Mark Scheme (Results)

November 2014

Pearson Edexcel GCSE
Linked Pair Pilot in Mathematics
Application of Mathematics
Foundation: (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.

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

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)

14   The detailed notes in the mark scheme, and in practice/training material for examiners, should be taken as precedents over the above notes.

Guidance on the use of codes within this mark scheme
M1 – method mark for appropriate method in the context of the question 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)		600	1	B1
	(b)		1315	1	B1
	(c)(i)		$\dfrac{8}{10}$	2	B1 Accept 800 m, oe
	(ii)		829		B1 cao
2	(a)		15	3	M1 for 30-23+18 or 30-5 (=25) or 23-18 (=5) M1 for 40 – "25" or 40-30+5 oe A1 cao
	(b)		23	3	M1 for 12+11+15+10+8 (=56) or 15+20+18+12+14 (=79) M1 for "79"-"56" A1 cao Or M1 for 15-12,20-11,18-15,12-10,14-8 oe M1 for 15-12+20-11+18-15+12-10+14-8 A1 cao
3		by,bo,bw ry,ro,rw gy,go,gw		2	B2 for all 9 correct combinations (no errors, ignore repeats) (B1 for at least 4 correct combinations (ignore repeats))

Question		Working	Answer	Mark	Notes
4			25	2	M1 for (65-15)÷2, $2x\pm15=65$ oe, at least three pairs of numbers a, b where $a + 15 = b$ OR $a + b = 65$ A1 cao
5	(a)			2	B2 conversion graph (line) drawn between 4.4 pounds and 15.4 pounds (B1 for plotting at least 2 points from the table)
	(b)		4.4 – 4.6	1	B1 for 4.4 – 4.6 or ft graph (dep on single straight line)
	(c)		14.2 – 14.4	1	B1 for 14.2 – 14.4 or ft graph (dep on single straight line)
6	(a)(i)		unlikely	3	B1 cao
	(ii)		evens		B1 cao
	(iii)		impossible		B1 cao
	(b)		A,A,A,A,B,B,C,D	2	M1 for the same number of Cs and Ds OR twice as many As as Bs. A1 cao

Question		Working	Answer	Mark	Notes
7	(a)		16.20	2	M1 for 18×90 oe or 16.2 A1 for 16.20
	(b)		5.15	3	M1 for 9 × £1.65 (=14.85) M1 for 20 – "14.85" A1 cao SC B1 for an answer of 11.90 or 9.20 oe
	*(c)		8 packages cheaper	3	M1 for 16×1.20 (=19.2(0)) or 8×1.65 (=13.2(0)) A1 for £19.2(0) and £13.2(0) C1 (dep on at least M1) statement that it is cheaper to send 8 packages (oe on ft) OR M1 2×1.20 (=2.40) or 1.65÷2 (=0.825) A1 for "2.40" with 1.65 or for "0.825" with 1.20 C1 (dep on at least M1) statement that it is cheaper to send 8 packages (oe on ft)
8	(a)		10 – 13	2	M1 for evidence of counting squares or an answer in the range 9 – 14 A1 answer in the range 10 – 13
	(b)		60	1	B1 cao

PAPER: 5AM2F_01					
Question		Working	Answer	Mark	Notes
9			13.50	6	M1 Overhead costs: 980+120+580 (=1680) M1 meal costs: $8 \times$ [30 or 240 or 270] (=240 or 1920 or 2160) M1 teacher income: 30×20 (=600) or 30×12 (=360 without meal) M1 balance: overhead costs + meal costs – teacher income oe (=3240 or 1320 without meal) M1 balance ÷ 240 A1 cao for 13.5(0)
10	(a)		107.60	2	M1 for substitution eg 48×1.2+50 A1 cao for 107.6(0)
	(b)		37	3	M1 for 94.4-50 (=44.4) M1 for (94.4-50)÷1.2 A1 cao OR M1 $1.2x$+50=94.4 oe M1 attempt to rearrange both sides eg $1.2x = 94.4 – 50$ or division through by 1.2 A1 cao

