

Mark Scheme (Results)

November 2013

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, 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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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)(i)		kilogram	1	B1 for kilogram or kg or kilo
	(a)(ii)		kilometre	1	B1 for kilometre or km
	(a)(iii)		litre	1	B1 for litre, l, cm <sup>3</sup> , m <sup>3</sup>
	(b)(i)		10	2	B1 for 10 – 10.2
	(b)(ii)		2.75		B1 for 2.75 – 2.8 oe
2	(a)		18	1	B1 cao
	(b)		20	2	M1 for $5 \times 4$ A1 cao
	(c)	$80 \div 12=6.66$	7	2	M1 for $80 \div 12$ or $7 \times 12=84$ A1 cao

**PAPER: 5AM1F\_01**

Question		Working	Answer	Mark	Notes
3	(a)		6300	1	B1 cao
	(b)		6000	1	B1 cao
	*(c)	$3 \times 1438 = 4314$ OR $4667 \div 3 = 1555.(6)$ OR $4667 \div 1438 = 3.2(4)$	Yes+ reason	3	M1 for $3 \times 1438$ A1 for yes and 4314 C1 (dep on M1) for reason, e.g. $4700 > 4314$ oe OR M1 for $4667 \div 3$ A1 for yes and 1555(.6) C1 (dep on M1) for $1555(.6) > 1438$ oe OR M1 for $4667 \div 1438$ A1 for yes and 3.2(4) C1 (dep on M1) for $3.2(4) > 3$ oe
4	(a)		B, C	2	B1 for B B1 for C
	(b)		4	1	B1 cao
	(c)		F, H	1	B1 cao
5		$20 - 15 = 5$ $18 - 10 = 8$ $15 - 12 = 3$ $5 + 8 + 3 = 16$ OR $20 + 18 + 15 = 53$ $15 + 10 + 12 = 37$ $53 - 37 = 16$	16	3	M1 a correct method to work out all 3 daily differences M1 for adding 3 daily differences A1 cao OR M1 for total bought and for total sold M1 for total bought - total sold A1 cao

**PAPER: 5AM1F\_01**

Question		Working	Answer	Mark	Notes
6	(a)		1.6, 2.0	2	B1 for (M-H=)1.6 B1 for (H-E=)2.0
	(b)(i)		P-M-S-H-M-P	4	M1 for a route that starts and finishes at P and goes through at least 2 of M, S and H A1 for P-M-S-H-M-P or P-M-H-S-M-P oe
	(ii)	$2.2 + 5.1 + 4.0 + '1.6' + 2.1$	15.1		M1 for adding the distances of a route that starts and finishes at P and goes through M, S and H A1 for 15.1 or ft $13.5 + '1.6'$ (SC B1 for 15.6)
7	(a)(i)		2.5 marked with arrow	2	B1 for 2.5 marked with arrow
	(a)(ii)		2500		B1 cao
	(b)	$2.5 \times 40 = 100$ , $100 \div 60 = 1\text{h } 40\text{min}$ $1(\text{pm}) - 1\text{h } 40\text{min}$	11.20(am)	3	M1 for a correct method to find the total cooking time M1 for a correct method to find the start time A1 cao
8		$3 \times 46 + 36 = 174$ $200 - 174 = 26\text{p}$ OR $200 - 46 - 46 - 46 - 36$	26p	3	M1 for a correct method to find the total cost M1 for a correct method of subtracting their total from £2 A1 for 26p or £0.26 (accept £0.26p)
9	(a)		10.6	1	B1 for 10.4 – 10.8
	(b)		12	1	B1 for 10 – 14
	(c)		(5,2)	1	B1 cao



