Mark Scheme (Results)

Summer 2013

GCSE Mathematics Linked Pair Pilot Methods in Mathematics (2MM01) Foundation (Calculator) Paper 2F

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

Paper: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		8.68	1	B1 for 8.68 oe
	(b)		8.28	1	B1 for 8.28 oe
	(c)		7.5	1	B1 for 7.5 (accept 7½) oe
	(d)		54	1	B1 cao
	(e)		100	1	B1 cao
2	(a)		40	2	M1 for 7 + 3 (= 10) A1 cao
	(b)		5	2	M1 for an intention to divide by 4 (÷4) or subtract 3 (−3) A1 cao
	(c)		$x + 3$	1	B1 for $x + 3$ or $3 + x$
	(d)		$4y$	1	B1 for $4y$ oe

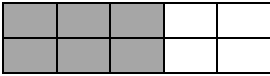| Question		Working	Answer	Mark	Notes
3	(a)		8	1	B1 cao
	(b)		>> on both horizontal lines	1	B1 for >> on both horizontal lines and on no other line(s)
	(c)		Pentagon	1	B1 cao
	(d)		Reason	1	B1 for any correct reason that relates to the specific pentagon in this question
4	(a)		26.01	1	B1 for 26.01 oe
	(b)		5.9	1	B1for 5.9 oe
	(c)		0.064	1	B1 for 0.064 cao
	(d)		1.5	1	B1 for 1.5 oe
5	(a)		10	1	B1 for 10 or −10
	(b)		−7	2	M1 for a correct first step using two of the given figures; eg −3 + 8 (=5), −3 − 12 (= −15), 12 − 8 (= 4), 8 − 12 (= −4) A1 cao OR M1 for using a number line correctly to carry out at least one calculation. (may be simply seen by arcs on a number line) A1 cao

Question		Working	Answer	Mark	Notes
6		$43.80 \div 12 = 3.65$ 3.65×6	21.90	2	M1 for $43.8(0) \div 2$ or $\frac{1}{2} \times 43.8(0)$ or $\frac{1}{2}$ of $43.8(0)$ A1 for $21.9(0)$ OR M1 for $(43.8(0) \div 12) \times 6$ A1 for $21.9(0)$
7			12	1	B1 for 12
8	(a)		130	1	B1 cao
	(b)		Scale factor is 2	1	B1 for a correct explanation, eg; scale factor = 2 or 6 = 2 x 3 or 10 is 2 × 5
9	(a)		$\frac{1}{2}$	1	B1 for $\frac{1}{2}$ or an equivalent fraction
	(b)		0.17	1	B1 cao
	(c)		$\frac{4}{5}$	2	M1 for $\frac{40}{50}$ oe A1 cao
	(d)		18	2	M1 for $24 \div 4 \times 3$ oe A1 cao

Question		Working	Answer	Mark	Notes
10	(a)		2.8	2	M1 for a correct first step; eg. 20.2 – 7.8 (=12.4) or 20.2 – 9.6 (= 10.6) or 7.8 + 9.6 (=17.4) A1 cao
	(b)	7.53 + (5.35 – 3.8) = 7.53 + 1.55 Or 5.35 + (7.53 – 3.8) = 5.35 + 3.73	9.08	2	M1 for a fully correct method to find *SV* A1 cao
11	(a)		48	2	M1 for 8 × 6 A1 cao
	(b)		24	2	M1 for 144 ÷ 6 A1 cao
12	(a)		6	1	B1 cao
	(b)	3 × 5 + 2 × 4 = 15 + 8	23	2	M1 for 3 × 5 + 2 × 4 A1 cao

