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Mark Scheme (Results)

Summer 2014

Pearson Edexcel GCSE
Linked Pair Pilot in Mathematics
Methods in Mathematics (2MM01)
Foundation 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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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)		14.1	1	B1 for 14.1 oe
	(b)		6	1	B1 cao
	(c)		–16	1	B1 cao
	(d)		90	1	B1 cao
	(e)		2.31	1	B1 for 2.31
	(f)		5.2	1	B1 for 5.2 or − 5.2 or ± 5.2 oe
2	(a)		21	2	M1 for 7 × 3 or 9 + 6 + 6 or 15 A1 cao
	(b)		6	1	B1 for 6 or ft from (a)
3			Box Q	2	M1 for 32 + 17 + 68 + 92 + 143 **or** 352 seen **or** 18 + 29 + 80 + 128 + 110 **or** 365 seen A1 for Q with 352 **and** 365 seen

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
4	(a)		$\frac{29}{100}$	1	B1 for $\frac{29}{100}$ oe
	(b)		$\frac{7}{100}$	1	B1 for $\frac{7}{100}$ oe
	(c)		0.03	1	B1
	(d)		4 squares	1	B1 for any 4 squares shaded
5			BEDAC	3	B3 for all 5 correct (B2 for 3 or 4 correct, B1 for 1 or 2 correct)
*6		eg $\frac{5}{8} = \frac{15}{24}$ $\frac{2}{3} = \frac{16}{24}$ OR $\frac{5}{8}$ = 0.625 or 62.5% $\frac{2}{3}$ = 0.66... or 66.6...% or 0.67 or 67%	$\frac{2}{3}$ bigger + correct working	3	M1 for attempting to change to fractions with a common denominator; at least one correct A1 for 2 correct fractions C1 (ft) (dep on M1) for correct answer for their two fractions OR M1 for attempting to change both fractions to decimals or percentages; at least one correct A1 for 2 correct decimals or percentages which can be used to compare C1 (ft) (dep on M1) for correct answer for their two decimals or percentages OR M1 for attempting to find $\frac{5}{8}$ and $\frac{2}{3}$ of a number; at least one correct A1 for 2 correct solutions C1 (ft) (dep on M1) for correct answer for their two solutions

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
7			11	3	M1 for 39 – 14 (= 25) M1 for '25' – 14 A1 cao OR for 14 + 14 (= 28) M1 for 39 – '28' A1 cao
8	(a)		37	1	B1 cao
	(b)		a	1	B1 cao
9	(a)		37	1	B1 cao
	(b)		5	2	M1 for 17 + 3 (=20) seen or $4x - 3 = 17$ oe A1 cao
	(c)		+8	1	B1 for +8 or × 1.5333(333...) or × $\frac{23}{15}$ or ÷ $\frac{15}{23}$
10	(a)		4	1	B1 for 4 (accept – 4)
	(b)		–2	1	B1 cao
	(c)		−8	2	M1 for correct method for finding difference 5 or −5 between 2 and −3 Eg 2 − −3 or −3 – 2 or indication on number line A1 cao

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
11	(a)	0.07, 0.59, 0.6, 0.63, 0.76	order	1	B1 cao
	(b)	35%, 37.5%, 40%, 25%, 30% 0.35, 0.375, 0.4, 0.25, 0.3	order	2	M1 for conversion of all 5 numbers into the same form for comparison with at least one correct conversion or 4 in the correct order or all 5 in reverse order A1 for 25%, $\frac{3}{10}$, 35%, $\frac{3}{8}$, $\frac{2}{5}$ oe
12	(a)		13	1	B1 cao
	(b)		16.7	2	M1 for $4.3 + 2 \times 6.2$ oe A1 cao
	(c)		–17	2	M1 for correct substitution into the formula $4\times{-5} - 3\times{-1}$ or $-20 - -3$ oe A1 cao
13	(a)		50	1	B1 cao
	(b)		white 2 grey 1	2	M1 for two answers that total 3 **or** white =2 **or** white=3, grey=4 A1 cao
14			4	3	M1 for $20 \times 6 \times 5$ or 600 seen M1 for "600" ÷ (15×10) oe A1 cao

