Mark Scheme (Results)

November 2014

Pearson Edexcel GCSE
Linked Pair Pilot in Mathematics
Application of Mathematics
Foundation: (Calculator) Unit 1

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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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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)		17 000	1	B1 for 17000 (accept in words)
	(b)		150	1	B1 for 150 (accept in words)
	(c)		45.8	1	B1 cao
2	(a)		77	1	B1 cao
	(b)		212	1	B1 cao
	(c)		3 numbers less than 12 adding to 25	2	M1 for writing 3 numbers less than 12 and adding. A1 for 3 numbers less than 12 which add to 25
3	(a)		729, 1299, 2750, 3520, 4992	1	B1 cao
	(b)		$\frac{2}{5}, \frac{1}{2}, \frac{3}{5}, \frac{3}{4}$	3	M1 for correct method to change two fractions to marks or percentages or fractions with a common denominator or decimals with at least one conversion correct. M1 for correct method to change two fractions to marks or percentages or fractions with a common denominator or decimals with all conversions correct A1 for the correct order.
4	(a)		Correct bar chart	3	B1 for labelling bars B2 for four correct bars drawn (B1 for two or three correct bars drawn)
	(b)		Choc bar wrapper	1	B1 ft from their graph or the frequency table

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Question		**Working**	**Answer**	**Mark**	**Notes**
5	(a) (i)		Miles/km	1	B1 for miles or kilometres oe (do not accept m)
	(ii)		pounds/kg	1	B1 for pounds or kilograms oe
	(b)(i)		2m/ 6ft 6 in	1	B1 for 1.9 – 2.1m or 6ft 4 in to 6ft 8 in oe
	(ii)		300 - 400ml or $\frac{1}{2}$ pint	1	B1 for answer in range 300 – 400 ml oe or ½ pint, accept 130 – 170 ml
*6		15.95 + 4 × 1.35 + 7.20 = 28.55 45.75 – 28.55	Profit of £17.20	4	M1 for 4 × £1.35 or sight of 5.40 M1 for 15.95 + "5.40" + 7.20 or sight of 28.55 M1 for 45.75 – "28.55" C1 (dep on M1) for statement of profit of £17.20 with associated accurate calculations (SC B1 for statement of profit of £21.25)
7	(a)(i)		(3, 5)	1	B1 cao
	(ii)		(5, 0)	1	B1 cao
	(b)		Cross at (7, 3)	1	B1 for cross at (7, 3)
	(c)		(4, 2.5)	2	B1 for x coordinate 4 B1 for y coordinate 2.5 oe
8	(i)		Diameter drawn	1	B1 for drawing a diameter.
	(ii)		Sector identified	1	B1 for identifying the sector of the circle.

Question		Working	Answer	Mark	Notes
*9	(a)		Appropriate correct graph drawn	4	B1 for key or suitable labels to identify London and Rome B1 for diagram(s) or chart(s) set up for comparison e.g. dual bar chart, line graph etc. B1 for correct heights for temperatures in London and Rome, dependent on a linear scale C1 for fully correct diagram or chart to include all 6 months labelled and temperature axis correctly scaled and labelled
10	(a)	$(4 + 6) \times 5.5 = 10 \times 5.5 = 55$ $2 \times 2.75 = 5.50$ $55 + 5.50$ **Or** $4 \times 5.50 + 6 \times 5.50 + 2 \times 2.75$ $22 + 33 + 5.50$ **Or** $4 + 6 = 10$ adults 2 children $(10 + 2 \div 2) \times 5.50$	60.50	4	M1 for totalling adults or children M1 for multiplying their adult's total by 5.50 or their children's total by 2.75 M1 (dep M1) for adding their adult total amount and their children's total amount A1 for 60.5(0) **Or** M1 for finding the cost of one trip e.g. 4×5.50 or $6 \times 5.50 + 2 \times 2.75$ M1 finding the cost of both individual trips e.g. 4×5.50 and $6 \times 5.50 + 2 \times 2.75$ M1 for "4×5.50" + "$6 \times 5.50 + 2 \times 2.75$" A1 for 60.5(0) **Or** M1 for totalling adults or children M1 for realising that 2 children is 1 adult cost M1 for $(10 + 2 \div 2) \times 5.50$ A1 for 60.5(0)
	*(b)	Leave Flatford 11 00 or 12 30 Arrive Dedham 11 30 or 13 00 Finish lunch 13 00 or 14 30 Leave Dedham 13 15 or 14 45 Arrive Flatford 13 45 or 15 15	Leave Flatford 11 00 Arrive Dedham 11 30 (Finish lunch 13 00) Leave Dedham 13 15 Arrive Flatford 13 45	4	B1 for leaving Flatford at 11 00 or 12 30 B1 for arriving at Dedham at 11 30 or 13 00 B1 ft for leaving Dedham at 13 15 or 14 45 C1 (dep on first B1 awarded) for correct timetable with allowance of $1\frac{1}{2}$ hours for lunch and correct arrival time back at Flatford

