

Mark Scheme (Results)

Summer 2012

GCSE Mathematics Linked Pair Pilot
Application of Mathematics (2AM01)
Foundation (Calculator) 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, 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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

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Question		Working	Answer	Mark	Notes
1	(a)		2000	1	B1 for 2000 or two thousand
	(b)(i)		6300000	2	B1 cao
	(ii)		300000		B1 for 300000 or 300 thousand or three hundred thousand
	(c)		21.45	1	B1 for 21.45 or 21 45 or 21:45
2	(a)	$3.85 + 2.25$	6.10	2	M1 for $3.85 + 2.25$ or 6.1 seen A1 for 6.10 (correct money notation)
	(b)	$20 - (3.85 + 3 \times 3.40)$ $20 - 3.85 - 10.20$ OR $20 - 3.85 = 16.15$ $16.15 - 3.40 = 12.75$ $12.75 - 3.40 = 9.35$ $9.35 - 3.40$	5.95	3	M1 for $3.85 + 3 \times 3.40 (=14.05)$ M1 for $20 - "14.05"$ A1 cao OR M1 for one subtraction from 20 of 3.85 or 3.40 M1 for fully correct method A1 cao
3	(a)		Even	1	B1 cao
	(b)		Unlikely	1	B1 cao
	(c)(i)		× at 0	2	B1 cao
	(ii)		× at 1		B1 cao

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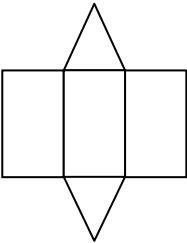
Question		Working	Answer	Mark	Notes
4	(a)	$23 + 20 = 43$; $72 - 43$ OR $72 - 23 = 49$; $49 - 20$	29	3	M1 for $23 + 20 (=43)$ or $72 - 23 (=49)$ M1 for $72 - '43'$ or $'49' - 20$ A1 cao
	(b)	$162 \div 60$	2 hours 42 mins	3	M1 for 2.25×72 or 135×72 A1 for 162 or 9720 A1 ft for correct conversion to hours and minutes
5			25	2	B2 for answer in the range 24 to 26 (B1 for answer in the range 23 to 27)
6	(a)	$P = 7 + 8 + 9 + 10 + 10 = 44$ $J = 7 + 8 + 9 + 9 + 10 = 43$ $44 - 43$ OR Same 7 and 8 $(20 + 9) - (10 + 18)$ OR They both score 7, 8, 9 and 10 P gets a 10 and J gets a 9 with 5 th shot: $10 - 9$	1	3	M1 for $7 + 8 + 9 + 10 + 10 (= 44)$ or $7 + 8 + 9 + 9 + 10 (= 43)$ M1 for $'44' - '43'$ A1 cao OR M1 for $20 + 9$ or $10 + 18$ M1 for $'29' - '28'$ A1 cao OR M1 for statement that they both score 7, 8, 9, 10 M1 for P gets 10, J gets 9 A1 cao
	(b)	e.g. 7, 7, 7, 9, 9; 10, 10, 10, 9; 7, 7, 8, 8, 9; 7, 7, 7, 8, 10	5 scores total 39	1	M1 for any combination of scores totalling 39 A1 for correct diagram

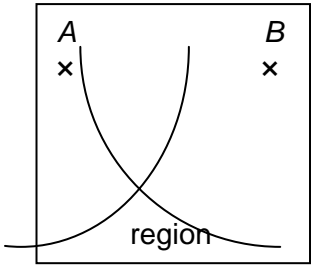
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Question	Working	Answer	Mark	Notes
7	$300 \div 25$ or $3 \div 0.25 = 12$ $500 \div 25$ or $5 \div 0.25 = 20$ 12×20	240	3	M1 for $300 \div 25$ or $3 \div 0.25$ oe OR $500 \div 25$ or $5 \div 0.25 = 20$ oe M1 for '12' \times '20' A1 cao OR M1 for $0.25 \times 0.25 (=0.0625)$ or $3 \times 5 (=15)$ or $25 \times 25 (=625)$ or $300 \times 500 (=150000)$ M1 for " $15 \div 0.0625$ " or " $150000 \div 625$ " A1 cao
8	(a)	Straight line graph from (0, 0) to (10, 45)	2	M1 for at least one correct point plotted < 5 gall AND at least one correct point plotted ≥ 5 gall or a graph that passes through. A1 for line from (0, 0) to (10, 45)
	(b)	6.5 to 6.8	2	M1 for $30 \div 4.5$ or evidence of using the graph from 30 litres (ft) A1 for answer in the range 6.5 to 6.8
	(c)	From graph or 4.5×60	2	M1 for using a correct reading from the graph at a factor of 60 gallons or 4.5×60 or 27 seen A1 cao

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Question	Working	Answer	Mark	Notes	
9	(a)		2	1	B1 for $8 \div 4$ or $12 \div 6$ oe or 2
	(b)	$5 \times 6 = 30$ $2 \times 20 + 2 \times 30$ OR $2 \times 4 + 2 \times 6 = 20$ 5×20	100	3	M1 for use of the scale factor of 5 or 30 seen M1 for $2 \times (20 + '30')$ or $2 \times 20 + 2 \times n$ oe OR M1 for $2 \times 4 + 2 \times 6 (= 20)$ M1 for $5 \times '20'$ A1 cao SC B1 for 88
	(c)	eg. $5 \times 6 + 1 \times 4$ OR $34 - 6 = 28$ $28 - 4 = 24$ $24 = 4 \times 6$ or 6×4	1A and 5B's or 4A's and 3B's or 7A's and 1B	3	M1 for a combination of A and B M1 for trying to make up 34 with multiples of 4 & 6 by subtracting from 34 to give zero A1 for a correct combination SC B2 for a correct combination written the wrong way around.
10	(a)	$680 - 500 = 180$ $180 \div 72$	90	2	M1 for $20 + 10 \times 7$ A1 cao
	(b)	$(180 - 30) \div 15$	10	3	M1 for $180 - 30 (=150)$ or for $30 + n \times 15$ ($n \geq 1$) or $\div 15$ M1 for $('180 - 30 ') \div 15$ or for 30 + repeated addition of 15 up to 180 A1 cao

