

Mark Scheme (Results)

Summer 2014

Pearson Edexcel GCSE
Linked Pair Pilot in Mathematics
Methods in Mathematics (2MM01)
Foundation Paper 1F

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Publications Code UG039526

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

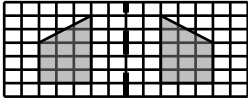

13 Range of answers

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: 5MM1F_01

Question		Working	Answer	Mark	Notes
1	(a)		52018	1	B1 cao
	(b)		Six thousand	1	B1 accept 6000
	(c)		6700	1	B1 cao
	(d)		0.08	1	B1 cao
2	(a)			2	B2 cao (B1 for any reflection in a vertical line or 3 vertices in correct position)
	(b)		Correct position	1	B1
3	(i)		11	2	B1 cao B1 for an appropriate reason e.g. subtract 3 e.g. goes down by 3
	(ii)				

PAPER: 5MM1F_01

Question		Working	Answer	Mark	Notes
4	(a)		Reflex	1	B1
	(bi)		54	2	B1 cao
	(bii)		reason		B1 for <u>Angles</u> on a straight <u>line</u> add up to <u>180°</u>
	(ci)		90	2	B1 cao
	(cii)		60		B1 cao
*5			$2\frac{2}{5}$	2	M1 for a method to convert all fractions to the same form e.g. improper fractions, mixed numbers, decimals, % with at least one correct C1 (dep on M1) for statement that $2\frac{2}{5}$ is the smallest oe with 3 correct conversions for comparison
6	(a)		Cross at $\frac{1}{2}$	1	B1 for cross at $\frac{1}{2}$
	(b)		Cross at 1	1	B1 for cross at 1
	(ci)		blue	3	B1 for blue
	(cii)		$\frac{4}{11}$		M1 for $\frac{a}{11}$ where $a < 11$ or $\frac{4}{b}$ where $b > 4$ A1 for $\frac{4}{11}$ oe

PAPER: 5MM1F_01

Question		Working	Answer	Mark	Notes
7	(a)		56000	1	B1 cao
	(b)		7.835	1	B1 cao
	(c)		621	1	B1 cao
	(d)		11 , 14	2	M1 for identifying a pair of numbers that sum to 25 or differ by 3 A1 cao OR M1 for $(25 - 3) \div 2$ (= 11) or $(25 + 3) \div 2$ (= 14) A1 cao OR M1 for $x + x + 3 = 25$ oe A1 cao

PAPER: 5MM1F_01							
Question		Working			Answer	Mark	Notes
8			M	E	M2, M4, M7, E2, E4, E7	2	M1 for at least 4 correct combinations A1 for all 6 correct combinations (ignore repeats) OR M1 for possibility space with at least 4 combinations shown in table A1 for complete table
		2	M,2	E,2			
		4	M,4	E,4			
		7	M,7	E,7			
9	(a)				(4, 2)	1	B1 cao
	(b)				(-3, 0) plotted	1	B1 cao
10	(a)				example of an even number	1	B1 for any even number
	(b)				example of a square number	1	B1 for any square number
	(c)				31 or 37	1	B1 for 31 or 37 or 31 and 37
	(d)				1, 2, 4, 5, 8, 10, 20, 40	2	M1 for at least 4 factors of 40 (condone 1 error); may be seen in factor pairs A1 cao

PAPER: 5MM1F_01					
Question		Working	Answer	Mark	Notes
11	(a)		$-9, -7, -4, 0, 3$	1	B1 cao
	(b)		4	1	B1 cao
	(c)		10	1	B1 cao
12			5.7	3	M1 for $20 - 8.6$ (=11.4) M1 for '11.4' $\div 2$ A1 cao or M1 for $2x + 8.6 = 20$ oe M1 for clear intention to subtract 8.6 from each side A1 cao
13	(a)		$3t$	1	B1
	(b)		$4ef$	1	B1
	(c)		$4m + 8k$	2	M1 for $4m$ or $8k$ A1
	(d)		y^7	1	B1 for y^7

