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Mark Scheme (Results)

June 2012

GCSE Mathematics (2MB01) Foundation
5MB2F (Non-Calculator) Paper 01

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June 2012
Publications Code UG032657

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

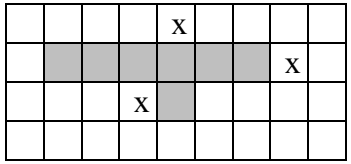
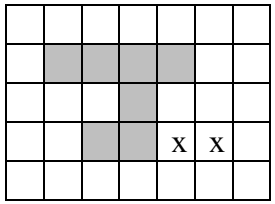
Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

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)		68	1	B1 cao
	(b)		4 000 000	1	B1 cao
	(c)		7 tenths	1	B1 accept $\frac{7}{10}$
2	(a)		Trapezium	1	B1 for trapezium ignore spellings
	(b)		Chord	1	B1 ignore spellings
	(c)(i)		7	2	B1 cao
	(ii)		10		B1 cao
3	(a)		$5p$	1	B1 for $5p$
	(b)		$4rs$	1	B1 for $4rs$
	(c)		$7a + 2b$	2	M1 for $7a$ or $2b$ accept equivalents; ignore signs A1 for $7a + 2b$

5MB2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
4		3 × 45p = £1.35 2 × 75p = £1.50 5 × £1.50p = £7.50 + £10.35 Change = £20 – £10.35	£9.65	4	M1 for 3 × 45 or 135 or 2 × 75 or 5 × 1.50 or 7.5 or 5 × 150 or 750 M1 for attempt to total 3 different items M1 (dep on at least M1 already) for attempt to take their total away from £20 with consistent units A1 for £9.65 cao **Alternative** M1 for 3 × 45 or 135 or 2 × 75 or 5 × 1.50 or 7.5 or 5 × 150 or 750 M1 for attempt to subtract one item from £20 M1 for attempt to subtract three different items from £20 with consistent units A1 for £9.65 cao SC B2 for £17.30
5	(a)(i) (ii)		Mark // lines Mark perpendicular lines	2	B1 for marking 2 lines parallel B1 for marking two perpendicular lines
	(b)(i) (ii)		11 68	2	B1 for 11 cm ± 2mm B1 for 68 ± 2°

5MB2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
6	(a)		22	1	B1 cao
	(b)		42	1	B1 cao
	(c)		Reason given	1	B1 for correct reason – accept as sufficient: 101 is odd Terms of the sequence are even or end in 0, 2, 4, 6, 8 Shows terms 98 and 102 or either 98 or 102 alone with evidence of term to term difference of 4
	(d)		$4n + 2$	2	B2 for $4n + 2$ oe (B1 for a linear expression in $4n$ e.g. $4n + a$ ($a \neq 2$) or $n = 4n+2$) (B0 for $n = 4n$ or $n + 4$)
7		$50 \div 10$ or $\frac{10}{100} \times 50 =$	£5	1	B1

5MB2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
8	(a)		One square correctly added	1	B1 for 1 square shaded to give a shape with one line of symmetry in any of the 3 marked squares
	(b)		Two squares correctly added	1	B1 for 2 marked squares shaded to give rotational symmetry of order 2
9		07 35 + 1h 35 min + 40 min	09 50	3	M2 for 7 35 + 1 hr 35 + 40 or 710 + 25 + 1 hr 35 + 40 (M1 for 1h 35 + 40 (=135 mins or 2hr 15 mins oe) Or 1hr 35 + 25 + 40 (=160 mins or 2hr 40mins oe) Or 7 35 + 1 hr 35 (=9 10) or 7 10 + 1hr 35 (=8 45) Or 7 35 + 40 (=8 15) or 7 10 + 40 (= 7 50) Accept from addition method using minutes or minutes and hours or by counting on along time line) A1 for 9 50(am)
10		10 + 8 + 10 + 8 = 36 36 × £1.50 or (10 × £1.50 + 8 × £1.50) × 2 =	54	4	M1 for 10 + 8 + 10 + 8 or 10 × £1.50 and 8 × £1.50 or 18 × £1.50 A1 for 36 or 27 or 15 and 12 M1 for "(10 + 8 + 10 + 8)" × £1.50 or (10 × £1.50 + 8 × £1.50) × 2 A1 cao

5MB2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*11		360 – (90 + 160 + 30) = 80º 180 – (80 + 80) Or exterior angle = 180 – 80 so x = 100 – 80	20	5	M1 for 360 – (90 + 160 + 30) C1 (dep) for angles at a point add up to 360° M1 ft for 180 – (2 × "80") or 180 – "80" = 100 and "100" – "80" A1 for 20 cao C1 (dep on second M1) for base angles of an isosceles triangle are equal and angles in a triangle add to 180° OR for base angles of an isosceles triangle are equal and the exterior angle of a triangle is equal to the sum of the interior opposite angles

