Mark Scheme (Results)

Summer 2014

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

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

Question		Working	Answer	Mark	Notes
1	(a)		150	2	M1 for $2\frac{1}{2} \times 60$ or $60 + 60 + 30$ oe A1 cao
	(b)		180	1	B1 cao
	(c)		2.2	1	B1 cao
	(d)		8	1	B1 cao
2	(a)	$10.95 + 5.50 =$	16.45	1	B1 cao
	*(b)	$2 \times 10.95 + 2 \times 5.50 =$ $21.90 + 11 = 32.90$ $32.90 - 25 = £7.90$	£7.90 with explanation	3	M1 for $2 \times 10.95 + 2 \times 5.50$ (= 32.90) M1 for using £25 in a subtraction or a comparison from their separate ticket total C1 for £7.90 with evidence of 32.90 from correct working
3	(a)		500	1	B1 for 500 (accept in words or digits or a combination as long as the meaning is clear)
	(b)		12 400 000	1	B1 cao
	(c)		7 tenths or $\frac{7}{10}$ or 70 cm	1	B1 for 7 tenths or $\frac{7}{10}$ or 70 cm (do not accept 'tenths' or 0.7)
	(d)		5 05 pm	1	B1 for 5 05 pm or five past five pm

Question		Working	Answer	Mark	Notes
4	(a)	$20 - 10 + 25 - 15 + 17 - 5 + 12$ OR $20 + (25 + 17 + 12) - (10 + 15 + 5)$	44	3	M1 for a correct addition or subtraction that starts with 20 people or a method to work out the net gain in passengers for one stop M1 for a complete method A1 cao OR M1 for $25 + 17 + 12$ or $10 + 15 + 5$ M1 for a complete method A1 cao
	(b)		20	2	M1 for $5.6 + 3.4 + 6.7 + 4.3$ A1 cao
	(c)	$4.3 + 5.6 = 9.9$ $6.7 + 3.4 = 10.1$ $10.1 - 9.9$	0.2	2	M1 for $4.3 + 5.6$ (= 9.9) and $6.7 + 3.4$ (= 10.1) A1 cao
5	(a)		A	1	B1 cao
	(b)		$\dfrac{1}{12}$	1	B1 cao
	(c)		$\dfrac{5}{12}$	2	B2 oe (B1 for $\dfrac{x}{12}$ where $x < 12$ or $\dfrac{5}{y}$ where $y > 5$ or $\dfrac{4}{12} + \dfrac{1}{12}$)

Question		Working	Answer	Mark	Notes
6			23	4	M1 for 5×365 M1 for "5×365" $\div 80$ A1 for 22.8(125) B1 ft for rounding up their answer to the next whole number OR M1 for $80 \div 5$ (= 16) M1 for $365 \div$ "16" A1 for = 22.8(125) B1 ft for rounding up their answer to the next whole number
7		BEF, BET, BMF, BMT SEF, SET, SMF, SMT	8 correct combinations	2	B2 for all 8 combinations with no incorrect combinations -- ignore any repeats (B1 for at least 4 correct combinations -- ignore any incorrect combinations and any repeats)
8	(a)		200	1	B1 cao
	(b)		320	2	M1 for 160×2 A1 cao
	(c)		15	2	M1 for $\dfrac{5(59-32)}{9}$ A1 cao

Question		Working	Answer	Mark	Notes
9	*(a)(i)		140°	3	M1 for 180 – 110 (= 70) A1 for 140 C1 for <u>exterior angle</u> of a triangle is <u>equal</u> to the sum of the <u>interior opposite angles</u> **and** <u>angles</u> in a <u>straight line</u> add to <u>180</u> OR M1 for 180 – 110 (= 70) and 180 – ("70" + 70) A1 for 140 C1 for <u>angles</u> in a <u>straight line</u> add to <u>180</u> **and** <u>angles</u> in a <u>triangle</u> add to <u>180</u>
	(b)		110 Corresponding angles are equal	2	B1 for 110 B1 for <u>corresponding angles</u> are equal
10	(a)		× at $\frac{1}{2}$	1	B1 for cross at $\frac{1}{2}$
	(b)		× at 0	1	B1 for cross at 0
	(c)		× near $\frac{1}{4}$	1	B1 for cross near $\frac{1}{4}$
11			4700	3	M1 for attempting to count the squares or for sight of a number in the range 40 to 54 M1 (dep) for multiplying any number of squares by 100 A1 for an answer in the range 4500 to 4900

