

Mathematics C (Graduated Assessment)

General Certificate of Secondary Education

Unit **B281**: Terminal Paper (Foundation Tier)

Mark Scheme for June 2011

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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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Subject-Specific Marking Instructions

1. **M** marks are for using a correct method and are not lost for purely numerical errors.
A marks are for an accurate answer and depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
W marks are workless marks, which are independent of **M** (method) marks and are awarded for a correct final answer or a correct intermediate stage.
SC marks are for special cases that are worthy of some credit.
2. Unless the answer and marks columns of the mark scheme specify **M** and **A** marks etc, or the mark scheme is 'banded', then if the correct answer is clearly given and is not from wrong working **full marks** should be awarded.

Do not award the marks if the answer was obtained from an incorrect method, ie incorrect working is seen and the correct answer clearly follows from it.
3. Where follow through (**FT**) is indicated in the mark scheme, marks can be awarded where the candidate's work follows correctly from a previous answer whether or not it was correct.

Figures or expressions that are being followed through are sometimes encompassed by single quotation marks after the word *their* for clarity, eg FT $180 \times (\textit{their} '37' + 16)$, or FT $300 - \sqrt{(\textit{their} '5^2 + 7^2')}$. Answers to part questions which are being followed through are indicated by eg FT $3 \times \textit{their} (a)$.

For questions with FT available you must ensure that you refer back to the relevant previous answer. You may find it easier to mark these questions candidate by candidate rather than question by question.
4. Where dependent (**dep**) marks are indicated in the mark scheme, you must check that the candidate has met all the criteria specified for the mark to be awarded.
5. The following abbreviations are commonly found in GCSE Mathematics mark schemes.
 - **cao** means **correct answer only**.
 - **figs 237**, for example, means any answer with only these digits. You should ignore leading or trailing zeros and any decimal point eg 237000, 2.37, 2.370, 0.00237 would be acceptable but 23070 or 2374 would not.
 - **isw** means **ignore subsequent working** (after correct answer obtained).
 - **nfw** means **not from wrong working**.
 - **oe** means **or equivalent**.
 - **rot** means **rounded or truncated**.
 - **seen** means that you should award the mark if that number/expression is seen anywhere in the answer space, including the answer line, even if it is not in the method leading to the final answer.
 - **soi** means **seen or implied**.

6. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise, indicated for example by the instruction 'mark final answer'.
7. As a general principle, if two or more methods are offered, mark only the method that leads to the answer on the answer line. If two (or more) answers are offered, mark the poorer (poorest).
8. When the data of a question is consistently misread in such a way as not to alter the nature or difficulty of the question, please follow the candidate's work and allow follow through for **A** and **W** marks. Deduct 1 mark from any **A** or **W** marks earned and record this by using the MR annotation. **M** marks are not deducted for misreads.
9. Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures even if this is rounded or truncated on the answer line. For example, an answer in the mark scheme is 15.75, which is seen in the working. The candidate then rounds or truncates this to 15.8, 15 or 16 on the answer line. Allow full marks for the 15.75.
10. If the correct answer is seen in the body and the answer given in the answer space is a clear transcription error allow full marks unless the mark scheme says 'mark final answer' or 'cao'. Place the annotation ✓ next to the correct answer.

If the answer space is blank but the correct answer is seen in the body allow full marks. Place the annotation ✓ next to the correct answer.

If the correct answer is seen in the working but a completely different answer is seen in the answer space, then accuracy marks for the answer are lost. Method marks would still be awarded. Use the M0, M1, M2 annotations as appropriate and place the annotation ✖ next to the wrong answer.

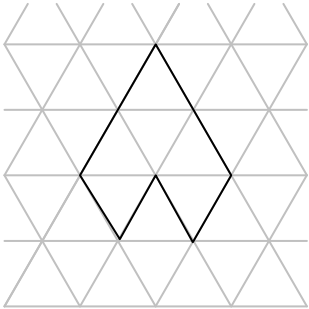
11. Ranges of answers given in the mark scheme are always inclusive.
12. For methods not provided for in the mark scheme give as far as possible equivalent marks for equivalent work. If in doubt, consult your Team Leader.
13. Anything in the mark scheme which is in square brackets [...] is not required for the mark to be earned, but if present it must be correct.

