



Pearson

# Mark Scheme (Results)

Summer 2017

Pearson Edexcel GCSE  
Linked Pair Pilot in Mathematics  
Methods in Mathematics (2MM01)  
Foundation: (Non-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. 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 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.

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

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: 5MM1F\_01**

<b>Question</b>	<b>Working</b>	<b>Answer</b>	<b>Mark</b>	<b>Notes</b>
1 (a)		2059	1	B1 cao
(b)		Ten thousand five hundred and eight	1	B1 ignore spellings (allow 10 thousand 5 hundred and eight)
(c)		40	1	B1 accept mixture of digits and words for correct answer
(d)		2400	1	B1 cao
(e)		0.017	1	B1 cao
2 (a)		certain	1	B1 cao
(b)		evens	1	B1 cao
(c)		impossible	1	B1 cao

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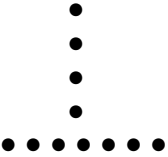
Question	Working	Answer	Mark	Notes
3 (a)  (b)  (c)  (d)		37000  1.964  352  13 , 18	1  1  1  2	B1 cao  B1 cao  B1 cao  M1 for identifying a pair of numbers that sum to 31 or differ by 5 A1 cao  <b>OR</b> M1 for $(31 - 5) \div 2$ (= 13) or $(31 + 5) \div 2$ (= 18) A1 cao  <b>OR</b> M1 for $x + x + 5 = 31$ oe A1 cao
4		1.1	2	M1 for a method to find the halfway point, eg. $(0.8 + 1.4) \div 2$ or a number line such as 0.8 0.9 1.0 1.1 1.2 1.3 1.4 and attempt to find the halfway point A1 for 1.1 oe



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Question	Working	Answer	Mark	Notes
5 (i)		$57^\circ$	3	M1 for $180 - 53 - 70$  A1 for $x = 57^\circ$ (this may be just seen on the diagram in the correct place)
5 (ii)		the sum of the angles on a straight line is $180^\circ$		B1 for the sum of the <u>angles</u> on a straight <u>line</u> is <u>180</u>
6 (a)		$2p$	1	B1 cao
6 (b)		$m^4$	1	B1 cao
6 (c)		$5xy$	1	B1 for $5xy$ (accept $xy5$ )
6 (d)		$6c - 7d$	2	M1 for $6c$ or $-7d$ A1 cao

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Question	Working	Answer	Mark	Notes
7 (a)			1	B1 cao
(b)(i)		23	2	B1 cao
(ii)		Add 3 each time or $3 \times 8 - 1$		C1 for 'add 3' oe or $3 \times 8 - 1$ oe
(c)		12	2	M1 for $(35 + 1) \div 3$ or for listing terms to include 35 A1 cao
8 (a)		correct square	1	B1 for a correct square
(b)		correct square	1	B1 for a correct square
(c)		parallelogram	1	B1 for a parallelogram
*9	$18 + 25 = 43$ $100 - 59 = 41$ (or -41) $6 \times 7 = 42$	the <b>sum</b> of 18 and 25 with supporting evidence	3	M1 for evidence of one correct operation e.g. $18 + 25$ or 43 <b>OR</b> $100 - 59$ or 41 (or $59 - 100$ or -41) <b>OR</b> $6 \times 7$ or 42 A1 43, 41 (or -41) <b>and</b> 42 C1 (dep on M1) ft for a statement identifying the correct calculation (not the biggest answer) from three calculated values

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Question	Working	Answer	Mark	Notes
10 (a)		$x - 3$	1	B1 for $x - 3$ oe
10 (b)		$3x$	1	B1 for $3x$ oe
11 (i)		28 and 32	4	B1 both 28 and 32 needed
11 (ii)		24		B1 cao
11 (iii)		30		B1 cao
11 (iv)		25		B1 cao
12 (a)		4	1	B1 cao
12 (b)		1.5 oe	2	M1 for $4c = 1 + 5$ oe <b>or</b> the clear intention to add 5 to both sides of the equation <b>or</b> $4c = 6$ <b>or</b> $(c = ) 6 \div 4$ <b>or</b> a correct reverse flow diagram eg. $\leftarrow \div 4 \leftarrow +5 \leftarrow$ A1 for 1.5 oe
13		P2, P6, Q2, Q6, R2, R6	2	M1 for at least 4 correct combinations A1 for all 6 correct combinations (no repeats or extras) <b>OR</b> M1 for possibility space with at least 4 combinations shown in table A1 for complete table