Question	Working	Answer	Mark	Notes
11		6	3	M1 for 2×4.5 (=9) M1 for "9"-3 A1 cao OR M1 for 3÷4.5 (=0.666..) M1 for (2 – "0.6666…") × 4.5. A1 cao OR M1 for 4.5 – 3 (=1.5) M1 for 1.5 + 4.5 A1 cao
12		$t = 6x$	2	B2 for $t = 6x$ oe (B1 for t = [linear expression in x] or for $6x$ oe)

PAPER: 5AM2F_01					
Question		Working	Answer	Mark	Notes
13	(a)		Sameena	4	M1 for a method to find Sameena time: eg 45 min+4 h+10 min (= 4h 55min) (= 295mins) M1 for a method to find Molly time: eg 10 min+4h+10 min (= 4h 20min) (= 260mins) A1 for two correct time periods C1 (dep on M1) ft for a correct statement with consistent units OR M1 for a method to find Sameena alone time: eg 8.15 to 11.50 = 45 min + 2h + 50min (= 3h 35min) (= 215mins) M1 for a method to find Molly alone time: eg 1.10 to 4.10 (= 3h) (= 180mins) A1 for two correct time periods C1 (dep on M1) ft for a correct statement with consistent units
	(b)		7.35	2	M1 attempts to work backwards from 8.15am eg 8.15 – 40 min A1 for 7.35 (am)
	(c)		11.08	2	M1 for 357.33 ÷ 32.25 oe A1 cao
14	(a)		58	1	B1 angle ±2°
	(b)		Correct position	2	B2 for the point C 4cm ± 2mm AND 120 ± 2° (B1 for the point C 4cm ± 2mm OR 120 ± 2°)

PAPER: 5AM2F_01					
Question		Working	Answer	Mark	Notes
15	(a)		8	2	M1 576 ÷ (12×6) oe A1 cao
	(b)		drawn triangle	2	B2 for triangle drawn accurately (B1 for at least one 60° angle or one line of length 6cm ± 2mm)
*16			5 kg	4	M1 for one of 1.90÷2 (=0.95), 4.35÷5 (=0.87); 8.45÷9 (=0.93(888..)) M1 for all of 1.90÷2 (=0.95), 4.35÷5 (=0.87); 8.45÷9 (=0.93(888..)) A1 for all 3 answers correct C1 (dep on M1) for a comparison of their answers leading to a correct deduction (ft). OR M1 for one of 2÷1.90 (=1.05(26..)), 5÷4.35 (=1.14(9..)), 9÷8.45 (=1.06(5…)) M1 for all of 2÷1.90 (=1.05(26..)), 5÷4.35 (=1.14(9..)), 9÷8.45 (=1.06(5…)) A1 for all 3 answers correct C1 (dep on at least M1) for a statement comparing of their three values leading to a correct deduction (ft). OR M1 price of 2 comparable quantities e.g 1.90 × 5 ÷ 2 (=4.75) M1 price of 3 comparable quantities A1 for all 3 answers correct C1 (dep on M1) for a comparison of their answers leading to a correct deduction (ft).

PAPER: 5AM2F_01					
Question		Working	Answer	Mark	Notes
17	(a)		1300	1	B1 oe
	(b)		5	1	B1 cao
	(c)		1.4	2	M1 0.6 to 2 or 2 – 0.6 oe A1 cao
	(d)		Graph complete	2	B1 horiz. line from 1340 to 1350 B1 horiz line starting at 1340 and line of negative gradient joining graph (ft) to (1415,0)
18			77	3	M1 for 21÷6 (=3.5) for sf length or 21÷6 × 5 (=17.5) M1 for 3×"3.5" + 3×"3.5" + 21 + 21 or 17.5+17.5+21+21 oe A1 cao OR M1 for 21÷6 (=3.5) for sf length M1 for (6+5+6+5)×"3.5" or 22×3.5 oe A1 cao
19			4.20	4	M1 for 30 ÷ (2 + 1) (=10) M1 for "10" × 2 × 2.8 (=56) oe M1 for (98 – "56") ÷ "10" A1 cao 4.2(0) OR algebraic approach M1 for (eg) $c=2a$ and $c+a=30$ M1 for (eg) 2.8 $c+wa=98$ M1 for ($w =$) (98 – "56") ÷ "10" A1 cao 4.2(0) [SC B2 for 3.5(0) as final answer]

