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Mark Scheme (Results)

November 2011

Modular Mathematics (GCSE)
Unit 2: 5MB2F_01 (Foundation)

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

3 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.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.

ii*) select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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 it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
If there is no answer on the answer line then check the working for an obvious answer.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
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.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 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: e.g. incorrect canceling 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 e.g. algebra.
Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

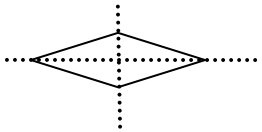
12 Parts of questions

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

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

5MB2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		rhombus	1	B1 cao
	(b)			1	B1 for both lines seen do not accept any extras but accept freehand Lines.
2	(a)		10 570	1	B1 for 10 570
	(b)		560	1	B1 cao
	(c)		2.17, 3.95, 5.03, 6.84	1	B1 cao
	(d)(i)		49	1	B1 cao
	(ii)		8	1	B1 cao
3	(a)		8.6	1	B1 for 8.6 ± 0.2 cm
	(b)		correct ×	1	B1 for × 5 cm from Q ± 0.2 cm use overlay provided
	(c)(i)		obtuse	2	B1 ignore spelling
	(ii)		120		B1 for 120 ± 2°

5MB2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
4		2 × 60 + 3 × 50 = 120 + 150 = 270 7 × (45 + 55) = 700 1500 – 970 **or** 2 × 60 + 3 × 50 + 7 × 45 +7 × 55 120 + 150 + 315 +385 = 970 1500 – 970 = **or for doubling travel costs** 2 × 2 × 60 + 2 × 3 × 50 = 240 + 300 = 540 7 × (45 + 55) = 700 1500 – 1240 = 260	530	4	M1 for 2 × 60 or 3 × 50 or 7 × 45 or 7 × 55 oe M1 for '2 × 60' + '3 × 50' + '7 × 45' + '7 × 55' oe M1 for 1500 – ('2 × 60' + '3 × 50' + '7 × 45' + '7 × 55') oe A1 cao **or** M1 for 2 × 60 or 3 × 50 or 45 + 55 oe M1 for '2 × 60' + '3 × 50' + '(45 + 55)' × 7 M1 for 1500 – ('2 × 60' + '3 × 50' + '(45 + 55) × 7)' oe A1 cao **Or for doubling travel costs** M1for 2 × 2 × 60 or 2 × 3 × 50 or 7 × 45 or 7 × 55 oe M1for '2 × 2 × 60' + '2 × 3 × 50' + '7 × 45'+ '7 × 55' oe M1for 1500 – ('2 × 2 × 60' + '2 × 3 × 50' + '7 × 45' +'7 × 55') oe A1 for 260
5	(a) (b)(i) (ii)		2 Monday 7	1 2	B1 cao B1 for Monday oe B1 ft for their (b)(i) accept positive and negative answers for 7
6	(a) (b)		5.6 9.58	1 1	B1 cao B1 ft from their weight in part (a) may be shown by selecting correct value in the table
7	(i) (ii)		70 reason	2	B1 for 70 look for answer on diagram C1 for angles (on a) straight line (add up to) 180°

5MB2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*8		28 = (4+1) + (4+1) + (4+1) + (4+1) + (4+1) + 3 Buy 4 + 4 + 4 + 4 + 4 + 3 23 × 6 = 138 or 140 ÷ 6 (= 23 rem 2) 23 ÷ 4 = 5 free 23 + 5 = 28	Yes + reason	3	M1 for attempt to account for 1 free e.g. (4+1) + (4+1) ... with at least 2 seen e.g. 140÷24 = 5 so 5 free eg every £24 get 1 free e.g. 23lots of £6 so 5 free M1 for using £140 in a calculation that could lead to the correct conclusion (need not be explicit) or for a method that leads to a total cost of 138 C1 (dep on M1) for 'Yes' **and** reason eg "138" is less than 140 oe or "Yes" **and** "23 with 5 free gives £2" left over oe **NB** Needs a statement to this effect
9	(a)	$\frac{15}{100} \times 240$	36	2	M1 for 15 ÷ 100 or 10% + 5% attempted with correct values of 24 and 12 seen or 24 and 12 seen or 0.15 seen A1 cao
	(b)	240 ÷ 3	80	1	B1 cao
	(c)	80 : 60 = 8 : 6	4 : 3	2	M1 for any correct ratio eg 80:60, 40 : 30, 8 : 6 or 4 gap 3 seen without ratio sign or 4 dot 3 A1 for 4 : 3 or 4 to 3 **SC** B1 for an answer of 3:4 or 3 to 4 if M1 not scored