Question		Working	Answer	Mark	Notes
13	(a)		75	1	B1 cao
	(b)			1	B1 for any 6 of the 10 cells shaded
	(c)		37	2	M1 for $\frac{74}{200} \times 100$ or $\frac{37}{100}$ A1 cao
	(d)	0.285.. 0.24 0.35 0.25 0.2 28.5..%, 24%, 35%, 25%, 20%	0.2 24% $\frac{1}{4}$ $\frac{2}{7}$ 0.35	2	M1 for an attempt to write all numbers as decimals or percentages (condone one conversion error) A1 for a correctly ordered list [SC: B1 for 4 numbers only in the correct order if M0 scored]

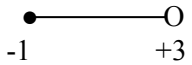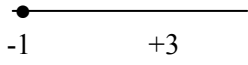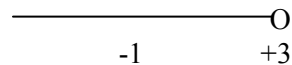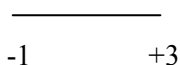| Paper: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
14	(a)		$\dfrac{1}{3}$	1	B1 $\dfrac{1}{3}$ or equivalent fraction
	(b)		$\frac{1}{4}$ and $\frac{3}{8}$	2	M1 for an explanation that a recurring decimal does not terminate or that a non-recurring decimal does or shows that $\frac{1}{4} = 0.25$ or $\frac{3}{8} = 0.375$ or $\frac{2}{9} = 0.222\ldots$ or $\frac{1}{3} = 0.333\ldots$ or $\frac{5}{7} = 0.714285714285..$ A1 for $\frac{1}{4}$ and $\frac{3}{8}$ [SC: B1 for an answer of $\frac{1}{4}$ and $\frac{3}{8}$ if M0 scored]
15		$2.59 \div 1.75$	1.48 or $1\frac{12}{25}$	2	M1 for $2.59 \div$ "1.75" A1 for 1.48 or $1\frac{12}{25}$ oe
*16			$\dfrac{5}{8}$ is the larger fraction	3	M1 for attempting to change the fractions to equivalent fractions or decimals or percentages; one must be correct A1 for two correct fractions (with common denominator) or decimals or percentages C1 (dep on M1) for a correct statement following their two results OR M1 for attempting to find 3/5 and 5/8 of a number or a diagram; one must be correct A1 for two correct solutions or diagrams C1 (dep on M1) for a correct statement following their two results

Paper: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
17	(a)		7 : 3	2	M1 for 14 : 6 oe A1 for 7 : 3 [SC: B1 for 3 : 7 if M0 scored]
	(b)		2	3	M1 for $(20 - 5) \div (4 + 1)$ (= 3) M1 (dep) for $4 \times$ "3" A1 cao
18			A correct tessellation	2	B2 for at least 6 correct tessellating shapes, including the initial shape, and no incorrectly drawn shapes or gaps [B1 for at least 3 correct tessellating shapes, including initial shape; ignore any additional shapes attempted, gaps or incorrect shapes]

Question		Working	Answer	Mark	Notes
*19			$x = 145$	5	M1 for $180 - 105$ (=75) C1 (dep on this M1) for "sum of the <u>angles</u> on a <u>straight line</u> is <u>180</u>° M1 for $360 - 60 - 80 - $ "75" C1 (dep on this M1) for 'the sum of the <u>exterior angles</u> of a polygon is <u>360</u>° A1 for $x = 145$ OR M1 for $180 - 60$ (=120) or $180 - 80$ (=100) C1 (dep on this M1) for "sum of the <u>angles</u> on a <u>straight line</u> is <u>180</u>°" M1 for $360 - 105 - $ "120" $- $ "100" (=35) and $180 - $ "35" C1 (dep on this M1) for 'the sum of the <u>angles</u> of a <u>quadrilateral</u> is <u>360</u>° A1 for $x = 145$ Note: 145 seen without the '$x = $ (or *ABE*=)" gets A0 and 145 seen without any working gets B1 instead of the M2A1