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Question	Working	Answer	Mark	Notes
14		5.2	3	M1 for $20 - 9.6$ (= 10.4) M1 for '10.4' $\div 2$ A1 cao <b>OR</b> M1 for $2x + 9.6 = 20$ oe M1 for clear intention to subtract 9.6 from each side A1 cao
15	(a)  (b)  (c)	$\times$ at $\frac{1}{2}$  $\times$ at 1  $\times$ at $\frac{1}{6}$ of the length of the line from 0	1  1  1	B1 cao  B1 cao  B1
16	(a)(i)  (ii) (b) (c)	(4, 1)  (-3, -2) (-4, 0) plotted (-2, 3)	2  1  2	B1 cao  B1 cao B1 cao M1 for $(x=) 1 - 3$ (= -2) or $(y=) 2 + 1$ (= 3) or (-2, 3) plotted A1 for (-2, 3)

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Question	Working	Answer	Mark	Notes																																
17		30	3	M1 for a method to find the area of 1 rectangle e.g. $5 \times 2 (= 10)$ e.g. $10 \times 9 (= 90)$ or for $5 + 5 (= 10)$ as the length of the whole rectangle M1 for a complete method e.g. $(10 - 4) \times 5$ A1 cao																																
18 (a)	$\begin{array}{r} 285 \\ \underline{34 \times} \\ 1140 \\ 8550 \\ \hline 9690 \end{array}$ <table border="1" data-bbox="465 742 853 863"> <tr> <td>×</td> <td>200</td> <td>80</td> <td>5</td> </tr> <tr> <td>30</td> <td>6000</td> <td>2400</td> <td>150</td> </tr> <tr> <td>4</td> <td>800</td> <td>320</td> <td>20</td> </tr> </table> $6000 + 2400 + 150 + 800 + 320 + 20 = 9690$ <table border="1" data-bbox="465 999 837 1214"> <tr> <td></td> <td>2</td> <td>8</td> <td>5</td> <td></td> </tr> <tr> <td>0</td> <td>0/6</td> <td>2/4</td> <td>1/5</td> <td>3</td> </tr> <tr> <td>9</td> <td>0/8</td> <td>3/2</td> <td>2/0</td> <td>4</td> </tr> <tr> <td></td> <td>6</td> <td>9</td> <td>0</td> <td></td> </tr> </table>	×	200	80	5	30	6000	2400	150	4	800	320	20		2	8	5		0	0/6	2/4	1/5	3	9	0/8	3/2	2/0	4		6	9	0		9690	3	M1 for complete method for multiplying 285 by 4 and 30 (condone one arithmetic error in multiplication) M1 (dep) for addition (condone one addition error) A1 cao  <b>OR</b> M1 for complete method for multiplying 200, 80 and 5 by 30 and 4 (condone one arithmetic error in multiplication) M1 (dep) for addition (condone one addition error) A1 cao  <b>OR</b> M1 for complete method for multiplying 2, 8 and 5 by 3 and 4 (condone one arithmetic error in multiplication) M1 (dep) for addition (condone one addition error) A1 cao
×	200	80	5																																	
30	6000	2400	150																																	
4	800	320	20																																	
	2	8	5																																	
0	0/6	2/4	1/5	3																																
9	0/8	3/2	2/0	4																																
	6	9	0																																	