**PAPER: 5AM1F\_01**

Question		Working	Answer	Mark	Notes
10	(a)		Front	1	B1 cao
	(b)		1600	1	B1 cao
	(c)		Wasu	1	B1 cao
	(d)		60	2	M1 for $20 \div 100 \times 300$ or $300 \div 5$ or $30 + 30$ oe A1 cao
11	(a)		$-7^{\circ}\text{C}, -2^{\circ}\text{C}, 0^{\circ}\text{C},$ $5^{\circ}\text{C}, 9^{\circ}\text{C}$	1	B1 accept without $^{\circ}\text{C}$
	(b)		5	1	B1 cao
	(c)		Chart or diagram to compare	4	B1 for suitable labels or key to differentiate maximum and minimum B1 for Jan-Mar, Apr-Jun, Jul-Sep and Oct-Dec clearly labelled B1 for accurately representing data, e.g. bars of correct height C1 for fully correct diagram or chart
12	(a)		2	1	B1 cao
	(b)	$(1+1+2+2+2+2+3+3+3+4) \div 10 = 23 \div 10$	2.3	2	M1 for correct method to find mean A1 cao
	(c)		Average with reason	1	B1 for e.g. mean- uses all values or mode-gives a whole number of eggs oe

PAPER: 5AM1F_01					
Question		Working	Answer	Mark	Notes
13	(a)	$x + 1 = 5$	4	1	B1 cao
	(b)	$a + 2a + 3a = 180$	30	2	M1 for $a + 2a + 3a (=180)$ or $180 \div 6$ A1 cao
14	(a)	$(2192 - 32) (=2160) \div 1.8$	1200	2	M1 for $(2192 - 32) \div 1.8$ A1 cao
	(b)	$16 \times 1.8 (=28.8) + 32$  OR $16 \rightarrow \times 1.8 \rightarrow + 32$	60.8	3	M1 for $\times 1.8$ or $+ 32$ M1 for $16 \times 1.8 + 32$ A1 cao OR M1 for a reverse number machine with $\times 1.8$ or $+ 32$ M1 for a reverse number machine with $\times 1.8$ and $+ 32$ A1 cao
15		$1.75 \times 2.8 = 4.9$ $7.24 - 4.9 = 2.34$ $2.34 \div 3.6$	0.65	4	M1 for $1.75 \times 2.8 (=4.9)$ M1 for $7.24 - '4.9' (=2.34)$ M1 for $'2.34' \div 3.6$ A1 cao

**PAPER: 5AM1F\_01**

Question		Working	Answer	Mark	Notes																
16	(a)	<table border="1"> <thead> <tr> <th></th> <th>f</th> <th>r</th> <th>tot</th> </tr> </thead> <tbody> <tr> <td>b</td> <td>(15)</td> <td>13</td> <td>28</td> </tr> <tr> <td>g</td> <td>(12)</td> <td>(10)</td> <td>22</td> </tr> <tr> <td>Tot</td> <td>27</td> <td>23</td> <td>(50)</td> </tr> </tbody> </table>		f	r	tot	b	(15)	13	28	g	(12)	(10)	22	Tot	27	23	(50)	Two-way table	3	B1 for correctly placing 3 out of 4 given numbers M1 for completing at least 2 further numbers A1 for a completely correct table
	f	r	tot																		
b	(15)	13	28																		
g	(12)	(10)	22																		
Tot	27	23	(50)																		
17	(i)	$3x + 2 + 2x + 5 = 3x + 2x + 2 + 5$	$5x + 7 = 19$	4	M1 for $3x + 2 + 2x + 5$ or $3x + 2x$ and $2 + 5$ A1 for completing the algebra correctly																
	(ii)	$5x + 7 = 19$ $x = (19 - 7) \div 5$	2.4		M1 for $5x + 7 - 7 = 19 - 7$ or $(19 - 7) \div 5$ A1 cao																
18	*(a)	(I cost per nail) $1.36 \div 20 = 0.068$ , $3.30 \div 50 = 0.066$ , $6.03 \div 90 = 0.067$	Medium + reason	4	M1 for correct method to work out a unit cost for 2 boxes M1 for correct method to work out a unit cost for all 3 boxes A1 for (£)0.068 and (£)0.066 and (£)0.067 oe C1 for correct conclusion based on their figures (consistent units) (dep on at least one M1 scored) OR																