PAPER: 5AM2F_01				
Question	**Working**	**Answer**	**Mark**	**Notes**
*20		Needed: 10 eggs 1 kg flour	5	M1 number of cupcakes is 90×2 + 120 (=300) M1 scaling "300"÷12 (=25) M1 needed 200 × "25" or 4 × "25" or 240 × "25" or 5000 or 100 or 6000 A1 5000 (g) and 100 (eggs) and 6000 (g) C1 (dep on at least M1) correct statement of which items are needed with quantities and units OR M1 number of cupcakes is 90×2 + 120 (=300) M1 scaling "300"÷12 (=25) M1 no. cupcakes 5 ÷ "25" or 90 ÷ "25" A1 0.2, 3.6, 0.2 C1 (dep on at least M1) correct statement of which items are needed with quantities and units. OR M1 number of cupcakes is 90×2 + 120 (=300) M1 200 ÷ 12(=16.6..), 4 ÷ 12(= 0.33..), 240 ÷ 12 (=20) M1 "300" × "16.6" and "300" × "0.33" and "300" × "20" A1 5000 (g) and 100 (eggs) and 6000 (g) C1 (dep on at least M1) correct statement of which items are needed with quantities and units

Question		Working	Answer	Mark	Notes
21	(a)		$\dfrac{7}{27}$	2	M1 for $\dfrac{7}{12+7+8}$ A1 for $\dfrac{7}{27}$ oe
	(b)		30	3	M1 for $1 - 0.4$ (=0.6) M1 for $18 \div 6 \times 10$ or $18 \div$ "0.6" A1 cao
22			326	5	M1 for $55^2 + 40^2$ M1 for $\sqrt{3025+1600}$ or $\sqrt{4625}$ A1 for 68(.00735…) M1 for $40 + 40 + 55 + 55 +$ "68" + "68" OR $2 \times$ ("68" + 55 + 40) A1 for 326 or better
*23			70°	3	M1 for $MDC = 70°$ or for $90 - (180 - 90 - 70)$ A1 cao C1 for <u>Alternate</u> <u>angles</u> are equal and Base <u>angles</u> of an <u>isosceles</u> triangle are <u>equal</u>. OR M1 for $MCB = 20°$ or for $180 - (90 + 70)$ A1 cao C1 for <u>Angles</u> in a <u>triangle</u> add up to <u>180º</u> and <u>angles</u> of a <u>rectangle</u> are <u>90°</u>

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: 5AM2F_01		
Question	**Modification**	**Notes**
Q02	Picture removed	
Q05	Vertical axis 3 cm for 1 with an intermediate line Horizontal axis 1½ for 1	
Q06	Size x 2 Central stick removed Blob at centre of spinners	
Q08	1st line 'centimetre' removed Wording added in paper and diagram: 'Each square on the grid represents a one centimetre square'	
Q11	Picture removed	
Q14	Angle at A made exactly 60° N line increased to 10 cm Scale given on both paper and diagram AB joined with a dotted line	

PAPER: 5AM2F_01			
Question		**Modification**	**Notes**
Q14	(b)	'with a cross (x)' removed	
Q15		Model provided. Diagram also provided for MLP	
15	(b)	Base line drawn in 6 cm long	
Q16		Pictures removed – just information given	
Q17		Beginning of graph changed (1300, 0) (1305, 0.5) (1310, 0.5) (1320, 2) – rest of graph line remains. Vertical axis 1½ cm for 0.5 Horizontal axis 1½ cm for 5 minutes	
Q18		5 cm moved to left side. 6 cm and 21 cm moved to top. Headings put above the diagrams.	
Q19		Picture removed	