Mark Scheme (Results)

Summer 2013

GCSE Mathematics Linked Pair Pilot
Application of Mathematics (2AM01)
Foundation (Calculator) 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, 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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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: 5AM1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		35 000	1	B1 cao
	(b)		430	1	B1 cao
2	(a)		Siele	1	B1 cao
	(b)		Zeko	1	B1 cao
	(c)		56	1	B1 cao
3			3200	1	B1 cao
	(b)		6.7	1	B1 for 6.7 or 6.70 (accept 6m 70cm provided units are clear)
	(c)		1.7	2	M1 for 1.5×1000 (=1500) **or** $200 \div 1000$ (=0.2) **or** 1700 A1 for 1.7 or 1.70
4	(a)		110	1	B1 cao
	(b)		−3.2	1	B1 cao
	(c)		arrow drawn at 2.4	1	B1 cao

PAPER: 5AM1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
5	(a)		3	1	B1 cao
	(b)		4	1	B1 cao
	(c)		36	3	M1 for $3x + x + x = 180$ M1 for correct method to solve '$3x + x + x = 180$' A1 for 36
6			Chart or graph	3	B1 for each colour clearly labelled either on the bars or along the horizontal axis B1 for correct column heights of all the bars either from the frequency axis or correct number of squares if the frequency axis is not scaled C1 for a fully correct graph or chart including labels
7	(a)		4	1	B1 cao
	(b)		5	1	B1 cao
	(c)	$(1+1+1+2+3+4+4+4+4+6)\div10$	3	2	M1 for $(1+1+1+2+3+4+4+4+4+6)\div10$ **or** $30\div10$ A1 cao

PAPER: 5AM1F_01					
Question		Working	Answer	Mark	Notes
8	(a)		9600	1	B1 cao
	(b)	10400+2400+1800+9500 (=24100) 9600+2100+2200+9800 (=23700)	400	3	M1 for at least 2 of 10400, 2400, 1800, 9500 or at least 2 of 9600, 2100, 2200, 9800 M1(dep) for '10400'+'2400'+'1800'+'9500'(=24100) **and** '9600'+'2100'+'2200'+'9800'(=23700) A1 for 400 **Or** M1 for 10400 – 9600 (=800) **or** 2400 – 2100 (=300) **or** 2200 – 1800 (=400) **or** 980 0– 9500 (=300) M1 for '800' + '300' – '400' – '300' oe A1 for 400

PAPER: 5AM1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
9	(a)	78 + 64 (142) 5 – 1.42	3.58	3	M1 for 78 + 64 (=142) **or** 0.78 + 0.64 (=1.42) M1 for 500 – '142'(=358) **or** 5 – '1.42' (=3.58) A1 for 3.58 **or** M1 for 5 – 0.78 (=4.22) or 5 – 0.64 (=4.36) M1 for '4.22' – 0.64 or '4.36' – 0.78 A1 for 3.58
	(b)		£4.60	2	M1 for 1.84 × 2.5 oe **or** 1.84 + 1.84 + 1.84÷2 A1 for 4.60 (must be correct money notation)
	(c)		6	2	M1 for 5 ÷ 0.75 **or** 500 ÷ 75 **or** 6.66666 or repeated addition of 75 (at least 3 additions) **or** repeated subtraction of 75 from 500 (at least 3 subtraction) A1 cao
	(d) (i)		= C2 + C3 + C4 + C5	3	B1 for (=) C2 + C3 + C4 + C5 or (=)SUM(C2:C5) or clear intention to add correct cells
	(ii)		= B2 * C2		B1 for (=) B2*C2 or (=) B2*C2/100 or clear intention to multiply correct cells. C1 for correct spreadsheet notation for both. Condone missing = sign. NB: do not accept '×' in place of '*'

PAPER: 5AM1F_01					
Question		Working	Answer	Mark	Notes
10	(a)	3×20 + 25	85	2	M1 for 3 × 20 + 25 A1 for 85 or 1 hour 25
	(b)	125 – 25 (=100) 100÷20	5	3	M1 for subtraction of 25 or division by 20 M1(dep) for subtraction of 25 and then division by 20 A1 cao **or** M1 for 125 – '85' (=40) M1 for '40'÷20 + 3 A1 cao
11		430 + 240 + 240 + 35 (=945) 45.6+195+60+23.9+27.99+45+50 +15.8(=463.29) '945'–'463.29'	481.71	3	M1 for clear attempt to add together either all amounts spent or all amounts put into account **or** for sight of a start of running total using at least first four transactions (may be in table) M1 for '945'–'463.29' **or** attempt at running total for all amounts shown A1 cao