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Question		Working	Answer	Mark	Notes
11	(a)	680 – 500 = 180 180 ÷ 72	2.50	3	M1 for 680 – 500 (= 180) M1 for '180' ÷ 72 (=2.5) A1 cao (do NOT accept 2.5)
	*(b)	72 ÷ 8 = 9 adults 72 + 9 = 81	No with some evidence	4	M1 for 72 ÷ 8 (=9) or adding up groups of 9 M1 for 72 + '9' and 40 × 2 (=80) A1 cao for 81 people on the trip (accept 82 with driver) C1 (dep on M1) ft for "No, with some evidence including use of figures"
12	(a)		2.30 pm	1	B1 cao
	(b)		1 hour	1	B1 for 1 hour or 60 minutes
	(c)		5 pm	1	B1 cao
	(d)		4.5	1	B1 for 4.5 hours oe

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Question		Working	Answer	Mark	Notes
13	(i)	$160 - 90 = 70$; $180 - 90 - 70$ or $180 - 160$	20	3	M1 for $180 - 90 - (160 - 90)$ or $180 - 90 - 70$ or $180 - 160$ oe A1 cao
	(ii)		Geometric reasoning		B1 for <u>angles</u> in a <u>triangle</u> add up to <u>180°</u> or <u>alternate angles</u> are equal
14		$24 \times 1000 =$ OR $4 \times 10 = 40$; $3 \times 10 = 30$; $2 \times 10 = 20$; $40 \times 30 \times 20 =$	$24\,000\text{ cm}^3$	4	M2 for 24×1000 or $4 \times 10 \times 3 \times 10 \times 2 \times 10$ (M1 for 24 or $4 \times 3 \times 2$ or $\times 1000$) A1 for 24 000 B1 for cm^3 (or m^3 if working in metres)
15	(a)	$2.85 \div 3 = 0.95$ $4.80 - (0.95 \times 2)$	2.90	3	M1 for $2.85 \div 3$ or $285 \div 3$ or sight of 0.95 or 95 M1 for $4.80 - ('0.95' \times 2)$ oe A1 for 2.90 (accept 2.9)
	(b)	$480 \div (5 + 3) = 60$ 3×60 5×60	3.00 1.80	3	M1 for $480 \div (5 + 3)$ or 60 seen or at least three multiples of 5:3 M1 for '60' $\times 3$ or '60' $\times 5$ A1 for 3.00 and 1.80 (accept 3, 3.0, 1.8)
16				3	B3 for a fully correct net [B2 for 3 rectangles and 2 triangles (not to correct scale)] B1 for any rectangle or triangle drawn accurately to the correct scale] NB: ignore tabs.

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Question		Working	Answer	Mark	Notes
17	(a)	6.5×20	130	3	B1 for 6.5 (± 2 mm) oe M1 for '6.5' $\times 20$ A1 ft
	(b)			3	M1 for an arc drawn, centre A or B , radius 5 cm M1 for two intersecting correct arcs drawn A1 for identifying the correct region. SC: B2 for two hand drawn arcs within tolerance and region identified SC: B1 for two hand drawn arcs within tolerance only.
18	(a)		1,5, 1,6, 1,7, 1,8, 2,5, 2,6, 2,7, 2,8, 3,5, 3,6, 3,7, 3,8, 4,5, 4,6, 4,7, 4,8	2	B2 for all 16 combinations (accept 1,5 etc. and ignore repeats) (B1 for at least 4 correct combinations)
	(b)	$P(\text{Jean wins}) = \frac{6}{16}$ $\frac{6}{16} \times 80$	30	3	B1 for $P(\text{Jean wins}) = \frac{6}{16}$ oe M1 for ' $\frac{6}{16}$ ' $\times 80$ A1 cao SC B2 for 30/80
19	(a)	$360 - 40$	320	1	B1 for an answer in the range 318 to 322
	(b)			2	M1 for an angle of 40° (allow $38-42^\circ$) from radio mast A1 for position of x , east of Gill's house
	(c)	$\pi \times 8^2$	201	2	M1 for $\pi \times 8^2$ A1 for an answer in the range 199 to 202

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Question		Working	Answer	Mark	Notes
20	(a)	$A = x + 5$	$2x + 5 < 50$	2	M1 for $x + x + 5$ or $x + 5 < 50$ A1 for $x + x + 5 < 50$ or better
	(b)	$2x < 50 - 5$ $x < 22.5$	22	3	M1 for attempt to isolate x or a term in x on one side of an "equation" or "inequality". eg $2x < 50 - 5$ eg $2x + 5 - 5 = 50 - 5$ M1 for $x < 22.5$ oe A1 cao SC B2 for 44 from $x + 5 < 50$ in (a)
21	(a)	$30 \times 5 - 4.9 \times 5^2$	0.95 0.98 0.05 0.95	2	M1 for $1 - 0.02 (= 0.98)$ or $1 - 0.05 (= 0.95)$ A1 for all 4 correct probabilities shown
	*(b)	$0.98 \times 0.95 = 0.931$	Ice town since $0.93 < 0.931$	3	M1 for 0.98×0.95 A1 for 0.931 C1 (dep on M1) for correct comparison, selecting their greater probability of no faults and naming company.

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