MARK SCHEME

Section A

♣ = Common with B282 (Higher Tier)

| Question | | Answer | Marks | Part marks and guidance | |
|----------|---------|----------------------------------|-------|---|---|
| 1 | (a) | One hundred [and] three thousand | 1 | accept 'a hundred [and] three thousand' | condone misspellings if clear intent; ignore m ² , oe in words |
| | (b) | 68 | 1 | | |
| | (c) | 2620 | 1 | | |
| | (d) | Upper | 1 | accept 39 165 | |
| | (e) (i) | 38 or 38.00 | 2 | M1 for attempt at $15 + 15 + 8$ or at $15 \times 2 + 8$ | condone 38.0 |
| | (ii) | 11: 45 [am] | 2 | M1 for 90 min = 1h 30 m or 1 ½ h soi | eg allow M1 for *: 45 with wrong hour 11:45 pm scores M1 only |
| 2 | (a) | 0.3[0] | 1 | condone .3[0] | 0 for 0.3̇ |
| | (b) | 60 | 1 | | |
| | (c) | 8.40 | 2 | M1 for 10% = $4.2[0]$ soi or for $42 \div 5$ or 0.2×42 or $\frac{20}{100} \times 42$ oe or for 33.6[0] | allow M1 for 8.4 M0 for just 4.2 with no 10% oe |
| 3 | (a) (i) | [regular] hexagon | 1 | | mark intent – condone misspellings if meaning clear; eg condone c or ct or ks instead of x, but 0 for hepagon (too like heptagon) |
| | (ii) | parallelogram | 1 | 0 for 'quadrilateral' | mark intent – condone misspellings if meaning clear |

| Question | | Answer | Marks | Part marks and guidance | |
|----------|---------|--|--------|---|---|
| | (b) | drawing of six triangle shape which has just one line of symmetry | 1 | eg  | may have line of symmetry drawn condone triangles attached at vertices only; condone unruled; condone internal lines; mark intent if several attempts including wrong ones, count as choice and award 0, unless directed to a correct one |
| | (c) | 2 | 1 | | 0 for '2 lines' |
| | (d) (i) | 14 | 1 | | ignore table carrying on |
| | (ii) | 26 Add on 3 lots of 4 triangles oe or 'add 4 each time' o.e. | 1 1 | or 'number of triangles is $4 \times \text{pattern number} + 2$ or '6 to start with then 5 more lots of 4' | 0 for just 'add 4' see exemplar comments |
| 4 | (a) (i) | 'There are more triangles than circles' or 'there aren't the same number of each shape' oe | 1 | if numbers of cards or probabilities are included, they must be correct (allow informal chance language) | see exemplar comments 0 for comment implying or stating that Trish is right |
| | (ii) | B | 1 | | |
| | (b) (i) | 3/10 oe | 1 | throughout part (b) accept fractional, decimal or percentage equivalents | throughout (b)(i) to (iii) ignore words such as 'unlikely' if correct fraction seen deduct 1 from mark gained once only in parts (b)(i) to (iii) for 'in' or 'out of' or 3 : 10 or 'to' etc |
| | (ii) | 7/10 oe | 1 | Or FT 1 – <i>their</i> (i) | |

