

# Mark Scheme (Results)

June 2012

Methods in Mathematics (GCSE)  
Unit 1: Methods 5MM1F\_01

Edexcel is one of the leading examining and awarding bodies in the UK and throughout the world. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers.

Through a network of UK and overseas offices, Edexcel's centres receive the support they need to help them deliver their education and training programmes to learners.

For further information, please call our GCE line on 0844 576 0025, our GCSE team on 0844 576 0027, or visit our website at [www.edexcel.com](http://www.edexcel.com).

If you have any subject specific questions about the content of this Mark Scheme that require the help of a subject specialist, you may find our **Ask The Expert** email service helpful.

Ask The Expert can be accessed online at the following link:

<http://www.edexcel.com/Aboutus/contact-us/>

June 2012

Publications Code UG032691

All the material in this publication is copyright

© Edexcel Ltd 2012

## 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 as 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




5MM1F_01					
Question		Working	Answer	Mark	Notes
1	(a)		59081	1	B1 cao
	(b)		eight thousand three hundred and five	1	B1 cao
	(c)		558	1	B1 cao
	(d)		29 000	1	B1 cao
	(e)		8	1	B1 cao
2	(i)		even	1	B1 cao
	(ii)		impossible	1	B1 cao
3	(a)		37	1	B1 for $x$ marked between $\frac{3}{8}$ and $\frac{5}{8}$
	(b)		500	1	B1 for $x$ marked near 0
	(c)		6.93	1	B1 for $x$ marked between $\frac{1}{2}$ and $\frac{3}{4}$
4	(a)		$6x$	1	B1 cao
	(b)		$y^3$	1	B1 cao
	(c)		$7f - 5g$	2	M1 for $6f + f$ or $-2g - 3g$ or $7f$ or $-5g$ A1 cao

5MM1F_01					
Question		Working	Answer	Mark	Notes
5	(i)		25	1	B1 cao
	(ii)		8	1	B1 cao
	(iii)		10	1	B1 cao
6	(a)		(5, 2)	1	B1 cao
	(b)	Plot (-3, -2), join PQ and draw midpoint OR $\left(\frac{5+(-3)}{2}, \frac{2+(-2)}{2}\right)$	(1, 0)	2	M1 for (1, y) <b>or</b> (x, 0) A1 for (1, 0)  <b>OR</b> M1 ft from (a) for $\left(\frac{'5'+(-3)}{2}\right)$ <b>oe or</b> $\left(\frac{'2'+(-2)}{2}\right)$ <b>oe</b> A1 ft from (a)  SC : B1 for an answer of (0, 1)
7	(i)		28 + 35 or 25 + 38	1	B1 for 28 + 35 or 25 + 38
	(ii)		63	3	B1 ft from (i) dep on all 4 digits used



5MM1F_01					
Question		Working	Answer	Mark	Notes
8	(a)	$180 - 155 - 10$ $= 180 - 165$	15	2	M1 for $180 - 155 - 10$ oe A1 cao
9	(a)		2,3,6,7,8	2	B2 for 2, 3, 6, 7, 8 (B1 for any 3 or 4 correct, no extras <b>or</b> 2, 3, 6, 7, 8 seen with at most one extra)
	(b)		3,8	1	B1 cao
10	(a)		3	1	B1 cao
	(b)		5	1	B1 cao
	(c)		$\frac{3}{2}$	2	M1 for $6c = 2 + 7$ oe <b>or</b> the clear intention to add 7 to both sides of the equation <b>or</b> $6c = 9$ <b>or</b> $(c = ) 9 \div 6$ <b>or</b> a correct reverse flow diagram eg. $\leftarrow \div 6 \leftarrow +7 \leftarrow$ A1 for 1.5 oe
11	(a)		mark at 1	1	B1 for $\times$ within the overlay ( within 1 cm of 1 )
	(b)		mark at 1/4	1	B1 for $\times$ within the overlay ( between 2 and 4 cm from 0 )

5MM1F_01					
Question		Working	Answer	Mark	Notes
12	(a)(i)		acute	1	B1 cao
	(ii)		obtuse	1	B1 cao
	(b)(i)		150	1	B1 cao
	(ii)		reason	1	B1 cao
13	(a)		8 and 12	1	B1 for 8 and 12
	(b)		8 and 4	2	M1 for a list of at least 2 different factors (not 24) of 12 in the working space with no more than one incorrect factor <b>or</b> for an answer of any two factors of 24 (not 24) <b>or</b> 6 and 6 A1 cao
14		RW, RG, PW, PG, BW, BG (WR, GR, WP, GP, WB, GB)	all 6 given	2	B2 for all 6 pairs correct, no repeats or extras <b>OR</b> all 12 pairs correct taking order into consideration (B1 for 4 pairs or 5 pairs correct)
15	(a)		2	1	B1 cao
	(b)		Line of symmetry	1	B1 cao

