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Mark Scheme (Results)

Summer 2014

Pearson Edexcel GCSE
Linked Pair Pilot in Mathematics
Application of Mathematics (2AM01)
Foundation Paper 1F

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

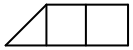
PAPER: 5AM1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		25th May, pitch hire, 51.50	2	B2 for 25th May, pitch hire and 51.50 in correct cells. (B1 for 1 or 2 of these in correct cells)
	(b)		142, 90.50	2	B1 142 B1 90.5(0) ft
2			£1 + 10p	2	M1 for a list of coins with a total of 110p A1 cao
3	(a)		14	1	B1 cao
	(b)		11L	1	B1 cao
	(c)	14 + 12 + 7 + 4 = 37 12 + 8 + 7 + 3 = 30 30 + 37 OR 14 + 12 = 26 12 + 8 = 20 7 + 7 = 14 4 + 3 = 7 26 + 20 + 14 + 7	67	2	M1 14 + 12 + 7 + 4 (= 37) or 12 + 8 + 7 + 3 (= 30) A1 cao OR M1 for at least two of 14 + 12 (= 26) or 12 + 8 (= 20) or 7 + 7 (= 14) or 4 + 3 (= 7) A1 cao

PAPER: 5AM1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
4	(a)		25	1	B1 25 or 25.0
	(b)		3.5	1	B1 3.5 cao
	(c)	20 + 20 = 40 2.2 × 40 OR 2.2 × 20 = 44 44 + 44	88	3	M1 20 + 20 (= 40) M1 2.2 × '40' A1 cao OR M1 2.2 × 20 (= 44) M1 '44' + '44' A1 cao
5	(a)		90	1	B1 cao
	(b)		4	1	B1 cao
	(c)		Cs correctly placed	1	B1 for identifying two congruent shapes
6	(a)		(2, 6)	1	B1 cao
	(b)		× plotted at (5, 7)	1	B1cao
	(c)	*M* plotted at correct place OR $\frac{1+7}{2}, \frac{1+4}{2}$	(4, 2.5)	2	M1 midpoint identified correctly on diagram A1 (4, 2.5) OR M1 (1 + 7)/2 or (1 + 4)/2, can be implied by correct *x* coordinate or correct *y* coordinate A1 (4, 2.5)

PAPER: 5AM1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
7	(a)		10 45	1	B1 10 45 or quarter to eleven or 22 45. Allow variants with notation such as 10:45, 10.45
	(b)		19 20	1	B1 cao
	(c)	$\frac{3}{4}$ hour = 45 min 15 + 45 + 25 = 85 min 3 45 + 1 25 or 3:45 →4:00→4:45→5:10	5 10	3	B1 $\frac{3}{4}$ hour = 45 min M1 15 + 25 + '45' A1 5 10 Allow variants with notation such as 5.10, 5:10
8	(a)		22	1	B1 cao
	(b)		Lichee	1	B1 cao
	(c)		480	1	B1 cao

PAPER: 5AM1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*9		Deal 1 4 + 3 + 5 = 12 12 × 5 = 60 Deal 2 4 + 3 + 5 = 12 12 × 3.50 + 10 = 52 OR Deal 2 4 + 3 + 5 = 12 12 × 3.50 + 10 = 52 52 ÷ 12 = 4.33.... OR difference between deal 1 and deal 2 per cm^2 is £5 – £3.50 = £1.50 4 + 3 + 5 = 12 12 × £1.50 = £18	Deal 2 with reasons	5	M1 for adding the 3 areas (= 12) M1 for '12' × 5 M1 for '12' × 3.50 + 10 A1 (£)60 and (£)52 C1 (dep on at least M1) ft choice consistent with total costs OR M1 for adding the 3 areas (= 12) M1 for '12' × 3.50 + 10 M1 for '52' ÷ 12 A1 for (£)4.33.. C1(dep on at least M1) ft choice consistent with cost per cm^2 using deal 2 OR M1 for adding the 3 areas (= 12) M1 for 5 – 3.50 M1 12 × '1.50' A1 for (£)18 C1(dep on at least M1) ft choice consistent with cost of '£18' compared to £10