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Question	Working	Answer	Mark	Notes
18 (b)	$\begin{array}{r} 236 \\ 15 \overline{)3540} \\ \underline{30} \\ 54 \\ \underline{45} \\ 90 \\ \underline{90} \\ 0 \end{array}$ $\begin{array}{r} 3540 \\ 1500 - 100 \\ \hline 2040 \\ 1500 - 100 \\ \hline 540 \\ 450 - 30 \\ \hline 90 \\ 30 - 2 \\ \hline 60 \\ 30 - 2 \\ \hline 30 \\ 30 - 2 \\ \hline 0 \\ 200 + 30 + 6 \end{array}$	236	3	<p>M1 for method that establishes <math>35 \div 15 = 2</math> plus a remainder of 5  M1 for a complete method that deals with remainders, condone one arithmetic error  A1 cao</p> <p><b>Alternative</b>  M1 for method that establishes the subtraction of a multiple of 15 or addition of multiples of 15  M1 for a complete method that could lead to the correct answer, condone one arithmetic error  A1 cao</p>

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Question	Working	Answer	Mark	Notes
*19		288	4	M1 for $(180 - 36) \div 2$ (= 72) M1 (dep) for $360 - "72"$ or $180 + "72" + 36$ A1 cao C1 for stating reasons appropriate to their method shown e.g. <u>Angles</u> in a <u>triangle</u> add up to <u>180°</u> Base <u>angles</u> in an <u>isosceles</u> triangle are <u>equal</u> <u>Angles</u> at a <u>point</u> add up to <u>360°</u>
20 (a)		$\frac{4}{9}$	1	B1 cao
(b)		$3\frac{5}{9}$	1	B1 cao
(c)		$\frac{7}{8}$	2	M1 for $\frac{5}{8} + \frac{2}{8}$ or another common denominator used with at least one correct numerator A1 oe

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Question	Working	Answer	Mark	Notes
20 *(d)		$\frac{37}{40}$	3	<p>M1 for writing <math>\frac{9}{10}</math> as <math>\frac{36}{40}</math> <b>or</b> <math>\frac{4}{5}</math> as <math>\frac{32}{40}</math></p> <p>M1 for writing <math>\frac{9}{10}</math> as <math>\frac{36}{40}</math> <b>and</b> <math>\frac{4}{5}</math> as <math>\frac{32}{40}</math></p> <p>C1 for correct conclusion with supportive evidence <b>OR</b></p> <p>M1 for clear attempt to write all 3 fractions with a common denominator (e.g. 80) with at least 1 numerator correct</p> <p>M1 for all 3 fractions correctly written as equivalent fractions with a common denominator</p> <p>C1 for correct conclusion with supportive evidence <b>OR</b></p> <p>M1 for clear attempt to write all 3 fractions as decimals (or %) with at least 1 correct</p> <p>M1 for all 3 fractions correctly written as decimals (or %) for comparison</p> <p>C1 for correct conclusion with supportive evidence <b>OR</b></p> <p>M1 for drawing grid of 40 (or any multiple of 40) squares <b>and</b> shading <math>\frac{3}{5}</math> or <math>\frac{7}{10}</math> or <math>\frac{29}{40}</math> of grid</p> <p>M1 for drawing grid of 40 (or any multiple of 40) squares <b>and</b> shading <math>\frac{3}{5}</math> <b>and</b> <math>\frac{7}{10}</math> <b>and</b> <math>\frac{29}{40}</math> of grid</p> <p>C1 for correct conclusion with supportive evidence</p>



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Question	Working	Answer	Mark	Notes																
21 (i)	<table border="1" data-bbox="465 469 844 611"> <tr> <td>×</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>2</td> <td>4</td> <td>6</td> <td>8</td> </tr> <tr> <td>3</td> <td>6</td> <td>9</td> <td>12</td> </tr> </table>	×	2	3	4	1	2	3	4	2	4	6	8	3	6	9	12	$\frac{2}{9}$	5	<p>M1 for identifying there are 9 possible outcomes or <math>\frac{1}{3} \times \frac{1}{3}</math>  M1 for clearly identifying the two required outcomes, (1, 4) and (2, 2) or <math>\frac{1}{3} \times \frac{1}{3} + \frac{1}{3} \times \frac{1}{3}</math>  A1 for <math>\frac{2}{9}</math> oe</p>
×	2	3	4																	
1	2	3	4																	
2	4	6	8																	
3	6	9	12																	
(ii)		$\frac{3}{9}$		<p>M1 for identifying the 3 correct outcomes (or at least 2 with no more than one incorrect)  A1 for <math>\frac{3}{9}</math> oe</p>																