Question		Working	Answer	Mark	Notes
*12		$\dfrac{1}{2} = 0.5$ $\dfrac{3}{4} = 0.75$ $0.5 + 0.4 + 0.75 = 1.65$ 1.65 is smaller than 1.8 OR $0.4 = \dfrac{4}{10}$ $\dfrac{1}{2} + \dfrac{2}{5} + \dfrac{3}{4} = \dfrac{33}{20}$ $1\dfrac{4}{5} = \dfrac{36}{20}$	No with reasons	4	M1 for changing fractions to decimals (at least one correct) M1 for "0.5" + 0.4 + "0.75" (= 1.65) A1 for 1.65 C1 ft (dep on M1) for a correct decision with a comparison made of "1.65" and 1.8 OR M1 for changing decimal to fraction M1 for $\dfrac{1}{2} + \dfrac{2}{5} + \dfrac{3}{4}$ (= $\dfrac{33}{20}$) A1 for $\dfrac{33}{20}$ oe C1 ft (dep on M1) for a correct decision with a comparison made of "$\dfrac{33}{20}$" and $\dfrac{36}{20}$
13	(a)		10	1	B1 cao
	(b)		10 15	1	B1 oe
	(c)		Travel graph	2	M1 for horizontal line joining (10 15, 16) to (10 45, 16) or for joining their (10 45, 16) to (12 00, 0) [Note: A single line from (10 15, 16) to (12 00, 0) gets M0] A1 cao
	(d)	16 ÷ 1.25	12.8	2	M1 for 16 ÷ "1.25" oe A1 cao

PAPER: 5AM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
14	(a)		135	3	M1 for $2 \times 15 \times 1$ or $2 \times 15 \times 3.5$ or $3.5 + 3.5 + 1 + 1$ M1 for $2 \times 15 \times 1 + 2 \times 15 \times 3.5$ with no other areas or $15 \times (3.5 + 3.5 + 1 + 1)$ A1 cao
	(b)		3125	4	M1 for 500×100 (= 50 000) M1 for $5 + 5 + 5 + 1$ (= 16) M1 for '50 000' ÷ '16' A1 cao
15	(a)(i)		053	3	B1 within 2º tolerance
	(ii)	6.4×5	32		M1 for 6.4×5 (with '6.4' given within 2 mm tolerance) A1 31 to 33
	(b)		*Q* marked	4	M1 for 17.5×2 (= 35) M1 for "35" ÷ 5 A1 for *LQ* = 7 cm within 2 mm tolerance B1 for correct bearing of 140º within 2º tolerance

Question		Working	Answer	Mark	Notes
PAPER: 5AM2F_01					
16		25 ÷ 2.5 = 10 15 ÷ 2.5 = 6 10 ÷ 2.5 = 4 10 × 6 × 4 = OR 25 × 15 × 10 = 3750 2.5 × 2.5 × 2.5 = 15.625 3750 ÷ 15.625 =	240	3	M1 for 25 ÷ 2.5 (= 10) or 15 ÷ 2.5 (= 6) or 10 ÷ 2.5 (= 4) M1 (dep) for "10" × "6" × "4" A1 cao OR M1 for 25 × 15 × 10 (= 3750) or 2.5 × 2.5 × 2.5 (= 15.625) M1 (dep) for "3750" ÷ "15.625" A1 cao
17			Region shaded	4	B1 for bisector of angle *ABE* B1 for line drawn parallel to *AD* and 5 cm from *AD* B1 for arc of circle drawn centre *E* with radius 6 cm B1 ft for shading a region to the right of their vertical line **and** above their angle bisector **and** below their arc
*18		225 ÷ 175 = 1.28(57....) 275 ÷ 250 = 1.10 <u>375 ÷ 300 = 1.25</u> 175 ÷ 225 = 0.7(77...) 250 ÷ 275 = 0.9(09...) <u>300 ÷ 375= 0.8</u>	Medium with reasons	4	M1 for a method that results in at least two values that can be used to compare two cups M1 for a complete method that results in values that can be used to compare the three cups A1 for all correct values that are used for a comparison C1 ft (dep on M2) for comparison of their values with a correct conclusion

