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Mark Scheme (Results)

November 2016

Pearson Edexcel GCSE
In Mathematics B (2MB01)
Higher (Non-Calculator) Unit 2

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November 2016
Publications Code 5MB2H_01_1611_MS

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.

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. Note that in some cases a correct answer alone will not score marks unless supported by working; these situations are made clear in the mark scheme. Examiners should 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 award marks for the quality of written communication (QWC).
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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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.
Partial answers shown (usually indicated in the ms by brackets) can be awarded the method mark associated with it (implied).
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks; transcription errors may also gain some credit. Send any such responses to review for the Team Leader to consider.
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.

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 (embedded answers).

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)

14 The detailed notes in the mark scheme, and in practice/training material for examiners, should be taken as precedents over the above notes.

Guidance on the use of codes within this mark scheme
M1 – method mark for appropriate method in the context of the question 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

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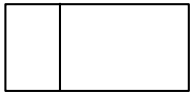
Question	**Working**	**Answer**	**Mark**	**Notes**	**Type**
1 (a)		$7n - 4$	2	B2 for $7n - 4$ (B1 for $7n + k$, $k \neq -4$	G
(b)	$3 \times 4^2 + 5$	53	2	M1 for $3 \times 4^2 + 5$ A1 cao	G
2 (a)	$7a + 4a - 8b$	$11a - 8b$	2	M1 for $4a - 8b$ A1 for $11a - 8b$	G
(b)		n^{11}	1	B1 cao	C
(c)		$5(x + 2)$	1	B1 cao	G
3		74	4	M1 for $200 - \frac{10}{100} \times 200$ (=180) M1 for "180" ÷ (1 + 2 + 7) (= 18) M1 for "18" × (1 + 2) + 20 A1 cao OR M1 for $200 - \frac{1}{10} \times 200$ (=180) M1 for $\frac{7}{10} \times 180$ (=126) M1 for 200 – "126" + 20 A1 cao	E
4		Plan 	2	M1 for 7 × 4 rectangle A1 for correct plan with dividing line	G

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Question	**Working**	**Answer**	**Mark**	**Notes**	**Type**
*5	(180 – 120) ÷ 2 = 30 (180 – 30) ÷ 2	75°	4	M1 for method to find angle ADB (or angle ABD) (180 – 120) ÷ 2 A1 for 75 C1 (dep on M1) for Alternate angles are equal **or** co-interior (allied) angles add up to 180° C1 (dep on M1) for Base angles of an isosceles triangle are equal **and** Angles in a triangle add up to 180°	E
6	30 ÷ 15 = 2 48 ÷ (6 – 2)	12	3	M1 for 30 ÷ 15 = 2 M1 for 48 ÷ (6 – "2") A1 cao	E
*7	120 ÷ 8 × 5 80 + 75 = 155 155 > 150 150 – 80 = 70 70 ÷ 5 × 8 112 < 120	No with reason	3	M1 for method to convert 120 km to miles 120 ÷ 8 × 5 (=75) M1 for 80 + '75' (=155) C1 for No with correct total distances in miles OR M1 for 150 – 80 = 70 M1 for complete method to convert 70 miles to km 70 ÷ 5 × 8 (=112) C1 for No with correct values for distance driven in France and mileage remaining.	E

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Question	**Working**	**Answer**	**Mark**	**Notes**	**Type**
8	$4 \times 3 = 12$ $2 \times 10 = 20$ $(12 + 20 + 20) \times 1.5$ $8 \times 10 \times 1.5 = 120$ $\frac{1}{2} \times 4 \times 7 \times 1.5 = 21$ $120 - 21 - 21$	78	4	M1 for method to find area of parallelogram or 2 triangles M1 for method to find whole cross sectional area M1 for complete method to find volume A1 cao OR M1 for method to find volume of enclosing cuboid or volume of a single cuboid. M1 for method to find volume of triangular prism(s) or for method to find volume of parallelogram prism(s) M1 for complete method to find volume of prism. A1 cao	E
9	$10 \times 4^2 - 4 - 21 = 135$ $2 \times 4 - 3 = 5$ $135 \div 5 = 27$ $10x^2 - x - 21$ $= (2x - 3)(5x + 7)$ $5 \times 4 + 7$	27	3	M1 for $10 \times 4^2 - 4 - 21$ (= 135) M1 for $135 \div (2 \times 4 - 3)$ A1 cao OR M1 for factorising to give $5x + 7$ or $5x + n$, $n \neq 7$ or $mx + 7$, $m \neq 5$) M1 (dep) for substitution of $x = 4$ into expression for length of rectangle A1 cao	E