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
15	(a)			1	B1 cao
	(b)		tessellation	2	B2 for at least 6 correct shapes including initial shape, correctly tessellating. (B1 for at least 4 correct shapes, which may include initial shape, correctly tessellating, ignore the rest of the diagram)
16	(a)		12	2	M1 for $9 \times 4 \div 3$ oe A1 cao
	(b)		6	3	M1 for a correct first step eg $20 \times 3 (= 60)$ or $20 \div 10 (= 2)$ or giving equation eg $10h \div 3 = 20$ M1 for complete method to give height eg '60' ÷ 10 or '2' × 3 or $h = 20 \times 3 \div 10$ oe A1 cao
*17			$x = 55$ + reasons	4	M1 for $<BAD = 360 - 80 - 105 - 65 (=110)$ M1(dep) for complete method to find x A1 for $x = 55°$ C1 for fully correct appropriate reasons for complete method used Angles in a quadrilateral add up to 360° Exterior angle of a triangle equals the sum of the interior opposite angles **or** Angles on a straight line add up to 180° **and** Angles in a triangle add up to 180° Base angles of isosceles triangle are equal

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
18	(a)		110.52	2	M1 for $614 \times 18 \div 100$ oe A1 cao
	(b)		75	2	M1 for $36 \div 48 \times 100$ oe A1 cao
19			19.6 cm^2	4	M1 for $\pi \times 5^2$ (=78.5…) M1 for "78.5" $\div 4$ oe A1 for 19.6 – 19.64 B1 indep for cm^2
20		$x + x + 7 + 3x = T$	$T = 5x + 7$	3	B3 for $T = 5x + 7$ oe (B2 for $5x + 7$ oe or $T = 5x + a$ oe, $a \neq 0$ or $T = bx + 7$ oe, $b \neq 0$ B1 for $x + 7$ or $3x$ or T = a linear expression in x or $5x + a$ oe, $a \neq 0$ or $bx + 7$ oe, $b \neq 0$)
21			1.1	2	M1 for $2.75 \div 55 \times 22$ oe, eg $\frac{2}{5} \times 2.75$ A1 cao
22			9.43	3	M1 for $8^2 + 5^2$ or 64 + 25 or 89 M1 for $\sqrt{8^2 + 5^2}$ or $\sqrt{64 + 25}$ or $\sqrt{89}$ A1 for 9.43(39811...)

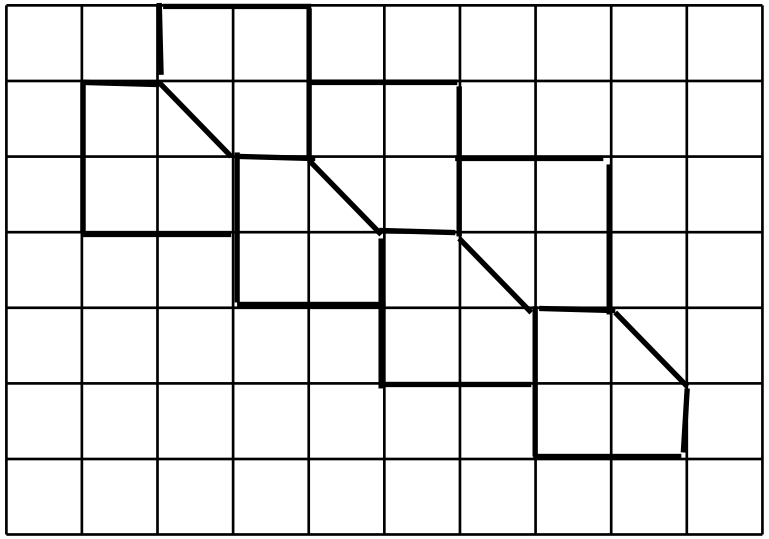
PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
23	(a)	<table><tr><td>*x*</td><td>–2</td><td>–1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>*y*</td><td>**3**</td><td>–1</td><td>**–3**</td><td>–3</td><td>–1</td><td>**3**</td></tr></table>	3, –3, 3	2	B2 for all 3 correct (B1 for 2 correct)
	(b)		Graph	2	M1 for 5 or 6 of 'points' plotted correctly (provided B1 is awarded in part a) A1 for correct graph
	(c)		–1.3, 2.3	2	B1 ft for '–1.3' ± 0.2 B1 ft for '2.3' ± 0.2
24			147	4	M1 for correct method to find sum of interior angles of a hexagon A1 for 720 M1 (dep on M1) for ['720' – (100 + 120 + 116 + 90)] ÷ 2 oe A1 cao OR M1 for 360 – (80 + 90 +64 + 60) condone one incorrect exterior angle A1 for 66 M1 (dep on M1) for 180 – ('66' ÷ 2) A1 cao