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Question		**Working**	**Answer**	**Mark**	**Notes**
10	(a)		16	1	B1for answer in range 15.5 to 16.5
	(b)		2.4	1	B1for answer in range 2.3 to 2.5
	(c)(i)		Debbie	1	B1 for Debbie
	(c)(ii)		Correct reason	1	C1for Debbie in Part (i) with a valid explanation e.g. It is higher **or** with a correct conversion ± 1 sq or Stefan in part (i) with an incorrect conversion but valid explanation Note: 6 mph = 9.6 km/h (accept 9-10) 10.5 km/h = 6.5625 mph (accept 6.4 – 6.8)
11	(a)		6	2	M1for any valid method e.g. drawing diagrams, counting in 2s which may be on the diagram or table of values A1cao
	(b)	nth term is $2n + 2$ so 50th term is $50 \times 2 + 2$	102	2	M1for $50 + 50 + 2$ or any other valid method A1cao
12			$4x + 9y$	2	B2for $4x + 9y$ (B1for $4x$ or $9y$ seen)

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Question		**Working**	**Answer**	**Mark**	**Notes**
13	(a)		17	1	B1 cao
	(b)		(5+3)×2+1	1	B1 cao
	(c)		24	1	B1 for 24 or + 24
	(d)	$\frac{7}{10} + \frac{1}{5} = \frac{7}{10} + \frac{2}{10}$ |	| 1 | 5 | | 7 | | 35 | | 10 | 10 | 50 |	$\frac{9}{10}$	2	M1 for a suitable common denominator (multiple of 10) with one fraction out of two (not $\frac{7}{10}$) correct or 0.7 + 0.2 or all cells correct if cell method used A1 for $\frac{9}{10}$ oe, accept 0.9
*14		$96 \div 2^2$ $= 96 \div 4$ $= 24$	No + calculations	3	M1 for $96 \div 2^2$ oe A1 for 24 C1 dep on M1for "No" **with** a calculation to support their conclusion **SC B1:** for $96 \div 2$ **and** a correct conclusion seen **NB** To award the marks in this question working **must** be shown

5MB2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
15	(a)	Missing sides are $2x + 1$ and $3x + 3$ Perimeter = $5x + 1 + x + 3x + 2x + 3 + 2x + 1 + 3x + 3$ OR $2(5x + 1) + 2(2x + 3 + x)$	$16x + 8$	3	M1 for $5x + 1 - 3x$ or $2x + 3 + x$ or identifying a missing side as $2x + 1$ or $3x + 3$(maybe on the diagram) M1 for adding 5 or 6 sides from x, $5x + 1$, $3x$, $2x + 3$, '$2x + 1$', '$3x + 3$' where the missing sides are in the form $ax \pm b$ (a and $b \neq 0$) or $2(5x + 1) + 2(2x + 3 + x)$ oe A1 for $16x + 8$ oe for unsimplified expression
	(b)		$4x + 2$	1	B1 ft for ['$2(5x + 1) + 2(2x + 3 + x)$'] ÷ 4 or ("$16x + 8$") ÷ 4 oe where the answer is an algebraic expression in x

5MB2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
16		Big area = 144 Small area = 64 Area frame = 144 – 64 = 80 80 ÷ 4 **or** Area one piece is a trapezium ½ (12+8) × (12– 8)÷2 ½ × 20 × 2 = 20 **or** Area of rectangle + 2 triangles 8 × 2 + 2× (½ × 2 × 2) 16 + 4 **or** Area of rectangle – 2 triangles 12×2 – 2× (½ × 2 × 2) 24 – 4	20	4	M1 for 12 × 12 or 8 × 8 or 144 seen or 64 seen as area M1 for 12 × 12 – 8 × 8 or '144' – '64' or 80 seen as area M1 for (12 × 12 – 8 × 8) ÷ 4 or '(144 – 64)' ÷ 4 or '80' ÷ 4 seen as area A1 for 20 cao **or** M1 for 12 – 8 or 4 seen as difference in lengths M1 for height of trapezium = (12 – 8) ÷ 2 or '4' ÷ 2 or 2 M1 for area trapezium = ½ (12 + 8) × '2' oe A1 for 20 cao **or** M1 for ½ × (12 – 8) or 2 for width of frame M1 for 8 × 2 = 16 for rectangle M1 for 2× (½ × 2 × 2) or 4 for 2 triangles A1 for 20 cao **or** M1 for ½ × (12 – 8) or 2 for width of frame M1 for 12 × 2 = 24 for rectangle M1 for 2× (½ × 2 × 2) or 4 for 2 triangles A1 for 20 cao **NB** marks can be awarded for correct measurements indicated on the diagram **Note:-**If 80 seen on the answer line following a correct calculation of one piece of card, full marks can be earned

5MB2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*17		Angle $ACB = 35°$ (base angles of an isosceles triangle are equal) (angles in a triangle add up to 180) Angle $CAE = 35°$ (alternate angles are equal) $x = 360 – (100 + 90 + 35)$ $= 135$ (angles in a quadrilateral add up to 360°)	135	4	M1 for angle $ACB = (180 – 110) \div 2$ or 35 seen M1 for angle CAE = angle ACB or "35" (this could be marked on diagram) A1 $x = 135$ cao C1 (dep on M1) for alternate angles are equal or allied angles (co-interior angles) are supplementary (add to 180º) AND any one of • (base) or 2 angles of an isosceles triangle are equal oe • angles in a triangle (add up to) 180 • angles in a quadrilateral (add up to) 360° • angles in a pentagon (add up to)540º

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