

Mark Scheme (Results)

November 2013

Pearson Edexcel GCSE
In Mathematics Modular (2MB01)
Unit 2: (5MB2H_01) Higher (Non-Calculator)

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

November 2013

Publications Code UG037482

All the material in this publication is copyright

© Pearson Education Ltd 2013

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 as 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

PAPER: 5MB2H_01					
Question		Working	Answer	Mark	Notes
1	(a)		11	2	M1 for $20 \div 2$ or 10 or list/table with 4 pairs of at least 5 pairs correct A1 cao
	(b)		$3n + 1$	2	B2 for $3n + 1$ oe (B1 for $3n + k$, $k \neq 1$ or absent)
2	(a)		5^{10}	1	B1 cao
	(b)		7^3	1	B1 cao
3			16	2	M1 for correct substitution of values eg $6^2 - 5 \times 4$ A1 cao
4	(i)		126	2	B1 cao B1 for reason relating to geometrical property & parallel lines which is not contradicted by method shown elsewhere eg <u>alternate angles are equal</u> , <u>corresponding angles are equal</u> , <u>allied angles</u> / <u>co-interior angles</u> add up to <u>180°</u>
	(ii)		Reason		

PAPER: 5MB2H_01				
Question	Working	Answer	Mark	Notes
5	(a)	400	2	M1 for the correct scale factor 2.5 oe eg $\frac{20}{8}$, $\frac{8}{20}$, 160+160+80 or 160÷8×20 oe A1 cao
	*(b)	12	3	M1 for number of scones for limiting ingredients, eg 2×6 (=16) or 8+4 (=12) A1 for 12 cao C1 ft (dep on M1) for displaying both limiting calculations and reaching correct conclusion for their working OR M1 for proportion of limiting ingredient e.g. 80 ÷ 40 (=2) or 300 ÷ 200 (=1.5) A1 for 12 cao C1 ft (dep on M1) for displaying both limiting calculations and reaching correct conclusion for their working OR M1 for relating proportion in list to proportion Sophie has. e.g. 200 ÷ 40 or 300 ÷ 80 or 5 or 3.75 or 3.8 oe A1 for 12 cao C1 ft (dep on M1) for displaying both limiting calculations and reaching correct conclusion for their working
6	(a)	Correct diagram	2	B2 (B1 any isometric face correct)
	(b)	6	2	M1 for $(1) \times 2 \times 3$ or $2 \times 4 \times 6 \div (2 \times 2 \times 2)$ A1 cao

PAPER: 5MB2H_01				
Question	Working	Answer	Mark	Notes
7	(a)	$e + 7f$	2	B2 for $e + 7f$ (B1 for e or $7f$)
	(b)	$10c + 15d$	1	B1 cao
	(c)	$2x - 7$	4	M1 for $x + x + 3 + 2x (= 4x + 3)$ M1 for $2(3x - 2) (= 6x - 4)$ M1 for '6x' - '4x' - '4' ± '3' oe A1 cao OR M1 for $2(3x - 2) (= 6x - 4)$ M1 for '6x' - $x - x - 2x (= 2x)$ oe M1 for '-4' ± 3 A1 cao
8		$\frac{90 \times 0.5}{5} = \frac{45}{5}$	2	M1 for at least two of 90, 0.5 and 5 A1 for $8.9 - 9.5$
9	(a)	1.52×10^8	2	M1 for 1.52×10^n or 1.5×10^n or 152×10^6 A1 cao
	(b)	0.0024	1	B1 cao

PAPER: 5MB2H_01				
Question	Working	Answer	Mark	Notes
10		126	3	<p>M1 for (angle BCD =) $\frac{180 \times (10 - 2)}{10}$ (= 144)</p> <p>M1 (dep) for (angle DCX =) $360 - '144' - 90$ oe A1 cao</p> <p>OR</p> <p>M1 for (exterior angle =) $\frac{360}{10}$ (= 36)</p> <p>M1 (dep) for (angle DCX =) $90 + '36'$ oe, eg $180 - (90 - 36)$ A1 cao</p>
11		66400	5	<p>M1 for explicit area of a trapezium eg $(3+4) \div 2 \times 14$ (=49) or $(60+62) \div 2 \times 14$ (=854)</p> <p>OR</p> <p>M1 for implicit area of trapezium eg 3×14 (=42) and $0.5 \times 14 \times 1$ (=7) or $3 \times 14 \times 4$ (=168) and $0.5 \times 14 \times 1 \times 4$ (=28)</p> <p>M1 for area of a rectangle using correct dimensions eg 68×2 (=136), 30×68 (=2040)</p> <p>M1 for a complete and correct method to find the total area</p> <p>M1 (dep on at least one previous M1) for multiplying their total area by 200 (where total area is a calculation involving at least two areas)</p> <p>A1 cao</p>