PAPER: 5AM1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
10			A square B rectangle C rhombus or kite or parallelogram D trapezium	2	B2 all correct (B1 2 or 3 correct)
*11		38 + 86 + 0 + 45 + 120 = 289 289 × 40p = 11560p 4 × £7.50 = £30 115.60 + 30 OR 38 × 40p = 1520p 86 × 40p = 3440p 45 × 40p = 1800p 120 × 40p= 4800p Mon 15.20 + 7.50 = 22.70 Tues 34.40 + 7.50 = 41.90 Wed 00.00 Thurs 18.00 + 7.50 = 25.50 Fri 48.00 +7.50 = 55.50 22.70 + 41.90 + 25.50 +55.50	Yes and 145.60	5	M1 38 + 86 + (0) + 45 + 120 (= 289) M1 '289' × 40 (= 11560) M1 for 4 × 7.5(0) (= 30) A1 145.6(0) C1 (dep on at least M1) for decision ft candidate's answer OR M1 38 × 40 (= 1520) or 86 × 40 (= 3440) or 45 × 40 (= 1800) or 120 × 40 (= 4800) M1 '1520' + '3440' + '1800' + '4800' (= 11560) M1 for 4 × 7.5(0) (= 30) A1 145.6(0) C1 (dep on at least M1) for decision ft candidate's answer NB calculations can be in £ or pence

PAPER: 5AM1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
12	(a)		5.5	1	B1 for answer in range 5.3 to 5.7
	(b)			2	B2 for circle, centre *P* and radius 2 cm (B1 for circle, centre *P* or radius 2 cm)
13	(a)		A	1	B1 cao
	(b)			2	M1 line of symmetry identified A1 correct shape
14	(a)		12	1	B1 for 12(.00)
	(b)		8800	1	B1 cao
	(c)	3 × 750 = 2250 8768 – 2250 – 750	5768	3	M1 3 × 750 (= 2250) or 4 × 750 (= 3000) M1 8768 – '2250' – 750 or 8768 – '3000' A1 cao

PAPER: 5AM1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
15		9 + 6 + 9 + 6 = 30 30 ÷ 0.5 OR 9 ÷ 0.5 = 18, 6 ÷ 0.5 = 12 18 + 12 +18 + 12 OR 8 ÷ 0.5 = 16, 6 ÷ 0.5 = 12 16 + 12 +16 + 12 + 4 OR 9 × 7 – 6 × 8 = 15 0.5 × 0.5 = 0.25 15 ÷ 0.25	60	3	M1 9 + 6 + 9 + 6 or 8 + 7 + 8 + 7 (= 30) M1 '30'÷ 0.5 A1 cao OR M1 9 ÷ 0.5 (= 18) and 6 ÷0.5(= 12) M1 '18' + '12' + '18' + '12' A1 cao OR M1 8 ÷ 0.5 (= 16) and 6 ÷ 0.5 (= 12) M1 '16' + '12' +'16' + '12' + 4 A1 cao OR M1 for 9 × 7 – 6 × 8 (= 15) M1 for '15' ÷ '0.5^{2}' A1 cao

PAPER: 5AM1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
16	(a)		6	1	B1 cao
	(b)		11	1	B1 cao
	(c)	20 ÷ 6 = 3 OR 6, 12, 18, ...	18	2	M1 20 ÷ 6 A1 cao OR M1 6, 12, 18, ... or listing multiples of 2 and multiples of 3 or marking ‘beeps’ and ‘thuds’ on a time line A1 cao
17	(a)	100 × 0.12 = 12 100 – 12 + 6.40	94.40	2	M1 100 × 0.12 (=12) A1 94.4(0)
	(b)	45.60 – 6.40	39.20	1	B1 cao
	(c)		New decision box with 80 replaced by 70	2	B1 new decision box with correct shape B1 80 replaced by 70