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<b>Question</b>	<b>Working</b>	<b>Answer</b>	<b>Mark</b>	<b>Notes</b>
22		88 cm <sup>2</sup>	5	M1 for a correct method to find the area of a relevant rectangle. M1 for a correct method to find the area of a relevant triangle. M1 for a complete method to find the total area A1 cao B1 for cm <sup>2</sup>  OR  M2 for splitting the shape into two trapeziums and using a correct method to find the area of a trapezium M1(dep) for 2 × 'area of trapezium' A1 cao B1 for cm <sup>2</sup>
23		342	3	M1 for method to find probability of Tails, eg. 1 - 0.43 (= 0.57) M1 for "0.57" × 600 A1 cao

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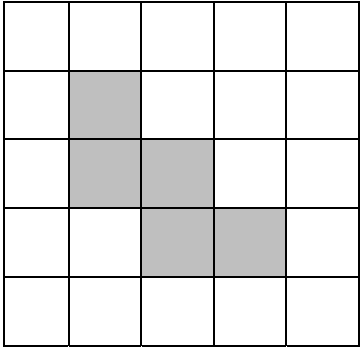
Question	Working	Answer	Mark	Notes												
24	<table border="1" data-bbox="465 316 757 391"> <tr> <td><math>x</math></td> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> </tr> <tr> <td><math>y</math></td> <td>-4</td> <td>-1</td> <td>2</td> <td>5</td> <td>8</td> </tr> </table>	$x$	-2	-1	0	1	2	$y$	-4	-1	2	5	8	$y = 3x + 2$ drawn	4	<p><b>(Table of values)</b>            C1 for axes scaled and labelled (condone zero omitted at origin)            M1 for at least 2 correct attempts to find points by substituting values of <math>x</math>.            M1 ft for plotting at least 2 of their points (any points plotted from their table must be plotted correctly)            A1 for correct line</p> <p><b>(No table of values)</b>            C1 for axes scaled and labelled (condone zero omitted at origin)            M2 for at least 2 correct points (and no incorrect points) plotted OR            line segment of <math>y = 3x + 2</math> drawn (ignore any additional incorrect segments)            (M1 for at least 3 correct points with no more than 2 incorrect points)            A1 for correct line</p> <p><b>(Use of <math>y=mx+c</math>)</b>            C1 for axes scaled and labelled (condone zero omitted at origin)            M2 for at least 2 correct points (and no incorrect points) plotted OR            line segment of <math>y = 3x + 2</math> drawn (ignore any additional incorrect segments)            (M1 for line drawn with gradient of 3 OR line drawn with a <math>y</math> intercept of 2 and a positive gradient)            A1 for correct line</p>
$x$	-2	-1	0	1	2											
$y$	-4	-1	2	5	8											

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<b>Question</b>	<b>Working</b>	<b>Answer</b>	<b>Mark</b>	<b>Notes</b>
25 (a) (b)(i)  (ii)		prime $\frac{2}{15}$  $\frac{9}{15}$	1 3	B1 cao B1 for $\frac{2}{15}$ oe  M1 for indicating elements of $B'$ (could be by listing) or $\frac{9}{n}$ in where $n$ is integer and $n > 9$ A1 for $\frac{9}{15}$ oe
26		90° anticlockwise or 270° clockwise about (0, 0)	3	B2 for 90° anticlockwise or 270° clockwise (B1 for 90° or 270° stated without direction or with incorrect direction or correct translation of S shown) B1 for centre (0, 0)

8

(a)



(b)