Question		Working	Answer	Mark	Notes
11	(a)(i)	180 –117	63	2	B1 cao
	(ii)				C1 for <u>angles</u> in a <u>straight line</u> add up to <u>180º</u>
	(b)(i)	360 – 48	312	2	B1 cao
	(ii)				C1 for <u>angles</u> at a <u>point</u> add to <u>360º</u>
12	(a)	(150 + 100 + 200 + 100 + 300 + 100 + 400 + 300 + 150 + 200) ÷ 10	200	2	M1 for adding to add all amounts and dividing by 10 A1 cao
	(b)	100, 100, 100, 150, 150, 200, 200 ,300, 300, 400 (150 + 200) ÷ 2	175	2	M1 for ordering and selecting 150 and 200 A1 cao
	(c)		100	1	B1 cao
	(d)		300	2	M1 for 400 – 100 or 100 to 400 A1 cao
13	(i)		160	1	B1 for 158 – 162
	(ii)		280	1	B1 for 275 – 285
	(iii)		16	1	B1 cao

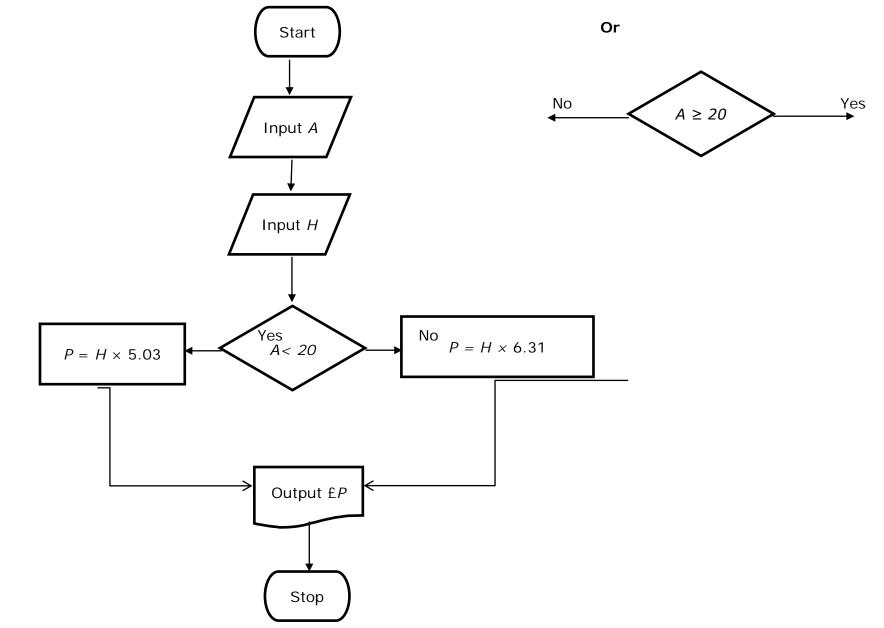| Question		Working	Answer	Mark	Notes
14	(a)	$\dfrac{4}{100} \times 300 \times 2$	24	3	M1 for $\dfrac{4}{100} \times 300$ oe M1 for "12" $\times 2$ A1 cao **Or** M1 for $\dfrac{PRT}{100}$ oe M1 for substituting into the formula A1 cao
	(b)	$\dfrac{20}{100} \times 450$	90	2	M1 for $\dfrac{20}{100} \times 450$ oe A1 cao
15		See end	Correct flow chart	4	B1 for including decision box for $A < 20$ oe B1 for including box for calculating total pay when $A < 20$ e.g. $P = H \times 5.03$ or when $A \geq 20$, e.g. $P = H \times 6.31$ B1 for output box with Output £P oe C1 for fully correct flowchart with all boxes the correct shape
16			12	5	M1 for writing a correct expression for the perimeter of the square or the rectangle e.g. $4(x + 6)$ or $10x + 20$ or for the semi-perimeter M1 for equating the two (semi) perimeters correctly M1 for resolving the fraction e.g. $20x + 120 = 30x + 60$ or for rearranging the equation to the form. $a = bx + c$ M1 for $10x + 60 = 120$ or $24 = 2x + 12$ or $x = 6$ A1 cao
17		$\dfrac{65^2}{4 \times \pi}$	336	2	M1 for $\dfrac{65^2}{4 \times \pi}$ or 4225 written as a numerator or 12.56(637…) written as a denominator A1 for answer in range 336 to 337