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
25			160	3	M1 for 360 ÷ (1 + 3 + 5) (= 40) M1 (dep) for 5 × '40' (= 200) A1 cao OR M1 for 360 ÷ (1 + 3 + 5) (= 40) M1 (dep) for 5 – 1 (= 4) A1 cao
26	(a)		$x \geq -1$	1	B1 cao
	(b)		$y < 4$	2	M1 for clear intention to add 2 onto each side of an inequality (or equation) or clear intention to divide all terms by 5 as a first step or (y =) 4 A1 cao

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
27			30	4	M1 for Y: 600 ÷ 5 × 3 oe (= 360) M1 for R: 600 × 25 ÷ 100 oe (= 150) M1 (dep on M2) for (600 – '360' – '150') × 2 – '150' oe A1 cao OR M1 for Y: 3 ÷ 5 × 100 (= 60%) M1 for G: 100 – '60' – 25 (= 15) **and** '15' ÷ 100 × 600 (= 90) M1 (dep on M2) for '90' × 2 − 150 A1 cao OR M1 for $\frac{12}{20}+\frac{5}{20}$ $(=\frac{17}{20})$ oe M1 for $\left(1-'\frac{17}{20}'\right)\times 600$ $(=90)$ M1 (dep on M2) for '90' × 2 − 150 A1 cao