PAPER: 5AM2F_01				
Question	**Working**	**Answer**	**Mark**	**Notes**
19	Flour: 300 ÷ 12 = 25 3000 ÷ 25 = 120 Butter 150 ÷ 12 = 12.5 900 ÷ 12.5 = 72 Sugar 150 ÷ 12 = 12.5 1000 ÷ 12.5 = 80 Fruit 100 ÷ 12 = 8.333 800 ÷ 8.333 = 96 Eggs 1÷ 12 = 0.0833... <u>12 ÷ 0.0833... = 144</u> Flour: 3000 ÷ 300 = 10 12 × 10 = 120 Butter 900 ÷ 150 = 6 12 × 6 = 72 Sugar 1000 ÷ 150 = 6.67 12 × 6.67 = 80 Fruit 800 ÷ 100 = 8 12 × 8 = 96 Eggs 12 ÷ 1 = 12 12 × 12 = 144	72	4	M1 for a correct method to either find the amount of one ingredient required for one bun, e.g. 300 ÷ 12 (= 25 g), 150 ÷ 12 (= 12.5 g), etc. or for a correct method to find the number of groups of 12 buns that are possible with the amount of one ingredient available, e.g. 3000 ÷ 300 (= 10), 900 ÷ 150 (= 6), etc. M1 (dep) for a correct method for considering all ingredients in this way M1 for a fully complete and correct method leading to the number of buns that can be made from each ingredient. A1 for 72 cao

Question	Working	Answer	Mark	Notes
*20		13	4	M1 for a correct algebraic representation showing a correct relationship between at least two ages, eg (Narinder =) x, (Rashmi =) $x + 3$ Note: $x + 3$ or $2(x + 3)$ can imply Narinder = x. M1 (dep on M1) for deriving an algebraic inequality (or equality) correct from their three algebraic expressions eg. $x + x + 3 + 2(x + 3) <$ (or =) 50 M1 (dep on M2) for a complete and correct method to simplify their inequality (or equality) to e.g. $4x < 41$ $(4x = 41)$ C1 (dep on previous M1) for $x < 10.25$ $(x = 10.25)$ and a statement identifying Rashmi as 13 years of age, cao OR M1 for one correct trial showing total of ages under 50 M1 for one correct trial showing total of ages over 50 M1 for identifying 10, 13 and 26 as their ages with a sum of 49 years. C1 (dep on previous M1) for fully correct arithmetic and a statement identifying Rashmi as 13 years of age, cao
21		46.20	5	M1 for 660×4 (= 2640) M1 for "number of points" ÷ 10 (= 264) M1 for "264" × 20p (= £52.80) M1 (dep on M2) for £99 – "£52.80" A1 for 46.2(0) OR M1 for £99 ÷ 20p (= 495) M1 for "495" × 10 (= 4950) points needed M1 for 660×4 (= 2640) M1 (dep on M2) for ("4950 – 2640") ÷ 10 × £0.20 A1 for 46.2(0)

PAPER: 5AM2F_01					
Question		Working	Answer	Mark	Notes
22	(a)	$1 - \dfrac{3}{80} =$	$\dfrac{77}{80}$	1	B1 $\dfrac{77}{80}$ oe
	(b)	$0.05 \times 80 =$	4	2	M1 for 0.05×80 or $\dfrac{4}{80}$ A1 for 4 oe (e.g. 4 out of 80)
23			18	3	M1 for total claimed is 150×1200 (= £180 000) M1 for "180 000" ÷ 10 000 A1 cao OR M1 for writing probability of a claim as $\dfrac{150}{10000}$ M1 for "$\dfrac{150}{10000}$" × 1200 A1 cao OR M1 for 10 000 ÷ 150 = 66.66 ...) M1 for 1200 ÷ "66.66 ..." A1 cao

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**
Q4	Join places with straight lines	Standard mark scheme
Q9	Top diagram is removed Wording changed: "Perfect Fotos' art gallery has a logo" Diagram kept for part (a) 'It shows part of the logo' Diagram kept for part (b) t changed to y.	Standard mark scheme
Q10	Probability scales made longer	Standard mark scheme
Q11	2 cm grid. 'centimetre' removed from text Wording inserted "Each square on the grid represents 100 m^2	Standard mark scheme
Q12	Just cross sections of paint tins given	Standard mark scheme
Q13	2 cm grid. Right axis is labelled	Standard mark scheme

PAPER: 5AM2F_01			
Question		**Modification**	**Notes**
Q14	(a)	Model supplied as well as diagram	Standard mark scheme
	(b)	3 models supplied as well as diagrams Wording changed	Standard mark scheme
Q15		*N* lines extended to 10 cm. *PL* = 9.5 cm Angle *NPL* = 55 degrees	
	(a)i		B1 for answer in range 50 to 60
	ii		M1 for 9.5 × 5 (with '9.5 given within 5 mm tolerance) A1 45 to 50
	(b)		M1 for 17.5 × 2 (= 35) M1for "35" ÷ 5 A1 for *LQ* = 7 cm within 5 mm tolerance B1 for correct bearing of 140º within 5º tolerance
Q16		Model supplied as well as diagram	Standard mark scheme
Q18		Diagrams removed – information given instead	Standard mark scheme