| Question | | Answer | Marks | Part marks and guidance | |
|----------|---------|---------------------------|-------|--|--|
| | (iii) | 0 | 1 | condone 0/10 | 0 for 'impossible' or 'none' on its own; condone 'zero' or 'nil' ignore eg impossible if 0 or 0/10 seen |
| 5 | (a) (i) | $2x$ | 1 | mark final answer | 0 for $x + x$ etc |
| | (ii) | $5c + d$ | 2 | mark final answer W1 for each term or for correct answer seen and then spoilt | accept $1d$ instead of d : condone capitals allow W1 for $5cd$ as answer |
| | (b) (i) | 17 | 1 | | condone embedded ; 0 for $17x$ |
| | (ii) | $4\frac{1}{2}$ or 4.5 | 2 | M1 for $2x = 9$ or $[x =] 9/2$ or for final answer ft their $2x = a$ | condone embedded; eg M1 for 3.5 as answer after $2x = 7$ M0 for just 9 |
| 6 | (a) | Correct isometric drawing | 2 | accept width 4 cm, height 3 cm or width 3 cm, height 4 cm; M1 for cuboid with two dimensions correct | ignore internal lines; eg hidden edges of cube or centimetre cubes drawn in; condone unruled; mark intent allow M1 for correct dimensions except just one vertex misplaced condone not using given starting line, but must use at least 2 dimensions of given grid correctly |

| Question | | Answer | Marks | Part marks and guidance | |
|----------|-----|---|------------|--|---|
| | (b) | 60 or FT from <i>their</i> cuboid drawn (must be cuboid) cm ³ | 2 1 | M1 for $5 \times 4 \times 3$ or FT <i>their</i> cuboid | FT only for cuboid or cube drawn using isometric grid correctly eg allow 2 marks for 125 with or without working after 5 by 5 by 5 cube drawn NB if there are no units given, mark units as NR; if there are wrong units award 0 |
| 7 | (a) | 500 | 2 | M1 for 125 seen or for $2 \times 2 \times 5 \times 5 \times 5$ | M0 for just 4 seen |
| | (b) | -2 | 1 | | |
| | (c) | 15 | 1 | | |
| 8 ▲ | | $x = 135$ $y = 45$ | 2 2 | M1 for 6×180 oe or [exterior =] $360/8$ soi or $(360 - 90) \div 2$ or FT $180 - \textit{their } x$ no ft for $x = 90$; M1 for $360 - 90 - 90 - \textit{their } x$ or for <i>their</i> $x + y = 180$ oe Or M1 for <i>their</i> $x - 90$ or for <i>their</i> $x \div 3$ SC1 for $x = 90, y = 90$ | there are various correct ways that each of the angles may be obtained, so throughout this question do not apply nfw |
| 9 | (a) | 6, 2 | 2 | W1 each | |

| Question | | Answer | Marks | Part marks and guidance | |
|----------|-----|-------------------------------------|-------|--|---|
| | (b) | All 3 points plotted | 1 | correct or FT <i>their</i> table; tol 2 mm | if points not seen, they may be implied by the correct line drawn |
| | | Correct ruled line drawn | 1 | from $x = 0$ to 4 at least; Within 2 mm of correct points; no FT from wrong points | No FT for points off the grid |
| 10 | ♣ | $2\frac{8}{15}$ or $2\frac{16}{30}$ | 3 | <p>W2 for $\frac{38}{15}$</p> <p>or M2 for $3 - \frac{7}{15}$</p> <p>Or M1 for attempt to convert both fractions to all <u>common denominator</u> with at least one numerator correct eg $\frac{5}{15}$ or $\frac{12}{15}$ or $\frac{65}{15}$ or $\frac{27}{15}$</p> <p>And M1 for the result of their subtraction changed correctly to mixed number (their subtraction must involve borrowing/conversion of an integer)</p> <p>if 0, allow SC1 for 2.53(...)</p> | <p>BOD the meaning of the negative fraction</p> <p>common denominator a multiple of 15</p> <p>allow M1 for $\frac{7}{15}$ or $-\frac{7}{15}$ or $3\frac{7}{15}$</p> <p>eg $4\frac{5}{15} - 1\frac{11}{15} = 2\frac{9}{15}$ gets M1M1</p> <p>but $4\frac{5}{15} - 1\frac{4}{15} = 3\frac{1}{15}$ gets M1M0 (no conversion required)</p> |

