Mark Scheme (Results)

Summer 2016

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

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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.

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

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

Question		Working	Answer	Mark	Notes
1	(a)		6037	1	B1 cao
	(b)		8380	1	B1 cao
	(c)		19,21,26,37,43	1	B1 cao
2	(a)		Rectangle	1	B1 (accept square)
	(b)		Cylinder	1	B1 cao
	(c)		Circle drawn	1	B1 for circle radius 4 cm
3	(a)		London	1	B1 cao
	(b)(i)		5	2	B1 for 5 (accept −5)
	(ii)		6		B1 for 6 (accept −6)
4	(a)		4.6	1	B1 for 4.4 − 4.8
	(b)		Parallel lines	1	B1 for parallel lines marked
	(c)		Acute angle	1	B1 for acute angle identified
	(d)		Angle *EDC*	1	B1 for angle *EDC* identified

Question		Working	Answer	Mark	Notes
*5			No (supported)	2	M1 for 53×10 (= 530) or 0.53×10 (= 5.3(0)) or 50×10 and 3×10 C1 for no, (£)5.30 > (£)5 oe OR M1 for $500 \div 10$ (= 50) C1 for no, 50(p) < 53(p) oe OR M1 for $500 \div 53$ (= 9…) or 9×53 (= 477) C1 for no, 9… < 10 oe or 477 < 500 oe
6	(a)		48	1	B1 cao
	(b)		115	1	B1 cao
7	(a)		$\dfrac{10}{20}$	1	B1 for fraction $\dfrac{10}{20}$ oe
	*(b)		$\dfrac{5}{7}$	3	M1 for 14 squares shaded for $\dfrac{2}{3}$ or for 15 squares shaded for $\dfrac{5}{7}$ M1 for 14 squares shaded for $\dfrac{2}{3}$ and 15 squares shaded for $\dfrac{5}{7}$ C1 for correct statement from supportive working OR M1 for method to express each fraction with a common denominator eg $\dfrac{2 \times 7}{3 \times 7}$ and $\dfrac{5 \times 3}{7 \times 3}$, at least one numerator correct. M1 for $\dfrac{14}{21}$ and $\dfrac{15}{21}$ oe C1 for correct statement from supportive working

Question		Working	Answer	Mark	Notes
8	(a)		6	1	B1 cao
	(b)		11	1	B1 cao
	(c)	(s, Δ) = (2,1), (3,3), (4,5), (5,7), (6, 9), (7, 11), (8, 13), (9, 15), (10, 17)	17	2	M1 for relating number of triangles to number of stars for at least one pattern greater than Pattern 7, eg (8, 13), (9, 15) or (10, 17) or for identifying Pattern 9 A1 cao
9	(a)		E	1	B1 cao
	(b)(i)		P marked	2	B1 for correct point marked, eg $(1, -1)$
	(ii)		coordinates of P		B1 for correct coordinates for 'point'
10			63	2	M1 for $\frac{30}{100} \times 210$ or 0.3×210 or $21 + 21 + 21$ oe A1 cao
11	(a)		$10.5 - 11$	1	B1 for $10.5 - 11$
	(b)	eg 15 lbs = 6.8 kg So, 150 lbs = 68 kg 68 + 64 = 132 kg	132	3	M1 for converting 150 lbs to kg M1 for addition of 150 pounds and 64 kg in consistent units A1 for $130 - 134$ kg
*12			Patterned and Textured	5	M1 for $5 + 7 + 5 + 7$ (= 24) M1 for ("24" ÷ 3) × 20 (= 160) or ("24" ÷ 2) × 11 (= 132) or ("24" ÷ 2.4) × 14.5 (= 145) M1 for two of the above. A1 for 160 and 132 and 145 C1 ft (dep on M3) for Patterned and Textured from a comparison of 3 costs

Question		Working	Answer	Mark	Notes
13	(a)		7000	1	B1 cao
	(b)		6	1	B1 cao
14	(a)		4*a*	1	B1 cao
	(b)		6*m*	1	B1 cao
	(c)		3*x*^{2}	1	B1 cao
	(d)		7*cd*	1	B1 cao
*15			Yes (supported)	4	M1 for attempt to divide corresponding sides eg 500 ÷ 50 (= 10) or 250 ÷ 50 (= 5) or 200 ÷ 50 (= 4) M1 (dep) multiplying divisors eg "10" × "5" × "4" (= 200) [consistent units] M1 for use of 3 containers eg "200" × 3 (= 600) or use of 500 boxes eg 500 ÷ "200" (=2.5) C1 for yes and 600 (boxes) or 2.5 (containers) oe OR M1 for attempt to find the volume, eg 500 × 250 × 200 (= 25 000 000) or 50 × 50 × 50 (=125 000) M1 (dep) for dividing volumes [consistent units] eg "25 000 000" ÷ "125 000" (=200) or "125 000" × 500 (=62 500 000) M1 for use of 3 containers eg "25 000 000" × 3 (=75 000 000) or "200" × 3 (=600) or use of 500 boxes eg for "125 000" × 500 (= 62 500 000) and "25 000 000" × 3 (= 75 000 000) or 500 ÷ "200" (=2.5) C1 for yes and 600 (boxes) or 2.5 (containers) or 62 500 000 and 75 000 000 oe