PAPER: 5MM1F_01

Question		Working	Answer	Mark	Notes
14		6, 11, 16, ...	51	3	M1 for a correct pattern number (> 3) drawn M1 for pattern number 10 drawn A1 cao OR M1 for 6, 11, 16, (...) or $+ 5$ seen M1 for continuing the sequence to at least the 10th term (condone one arithmetic error) A1 cao OR M1 for $5n$ M1 for $5 \times 10 + 1$ oe or $5n + 1$ A1 cao
15	(ai)		Kite	2	B1 cao
	(aii)		1		B1 cao
	(bi)		F	2	B1 cao
	(bii)		G		B1 cao

PAPER: 5MM1F_01

Question		Working	Answer	Mark	Notes
16			126	3	M1 for a method to find the area of 1 rectangle e.g. 9×2 e.g. 18×13 (= 234) or for $7 + 7$ (= 14) as the length of the shaded rectangle M1 for a complete method e.g. 14×9 A1 cao
17		$3 \times 10 + 2 \times 4$	38	2	M1 for 3×10 (= 30) or 2×4 (= 8) A1 cao

PAPER: 5MM1F_01

Question	Working	Answer	Mark	Notes
18		4	3	<p>M1 for any fraction equivalent to $\frac{3}{5}$ e.g. $\frac{9}{15}$</p> <p>M1 for calculation to work out number of additional counters e.g. '15' - 6 - 5</p> <p>A1 cao</p> <p>OR</p> <p>M1 for $\frac{5}{11}$ or 6 : 5</p> <p>M1 for $\frac{5+n}{11+n}$ or $\frac{5+n}{11+n}$ or 6 : 5 + n, where n is a number</p> <p>A1 cao</p> <p>OR</p> <p>M1 for $\frac{5+x}{6+5+x} = \frac{3}{5}$</p> <p>M1 for correct method to solve equation as far as isolating terms in x</p> <p>A1 cao</p> <p>OR</p> <p>M1 for $p(\text{green}) = \frac{2}{5} = \frac{6}{n}$</p> <p>M1 for $(n =) 5 \times (6 \div 2) (=15)$</p> <p>A1 cao</p>

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Question		Working	Answer	Mark	Notes
*19			289	4	M1 for $(180 - 38) \div 2$ (= 71) M1 (dep) for $360 - '71'$ or $180 + '71' + 38$ A1 cao C1 for stating reasons appropriate to their method shown e.g. <u>Angles in a triangle</u> add up to <u>180°</u> <u>Base angles in an isosceles triangle</u> are <u>equal</u> <u>Angles at a point</u> add up to <u>360°</u>
20	(a)		3	1	B1 cao
	(b)		9	1	B1 cao
	(c)	$3x - 4 = 17$ $3x = 21$	7	2	M1 for clear intention to add 4 to each side or divide all terms by 3 in an equation A1 cao

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Question		Working	Answer	Mark	Notes
21	(b)	$\begin{array}{r} \underline{415} \\ 14 \overline{)5810} \\ \underline{56} \\ 21 \\ \underline{14} \\ 70 \\ \underline{70} \\ 0 \end{array}$ $\begin{array}{r} 5810 \\ \underline{1400} - 100 \\ 4410 \\ \underline{1400} - 100 \\ 3010 \\ \underline{1400} - 100 \\ 1610 \\ \underline{1400} - 100 \\ 210 \\ \underline{140} - 10 \\ 70 \\ \underline{70} - 5 \\ 0 \\ 400 + 10 + 5 \end{array}$	415	3	<p>M1 for method that establishes $58 \div 14 = 4$</p> <p>M1 for a complete method that deals with remainders (condone one arithmetic error)</p> <p>A1 cao</p> <p>OR</p> <p>M1 for method that establishes the subtraction of a multiple of 14 or addition of multiples of 14</p> <p>M1 for a complete method that could lead to the correct answer (condone one arithmetic error)</p> <p>A1 cao</p>

