GCSE

Mathematics A (Two Tier)

General Certificate of Secondary Education

Component **J512/01:** Paper 1

Mark Scheme for June 2011

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Subject-Specific Marking Instructions

1.   **M** marks are for <u>using a correct method</u> and are not lost for purely numerical errors.
     A marks are for an <u>accurate</u> answer and depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
     B marks are <u>independent</u> of **M** (method) marks and are awarded for a correct final answer or a correct intermediate stage.
     SC marks are for <u>special cases</u> 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 <u>not from wrong working</u> **full marks** should be awarded.

     Do <u>not</u> award the marks if the answer was obtained from an incorrect method, ie incorrect working is seen <u>and</u> 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 × (*their* '37' + 16), or FT 300 − √(*their* '$5^2 + 7^2$'). Answers to part questions which are being followed through are indicated by eg FT 3 × *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).
     -    **nfww** 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 **B** marks. Deduct 1 mark from any **A** or **B** 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

Question			Answer	Marks	Part marks and guidance	
1			Octagon	1		
			Hexagon	1		
			Trapezium	1		
			Scalene triangle	1		
			Cuboid	1		
2	(a)		9 17 卌 || 11	2	Allow **1** if any 3 correct	
	(b)		Apple	1		Ignore any number given
	(c)		8	1		
	(d)		9	3	**B1** for 47 nfww or 3 + 9 + 17 + 7 + 11 **B1** for 50 − 12 (= 38)	At least 4 terms of addition and at least 3 correct No FT in this part
3	(a)		549	1		
	(b)		584	1		
	(c)		18	1		

Question	Answer	Marks	Part marks and guidance	
(d)	1242 nfww	3	**M1** for 92(0) + 322 or 108(0) + 162 (at least 1 term correct **and** addition attempted) **A1** if all digits are correct in their part sums	e.g. 0 for 92 + 312, 108 + 164 as no term correct e.g. **M1** for 920 + w or x + 322 or 1080 + y or z + 162 **and** attempt made to add e.g. **M1A1** for 92 + 322 = … or 108 + 162 = … – again addition must be attempted but ignore total
			OR **M1** for 800 + 120 + 280 + 42 (i.e. 4 values added at least two terms correct) **A1** for all digits correct, and 3 terms correct	e.g. **M1** for say x + y + 280 + 42 **and** addition attempted e.g. **M1A1** for say 80 + 120 + 280 + 42 **and** addition attempted
			OR if grid ('Chinese' method) used **M1** complete grid, 2 products correct **A1** whole grid correct Other correct complete methods, if clear, and no more than one arithmetic error earn **M1**	Again to earn any marks the diagonal additions (top right to bottom left) must be attempted 800 + 42 = 842 gets **0** (This is a common response)

4	(a)		− 0 0 −	2	**B1** for 1 correct (and 1 wrong) or 2 correct and 1 extra	
	(b)		0 − − 0 −	2	**B1** for 1 correct (and 1 wrong) or 2 correct and 1 extra	
	(c)		− 0 − − 0	2	**B1** for 1 correct (and 1 wrong) or 2 correct and 1 extra	
5	(a)		8, 10	1		Ignore any extra even numbers
	(b)		15, 19 or 19, 15	2	**B1** if 1 correct	E.g. **B1** for 15, 18 or 19, 16 Condone … 11, 13, 15 19, 21, 23,… for **2**
6	(a)		150 isw	2	**B1** for 4 × 30 or 120 seen	
	(b)		4h 45mins	3	**M1** for 8½ × 30 + 30 **A1** for 285 **B1FT** for a correct conversion of any time in mins (if >60) to hours and mins rot If **0** then **SC2** for 4hr 15 Or **SC1** for 255	Could be in stages eg 8½ **x** 30 = 210 + 30 earns **M1** Calculation doesn't have to be evaluated Can be awarded at any stage in their method even if spoilt later.

7	(a)		Fully correct net with no additional lines or flaps	3	±2mm **B1** for 1 rectangle 8 × 6 **B1** for 2 correctly placed sides 8 × 2 and/or 6 × 2 Following **0**, award **SC1** for any correct net of any open cuboid (cube)	Condone freehand/dotted Condone missing fold lines If net extends beyond grid condone if accurate by eye Ignore any additional lines for B marks 3D views score zero
	(b)	(i)	60 isw	2	**M1** for full method with attempt to evaluate	
		(ii)	32	2	**M1** for 400 × 0.08 or answer of figs 32	Does not need to attempt to evaluate for **M1**
8	(a)	(i)	1	1		
		(ii)	Middle number will still be 1	1	See list of examples	
	(b)	(i)	2.8 oe isw	3	**M1** for 1 + 1 + 2 + … (= 28) **M1dep** for $\dfrac{\textit{their}\ 1+1+2+...(=28)}{10}$	Addition can be implied by total of 23 – 33 nfww 28/10 = 3 scores **3**
		(ii)	0.2 nfww	3	**M1** for *their* 28+ 5 (= 33) **M1dep** for $\dfrac{\textit{their}\ 28+5}{11}$	*their* 28 could be *their* bi × 10 5 alone scores **0** <u>New mean</u> = 3 nfww implies **M2**