5MB2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
12		**Using 1000g = 5 × 200g** 2.50 × 5 = 12.50 or 10.50 ÷ 5 = 2.10 10.50 < 12.50 or 2.10 < 2.50 **Alternative (using cost per n grams)** $250 \div (\frac{200}{n}) = 1.25n$ $1050 \div (\frac{1000}{n}) = 1.05n$ 1.05n < 1.25n **Alternative method** **(using 800 = 4 × 200g)** 2.50 × 4 = 10.00 10.50 – 10.00 = 0.50 0.50 < 2.50 **Alternative (using grams per 1p)** 200 ÷ 250 = 0.8g 1000 ÷ 1050 = 0.95...g 0.95 >0.8	1000g packet	3	**(Using 1000g = 5 × 200g)** M2 for £2.50 × 5 (= £12.50) or £10.50 ÷ 5 (= £2.10) oe (M1 for 1000 ÷ 200 = 5 or 5 × 200 = 1000 oe) C1 for 1000g packet and 2 correct comparable values **Alternative method (using cost per n grams)** M2 for $250 \div (\frac{200}{n})$ (= 1.25n) and $1050 \div (\frac{1000}{n})$ (= 1.05n) oe (M1 for 250 ÷ (200) (= 1.25) or 1050 ÷ (1000) (=1.05) oe) C1 for 1000g packet and 2 correct comparable values **Alternative method (using 800 = 4 × 200g)** M1 for £2.50 × 4 (=£10) M1 for identifying the extra 200g costs 50p C1 for 1000g packet and 2 comparable values £2.50 and 50p **Alternative method (using grams per 1p)** M2 for 200 ÷ 250 (= 0.8g) and 1000 ÷ 1050 (= 0.95...g) oe (M1 for 200 ÷ 250 (= 0.8g) or 1000 ÷ 1050 (= 0.95...g)oe) C1 for 1000g packet and 2 correct comparable values (Throughout, candidates may work in £ or pence)

<table>
<tr><th colspan="6">5MB2F_01</th></tr>
<tr><th colspan="2">Question</th><th>Working</th><th>Answer</th><th>Mark</th><th>Notes</th></tr>
<tr><td>13</td><td>(a)</td><td>$\frac{2}{5} \times \frac{3}{8} = \frac{6}{40}$</td><td>$\frac{3}{20}$</td><td>2</td><td>M1 for multiplying the numerators and the denominators
A1 for $\frac{3}{20}$ or 0.15 cao</td></tr>
<tr><td></td><td>(b)</td><td>$\frac{3}{8} + \frac{2}{8} = \frac{5}{8}$
<table><tr><td></td><td>1</td><td>4</td></tr><tr><td>3</td><td></td><td>12</td></tr><tr><td>8</td><td>8</td><td>32</td></tr></table></td><td>$\frac{5}{8}$</td><td>2</td><td>M1 for a suitable common denominator (multiple of 8) with one fraction out of two (not $\frac{3}{8}$) correct
or 0.25 + 0.375
or all cells correct if cell method used
A1 for $\frac{5}{8}$ or equivalent fraction, accept 0.625</td></tr>
<tr><td>14</td><td>(a)</td><td>$5x + 35 + 3x - 6$</td><td>$8x + 29$</td><td>2</td><td>M1 for $5x + 35$ OR $3x - 6$ or $8x$ or 29
A1 for $8x + 29$</td></tr>
<tr><td></td><td>(b)</td><td></td><td>$3ab(a + 2b)$</td><td>2</td><td>B2 for $3ab(a + 2b)$
(B1 for correct partial factorisation $a(3ab + 6b^2)$ or $b(3a^2 + 6ab)$ or $3a(ab + 2b^2)$ or $3b(a^2 + 2ab)$
or $ab(3a + 6b)$
OR $3ab(ma + 2b)$ or $3ab(a + nb)$ where $m \neq 1$, $n \neq 2$)
[B0 for partial factorisation using only an integer e.g. $3(a^2b + 2ab^2)$]</td></tr>
</table>

<table>
<tr><th colspan="5">5MB2F_01</th></tr>
<tr><th colspan="2">Question</th><th>Working</th><th>Answer</th><th>Mark</th><th>Notes</th></tr>
<tr><td>15</td><td></td><td>515 × 35
2575
15450
18025

10 × 515 = 5150
10 × 515 = 5150
10 × 515 = 5150
5 × 515 = 2575
18025

<table>
<tr><td></td><td>5</td><td>1</td><td>5</td><td></td></tr>
<tr><td>1</td><td>1 / 5</td><td>0 / 3</td><td>1 / 5</td><td>3</td></tr>
<tr><td>8</td><td>2 / 5</td><td>0 / 5</td><td>2 / 5</td><td>5</td></tr>
<tr><td></td><td>0</td><td>2</td><td>5</td><td></td></tr>
</table>