PAPER: 5MM1F_01

Question		Working	Answer	Mark	Notes
21	(b)	$\begin{array}{r} \underline{415} \\ 14 \overline{)5810} \\ \underline{56} \\ 21 \\ \underline{14} \\ 70 \\ \underline{70} \\ 0 \end{array}$ $\begin{array}{r} 5810 \\ \underline{1400} - 100 \\ 4410 \\ \underline{1400} - 100 \\ 3010 \\ \underline{1400} - 100 \\ 1610 \\ \underline{1400} - 100 \\ 210 \\ \underline{140} - 10 \\ 70 \\ \underline{70} - 5 \\ 0 \\ 400 + 10 + 5 \end{array}$	415	3	<p>M1 for method that establishes $58 \div 14 = 4$</p> <p>M1 for a complete method that deals with remainders (condone one arithmetic error)</p> <p>A1 cao</p> <p>OR</p> <p>M1 for method that establishes the subtraction of a multiple of 14 or addition of multiples of 14</p> <p>M1 for a complete method that could lead to the correct answer (condone one arithmetic error)</p> <p>A1 cao</p>

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Question	Working	Answer	Mark	Notes
*22		$\frac{29}{40}$	3	<p>M1 for writing $\frac{7}{10}$ as $\frac{28}{40}$ or $\frac{3}{5}$ as $\frac{24}{40}$</p> <p>M1 for writing $\frac{7}{10}$ as $\frac{28}{40}$ and $\frac{3}{5}$ as $\frac{24}{40}$</p> <p>C1 for correct conclusion with supportive evidence</p> <p>OR</p> <p>M1 for clear attempt to write all 3 fractions with a common denominator (e.g. 80) with at least 1 numerator correct</p> <p>M1 for all 3 fractions correctly written as equivalent fractions with a common denominator</p> <p>C1 for correct conclusion with supportive evidence</p> <p>OR</p> <p>M1 for clear attempt to write all 3 fractions as decimals (or %) with at least 1 correct</p> <p>M1 for all 3 fractions correctly written as decimals (or %) for comparison</p> <p>C1 for correct conclusion with supportive evidence</p> <p>OR</p> <p>M1 for drawing grid of 40 (or any multiple of 40) squares</p> <p>and shading $\frac{3}{5}$ or $\frac{7}{10}$ or $\frac{29}{40}$ of grid</p> <p>M1 for drawing grid of 40 (or any multiple of 40) squares</p> <p>and shading $\frac{3}{5}$ and $\frac{7}{10}$ and $\frac{29}{40}$ of grid</p> <p>C1 for correct conclusion with supportive evidence</p>

PAPER: 5MM1F_01

Question	Working	Answer	Mark	Notes
*22		$\frac{29}{40}$	3	<p>M1 for writing $\frac{7}{10}$ as $\frac{28}{40}$ or $\frac{3}{5}$ as $\frac{24}{40}$</p> <p>M1 for writing $\frac{7}{10}$ as $\frac{28}{40}$ and $\frac{3}{5}$ as $\frac{24}{40}$</p> <p>C1 for correct conclusion with supportive evidence</p> <p>OR</p> <p>M1 for clear attempt to write all 3 fractions with a common denominator (e.g. 80) with at least 1 numerator correct</p> <p>M1 for all 3 fractions correctly written as equivalent fractions with a common denominator</p> <p>C1 for correct conclusion with supportive evidence</p> <p>OR</p> <p>M1 for clear attempt to write all 3 fractions as decimals (or %) with at least 1 correct</p> <p>M1 for all 3 fractions correctly written as decimals (or %) for comparison</p> <p>C1 for correct conclusion with supportive evidence</p> <p>OR</p> <p>M1 for drawing grid of 40 (or any multiple of 40) squares</p> <p>and shading $\frac{3}{5}$ or $\frac{7}{10}$ or $\frac{29}{40}$ of grid</p> <p>M1 for drawing grid of 40 (or any multiple of 40) squares</p> <p>and shading $\frac{3}{5}$ and $\frac{7}{10}$ and $\frac{29}{40}$ of grid</p> <p>C1 for correct conclusion with supportive evidence</p>

