Mark Scheme (Results)

Summer 2014

Pearson Edexcel GCSE
In Mathematics B (2MB01)
Unit 2: 5MB2H_01 (Higher)

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

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

PAPER: 5MB2H_01

Question		Working	Answer	Mark	Notes
1			350	3	M1 for finding 30% of 500 (=150) M1 dep for subtraction of discount from 500 A1 cao OR M1 for $1 - 0.3$ (= 0.7) M1 dep for $500 \times$ "0.7" A1 cao
2	(a)		$2e - f$	2	M1 (implied) for $2e$ or $-f$ A1 oe
	(b)		$6x + 10$	2	M1 for $2 \times 3x$ (= $6x$) or 2×5 (= 10) A1 cao
3			375 25 1250 500	3	M1 for $15 \div 6$ (= 2.5) oe (can be implied by one answer correct) A1 for two answers correct B1 all correct

*4			Yes
			200 > 180 oe
				4	M1 for converting using figures from the graph
					    or for 5 miles = 8 km oe
					M1 for correct method to convert 240 km into miles (=150 miles)
					    or to convert 350 miles into km (= 560 km)
					    or to convert 180 miles into km (= 288 km)
					M1 (dep on M2) for correct method for comparison
					    eg 180 miles with $350 - 150$ (= 200) miles
					    eg 288 km with $560 - 240$ (= 320) km
					C1 for a correct statement that she will have to stop oe
					    with appropriate supporting evidence
					    eg Yes and 200 miles is too far eg Yes and 330 < 350
					    eg Yes and 20 miles under" oe eg Yes and 320 > 288

PAPER: 5MB2H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
5	(a)		x^6	1	B1 cao
	(b)		y^2	1	B1 cao
	(c)		t^6	1	B1 cao
6			500	4	M1 for a correct method to convert cm to m or m to cm or cm^3 to m^3 or m^3 to cm^3 (can be implied eg 4 packets drawn in container height) M1 for correct method for one volume or correct method to get at least 2 multipliers from packet to container (can be implied on the diagram) M1 for complete correct method (ignore incorrect conversions) A1 cao

PAPER: 5MB2H_01

Question	Working	Answer	Mark	Notes

*7		80	4	B1 for *EBF* = 50 or *ABE* = 50
				
				M1 for angles given that can lead to *x* = 80 as the next step
				      eg *EBF* = 50 and *ABE* = 50
				      eg *EBF* = 50 and *BFG* = 100
				      eg *EBF* = 50 and *BFE* = 80
				      eg *EBF* = 50 and *DEB* = 130 and *ABE* = 50
				
				A1 cao
				
				C1 for stating correct reasons appropriate to their method shown
				
				eg
				Base <u>angles</u> of an <u>isosceles</u> triangle are <u>equal</u>.
				with <u>Angles</u> in a <u>triangle</u> add up to <u>180</u>$^{\circ}$
				with <u>Alternate</u> <u>angles</u> are equal
				
				eg
				Base <u>angles</u> of an <u>isosceles</u> triangle are <u>equal</u>.
				with <u>Alternate</u> <u>angles</u> are equal
				with <u>Angles</u> on a <u>straight line</u> add up to <u>180</u>$^{\circ}$
				
				eg
				Base <u>angles</u> of an <u>isosceles</u> triangle are <u>equal</u>.
				with The <u>exterior angle</u> of a triangle is <u>equal</u> to the sum of the
				      <u>opposite interior angles</u>.
				with <u>Allied</u> angles / <u>Co-interior</u> <u>angles</u> add up to <u>180</u>$^{\circ}$

PMT

PAPER: 5MB2H_01				
Question	Working	Answer	Mark	Notes

8		blue paint 5
		white paint 4
			5	M1 attempts multiples of either 12 or 15
				     (at least 3 but condone errors if intention is clear)
				
				M1 attempts multiples of both 12 and 15
				     (at least 3 but condone errors if intention is clear)
				
				M1 (dep on M1) for a division of 60 by 12 or 15,
				   or counts up "multiples"
				   or answer blue : white in the ratio 5 : 4
				
				A1 blue paint 5; white paint 4
				
				OR
				M1 correct expansion of either number into factors
				M1 correct expansion of both number into factors
				M1 (dep on M1) demonstrates two expansions that include 3 oe
				A1 blue paint 5; white paint 4

9		$2n + 1$	2	M1 for $2n$ or $2n + k$ where $k \neq 1$ A1 for $2n + 1$

10	(a)	$2x^2 + 7x + 3$	2	M1 for 4 terms correct with or without signs
				   or 3 out of exactly 4 terms correct
				   (the terms may be in an expression or table)
				A1 cao