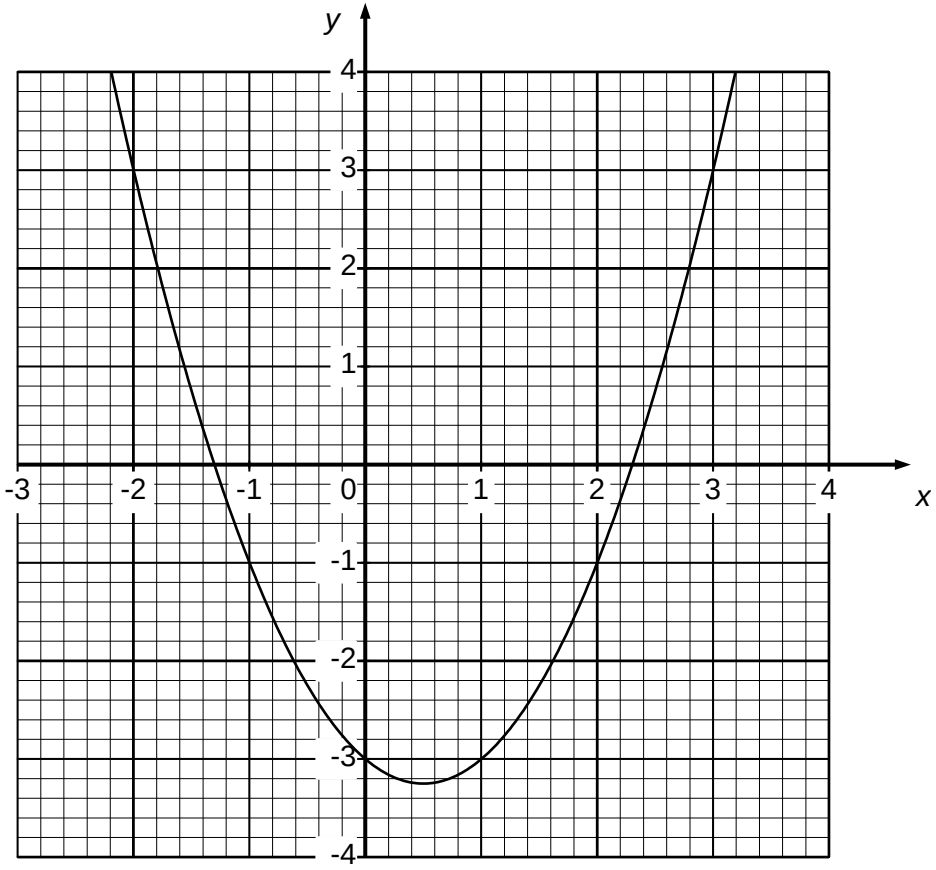
PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*28			$x = 83°$ and reasons	4	M2 for 180 – 62 – 35 (=83) (M1 for angle *ACB* = 35° (could be on the diagram)) C2 for $x = 83°$ **and** alternate angles are equal **and** angles in a triangle add up to 180° (C1 for 1 relevant reason (dep on M1)) OR M2 for 180 – 62 – 35 (=83) (M1 for angle *DAE* = 62° (could be on the diagram)) C2 for $x = 83°$ **and** corresponding angles are equal **and** angles on a straight line add up to 180° (C1 for 1 relevant reason (dep on M1)) OR M2 for 180 – 62 – 35 (=83) C2 for $x = 83°$ **and** co-interior (allied) angles add up to 180° (C1 for co-interior (allied) angles add up to 180°)

Question 15



Question 23 $y = x^2 - x - 3$

x	–2	–1	0	1	2	3
y	**3**	–1	**–3**	–3	–1	**3**



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: ±5º
Measurements of length: ±5 mm

PAPER: 5MM2F_01			
Question		**Modification**	**Notes**
Q2		Models provided as well as diagrams Wording inserted 'Each cube represents a one centimetre cube' Original references to 'centimetre' removed	Standard mark scheme
Q3		No diagrams. Information given	Standard mark scheme
Q4	(d)	2 cm squares	Standard mark scheme
Q8	(b)	*a*, *b*, *c* and *d* are replaced by *p*, *q*, *r* and *s*	B1 for *p*
Q12	(c)	*t* changed to *p*	Standard mark scheme
Q13		'grey' changed to 'shaded' in text Dotty shading in the diagram	Standard mark scheme
Q14		Models provided as well as diagrams	Standard mark scheme

PAPER: 5MM2F_01			
Question		**Modification**	**Notes**
Q15	(a)	Diagrams labelled *A, B, C, D* Candidates asked to write the letter of the shape – not to circle	B1 for C
	(b)	5 shapes asked for not 6 Final 2 columns removed from the grid 2cm grid. A cut out shape is provided for use	B2 for at least 5 correct shapes including initial shape, correctly tessellating. (B1 for at least 4 correct shapes, which may include initial shape, correctly tessellating, ignore the rest of the diagram)
Q17		Wording changed 'Work out the size of the angle marked $x°$	Standard mark scheme
Q22		Diagram labelled: *DC* = 8cm *DA* = 5cm Wording changed in question to match	Standard mark scheme
Q23	(a)	Table changed to vertical layout	Standard mark scheme
	(b)	2cm grid	
Q24		Wording changed 'Work out the size of the angle marked $x°$	Standard mark scheme
Q26		Number line – line and arrow is extended so it obviously goes past 2	Standard mark scheme

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