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Question		Working	Answer	Mark	Notes
23			Correct enlargement	2	M1 for 2 lines correctly enlarged or a correct enlargement by incorrect scale factor in any orientation A1 for correct enlargement, scale factor 2 in any orientation
*24			115 cm ²	4	M1 for correct method to find area of one part of shape M1 for a complete method to find area A1 for 115 C1 (dep on M1) for '115' cm ² with the answer clearly identified

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Question	Working	Answer	Mark	Notes																												
25	<p>(i)</p> <table border="1" data-bbox="342 331 728 580"> <tr> <td>+</td> <td>2</td> <td>4</td> <td>6</td> </tr> <tr> <td>1</td> <td>3</td> <td>5</td> <td>7</td> </tr> <tr> <td>2</td> <td>4</td> <td>6</td> <td>8</td> </tr> <tr> <td>3</td> <td>5</td> <td>7</td> <td>9</td> </tr> <tr> <td>4</td> <td>6</td> <td>8</td> <td>10</td> </tr> <tr> <td>5</td> <td>7</td> <td>9</td> <td>11</td> </tr> <tr> <td>6</td> <td>8</td> <td>10</td> <td>12</td> </tr> </table>	+	2	4	6	1	3	5	7	2	4	6	8	3	5	7	9	4	6	8	10	5	7	9	11	6	8	10	12	$\frac{3}{18}$	5	<p>M1 for identifying or using $1 + 6 (= 7)$ and $3 + 4 (= 7)$ and $5 + 2 (= 7)$ M1 (indep) for 18 seen or 18 outcomes or sample space with 18 possibilities or list of 18 ordered pairs A1 for $\frac{3}{18}$ oe</p> <p>ALTERNATIVE METHOD</p> <p>M1 for $\frac{1}{6} \times \frac{1}{3}$ oe seen M1 for $3 \times \frac{1}{6} \times \frac{1}{3}$ oe A1 for $\frac{3}{18}$ oe</p> <p>M1 for identifying or using all four possible of $2+1 (= 3)$, $2+2 (= 4)$, $2+3 (= 5)$ and $4+1 (= 5)$, condone inclusion of $2+4 (= 6)$ and/or $4+2 (= 6)$ or ft from their ordered list in part (i) A1 for $\frac{4}{18}$ oe</p> <p>[SC: If M0 scored, award B1 for $\frac{6}{18}$ oe]</p>
+	2	4	6																													
1	3	5	7																													
2	4	6	8																													
3	5	7	9																													
4	6	8	10																													
5	7	9	11																													
6	8	10	12																													
	(ii)	$\frac{4}{18}$																														

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: 5MM1F_01			
Question		Modification	Notes
Q2	(a)	2 cm grid. 'mirror' 'line' marked at the top as well as bottom	
	(b)	2 cm grid. cut-out square provided	
Q6		Probability scale lengthened	
Q8		Letters and numbers put level in boxes	
Q9		2cm grid. Cross changed to solid circle	
	(b)	Q2 'with a cross (x)' removed	
Q12		Vertical line put at A B C and D. Measurement arrow removed and 8.6cm move up between A and B	

PAPER: 5MM1F_01			
Question		Modification	Notes
Q13	(a)	t changed to p	
Q14		Patterns put vertically	
Q15	(b)	Rectangle D removed, E relabelled as D, F as E and G as F. 2 cm grid. '7 shaded rectangles' changed to '6'	
Q16		Single rectangle – labelled top and left	
Q17		a changed to e , b changed to f	
Q19		'...the size of the angle marked y '	
Q23		2cm grid – last 2 columns removed to fit in page more easily. Dotty shading for shape	
Q26		x changed to y . Diagram labels top and left	
Q27		Diagram sheet put into Diagram Book instead of answer space in the paper.	