PAPER: 5AM1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
18		$\frac{130}{100} \times 340 = 442$ OR $\frac{30}{100} \times 340 = 102$ 340 + 102 = 442 OR $\frac{30}{100} \times 340 = 102$ 450 – 102 = 348	£442 or 32.35% or 348	3	M1 for $\frac{100+30}{100}$ oe M1 for $\frac{130}{100} \times 340$ oe (= 442) A1 442 OR M1 $\frac{30}{100} \times 340$ (= 102) oe M1(dep) 340 + 102 (= 442) A1 442 OR M1 $\frac{30}{100} \times 340$ (= 102) oe M1 (dep) 450 – 102 (= 348) or 450 – 340 (= 110) A1 348 **or** 102 and 110 **Alternative method** M1 $\frac{450}{340}$ or $\frac{110}{340}$ M1 $\frac{450}{340} \times 100$ (= 132.35) or $\frac{110}{340} \times 100$ (= 32.35) A1 32(.35)

PAPER: 5AM1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
19	(a)		Wages	1	B1 cao
	(b)	$\frac{72}{360}$	$\frac{1}{5}$	2	B2 $\frac{1}{5}$ (B1 $\frac{72}{360}$ oe)
	(c)	18×4	72	2	M1 18 (million) × 4 or a complete method A1 72 (million) oe
20		$30\,000 \div 6 = 5000$ $5000 \div 4 \times 3 =$ OR $\frac{1}{6} \times \frac{3}{4} = \frac{1}{8}$ $30\,000 \div 8$	3750	3	M1 for $30\,000 \div 6$ (=5000) M1 for '5000' ÷ 4 × 3 oe A1 cao OR M1 $\frac{1}{6} \times \frac{3}{4}\left(= \frac{1}{8}\right)$ M1 for $30\,000 \div 8$ oe A1 cao

PAPER: 5AM1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
21	(a)	$x + 2x + 2x + 4$	$5x + 4$	2	M1 for at least 2 terms out of x, $2x$, $2x$ +4 added A1 for $5x + 4$ SC B1 for answer of $2x + 4$ if M0 scored
	(b)	$x = 6$ $5x + 4 = 5 \times 6 + 4$ OR $6 + 12 + 12 + 4$	34	3	B1 $x = 6$ M1 ft on (a) for substituting 6 into their expression(s) A1 cao OR B1 for 6 M1 for $6 + 12 + 12 + 4$ A1 cao
22	(a)		Frequency polygon	2	B2 Complete polygon (ignore histograms and any lines below an age of 20 or above an age of 54), but only award B1 if there is a line joining the first to the last point. (B1 One vertical or horizontal plotting error **OR** incorrect but consistent error in placing the midpoints horizontally **OR** correct plotting but not joined or joined with a curve).
	(b)		30 - 34	1	B1 30 - 34
	*(c)		2 correct comments	2	C1ft on average the women are younger C1 the range of the women ages is larger
23	(a)		Correct point plotted	1	B1 cao
	(b)		LOBF drawn	1	B1 line of best fit drawn
	(c)		answer in range 120 – 140	1	B1 answer in range 120 – 140
	(d)	$200 \div 4 = 50$	answer in range 10 – 15	2	M1 $200 \div 4$ (= 50) A1 answer in range 10 – 15