PAPER: 5MB2H_01

Question		Working	Answer	Mark	Notes
12	(a)		$2a(3b + 5c)$	2	B2 cao (B1 for $a(6b + 10c)$ or $2(3ab + 5ac)$ or $2a(\text{linear term in } b \text{ and } c)$)
	(b)		$x^2 + 2x - 35$	2	M1 for 3 terms out of 4 correct including signs or all 4 terms correct ignoring signs A1 cao
	(c)		$\frac{2t^4}{m^2}$	2	B2 for $2m^{-2}t^4$ oe (B1 $\frac{2t^4}{m^n}$, $n \neq 2$ oe or $\frac{2t^k}{m^2}$, $k \neq 4$ oe or $m^{-2}t^4$ oe)
	(d)		$(y-4)(y+4)$	1	B1 cao
	(e)		h^{-6}	1	B1 for h^{-6} or $\frac{1}{h^6}$
13			7.5	3	B1 for length given as $\frac{\sqrt{120}}{4}$ oe M1 for squaring $\frac{\sqrt{120}}{4}$ or $\frac{120}{4 \times 4}$ oe A1 for $\frac{120}{16}$ oe or $7\frac{1}{2}$ or 7.5 oe SC B1 for $\sqrt{30} \times \sqrt{30}$

PAPER: 5MB2H_01				
Question	Working	Answer	Mark	Notes
*14		113	5	<p>B1 for stating angle $TAO = 90$ M1 for stating angle OBA or angle $OAB = 90 - 58 (=32)$ M1 for stating angle $ABT = 180 - 58 - 41 (=81)$ or angle $AOB = 180 - 64 (=116)$ A1 for 113 clearly identified as the answer C1 (dep on M1) for correct statements for method used: angle between <u>tangent</u> and <u>radius</u> = <u>90°</u> AND at least one of base <u>angles</u> of an <u>isosceles</u> triangle are <u>equal</u> sum of <u>angles</u> in a <u>triangle</u> is <u>180</u> sum of <u>angles</u> in a <u>quadrilateral</u> is <u>360</u></p> <p>NB angles may be seen in diagram</p>
15	(a)	$y = 4x + 2$	2	B2 for $y = 4x + 2$ oe (B1 for $y = 4x + c$ or $4x + 2$ or $L = 4x + 2$)
	(b)	$y = 4x - 14$	3	B1 for gradient = 4 M1 for $-6 = '4' \times 2 + c$ or $y - -6 = '4'(x - 2)$ A1 for $y = 4x - 14$ oe

Modifications to the mark scheme for Modified Large Print (MLP) papers.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:

Angles: $\pm 5^\circ$

Measurements of length: ± 5 mm

PAPER: 5MB2H_01		
Question	Modification	Notes
Q1	2cm squares. Shading is dotted. 'Grey' changed to 'shaded'. 'Centimetre' removed throughout the question.	Standard mark scheme
Q4	Parallel lines labelled AB and CD. Extra wording inserted 'AB is parallel to CD'.	Standard mark scheme
Q6 Q6 Q6	<p>Models for part (b) – dimensions of $2 \times 4 \times 6$ given. Wording given below</p> <p>(a) Look at the model or at the diagram for Question 6(a). They show a cuboid. For the cuboid</p> <ul style="list-style-type: none">(i) write down the number of faces,(ii) write down the number of edges,(iii) write down the number of vertices. <p>(b) Look at the two models or at the diagram for Question 6(b). They are NOT accurate. A different box has been made to hold cubes. This box is in the shape of a cuboid. A cube is also shown. Each cube has edges of length 2 cm Work out the largest number of cubes that can fit into the box.</p>	

PAPER: 5MB2H_01			
Question		Modification	Notes
Q7	(c)	MLP only: x changed to y . Information given about the diagram.	Standard mark scheme
Q11		Shape rotated 90° clockwise to fit measurement more easily. On diagram 'cm' removed. Wording inserted 'All measurements are in centimetres.'	Standard mark scheme
Q12	(a)	a changed to e , b changed to f , c changed to g .	B2 cao (B1 for $e(6f + 10g)$ or $2(3ef + 5eg)$ or $2e(\text{linear term in } f \text{ and } g)$)
Q12	(b)	x changed to y .	Standard mark scheme

