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Mark Scheme (Results)

March 2013

GCSE Mathematics (2MB01) Higher
5MB2H (Non-Calculator) Paper 01

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March 2013
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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 labelling 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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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 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 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

5MB2H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		x −2 −1 0 1 2 3 4 y -2 **0** **2** **4** 6 **8** **10**	2	B2 cao (B1 for any 2 correct values)
	(b)		Correct graph	2	B2 correct line through at least 2 correct points (B1 for correct points plotted or ft from their table if at least B1 earned in part (a))
2			60	3	M1 for 200 ÷ 5 (=40) M1(dep) for '40' × 1.50 or '40' × 150 A1 cao OR M1 150 ÷ 5 (= 30) or 1.5(0) ÷ 5 (=0.3(0)) M1(dep) for 200 × '30' or 200 × '0.3(0)' A1 cao (If no marks scored, SC B1 for 120)
3		$\frac{9}{24}+\frac{8}{24}$	$\frac{17}{24}$	2	M1 for converting to two fractions with a correct common denominator, at least one fraction correct. A1 $\frac{17}{24}$ oe

5MB2H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
4			150	3	M1 300 ÷ 20 (= 15) or 200 ÷ 20 (=10) or 3 ÷ 0.2 (= 15) or 2 ÷ 0.2 (=10) M1(dep) '15' × '10' A1 cao OR M1 300 × 200 (= 60000) or 20 × 20 (=400) or 3 × 2 (= 6) or 0.2 × 0.2 (=0.04) M1 (dep) '60000' ÷ '400' or '6' ÷ '0.04' A1 cao
5	(a)		$3x - y$	2	M1 for $3x$ or $-y$ A1 for $3x - y$ or $-y + 3x$
	(b)		$2 - 3x$	1	B1 for $2 - 3x$ or $-3x + 2$
	(c)		t^{11}	1	B1 cao
	(d)		y^4	1	B1 cao
	(e)		c^{12}	1	B1 cao
6			6400	4	M1 for correct method to work out 20% M1 for correct method to divide in the ratio 2:3 M1for complete and correct method A1 cao

5MB2H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
7	(a)		$4n - 2$	2	B2 $4n - 2$ or $2 + (n - 1) \times 4$ oe (B1 for $4n + k$, $k \neq -2$, or $4n$)
	(b)		-30	2	M1 $20-5 \times 10$ A1 cao
8			48	4	M1 for $360 \div 5$ (=72) M1 for $180 -$ '72' (= 108) M1 (dep M2) for '108' – 60 A1 cao OR M1 for $(5 - 2) \times 180$ (=540) M1 for '540' ÷ 5 (= 108) M1 (dep M2) for '108' - 60 A1 cao
9	(a)		$3(t + 4)$	1	B1 for $3(t + 4)$ or $3 \times (t + 4)$ oe
	(b)(i)		$20x + 25$	3	M1 for $7 \times 2x + 7 \times 1$ or $14x + 7$ or $6 \times x + 6 \times 3$ or $6x + 18$ A1 for $20x + 25$ (accept $5(4x+5)$)
	(ii)		Shown		B1 for $5(4x+5)$ or describes how the coefficient of x and the constant term are both multiples of 5
10			Correct elevation	2	M1 for a side elevation which shows 2 vertical, 2 horizontal and 1 sloping line in the correct order. A1 fully correct

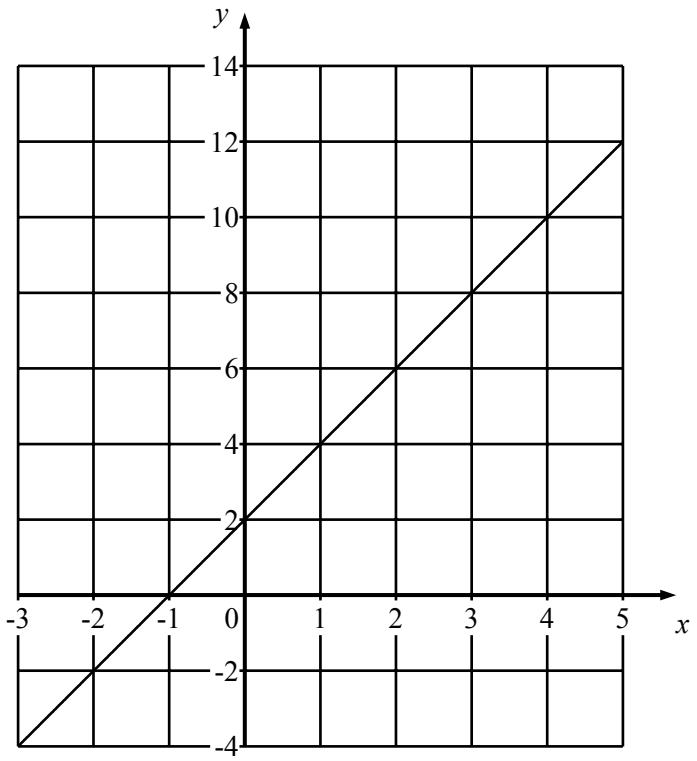
5MB2H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
11		$8\times10+\frac{4+10}{2}\times6=122$ 80+42 = 122 122×30 OR $(8+6)\times10-2\times\frac{1}{2}\times\frac{10-4}{2}\times6=$ $140-18=122$ 122 × 30 OR 8 × 10 × 30 = 2400 $\frac{4+10}{2}\times6\times30=1260$ 2400 + 1260 OR (8 + 6) × 10 × 30 = 4200 $2\times\frac{1}{2}\times\frac{10-4}{2}\times6\times30=540$ 4200-540	3660	4	M1 for correct method to find one correct area eg 8 × 10 (= 80) or $\frac{4+10}{2}\times6\ (=42)$ or (8 + 6) × 10 (=140) or $\frac{1}{2}\times\frac{10-4}{2}\times6\ (=9)$ M1 for correct method to find one correct volume eg 8 × 10 × 30 (= 2400) or $\frac{4+10}{2}\times6\times30\ (=1260)$ or 9 ×30 M1 for correct and complete method to find the total volume A1 cao