9	(a)		1 cao	1		Not 1^2 or 1×1
	(b)	(i)	11	2	**B1** for 3 or 8 nfww	
		(ii)	5 cao	1		Not 5^3 or $5 \times 5 \times 5$
		(iii)	(0).4(0)	1		
	(c)	(i)	It is 3×7	1	See list of examples	
		(ii)	17	1		
10			176	3	**B2** for any 2 seen from: 86, (8 + 60 + 18 oe), 1:26, 1.26, 1hr 26 Or 14, 0:14, 0.14, Or 76, (5 + 60 + 11 oe), 1:16, 1.16, 1hr 16 Or **B1** for any 1 of the above	Condone incorrect labels

11	(a)		70°	2	**M1** for (180 – 40)/2 Or **SC1** for 100	If correct answer on diagram and contradicted in answer space then **M1**only earned. If answer space blank, check diagram for up to full marks
	(b)		110	FT1	FT 180 – *their* 70 or *their* 70 + 40	
			"Line" **with** ("angles" or "180") or "exterior" or "interior opposite"	1	'180' can be implied by correct answer / working Where totals are given with reasons they must be correct	E.g. "Angles on line" scores **1**. "Angles = 180" scores **0** "Line" with answer of 110 scores **1, 1** "Angles on line = 200" scores **0** Reasons independent of correct working eg 40° with "line =180" scores **0,1** Condone poor spelling
12	(a)		E.g. 2|3 represents 2.3	1		Condone eg 3 | 0 represents 3
	(b)		8 in correct cell	1		Condone if not vertically aligned
	(c)		22	1		
	(d)		3.3	1		
	(e)		4.3 or 43	1		
13	(a)	(i)	$\frac{420}{10}$ oe isw	1		Condone embedded answer even if contradicted ie 10 × 42 = 420 Condone 42x , x42 or 10 × 42
		(ii)	36	1		Condone embedded answer even if contradicted 36 - 7 = 29
	(b)		t^5	1		Condone T^5 0 for t5

14	(a)		(0)66°	1	± 2°	
	(b)		345°	1	± 2°	
	(c)		126	2	± 4 **B1** for 6.3 ± 0.2	
15			20 Stopped oe 2 Constant oe 40 or 2 × *their*(20)	2 1 1 1 FT1	**M1** for 2 ÷ 0.1 or 2÷6 (×60) or 1÷3 (×60) or 0.33 or better (× 60) seen Accept steady, fixed oe or average, faster, higher, increased oe	This method mark may be gained in the last part for 4 ÷ 0.1 or 4÷6 (×60) or 2÷3 (×60) or 0.66 or better (×60) seen. NOT 'fast', 'high', 'increasing' etc If M0 scored for first speed, 40 will score 2 (from M1, 1)
16	(a)		16	1		In both parts, allow marks for embedded answers if not contradicted
	(b)		7½, 7.5, $7\frac{3}{6}$, $\frac{15}{2}$, $\frac{45}{6}$ isw nfww	3	**M1** for $6x - 15$ seen or $2x - 5 = 10$ **And M1** for $6x = 30 + $ *their* 15 oe or $2x = $ *their* 10 + 5 oe	
17	(a)		92	2	**M1** for 46 ÷ 50 (× 100) soi **Or SC1** for answer 8	
	(b)		963.5	3	**B1** for 10% = 82, 5% = 41, 2½% = 20.5 or 10% = 82, 1% = 8.2, ½% = 4.1 etc seen **And M1** for 820 + *their*(10% + 5% + 2½% values) oe **Or M2** for 1.175 × 820 oe **Or M1** for 0.175 × 820 oe	B mark may be implied by 143.5 seen At least 3 relevant correct percentages seen or implied With attempt at long multiplication With attempt at long multiplication

18	(a)	(i)	54	2	**M1** for $9 \times 12 \div 2$ soi	
		(ii)	540 000	FT1	Follow through *their* (i) × 10 000	
	(b)		15	3	**M2** for $\sqrt{(12^2 + 9^2)}$ oe soi or $\sqrt{225}$ **Or M1** for $12^2 \pm 9^2$ soi	**Or M2** for 5 × 3 (from 3,4,5 triangle ×3) if clear
19			Line parallel to one side of house 4cm from house Arc of circle, centre at tree 6cm from tree Indicates 2 correct regions only	M1 A1 M1 A1 A2	Ruled ±2mm Compass drawn, any length of arc ±2mm **A1** for 1 correct region indicated Or for 2 'correct' (FT) regions after 3 marks scored **Or SC1** for at least one point or some shading within each of the correct regions and no points or shading outside the correct regions.	More than half length or width of house If both lines drawn, mark best For SC mark, points/shading must be within the overlay boundaries ± 2mm

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