Question		Working	Answer	Mark	Notes
18	(a)	400 × 1.20	480	2	M1 for 400 × 1.2 oe A1 cao
	(b)	150 ÷ 1.2 = 125 125 × 1.56 **Or** 1.56 ÷ 1.2 = 1.3 150 × 1.3	195	3	M1 for 150 ÷ 1.2 or 125 M1 for "125" × 1.56 A1 cao **Or** M1 for 1.56 ÷ 1.2 (= 1.3) M1 for 150 × "1.3" A1 cao
19		12 × 10 – 10 × 8 120 – 80 **Or** (12 – 10) ÷ 2 × 12 × 2 = 24 (10 – 8) ÷ 2 × 8 × 2 = 16 24 + 16 **Or** (12 – 10) ÷ 2 × 10 × 2 = 20 (10 – 8) ÷ 2 × 10 × 2 = 20 20 + 20 **Or** (12 – 10) ÷ 2 × 12 × 2 = 24 (10 – 8) ÷ 2 × 10 × 2 = 20 24 + 20 – 4	40	4	M1 for 12 × 10 or 120 M1 for 10 × 8 or 80 M1 for 12 × 10 – 10 × 8 A1 cao **Or** M1 for (12 – 10) ÷ 2 × 12 × 2 (= 24) M1 for (10 – 8) ÷ 2 × 8 × 2 (= 16) M1 for "24" + "16" A1 cao **Or** M1 for (12 – 10) ÷ 2 × 10 × 2 (= 20) M1 for (10 – 8) ÷ 2 × 10 × 2 (= 20) M1 for "20" + "20" A1 cao **Or** M1 for (12 – 10) ÷ 2 × 12 × 2 (= 24) M1 for (10 – 8) ÷ 2 × 10 × 2 (= 20) M1 for 24 + 20 – 4 A1 cao

Question		Working	Answer	Mark	Notes
20		Plain $5 \times 48 + 24$ = 264 S & V $4 \times 48 + 54$ = 246 BBQ $3 \times 48 + 18$ = 162 Amount left Plain $264 - 162$ = 102 S & V $246 - 162$ = 84 **Or barbecue first** BBQ sold is $3 \times 48 + 18 = 162$ Plain left = $5 \times 48 + 24 - 162 = 102$ S & V left = $4 \times 48 + 54 - 162 = 84$ **Or boxes sold** $(5 - 3) \times 48 + 24 - 18 = 102$ Plain $(4 - 3) \times 48 + 54 - 18 = 84$ S & V	Plain 102 S & V 84	4	M1 for one of $5 \times 48 + 24$ (= 264) or $4 \times 48 + 54$ (= 246) or $3 \times 48 + 18$ (= 162) M1 for all of $5 \times 48 + 24$ (= 264) and $4 \times 48 + 54$ (= 246) and $3 \times 48 + 18$ (= 162) M1 for $264 - "162"$ (= 102) or $246 - "162"$ (= 84) A1 cao **Or** M1 for correct method to work out number of barbecue sold e.g. $3 \times 48 + 18$ (= 162) M1 for correct method to calculate number of packets left for one flavour e.g. $5 \times 48 + 24 - "162"$ or $4 \times 48 + 54 - "162"$ M1 for correct method to calculate number of packets left for both flavours e.g. $5 \times 48 + 24 - "162"$ or $4 \times 48 + 54 - "162"$ A1 cao **Or** M1 for $(5 - 3) \times 48$ or $(4 - 3) \times 48$ M1 for $(5 - 3) \times 48 + 24 - 18$ or $(4 - 3) \times 48 + 54 - 18$ M1 for $(5 - 3) \times 48 + 24 - 18$ and $(4 - 3) \times 48 + 54 - 18$ A1 cao
21	(a)		(4, 2300) plotted	1	B1 cao
	(b)		3200	2	M1 for drawing a suitable line of best fit A1 for answer in range 3000 – 3400