5MM1F_01					
Question		Working	Answer	Mark	Notes
16	(a)		9	1	B1 cao
	(b)		12	1	B1 cao
	(c)		brackets	1	B1 for $10 - 2 \times (3 + 1) = 2$
	(d)		-5	1	B1 cao
	(e)		25	1	B1 cao
17	(a)		3	1	B1 cao
	(b)	$5(2 - 6) = 5 \times -4$	-20	2	M1 for $5 \times 2(=10)$ <b>or</b> $5 \times -6(=-30)$ <b>or</b> -4 seen A1 cao

5MM1F_01					
Question		Working	Answer	Mark	Notes
18	(a)		enlargement	2	B2 for a correct enlargement, scale factor 3 in any orientation (B1 for a right angled triangle with 1 line correctly enlarged <b>or</b> a correct enlargement by incorrect scale factor in any orientation)
	(b)		translation $\begin{pmatrix} -5 \\ 3 \end{pmatrix}$	2	B1 for translation B1 for $\begin{pmatrix} -5 \\ 3 \end{pmatrix}$ NOTE: Combination of transformations scores B0
19	(a)		Draw pattern 4	1	B1 cao
	(b)		26,32	1	B1 cao
	(c)	$6n + 2 = 122$ , $6n = 120$ or eg $20 + 17 \times 6 = 122$ so $3 + 17 = 20$ etc  38, 44, 50, 56, 62, 68, 74, 80, 86, 92, 98, 104, 110, 116, 122	20	2	M1 for $6n + 2 = 122$ oe <b>or</b> any valid method to reach 20 <b>or</b> $(122 - 2) \div 6$ A1 for 20 <b>or</b> 20th pattern oe  <b>OR</b>  M1 (ft from candidate's answer to (b)) for evidence of the sequence being continued in an attempt to get to 122 - sequence must go up to or beyond 122; condone one arithmetic error A1 for 20 <b>or</b> 20th pattern oe

5MM1F_01				
Question	Working	Answer	Mark	Notes
20	(a)	$\frac{2}{3}$	1	B1 cao
	(b)	$\frac{3}{35}$	1	B1 for $\frac{3}{35}$ oe
	(c)	$\frac{5}{6}$	2	M1 for correct common denominator and at least one correct numerator (must be $\frac{4}{6}$ if 6 used as common denominator) A1 for $\frac{5}{6}$ oe
	(d)	91.8	2	M1 for valid method to multiply $153 \times 6$ (ignore decimals), allow 1 arithmetic error <b>or</b> the digits 918 in the answer A1 for 91.8 oe  <b>OR</b> M1 for a valid method to multiply 15.3 by 6, allow 1 arithmetic error but <b>not</b> the error $0.3 \times 6 = 0.18$ A1 for 91.8 oe  NB: An answer of 90.18 scores M0A0

5MM1F_01					
Question	Working	Answer	Mark	Notes	
21		correct rectangle drawn	2	M1 for a rectangle (or square) drawn <b>or</b> sight of 14 <b>or</b> a non-rectangular shape with area 14 A1 for a rectangle with area 14 eg 7 by 2, 14 by 1	
22	$20 \times 24 = 480$ $3 \times 5 = 15$ $480 \div 15 = 32$  $20 \div 5 = 4$ $20 \div 3 = 8$ $4 \times 8 = 32$	32	3	M1 for $20 \times 24 (= 480)$ <b>or</b> $5 \times 3 (= 15)$ M1(dep) for $(20 \times 24) \div (5 \times 3)$ A1 cao  <b>OR</b> M1 for 8 <b>and</b> 4 seen (may be on diagram) <b>or</b> 8 divisions seen on length of diagram <b>or</b> 4 divisions seen on width of diagram M1 for 32 rectangles seen on diagram A1 cao  <b>OR</b> M1 for $20 \div 5 (= 4)$ <b>or</b> $24 \div 3 (= 8)$ M1(dep) for $(20 \div 5) \times (24 \div 3)$ A1 cao	
23	(a)	$1 - (0.35 + 0.15 + 0.18 + 0.12)$ $= 1 - 0.8(0)$	0.2	2	M1 for $1 - '(0.35 + 0.15 + 0.18 + 0.12)'$ oe A1 oe
	(b)	$300 \times 0.35$	105	2	M1 for $300 \times 0.35$ A1 cao  SC : B1 for an <b>answer</b> of $\frac{105}{300}$