**PAPER: 5AM1F\_01**

Question	Working	Answer	Mark	Notes								
<p>18 (cont)</p>	<p>*(a)</p> <p>(II e.g. number of nails for £1)  <math>20 \div 1.36=14.7</math>, <math>50 \div 3.30=15.1</math>,  <math>90 \div 6.03=14.9</math></p> <p>(III e.g. cost for 20 nails)  <math>3.30 \div 50 \times 20=1.32</math>, <math>6.03 \div 90 \times 20=1.34</math></p> <p>(IV using multipliers)  <math>50 \div 20 = 2.5</math> and <math>3.30 \div 1.36 = 2.42</math>  <math>90 \div 50 = 1.8</math> and <math>6.03 \div 3.30 = 1.82</math></p> <table border="1" data-bbox="427 1090 734 1230"> <tr><td>2</td><td>0 5 8</td></tr> <tr><td>3</td><td>0 0 0 5 7 9</td></tr> <tr><td>4</td><td>0 5 7 9</td></tr> <tr><td>5</td><td>0 5</td></tr> </table>	2	0 5 8	3	0 0 0 5 7 9	4	0 5 7 9	5	0 5	<p>S&amp;L diagram with key</p> <p>37</p>	<p>3</p> <p>1</p>	<p>M1 for correct method to work out the number of nails for £1 oe from 2 boxes  M1 for correct method to work out the number of nails for £1 oe from all 3 boxes  A1 for 14.7 and 15.1 and 14.9  C1 for correct conclusion based on their figures (consistent units) (dep on at least one M1 scored)  OR  M1 for correct method to work out the cost of 20 nails using the 50 nails cost oe  M1 for correct method to work out the cost of 20 nails using the 50 nails cost and 20 nails using the 90 nail cost  A1 for (£)1.36, (£)1.32, (£)1.34 oe  C1 for correct conclusion based on their figures (dep on at least one M1 scored) (consistent units)  OR  M1 for correct method to compare multipliers for cost and number for 1 pair of boxes  M1 for correct method to compare multipliers for cost and number for correct 2 pairs of boxes  A1 for 2.5 and 2.42, 1.8 and 1.82  C1 for correct conclusion based on their figures (dep on at least one M1 scored) (consistent units)</p> <p>M1 for correct stem and unordered leaves (condone two errors or omissions)  A1 cao  B1 for key, e.g. 2   0 means 20mm</p> <p>B1 cao</p>
2	0 5 8											
3	0 0 0 5 7 9											
4	0 5 7 9											
5	0 5											
(b)												
(c)												

**PAPER: 5AM1F\_01**

Question		Working	Answer	Mark	Notes						
19	(a)		The greater the length the heavier the dolphin	1	B1 for the greater the length the heavier the dolphin oe or positive correlation						
	(b)		(2.54, 132) plotted	1	B1 for correct point plotted $\pm 1$ sq						
	(c)		120 – 125	2	M1 for a single straight line segment with positive gradient that could be used as a line of best fit or an indication on the diagram from 2.3 on the height axis A1 for 120 – 125						
20	(i)		=0.4*B3	3	B1 for (=)0.4*B3 oe e.g. (=)C3*B3						
	(ii)		=SUM(B2:B6)		B1 for (=)SUM(B2:B6) oe, e.g. (=)B2+B3+B4+B5+B6 B1 for using correct spreadsheet notation; condone missing “=” throughout.						
21		<table border="1"> <thead> <tr> <th>subject</th> <th>tally</th> <th>frequency</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	subject	tally	frequency				Data collection sheet	3	B1 for a data label for types of subjects with at least 3 subjects entered B1 for space next to data labels headed tally oe B1 for space next to tally column headed freq oe (ignore tallies/frequencies if entered)
subject	tally	frequency									
22		$400 \div 59.99 = 6.6(7)$ rolls 6 rolls cover $6 \times 1.5 \times 5 = 45\text{m}^2$ Floor area $4.5 \times 6 + 4.5 \times 3 = 40.5\text{m}^2 (<45)$  $3 \div 1.5 = 2$ $(4.5 + 4.5 + 9 + 9) \div 5 = 5.4$ 5.4 $\rightarrow$ 6 rolls $6 \times 59.99 = \text{£}359.94 (< \text{£}400)$	Yes with correct figures	4	M1 for correct method to find number of rolls for $\text{£}400$ M1 for correct method to work out coverage for found number of rolls. M1 for correct method to find area of floor C1 for yes with 40.5 and 45 OR M1 for an attempt to fit widths M1 for a correct method to find total number of rolls M1 for correct method to find total cost of rolls C1 for yes with ( $\text{£}$ )359.94						

