B1 |
| | (b) | | $p(p - 5)$ | 2 | B2 Also accept $(p+0)(p-5)$ for B2 B1 for factors which, when expanded and simplified, give two terms, one of which is correct. SC: B1 for $p(p - 5p)$ |
| | (c) | $7x - 3 = 2x$ | | 3 | M1 for $7x - 3 = 2x$ or $7x - 3 = 2 \times x$ or $\frac{7x}{2} - \frac{3}{2} = x$ oe |
| | | $7x - 2x = 3$ or $5x = 3$ | | | M1 for $7x - 2x = 3$ or $5x = 3$ or $5x - 3 = 0$ or $\frac{7x}{2} - x = \frac{3}{2}$ or $\frac{5x}{2} = \frac{3}{2}$ NB. All these examples could be written with all terms 'on the other side' eg. $-5x = -3$ etc |
| | | | $\frac{3}{5}$ oe | | A1 Award full marks if at least one method mark awarded and answer correct. |
| | | | | | Total 6 marks |

| | | | | |
|----------------------|--|-----|----|---|
| 16. (a) | corresponding (angle(s)) | 1 | B1 | oe eg x corresponds to angle A ; corresponding to angle A |
| (b) | $(6 - 2) \times 180$ or 4×180 or $(2 \times 6 - 4) \times 90$ or 8×90 or 120×6 or $(180 - 60) \times 6$ or $360 + 360$ | 4 | M1 | $360 - (73 + 46 + 38 + 88 + 57)$ Condone one incorrect ext angle |
| | 720 | | A1 | M1 A1 for 720 seen 58 M1 A1 for 58 seen |
| | "720" - (107 + 134 + 142 + 92 + 123) or "720" - 598 | | M1 | dep on first M1 180 - "58" |
| | | 122 | A1 | |
| Total 5 marks | | | | |

| | | | | | |
|----------------------|--|-----|---|---------|---|
| 17. (a) | $\frac{8}{100} \times 475$ oe or 38 or 437 | | 3 | M1 | |
| | 475 + "38" | | | M1(dep) | M2 for 475×1.08 oe |
| | | 513 | | A1 | cao |
| (b) | $1\% = \frac{48}{8}$ or 6 8% (of amount) = 48 | | 3 | M1 | M2 for $\frac{48}{8} \times 100$ or 600 or $\frac{48}{0.08}$ |
| | "6" $\times 100$ or 600 | | | M1 | or $\frac{48}{8} \times 108$ or $\frac{48}{0.08} \times 1.08$ |
| | | 648 | | A1 | cao (NB: An answer of 600 scores M2A0) |
| Total 6 marks | | | | | |

| | | | | | |
|----------------|---|------------------------|-----|---|--|
| 18. (i) | | u, a, e | 2 | B1 | Any order. Brackets and commas not necessary |
| (ii) | | s, q, r, a, e, i, o, u | | B1 B0 if 'a' or 'e' or 'u' repeated | |
| | | | | | Total 2 marks |
| 19. | $2 \times \pi \times 5.1^2 + 2 \times \pi \times 5.1 \times 3.7$ oe or 163.42... + 118.56... (using π) or 163.3428 + 118.5036 (using 3.14) (rounded or truncated to at least 3 sig figs) or $2 \times \pi \times 5.1 \times (5.1 + 3.7)$ or $\frac{2601}{50} \pi + \frac{1887}{50} \pi$ or $\frac{2244}{25} \pi$ | | 3 | M2 M1 for one of $2 \times \pi \times 5.1^2$ or value in range 163-163.43 inc or $\frac{2601}{50} \pi$ $2 \times \pi \times 5.1 \times 3.7$ oe or value in range 118-119 inc or $\frac{1887}{50} \pi$ NB. Accept 3.14(...) or 22/7 in place of π | |
| | | | 282 | A1 for answer in range 281.8-282 inc | |
| | | | | | Total 3 marks |

| | | | | | |
|-----|---|-----|--|----|--|
| 20. | No approximation $\frac{37527}{365}$ or $\frac{37527}{366}$ or $\frac{37527}{365.25}$ or $\frac{37527}{364}$ | | | M2 | M1 for $\frac{37527}{x}$ where $356 \leq x \leq 370$ |
| | | 103 | | A2 | Accept 102 if M2 awarded A1 for $102.5 \leq \text{answer} \leq 103.1$ |

| | | | | | |
|-----|---|---|---|----------------------|--|
| 20. | Alternative - with approximation $\frac{x}{y}$ or $x \times \frac{1}{y}$ where x is $35\,000 \leq x \leq 40\,000$ AND $336 \leq y \leq 400$ | | 4 | M2 | M1 for $\frac{x}{y}$ or $x \times \frac{1}{y}$ where either the value of x or the value of y is acceptable or $\frac{y}{x}$ where the values of x and y are acceptable |
| | | integer in the range 93 – 111 inclusive | | A2 | The award of any accuracy marks is dependent on the award of M2 A1 for non-integer in the range 93 – 111 |
| | | | | Total 4 marks | |

| | | | | | | |
|----|--|------|---|----|--|--|
| 21 | use of cos | | 3 | M1 | cos must be selected for use in trig ratio NOT Cosine Rule | <p>or M2 for sin and $\frac{\sqrt{21.36}}{9.5}$ following correct Pythagoras</p> <p>or M2 for tan and $\frac{\sqrt{21.36}}{8.3}$ following correct Pythagoras</p> <p>or correct Pythag and then correct use of sine or cosine rule with "21.36"</p> |
| | $\cos("x") = \frac{8.3}{9.5} (=0.87\dots)$ or $("x" =) \cos^{-1}\left(\frac{8.3}{9.5}\right)$ | | | M1 | | |
| | | 29.1 | | A1 | for ans rounding to 29.1 (29.1103...) | |
| | | | | | Total 3 marks | |

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