	(b)	$4x(x + 2y)$	2	M1 for $4x(ax + by)$, a & b integers or ax $(x + 2y)$
				   or any expression with brackets which multiplies
				   to give $4x^2 + 8xy$
				A1 cao

PAPER: 5MB2H_01				
Question	Working	Answer	Mark	Notes

11	$0.0034\times10^5 = 340$
	$34\times10^{-5} \quad = 0.00034$
	$-3.4\times10^{-3} \quad = -0.0034$
	$3.4\times10^4 \quad = 34\ 000$
	$34\times10^2 \quad = 3400$
		-3.4×10^{-3}
		34×10^{-5}
		0.0034×10^5
		34×10^2
		3.4×10^4
			3	M1 for changing at least 1 correctly to standard form
				    or for changing at least 1 correctly to an ordinary number
				
				M1 at least 3 correct changes to standard form
				    or at least 3 correct changes to ordinary numbers
				
				A1 ordered
				
				[S.C. B2 (if no working) for 4 in the correct order
				    or all correct but reverse order]

12		20	3	M1 for indication that angle between a tangent and radius is 90
				    (could be seen on the diagram)
				
				M1 for OAC = 20 or AOC = 70 or BOC = 140
				    or ABC = ACB or BCA $= \dfrac{180-40}{2}$ (= 70)
				
				A1 cao

13		62	4	M1 for B to C time = 210 ÷ 70 (= 3 h) M1 for A to B dist = (5 − "3") × 50 (= 100) M1 (dep on M1) for average speed = total distance ÷ total time or 210 + "(2 × 50)" ÷ 5 A1 cao

PAPER: 5MB2H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**

14		**Front or Back**:
		½ × 3x(13x − 3 + 5x − 3)
		= 27x² − 9x
		or ½ (4x)(3x) + 3x(5x − 3)
		
		Top: (5x − 3)(x + 2)
		= 5x² + 7x − 6
		
		 Bottom: (13x−3)(x + 2)
		= 13x² + 23x − 6
		
		Each Side: 5x(x + 2)
		 = 5x² + 10x
		
		Total SA = 2(27x² − 9x) +
		2(5x² + 10x) + (5x² + 7x − 6)
		+ (13x² + 23x − 6)
		
		= (54 + 10 + 5 + 13) x²
		+ (−18 + 20 + 7 + 23) x
		+ (− 6 − 6)
			82x² + 32x − 12	4	M1 finds the area of at least 2 faces
					     (condone omission of brackets)
					
					M1 writes a correct algebraic expression for the area of at least
					     3 different faces
					
					M1 correct expressions for all 6 faces and adds
					
					C1 (dep on M3) for correct algebraic expression as a correct
					                summary

PAPER: 5MB2H_01

Question	Working	Answer	Mark	Notes
15	$x = 0.15555…$ $10x = 1.5555…$ $9x = 1.4$ $x = \dfrac{1.4}{9} = \dfrac{14}{90}$ OR $x = 0.1 + y$ where $y = 0.0555…$ $10y = 0.5555…$ $100y = 5.5555..$ $90y = 5$ so $y = 5/90$ $x = 0.1+5/90 = 1/10 + 5/90$	$\dfrac{7}{45}$	3	M1 for $0.155(5…)$ or $0.1+0.055(5…)$; This can be implied in subsequent working. M1 for 2 correct recurring decimals which when subtracted will leave an integer or a terminating decimal number with a correct fraction for their 2 recurring decimals A1 for $\dfrac{7}{45}$ [**SC**: B1 for an answer of $\dfrac{15}{99}$ oe, with or without working]
16		$30 - 10\sqrt{5}$	2	M1 for 4 terms correct with or without signs or 3 out of exactly 4 terms correct (the terms may be in an expression or table) or $25 - 10\sqrt{5} + 5$ A1 cao
17		$y = -\dfrac{1}{2}x + 2$	3	M1 for gradient $= -\dfrac{1}{m}$ or $-\dfrac{1}{2}$ M1 for substitution of $x = -2$, $y = 3$ into their $y = mx + c$ where c is a constant to be found A1 for $y = -\dfrac{1}{2}x + 2$ oe eg accept $2y + x = 4$
18		$\dfrac{3x}{x+4}$	3	M1 for $3x(x - 2)$ M1 for $(x - 2)(x + 4)$ A1 cao

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: ±5°
Measurements of length: ±5 mm

PAPER: 5MB2H_01		
Question	**Modification**	**Notes**
Q02	MLP only. x changed to y	
Q04	2cm grid. label right axis	
Q05a	MLP only. x changed to y	
Q06	2 models provided as well as diagram	
Q10a	MLP only. x changed to y	
Q10b	MLP only. x changed to e and y to f	
Q12	BC joined with a dashed line	