5MB2H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
12		4.2×10^5 1.3×10^5 3.0×10^{-5} -2.5×10^{-4} 5.2×10^3 OR 420000 130000 0.00003 −0.00025 5200	-2.5×10^{-4} 30×10^{-6} 0.0052×10^6 13×10^4 4.2×10^5	3	M1 for intention to reduce numbers to standard form A1 at least two numbers correctly changed into standard form A1 correct order (any form) OR M1 for intention to reduce numbers to ordinary form A1 at least two numbers correctly changed into ordinary form A1 correct order (any form) (SC B2 for correct ordering largest to smallest)
13	(a) (b)		(8, 4, 0) $(8, 2, \frac{7}{2})$	1 2	B1 cao M1 for mean of each pair of coordinates, $\frac{8+8}{2}$ (= 8), $\frac{4+0}{2}$ (= 2), $\frac{7+0}{2}$ (= $\frac{7}{2}$ oe), or 2 correct coordinates. A1 $(8, 2, \frac{7}{2})$ accept $3\frac{1}{2}$ or 3.5 for $\frac{7}{2}$

5MB2H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*14		Angle $BCD = 27^o$ Angle $CBD = 90^o$ Angle $CDB = 180^o - 90^o - 27^o = 63^o$ Alternate angles are equal The tangent to a circle is perpendicular (or 90°) to the radius (or diameter) Angles in a triangle add up to 180° OR Angle $CBE = 90^o$, Angle $ABE = 90^o - 27^o = 63^o$ Angle $CDB = 63^o$ The tangent to a circle is perpendicular (or 90°) to the radius (or diameter) Corresponding angles are equal OR Angle $CBD = 90^o$ Angle $ABD = 90^o + 27^o = 117^o$ Angle $CDB = 180^o - 117^o = 63^o$ The tangent to a circle is perpendicular (or 90°) to the radius (or diameter) Allied angles/Co-interior angles add up to 180°	63^o	4	B1 for Angle CBD = 90° or Angle CBE = 90° B1 for Angle BCD = 27° or Angle ABE = 63° C1 for Angle CDB = 63° and one correct reason C1 for complete and correct reasons. OR B1 for Angle CBD = 90° B1 for Angle ABD = 117° C1 for Angle CDB = 63° and one correct reason C1 for complete and correct reasons. Alternate angles are equal Corresponding angles are equal The tangent to a circle is perpendicular (or 90°) to the radius (or diameter) Angles in a triangle add up to 180° Angles on a straight line add up to 180° The exterior angle of a triangle is equal to the sum of the interior opposite angles. Allied angles/Co-interior angles add up to 180°

5MB2H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
15	(a)		$y = 3x$	2	M1 for equation $y = 3x + k$ $(k \neq -4)$ A1 for $y = 3x$
	(b)		$y = -\frac{1}{3}x + 5$	2	M1 for gradient $-\frac{1}{3}$ A1 $y = -\frac{1}{3}x + 5$ oe
16			1	3	M1 $(\sqrt{5})^2 - 1$ or $\sqrt{25} - 1$ or $\sqrt{5} \times \sqrt{5} - \sqrt{5} + \sqrt{5} - 1$ or $\sqrt{25} - \sqrt{5} + \sqrt{5} - 1$ M1 (indep) use of $(\sqrt{5})^2 = 5$ or $\sqrt{5} \times \sqrt{5} = 5$ A1 cao
17			$\frac{x}{2x+1}$	3	B1 for $x(x - 3)$ B1 for $(2x + 1)(x - 3)$ B1 for $\frac{x}{2x+1}$

1.



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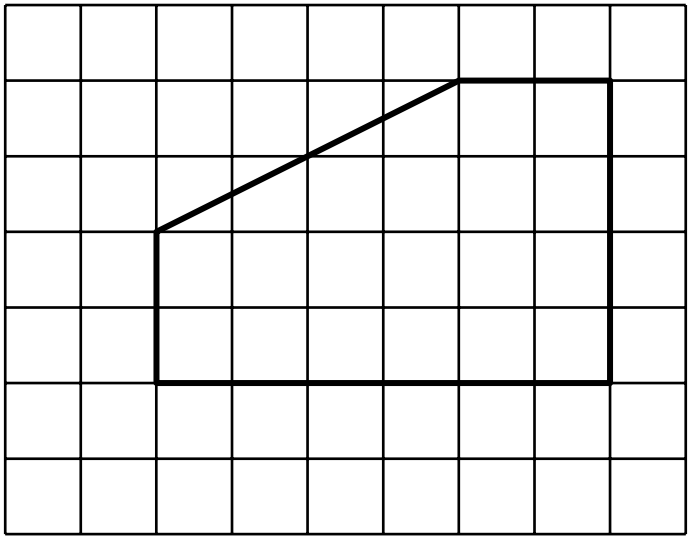

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Order Code UG035037 March 2013

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