Question		Working			Answer	Mark	Notes
22	*(a)				Explanation	1	C1 for all angles of the triangles are equal or two angles are equal (so all three are equal)
	(b)				7.5	2	M1 for 15 ÷ 2 oe A1 cao **Or** M1 for $\frac{3}{4} \times 10$ oe A1 cao
23	(a)				17.50	1	B1 for 17.5(0)
	(b)				1.25	1	B1 cao
	(c)				Comparison made	3	M1 for drawing line for Saws to You through the origin or for line with gradient 3 C2 for a correct line and making a statement of which is cheaper up to 5 days and which is cheaper for 6 days or more (C1 (depM1) for making any correct comparison from their graphs) **Or** M1 for any three correct costs for Saws to You C2 for correct figures for 5 days and 6 days for both companies and making a statement of which is cheaper up to 5 days and which is cheaper for 6 days or more (C1 (depM1) for making any correct comparison from their calculations for the two companies)

Table for question 23(c):

Days	SAV	STY
3	13.75	9
4	15.00	12
5	**16.25**	**15**
6	**17.50**	**18**
7	18.75	21

Question	Working	Answer	Mark	Notes
24	$2(x + x + 10) = 40$ $4x + 20 = 40$ $4x = 20$ $x = 5$ **Or** $2(x + x - 10) = 40$ $2x - 10 = 20$ $2x = 30$ $x = 15$ **Or** <table><tr><td></td><td>**Amy**</td><td>**Beth**</td><td>**Chris**</td></tr><tr><td>$x = 2$</td><td>2</td><td>12</td><td>28</td></tr><tr><td>$x = 4$</td><td>4</td><td>14</td><td>36</td></tr><tr><td>$x = 6$</td><td>6</td><td>16</td><td>44</td></tr><tr><td>$x = 5$</td><td>5</td><td>15</td><td>40</td></tr></table>	5	4	M1 for algebraic method to set up Amy and Beth's ages as x and $x + 10$ M1 for setting up the equation $2(x + x + 10) = 40$ oe M1 for $4x + 20 = 40$ A1 cao **Or** M1 for algebraic method to set up Beth and Amy's ages as x and $x - 10$ M1 for setting up the equation $2(x + x - 10) = 40$ oe M1 for $4x - 20 = 40$ A1 cao **Or** M1 for establishing Amy is x and Beth is $x + 10$ (can be implied by one correct trial) M1 for strategy to involve 3 trials with correct ages (totals not needed) or 2 trials with correct ages and totals M1 for a trial where Chris' age < 40 **and** trial where Chris' age > 40 or 5, 15 and 40 identified as the answer A1 cao

Question 15.

Start

Input *A*

Input *H*

Yes
A< 20

No
P = H × 6.31

P = H × 5.03

Output £*P*

Stop

Or

No ← *A ≥ 20* → Yes

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

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Question		**Modification**	**Notes**
Q02		Picture removed	
Q04		2 cm grid	
Q07		$2\frac{1}{2}$ cm grid	
Q07	(b)	'with a cross x' removed	
Q08		Rectangle put on the right hand side	
Q09		Vertical axis $15 \times 1\frac{1}{2}$ cm Horizontal axis $12 \times 1\frac{1}{2}$ cm	
Q10		Table – remove row for trip number 8	
Q13	(i)	Just circle given with °C in centre 100, 150, 200 marked off around $\frac{2}{3}$ of the circumference with 5 divisions for each 50	

PAPER: 5AM1F_01				
Question		**Modification**	**Notes**	
Q13	(ii)	Straight line labelled 100 to 400 in hundreds 1 cm space – spaces marked		
Q13	(iii)	Handle and pourer removed Markings extended outside of jug		
Q16		x changed to y 2y + 5 moved to left of diagram Square is shaded Shading removed from rest of diagram		
Q19		Photograph picture removed The word 'photograph' inserted Measurements put on the diagram		
Q21		$1\frac{1}{2}$ cm grid Crosses changed to filled in circles		
Q21	(a)	2300 changed to 2500		
Q23		$1\frac{1}{2}$ cm grid		