Section A Total: 50

Section B

♣ = Common with B282 (Higher Tier)

| Question | | Answer | Marks | Part marks and guidance | |
|----------|-----|--|-------|--|--|
| 11 | (a) | Heights of bars correct | 2 | W1 for 3 bars of correct heights or 5 correct heights indicated if bars not attempted | for bars for cooker and lightbulb there must be daylight between them and the relevant gridline; must be in the correct 'half square' (condone at 0.5) – so error if cooker is in top half of square or light bulbs in lower half of square (if in doubt check eg that gap above cooker bar is larger than gap below); |
| | | Bars the same width with outlines drawn and labelled with name of item | 1 | condone abbreviations if meaning clear | condone unruled; condone missing vertical lines at edges of grid; do not penalise touching bars, but gaps must be of consistent size; condone bars one square wide; condone order of items changed – for full marks labels must match heights of bars |
| | (b) | 1.74 | 3 | M1 for 12 or for attempt at adding all five quantities M1 for <i>their</i> $12 \times 14.5 [=174]$ A1 for 1.74 | working may be near table or M1 for <i>their</i> 12×0.145 allow M2 for attempt at $3.0 \times 14.5 + 2.5 \times 14.5 + \dots + 0.3 \times 14.5$ or M1 for at least one of 43.5, 36.25, 53.65, 4.35 or equivalents in pounds allow M2 for digits 174 |
| 12 | (a) | obtuse | 1 | | |
| | | acute | 1 | | |
| | | reflex | 1 | | |
| | (b) | 35 to 37 | 1 | | |

| Question | | Answer | Marks | Part marks and guidance | |
|----------|---------|--|--------|--|--|
| | (c) (i) | 5 to 5.2 | 1 | | allow 1 for 50 to 52 mm - unit must be stated |
| | (ii) | 50 to 52 | 1 | Or FT <i>their</i> (c)(i) $\times 10$ | |
| 13 | (a) | 12 | 1 | | |
| | (b) | 5 symbols drawn for Wed am 3 ½ symbols drawn for Wed pm | 1 1 | | mark intent; eg condone last symbol just missing a leg or just having a top half |
| | (c) | Thursday afternoon | 1 | or Thursday pm; accept abbreviations if meaning is clear | 0 for Thursday; 0 for Thursday afternoon ringed in table but not mentioned in this part |
| | (d) | 181 [accept 178 to 182] | 2 | M1 for at least 5 correct of: 16, 20, 12, 22, 20, 14, 12, 27, 20, 18 or for strategy of 43×4 [+ 6 to 10], condoning one error if 0, allow W1 for answer in range 174 to 177 or 183 to 186 | may be by table; eg M1 for just the whole symbols included |
| | (e) (i) | 44 | 2 | M1 for 42 and/or 46 identified or for a correctly ordered list of all ten numbers | |

| Question | | Answer | Marks | Part marks and guidance |
|----------|-----|---|--|--|
| ▲ | (c) | $[x =] \frac{y+7}{4}$ oe | 2 | <p>M1 for $y + 7 = 4x$ oe (eg $y/4 = x - 7/4$)</p> <p>Or SC1 for answer of</p> <p>$y + 7 \div 4$ or $y + 7 / 4$ or $\frac{y}{4} + 7$ oe or for incorrect versions of $\frac{\pm y \pm 7}{\pm 4}$ oe</p> <p>NB There is no FT mark from wrong 1st step eg $8y = 4x$ then $x = 2y$ scores 0</p> <p>allow M1 for correct reverse flow chart (ie correct operations and clearly in correct order eg as shown by arrows)</p> |
| 16 | | <p>Area of 1 sheet = 250×229 used or 57 250</p> <p><i>Their</i> Area of 1 sheet $\times 60$ or 3 435 000</p> <p><i>Their</i> Area of 1 roll $\times 6$ or 20 610 000</p> <p>Correct conversion shown eg divide by 1 million since $1 \text{ m}^2 = 1 \text{ million mm}^2$</p> | <p>M1 or equivs using eg m not mm</p> <p>M0 for just 250×229 stated (given in question)</p> <p>Alternative method for second and third M1 (mark one method or the other, not a mixture):</p> <p>M1 M1 for 60×6 or 360 [sheets]</p> <p>then</p> <p>M1 M1 for area of 1 sheet \times <i>their</i> 360</p> <p>M1 eg may be conversion at beginning with sheet size 0.25[0] by 0.229</p> | <p>allow rounding eg 5.73 cm^2</p> <p>allow first M1 for digits 5725 (may try, perhaps wrongly, to convert units at this stage)</p> <p>Throughout, the M1's may be awarded in a different order</p> <p>eg $250 + 229 = 479$ then $479 \times 360 = 172440$ earns M0 M1 M1 M0 ft</p> <p>allow M3 for digits 2061</p> <p>if other conversions in stages, correct units must be shown</p> <p>condone working backwards if working is clear eg M2 for $20.6 \div 360 = 0.572(\dots)$</p> <p>[if a misread eg 129 instead of 229, deduct one mark from those earned]</p> |