Question	Working	Answer	Mark	Notes
16		$A = 13x + 8$	3	M1 for $5(2x + 1)$ or $3(x + 1)$ or $5 \times 2x + 1 + 3 \times x + 1$ M1 for $5(2x + 1) + 3(x + 1)$ or $13x + 8$ oe A1 for $A = 13x + 8$ oe OR M1 for $8(x + 1)$ or $5x$ or $8 \times x + 1 + 5x$ M1 for $8(x + 1) + 5x$ or $13x + 8$ oe A1 for $A = 13x + 8$ oe OR M1 for $8(2x + 1)$ or $3x$ or $8 \times 2x + 1 - 3x$ M1 for $8(2x + 1) - 3x$ or $13x + 8$ oe A1 for $A = 13x + 8$ oe
17	24, 48, 72, 96, 120, 144, 168, 192, 216, 240, 264, **288** 36, 72, 108, 144, 180, 216, 252, **288**	12 boxes of book marks 8 packs of dust covers	4	M1 attempts multiples of either 24 or 36 (at least 3 but condone errors if intention is clear) M1 attempts multiples of both 24 and 36 (at least 3 but condone errors if intention is clear) M1 (dep on M2) for a division of 250 or 288 by 24 or 36, or counts up "multiples" (implied if answers reversed) A1 for 12 boxes of book marks, 8 packs of dust covers. Accept (15b, 10p), (18b, 12p) etc (SCB1 for (11b, 7p))

Question	Working	Answer	Mark	Notes
18		88	4	M1 for (*APT* =) 180 − (32 + 90) (= 58) M1 for (*PTR* =) "58" M1 for 360 − ("58" + 124 + 90) A1 cao OR (line *XY* drawn through *Q* parallel to *AB*) M1 for (*QRD* =) 180 − 124 (= 56) M1 for (*XQR* =) "56" M1 for (*PQX* =) 32 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: 5MB2F_01

Question		Modification	Notes
Q2	(b)	Model provided for all candidates. Diagram enlarged and provided for MLP.	B1 cao
	(c)	Diagram enlarged. Wording changed to 'a circle of radius 5 cm.'	B1 for circle radius 5 cm
Q3		Map removed. Information put in table.	B1 cao
			B1 for 5 (accept −5)
			B1 for 6 (accept −6)
		Braille only	Braille only
		London changed to −1°, Manchester changed to 0°	B1 for at least one correct, none incorrect
			B1 for 6 (accept −6)
			B1 for 2 (accept −2)

Question		Modification	Notes
Q4		Diagram enlarged so *AB* = 7.5 cm. The wording 'with arrows (>>)' is removed.	B1 for 7.0 – 8.0 B1 for parallel lines marked B1 for acute angle identified B1 for angle *EDC* identified
Q6	(a)	Diagram enlarged.	B1 cao
	(b)	Diagram enlarged.	B1 cao
Q7	(a) *(b)	Grid enlarged. Shading changed to dotty shading.	B1 for fraction $\dfrac{10}{20}$ oe M1 for 14 squares shaded for $\dfrac{2}{3}$ or for 15 squares shaded for $\dfrac{5}{7}$ M1 for 14 squares shaded for $\dfrac{2}{3}$ and 15 squares shaded for $\dfrac{5}{7}$ C1 for correct statement from supportive working OR M1 for method to express each fraction with a common denominator eg $\dfrac{2\times7}{3\times7}$ and $\dfrac{5\times3}{7\times3}$, at least one numerator correct. M1 for $\dfrac{14}{21}$ and $\dfrac{15}{21}$ oe C1 for correct statement from supportive working

PAPER: 5MB2F_01			
Question		**Modification**	**Notes**
Q8	(c)	Diagram enlarged. Stars changed to circles and wording changed from 'stars' to 'circles'.	M1 for relating number of triangles to number of stars for at least one pattern greater than Pattern 7, eg (8, 13), (9, 15) or (10, 17) or for identifying Pattern 9 A1 cao
Q9	(a)	Grid enlarged. Crosses changed to filled in circles	B1 cao
	(b)(i)		B1 for correct point marked, eg $(1, -1)$
	(ii)		B1 for correct coordinates for 'point'
Q11	(a)	Grid enlarged	B1 for 10.5 – 11
	(b)		M1 for converting 150 lbs to kg M1 for addition of 150 pounds and 64 kg in consistent units A1 for $130 - 134$ kg

PAPER: 5MB2F_01			
Question		**Modification**	**Notes**
Q12		Diagram enlarged. Braille only – *A B C D* added to floor plan, measurements added to text.	M1 for 5 + 7 + 5 + 7 (= 24) M1 for ("24" ÷ 3) × 20 (= 160) or ("24" ÷ 2) × 11 (= 132) or ("24" ÷ 2.4) × 14.5 (= 145) M1 for two of the above. A1 for 160 and 132 and 145 C1 ft (dep on M3) for Patterned and Textured from a comparison of 3 costs
Q14	(a)	MLP only – *a* changed to *y*.	B1 cao
	(d)	Braille only – 3*cd* + 4*cd* changed to 3*pq* + 4*pq*.	B1 cao