<table>
<tr><td></td><td>500</td><td>10</td><td>5</td></tr>
<tr><td>30</td><td>15 000</td><td>300</td><td>150</td></tr>
<tr><td>5</td><td>2500</td><td>50</td><td>25</td></tr>
</table>

15 000 + 2500 + 300 + 50 + 150 + 25 =18 025</td><td>£180.25</td><td>4</td><td>M1 for 515 × 0.35 or 515 × 35 This may be implied from an incomplete method of multiplication

M1 for a complete method with relative place value correct. Condone one multiplication error, addition not necessary

Or for a complete grid, condone one multiplication error, addition not necessary

Or for sight of a complete partitioning method. Condone one multiplication error final addition not necessary

M1 (dep on the previous M1) for addition of appropriate elements of the calculation

A1 for £180.25(p) or 18025p (with ‘£’ sign deleted)</td></tr>
</table>

5MB2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
15		3307 × 35 16535 99210 115745 10 × 3307 = 33070 10 × 3307 = 33070 10 × 3307 = 33070 5 × 3307 = 16535 115745 3307 × 35 = 115745 90 000+15 000+9 000+1 500+210+35 2792 × 35 13960 83760 97720 10 × 2792 = 27920 10 × 2792 = 27920 10 × 2792 = 27920 5 × 2792 = 13960 97720 2792 × 35 = 97720 115 745 – 97 720 = 18 025			OR M1 for 3307 × 0.35 − 2792 × 0.35 or 3307 × 35 − 2792 × 35 M1 for a correct method of multiplication of at least one product, using digits 3307 and 35 or 2792 and 35 Condone one multiplication error, addition not necessary M1 (dep on the previous M1) for addition of appropriate elements of the calculation A1 for £180.25 or 18025p (with '£' sign deleted)

	3	3	0	7	
1	0/9	0/9	0/0	2/1	3
1	1/5	1/5	0/0	3/5	5
	5	7	4	5	

	3000	300	7
30	90 000	9 000	210
5	15 000	1 500	35

	2	7	9	2	
	0/6	2/1	2/7	0/6	3
9	1/0	3/5	4/5	1/0	5
	7	7	2	0	

	2000	700	90	2
30	60 000	21 000	2 700	60
5	10 000	3 500	450	10

<table>
<tr><th colspan="6">5MB2F_01</th></tr>
<tr><th colspan="2">Question</th><th>Working</th><th>Answer</th><th>Mark</th><th>Notes</th></tr>
<tr>
<td>16</td><td></td>
<td>Table of values
<table>
<tr><td>x</td><td>–2</td><td>–1</td><td>0</td><td>1</td><td>2</td></tr>
<tr><td>y</td><td>–7</td><td>–5</td><td>–3</td><td>–1</td><td>1</td></tr>
</table>
OR
Using y= mx + c
Gradient 2 intercept –3</td>
<td>Single line drawn from (–2, –7) to (2, 1)</td>
<td>3</td>
<td>(Table of values)
M1 for at least 2 correct attempts to find points by substituting values of x.
M1 (dep) ft for correctly plotting at least 2 of their points (any points plotted from their table must be plotted correctly)
A1 for the correct line from (-2, -7) to (2, 1)
OR
(No table of values)
M2 for at least 2 correct points (and no incorrect points) correctly plotted
or for a line segment of the graph of y = 2x – 3 drawn (ignore any additional incorrect line segments)
[M1 for at least 3 correct points plotted with no more than 2 incorrect points]
A1 for the correct line from (-2, -7) to (2, 1)
OR
(Use of y = mx + c)
M2 for a single straight line of gradient 2, passing through (0, -3)
[M1 for a single straight line of gradient 2 or for a single straight line passing through (0, -3)]
A1 for the correct line from (-2, -7) to (2, 1)</td>
</tr>
</table>

5MB2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
17		**Triangular ends** $\frac{1}{2} \times 5 \times 12 = 30$ $\frac{1}{2} \times 5 \times 12 = 30$ **Base** $20 \times 5 = 100$ **Vertical face** $20 \times 12 = 240$ **Slant face** $20 \times 13 = 260$ **Total area** $= 30 + 30 + 100 + 240 + 260$ OR $(5 + 12 + 13) \times 20 + 2 \times \frac{1}{2} \times 5 \times 12$	660	3	M1 for area of one face $\frac{1}{2} \times 5 \times 12$ (= 30) or 20×5 (= 100) or 20×12 (= 240) or 20×13 (= 260) M1 (dep) for adding at least 3 areas found from correct methods (of no more than 5 faces) A1 cao OR M1 for $(5 + 12 + 13) \times 20$ or $\frac{1}{2} \times 5 \times 12$ (= 30) M1 (dep) for adding "$(5 + 12 + 13) \times 20$" to at least "$1 \times \frac{1}{2} \times 5 \times 12$" A1 cao Note: Sight of $\frac{1}{2} \times 5 \times 12 \times 20$ or 600 (ie a volume calculation) scores no marks

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Order Code UG032657 June 2012

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