PAPER: 5AM1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
24	(a)	<table><tr><td>0</td><td>400</td><td>800</td><td>1200</td><td>1600</td></tr><tr><td>**240**</td><td>360</td><td>**480**</td><td>600</td><td>**720**</td></tr></table>	240, 480, 720	2	B2 All 3 correct values (B1 1 or 2 correct values)
	(b)		Correct straight line	2	M1 ft for plotting at least 3 of their points A1 correct line from $x = 0$ to $x = 1600$
*25		Area = $15 \times 10 = 150$ 150 ÷ 20 = 7.5 7.5 litres requires 4 pots. 4 × 32.40 OR Area = $15 \times 10 = 150$ 20 × 2 = 40 150 ÷ 40 = 3.75 3.75 pots used requires 4 pots bought 4 × 32.40 OR 1 litre covers a strip 2m wide and 10m long 15 ÷ 2 = 7.5 7.5 litres requires 4 pots. 4 × 32.40	£129.60	5	M1 for 15×10 (= 150) M1 for '150' ÷ 20 M1 for '7.5' ÷ 2 M1 for '4' × 32.40 C1 (dep on M1) £129.60 OR M1 for 15×10 (= 150) M1 for 20 × 2 (= 40) M1 for '150' ÷ '40' M1 for '4' × 32.40 C1 (dep on M1) £129.60 OR M1 for 2m by 10m M1 15 ÷ 2 (= 7.5) M1 for '7.5' ÷ 2 M1 for '4' × 32.40 C1 (dep on M1) £129.60

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: 5AM1F_01			
Question		**Modification**	**Notes**
Q1		15th May row removed. 8th May row adjusted to £40 and £76	Standard mark scheme
Q2		No pictures – just value of coins given in a row	Standard mark scheme
Q3		3 cm grid with an intermediate line Key put top left Boys - dotty shading. Girls - striped shading	Standard mark scheme
Q4		Just scale given and enlarged	Standard mark scheme
Q5		Diagram × 2	Standard mark scheme
Q6		2 cm grid Crosses changed to filled in circles Right axis labelled	Standard mark scheme
Q7		Diagram ×3	Standard mark scheme
Q8		Remove top two rows from table. Hyphens removed and the word ‘no’ inserted.	Standard mark scheme
Q9		2 cm grid. ‘square centimetre of each letter’ is removed from the text and replaced with ‘square used for each letter’	Standard mark scheme

PAPER: 5AM1F_01			
Question		**Modification**	**Notes**
Q10		Diagram × 2 Shapes labelled ‘shape A’ ‘shape B’ etc. Wording added to text ‘There are four shapes shown in the diagram’	Standard mark scheme
Q11		Table in vertical format	Standard mark scheme
Q12	 (a) (b)	2 Diagrams same page – Diagram (i) and Diagram (ii) Diagram (i) hole moved down ¼ cm. Diagram (ii) P moved down 1cm Text 4 cm changed to 5 cm. Removal of the word ‘nest’ throughout	 B1 for answer in range 6 to 7 B2 for circle, centre *P* and radius 2.5 cm (B1 for circle, centre *P* or radius 2.5 cm)
Q13		Diagrams: 2 cm squares. See screenshot below for changes.	Standard mark scheme
Q15		Diagram × 1 ½	Standard mark scheme
Q16		Information in Diagram Book	Standard mark scheme
Q17c		“In the space below, or on the diagram…”	Standard mark scheme
Q19		Pie chart: ×2	Standard mark scheme

PAPER: 5AM1F_01			
Question		**Modification**	**Notes**
Q19		Pie chart: ×2	Standard mark scheme
Q22		Table – some frequencies changed. 0, 20, 60, 55, 25, 10, 5, 2, 0 Graph – both axes 1 ½ cm for 5. Difficulty with accuracy for midpoints Q version *x* axis labelled only in 10's due to space constraints	Standard mark scheme
Q23		Scatter graph – *x* axis 3 cm for 10 with an intermediate line, *y* axis 3cm for 20 with an intermediate line	Standard mark scheme
Q24		*x* axis 1 ½ cm for 200, *y* axis 3cm for 100 with an intermediate line	Standard mark scheme
Q25		Diagram × 1 ½ size	Standard mark scheme

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