Question	Working	Answer	Mark	Notes
23	<pre> graph TD     Start([START]) --&gt; Input[/Input C cost of shopping/]     Input --&gt; Decision{C &gt; 100}     Decision -- yes --&gt; ProcessYes[Amount to pay = C-8]     Decision -- no --&gt; ProcessNo[Amount to pay = C]     ProcessYes --&gt; Output[/Output amount to pay/]     ProcessNo --&gt; Output     Output --&gt; End([END])         </pre>	Correct flow chart	5	<p>B1 for <math>&gt; 100</math> (allow in words)                  B1 for 'yes' (consistent) leading to <math>C - 8</math> oe (allow in words)                  B1 for output box following 'no' or '<math>C-8</math>'                  B1 for end box (stop)                  B1 for fully correct (condone omission of END box and of 'Amount to pay = C' box)</p> <p>Or</p> <p>B1 for <math>\leq 100</math>                  B1 for 'no' (consistent) leading to <math>C - 8</math> oe (allow in words)                  B1 for output box following 'no' or '<math>C-8</math>'                  B1 for end box (stop)                  B1 for fully correct (condone omission of END box and of 'Amount to pay = C' box)</p>

## 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:  $\pm 5$  mm

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PAPER: 5AM1F_01			
Question		Modification	Notes
1		Ruler enlarged by $1\frac{1}{2}$	Standard mark scheme
6		Shading removed from boxes in table replaced with cross eg. 	Standard mark scheme
7		Just scale given. Kilograms moved to top. Wording changed to "A chicken weighs 2.5kg. On the scale mark a weight of 2.5 kg."	Standard mark scheme
9	(a)	Line AB exactly 10.5cm long	B1 for 10 – 11
	(b)	Angle $x$ to be $20^\circ$	B1 for 15 – 25
	(c)	2cm grid	Standard mark scheme
10		Frex row removed from table	Standard mark scheme
11	(c)	2cm grid	Standard mark scheme

**PAPER: 5AM1F\_01**

Question		Modification	Notes
13	(a)	$x$ changed to $y$	Standard mark scheme
	(c)	$a$ changed to $x$	M1 for $x + 2x + 3x (=180)$ or $180 \div 6$ A1 cao
16		Braille only-Roman numerals (i) to (ix) put into spaces in the table	Standard mark scheme
17	(i)	$x$ changed to $y$	M1 for $3y + 2 + 2y + 5$ or $3y + 2y$ and $2 + 5$ A1 for completing the algebra correctly
	(ii)	$x$ changed to $y$	M1 for $5y + 7 - 7 = 19 - 7$ or $(19 - 7) \div 5$ A1 cao
18	(a)	No boxes just information	Standard mark scheme
	(b)	Stem and leaf diagram given to be filled in	Standard mark scheme
19	(a)	2cm grid Crosses changed to circles	Standard mark scheme
	(b)	2.54 changed to 2.5, 132 changed to 130	B1 for correct point plotted $\pm 2$ sq





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