PAPER: 5AM1F_01					
Question		Working	Answer	Mark	Notes
12	(a)	140 ÷ 60 (=2.333…) or 15 00 + 60 = 16 00 16 00 + 60 = 17 00 17 00 + 20	17 20	3	M1 for an understanding that there are 60 minutes in an hour M1 for 140 – 120 (=20) or 20 minutes seen as part of a method A1 17 20 or 5:20 pm oe SC B2 for answer of 5 20 given
	(b)	29.76 ÷ 3 (=9.92) 29.76 – '9.92'	19.84	3	M1 for 29.76 ÷ 3 (=9.92) M1(dep) for 29.76 – '9.92' or 2×'9.92' or 29.76 × 0.33($\dot{3}$) A1 cao **or** M1 for $1 - \dfrac{1}{3} (= \dfrac{2}{3})$ or 1 – 0.33 = 0.67 or 0.$\dot{6}$ M1 for 29.76 × 2 ÷ 3 or 29.76 × 0.67 or 29.67 × 0.$\dot{6}$ A1 cao
	(c)	$\dfrac{300}{450}$	$\dfrac{2}{3}$	2	M1 for $\dfrac{300}{450}$ oe A1 cao

Question	Working	Answer	Mark	Notes
13	0.1×240(=24) 216 ÷ '24'	9 weeks	4	M1 for 0.1×240 oe e.g. 240 ÷ 10 A1 for 24 M1 for 216 ÷ '24' A1 for 9
14	360÷120=3	Angles of 84°, 150°, 126° drawn and labelled	3	M1 for 360 ÷ 120 or 3 seen or one angle correct in pie chart (±2°), ignore all labels, or one correct angle in the table A1 for any two angles correct in pie chart (±2°), ignore all labels A1 for fully correct and labelled pie chart, all angles ±2°
15		Types of transport / Tally / Frequency	3	B3 for a completely correct data collection sheet, including 3 columns with headings: type or travel (oe or at least 3 modes of transport listed), tally, frequency (B2 for partially correct data collection sheet) (B1 for one column correctly labelled) **NB** Award no marks for graphs or questionnaires

PAPER: 5AM1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*16		36 × 4 (=144) 176 + 103 + '144' (=423) 15 × 28 = 420 Or '423' ÷ 28 = 15.107….	No with correct working	4	M1 for 36 × 4 (=144) M1 for 176 + 103 + '144' (=423) M1 for 28 × 15 C1 (dep on at least M2 awarded) for 420 **and** 423 and 'No she won't have enough' **Or** M1 for 36 × 4 (=144) M1 for 176 + 103 + '144' (=423) M1 for 423 ÷ 28 C1 (dep on at least M2 awarded) for 15.10 **or** 15.11 **or** 15.107… and 'No she won't have enough'
17		85 × 34	2890	2	M1 for 85 × 34 A1 cao

Question		Working	Answer	Mark	Notes
18	(a)		22	1	B1 cao
	(b)	15 ÷ 60	25p	2	M1 for 15 ÷ 60 oe or clear attempt to find gradient A1 for £0.25 or 25p
	(c)	0.2 × 90 (=18) From graph 90 units costs £19	Yes as cost will be lower	3	M1 for Tariff B price for 90 units 20 × 90 (=1800) **or** 0.2 × 90(=18) OR Tariff A price per unit unit $\frac{1800}{90}$ **or** $\frac{19}{90}$ B1 for reading from Tariff A graph at 90 units **or** £19 C1 for £18 and £19 with 'yes' or 21.(1…)p with 'yes' **Or** M1 for drawing the correct line (for Tariff B) through the origin with gradient 0.2 B1 for reading from Tariff A graph at 90 units **or** £19 C1 for £18 and £19 with 'yes'

PAPER: 5AM1F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*19		1.5 × 1000 =1500 1500 ÷ 2.88 = 520.83… 2 × 900 ÷ 3 = 600 or equivalent working in kg OR 1.5 × 1000 =1500 2.88 ÷1500 = 0.00192 3 ÷ (2 × 900) =0.00166… or equivalent working in kg OR 2 × 900 ÷ 100 = 18 300 ÷18 = 16.66.. 1500 ÷ 100 = 15 288 ÷15 = 19.2..	Two 900g bags	4	**Grams per penny** M1 for 1.5 × 1000 (=1500) or 900÷1000 (=0.9) M1 for '1500' ÷ 2.88 (= 520.83.) or 1.5÷ 2.88 (= 0.52083..) M1 for 2 × 900 ÷ 3 (=600) or 2×0.9 ÷ 3(=1.66.) C1 for Two 900g bags with a statement and 600 (or 0.6) and '520(.833..) (or 0.5208…) OR **Pence per gram** M1 for 1.5 × 1000 (=1500) or 900÷1000 (=0.9) M1 for 2.88 ÷'1500' (= 0.00192) or 2.88÷1.5 (=1.92) M1 for 3 ÷ (2 × 900) (=0.00166…) or 3 ÷ (2 ×0.9) (=1.66…) C1 for Two 900g bags with a statement and 0.00192 (or 1.92) and 0.00166… (or 1.66..) OR **Working with the same weight of peas** M1 for 2 × 900 ÷ 100 (= 18) or 1500 ÷ 100 (= 15) Or 5 × 2 × 900 (= 9000) or 1.5 × 6 (= 9000) M1 for 300 ÷18 (= 16.66..) or 5 × £3 (= £15) M1 for 288 ÷15 (= 19.2..) or 6 × £2.88 (= £ 17.28) C1 for Two 900g bags with a statement and 19.2 and 16.66… or £15 and £17.28