| Question | | | Answer | Marks | Part marks and guidance | |
|----------|-----|------|--------------|-------|--|--|
| 17 ♣ | (a) | (i) | 136 | 3 | <p>M1 for 2·25 seen and M1 for 306/<i>their</i> time interval</p> <p>or M2 for $\frac{306}{135} \times 60$</p> | <p>eg M1 for 306/2·15 or 142·(3...) or M1 for 306/135 or 2·26 to 2·27</p> <p>allow equivalent marks for those putting clocks forward on journey ie 3 marks for 244·8 or 245 allow M1 for 1·25 seen and M1 for 306/1·25 or M2 for $\frac{306}{75} \times 60$ or M1 for 306/75 or 4·08 or 4·1</p> |
| ♣ | | (ii) | 217·6 or 218 | 2 | <p>Or FT 1·6 x <i>their</i> (i) for M1A1</p> <p>M1 for <i>their</i> 136/5 × 8</p> | <p>Accept exact answers or sensible rounding/ truncation eg 142·(3...) accept 227 to 228 2·26 to 2·27 or 2·3 accept 3·61 to 3·64 244·8 or 245 accept 391 to 392</p> |
| ♣ | (b) | | £75 | 2 | <p>M1 for 90 ÷ 1·20</p> | <p>allow M1 for 75 × 1·2 [= 90]</p> |
| 18 ♣ | (a) | | £15·55 | 3 | <p>M1 for 230 × 18, 165 × 15, 85 × 10</p> <p>M1 for <i>their</i> 7465/480</p> | <p>may be implied by 7465; allow M1 for at least two of 4140, 2475 and 850 seen even if not used (or deleted)eg may be seen by table</p> <p>allow M2 for an answer of 15·5 to 15·6</p> <p>allow M2 to be implied by answer of 6616·77(...) (obtained from failure to press =)</p> <p>an answer of 16 scores: 3 if correct answer seen 2 if correct working seen 0 if no working seen</p> |

| Question | | Answer | Marks | Part marks and guidance | |
|----------|-----|--|-------|--|--|
| ▲ | (b) | £11.7[0] | 3 | <p>W2 for 6.3[0] M2 for 0.65×18 oe or for $18 - 0.35 \times 18$ oe Or M1 for 0.65 or 65/100 or for 0.35×18 oe</p> | <p>NB W0 for just 630 (18 x 35)</p> <p>if M0, allow SC1 for correctly working out 65% of back stalls or balcony prices, having seen the price being used (answers £9.75 or £6.50)</p> |
| ▲ | (c) | <p>Pie chart with 3 sectors correct and labelled Front, Back, Balcony oe Angles = 200°, 90°, 70° ($\pm 3^\circ$)</p> | 3 | <p>M2 for pie chart with sector sizes correct but mislabelled or 2 sectors within tolerance and 1 outside; all three labelled Or M1 for 200, 90 and 70 (or 56, 25 and 19[%]) seen or pie chart with 1 correct angle (condone wrong/no labels)</p> | <p>accept abbreviations; condone misspellings if intent clear; ignore 100, 45, 35 or angles or % as labels though they may score for M1 if all sectors incorrect</p> <p>for unruled lines, check the angle where a line crosses/would cross the circumference</p> <p>for the reflex angle measure the corresponding obtuse angle ($160^\circ \pm 3^\circ$)</p> |

Section B Total: 50

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