Question		Working	Answer	Mark	Notes
20	(a)		90	2	M1 for a fully correct method to find 20% of 450 A1 cao
	(b)		280	3	M1 for $\frac{1}{8} \times 320$ oe (=40) M1 (dep) for 320 – '40' A1 cao OR M1 for $1 - \frac{1}{8}$ or $\frac{7}{8}$ oe M1 (dep) for $320 \div 8 \times 7$ oe A1 cao
21			62	3	M1 for correct area of one face eg 5×3 or 5×2 or 2×3 M1 for a correct method to find the sum of the correct areas of at least 5 faces A1 cao Note: Any attempt to find volume gets NO marks

Question		Working	Answer	Mark	Notes
22	(a)		$x > -3$	1	B1 for $x > -3$ or $-3 < x$

	(b)		●━━━━O
			-1 +3
				2	M1 for:
					
					●━━━━━━━
					-1 +3
					Accept this line drawn with any length
					
					OR ━━━━━━━━O
					       -1 +3
					Accept this line drawn with any length
					
					OR ━━━━━━
					       -1 +3
					
					OR ● O
					      -1 +3
					
					A1 for a fully correct diagram

Paper: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*23		Angle BAC = 76° Angle BAP = 180° – 90° – 54° = 36° x = 76° – 36° OR Angle QCD = 54° Angle ACP = 180° – 76° – 54° = 50° x = 180° − 90° – 50 °	40°	4	B1 for Angle BAC = 76° (could be just on the diagram) M1 for 76° – ("180° – 90 – 54°") A1 for x = 40° (explicitly stated) C1 (dep on M1) for 'the sum of the <u>angles</u> of a <u>triangle</u> is <u>180°</u>' and '<u>alternate angles</u> on parallel lines are equal' OR B1 for Angle QCD = 54° (could be just on the diagram) M1 for 180° – 90° – ("180° – 76 °– 54°") A1 for x = 40° (explicitly stated) C1 (dep on M1) for '<u>corresponding angles</u> on parallel lines are equal' and 'sum of the <u>angles</u> on a <u>straight line</u> is 180°' and 'the sum of the <u>angles</u> of a <u>triangle</u> is <u>180°</u>' or '<u>corresponding angles</u> on parallel lines are equal' and '<u>exterior angle</u> of a triangle is equal to the sum of the two <u>interior opposite</u> angles' OR M1 for angle QCB = 180 – 54 (=126) M1 for 180 – 90 – "126 – 76" A1 for x = 40° (explicitly stated) C1 (dep on M1) for 'sum of <u>allied angles</u> = <u>180°</u>' and 'the sum of the <u>angles</u> of a <u>triangle</u> is <u>180</u>

Question		Working	Answer	Mark	Notes
24			905	2	M1 for $\pi \times 6^2 \times 8$ A1 for an answer in the range 904 to 905.2
25	(a)		$x > 12$	1	B1 for $x > 12$ or $12 < x$
	(b)		$y \leq 20$	1	B1 for $y \leq 20$ or $20 \geq y$
26			60	4	M1 for $8^2 + base^2 = 17^2$ oe or $17^2 - 8^2$ oe M1 for $\sqrt{(17^2 - 8^2)}$ M1 (indep) for their base $\times 8 \div 2$ A1 cao
27	(a)		Proof	2	M1 for $x + x + 3 + x + x + 3$ A1 for explicitly stating $D = 4x + 6$
	(b)		$x = \dfrac{D - 6}{4}$	2	M1 for $4x = D - 6$ (a clear intention to subtract 6 from both sides) or $\frac{D}{4} = \frac{4x}{4} + \frac{6}{4}$ (a clear intention to divide all terms by 4) A1 for $x = \frac{D-6}{4}$ oe [SC: B1 for $x = D - 6 \div 4$ if M0 scored]
28		$(\pi \times 10) \div 4 = 7.854$ $7.854 + 5 + 5$	17.85	3	M1 for $\pi \times 10$ $(= 31.4\ldots)$ M1 for "$(\pi \times 10)$" $\div 4$ A1 for an answer in the range 17.85 - 17.86 [SC: B1 for 13.92.. if M0 scored]

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