PAPER: 5AM1F_01					
Question		Working	Answer	Mark	Notes
20		2.4÷0.3 = 8 or 1.8÷0.3 = 6 8 × 6 =48 48 ÷14 = 3.42… **Or** 2.4×1.8 = 4.32 0.3×0.3 = 0.09 4.32 ÷ 0.09 = 48 48 ÷ 14 = 3.42…	4	5	B1 for correct conversion of units M1 for correct attempt to find how many rows of tiles using their units consistently. M1 for complete correct method to find the number of tiles needed. M1 for number of tiles ÷ 14 and round up A1 cao for 4 packs of tiles supported by correct working **Or** B1 for correct conversion of units M1 for correct method for area of wall and area of tile using their units consistently. M1 for complete correct method to find the number of tiles needed. M1 for number of tiles ÷ 14 and round up A1 cao for 4 packs of tiles supported by correct working

Question	Working	Answer	Mark	Notes
21	$x + 3x + 3x + 4 = 158$ $7x + 4 = 158$ $7x = 154$	22	4	M1 for $3x$ or $3x + 4$ seen M1 (dep) for forming equation $x +$ '$3x$' + '$3x+4$' = 158 M1 for intention to isolate x term(s) in their equation if of the form $ax + b = 158$ A1 22 cao dep on at least M1 awarded OR M1 for a correct trial with $x \geq 1$ to evaluate x, $3x$ and $3x + 4$ (algebraic expressions may not be seen) M1 for 3 values that sum to 158 M1 for intention to add $22 + 3 \times 22 + 3 \times 22 + 4$ (=158) A1 for 22 cao dep on at least M1 awarded
22	$60 - 29 = 31$ $13 - 8 = 5$ $31 - 10 - 5$ OR $29 - 6 - 8 = 15$ $15 + 10 = 25$ $60 - 13 - 25 = 22$ $22 - 6$ OR <table><tr><td></td><td>C</td><td>It</td><td>T</td><td></td></tr><tr><td>W</td><td>15</td><td>8</td><td>6</td><td>29</td></tr><tr><td>M</td><td>10</td><td>5</td><td>16</td><td>31</td></tr><tr><td></td><td>25</td><td>13</td><td>22</td><td>60</td></tr></table>	16	4	M1 for calculation of total Men $60 - 29$ (=31 Men) M1 for calculation for Men who like Italian $13 - 8$ (= 5 Men like Italian) M1 for calculation for Men who liked Thai '31' – 10 – '5' A1 for 16 **OR** M1 for a 2-way table or diagram with clear labelling showing at least 3 pieces of the given information correctly placed M1 for correct method for one calculated entry in diagram: Men 60-29 (=31) or Women and Chinese 29- 8 - 6 (=15) or Men and Italian 13- 8 (=5) M1 for 3 correct entries for Men or 2 correct entries for Thai that with correct arithmetic would lead to 16 (Men and Thai) A1 for 16

Question		Working	Answer	Mark	Notes
23			Suitable question with response boxes	2	B1 for a question about number of holidays within a time frame OR question about frequency of holidays with time frame(s) in response boxes. B1 for at least 3 correctly labelled non-overlapping response boxes (need not be exhaustive) OR 3 or more exhaustive response boxes which may overlap. [Do not accept inequalities in response boxes] NB Frequency tables or data collection sheets score B0
24	(a)	$\dfrac{700}{28000} \times 100$	2.5	2	M1 for $\dfrac{700}{28000} \times 100$ oe A1 cao
	(b)		3413.64	3	M1 for 3000×0.04 oe (=120) M1 for $(3000 + \text{'120'}) \times 1.046^2$ oe A1 cao **or** M2 for $3000 \times 1.04 \times 1.046^2$ **or** 3000×1.13788064 (M1 for 3000×1.04 or 3000×1.046) A1 cao SC: B2 for 3413.6419….