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Question	**Working**	**Answer**	**Mark**	**Notes**	**Type**
10 (a)(i)		1	3	B1 cao	C
(ii)		$\frac{1}{25}$		B1 for $\frac{1}{25}$ or 0.04	C
(iii)		4		B1 cao	C
(b)		$5a^4b^3$	2	B2 for $5a^4b^3$ (B1 for any two of 5, a^4, b^3 in a product)	E
11		$\frac{29}{35}$	4	M1 for writing both $4\frac{3}{5}$ and $2\frac{2}{3}$ or both $\frac{3}{5}$ and $\frac{2}{3}$, with a common denominator (a multiple of 15) with at least one correct numerator M1 for $4 - 2 + \frac{9}{15} - \frac{10}{15}$ ($= \frac{29}{15}$) or $\frac{69}{15} - \frac{40}{15}$ M1 for "$\frac{29}{15}$" $\times \frac{3}{7}$ A1 for $\frac{29}{35}$ oe single fraction	E
12 (a)		0.00023	1	B1 cao	C
(b)	$5.86 \times 10^6 = 5\,860\,000$ $4\,200\,000 = 4.2 \times 10^6$ 5.3 million $= 5\,300\,000 = 5.3 \times 10^6$	A C B	2	M1 for one correct conversion to or from standard form or answer reversed. A1 for A C B or numbers in correct order	G
13 (a)		(5, 2, 2)	1	B1 cao	E
(b)		(4, 2, 1)	2	M1 for an answer of (a, 2, 1) or (4, b, 1) or (4, 2, c) or ft from (a) A1 (4, 2, 1) or ft from (a)	E

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Question	**Working**	**Answer**	**Mark**	**Notes**	**Type**
*14	360 – 90 – 90 – 110 = 70 180 – 60 – 70 360 – 90 – 90 – 60 = 120 360 – 110 – 120 = 130 360 – 90 – 90 − 130	50^{O}	4	B1 for identifying 90 ° (may be on diagram) M1 for beginning method using MON = 110 eg 360 – 90 – 90 – 110 (= 70) M1 for completing method to find BAC eg 180 – 60 – 70 (=50) C1 for (angle BAC =) 50 and all reasons relevant to method used: Angle between tangent and radius is 90 Sum of angles in a quadrilateral is 360 Angles in a triangle add up to 180 OR B1 for identifying 90 ° (may be on diagram) M1 for beginning method using NCP = 60 eg 360 – 90 – 90 – 60 (= 120) M1 for completing method to find BAC, e.g. 360 – 110 – 120 = 130 360 – 90 – 90 – 130 (=50) C1 for (angle BAC =) 50 and all reasons relevant to method used: Angle between tangent and radius is 90 Sum of angles in a quadrilateral is 360 Angles around a point equal 360	E
15		$\frac{7x}{x+5}$	3	M1 for 7x(x – 3) M1 for (x – 3)(x + 5) A1 for $\frac{7x}{x+5}$	E

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Question	**Working**	**Answer**	**Mark**	**Notes**	**Type**
16	$\frac{(\sqrt{5}+\sqrt{5}+6)}{2} \times (\sqrt{5}-2)$ $(\sqrt{5}+3)(\sqrt{5}-2)$ $5 + 3\sqrt{5} - 2\sqrt{5} - 6$ $\sqrt{5}(\sqrt{5}-2) + \frac{6(\sqrt{5}-2)}{2}$ $5 - 2\sqrt{5} + 3\sqrt{5} - 6$	$\sqrt{5} - 1$	3	M1 for $\frac{(\sqrt{5}+\sqrt{5}+6)}{2} \times (\sqrt{5}-2)$ M1 for expansion $5 + 3\sqrt{5} - 2\sqrt{5} - 6$ with 3 terms out of 4 correct including signs or all 4 terms correct ignoring signs A1 cao OR M1 for $\sqrt{5}(\sqrt{5}-2) + \frac{6(\sqrt{5}-2)}{2}$ M1 for expansion $5 - 2\sqrt{5} + 3\sqrt{5} - 6$ with 3 terms out of 4 correct including signs or all 4 terms correct ignoring signs A1 cao	E
17	$\frac{-2}{6} = \frac{-1}{3}$ $1 = 3 \times 3 + c$	$y = 3x - 8$	4	M1 for gradient $\frac{-2}{6}$ M1 for use of $\frac{-1}{m}$ for perpendicular line M1 for substitution of (3,1) into their equation A1 for $y = 3x - 8$ oe	E