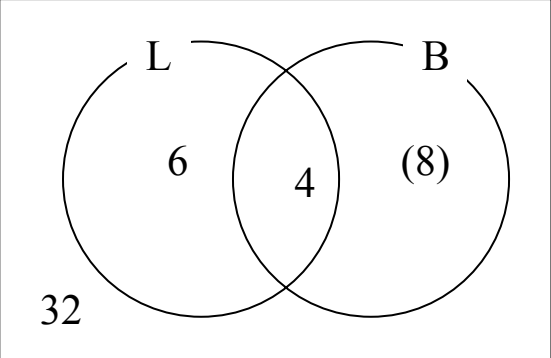
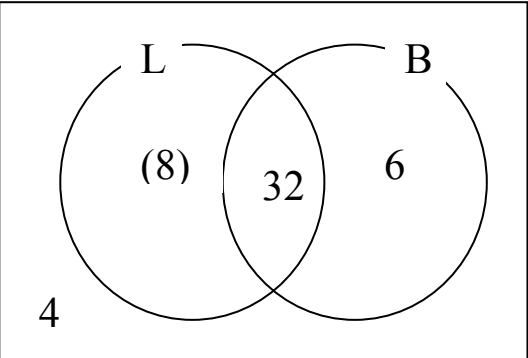
5MM1F_01																											
Question		Working			Answer	Mark	Notes																				
24	(i)	<table border="1"> <tr> <td>+</td> <td>2</td> <td>3</td> <td>7</td> <td>8</td> </tr> <tr> <td>1</td> <td>3</td> <td>4</td> <td>8</td> <td>9</td> </tr> <tr> <td>3</td> <td>5</td> <td>6</td> <td>10</td> <td>11</td> </tr> <tr> <td>4</td> <td>6</td> <td>7</td> <td>11</td> <td>12</td> </tr> </table>			+	2	3	7	8	1	3	4	8	9	3	5	6	10	11	4	6	7	11	12	$\frac{2}{12}$	5	<p>M1 for identifying 2,4 and 3,3  M1 for 12 seen <b>OR</b>  an attempt to get the 12 outcomes or attempt at a sample space or a list of possibilities or a list of ordered pairs (at least 6 correct outcomes or possibilities or ordered pairs (ignore repeats))  A1 for <math>\frac{2}{12}</math> oe  <b>OR</b>  M1 for <math>\frac{1}{4} \times \frac{1}{3}</math> oe seen  M1 for <math>\frac{1}{4} \times \frac{1}{3} + \frac{1}{3} \times \frac{1}{4}</math> oe  A1 for <math>\frac{2}{12}</math> oe</p>
	+	2	3	7	8																						
1	3	4	8	9																							
3	5	6	10	11																							
4	6	7	11	12																							
(ii)				$\frac{4}{12}$		<p>M1 ft from their ordered list from part (i) for identifying all four possible scores from; 7+4(=11), 7+3(=10), 8+4(=12), 8+3(=11),  (condone the inclusion of 8+1(=9) as a misread)  [accept an answer of <math>\frac{5}{12}</math> for M1 ONLY if the 5 outcomes are identified in either part (i) or part (ii)]  A1 for <math>\frac{4}{12}</math> oe</p>																					

5MM1F_01																				
Question	Working					Answer	Mark	Notes												
25	<table border="1" style="margin-left: auto; margin-right: auto;"> <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>-8</td> <td>-3</td> <td>2</td> <td>7</td> <td>12</td> </tr> </table>					$x$	-2	-1	0	1	2	$y$	-8	-3	2	7	12	$y = 5x + 2$ drawn		<p>C1 for acceptable scaling and labelling of the axes</p> <p><b>(Table of values)</b>  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 from their table must be correctly plotted)  A1 for correct line</p> <p><b>(No table of values)</b>  M2 for at least 2 correct points (and no incorrect points) plotted  <b>OR</b> line segment of <math>y = 5x + 2</math> drawn (ignore any additional incorrect line segments)  (M1 for at least 3 correct points plotted with no more than 2 incorrect points)  A1 for correct line</p> <p><b>(Use of <math>y = mx + c</math>)</b>  M2 for line segment of <math>y = 5x + 2</math> drawn (ignore any additional incorrect line segments)  (M1 for line drawn with gradient of 5 <b>OR</b>  Line drawn with a <math>y</math> intercept of 2 <b>and</b> a positive gradient)  A1 for correct line</p>
$x$	-2	-1	0	1	2															
$y$	-8	-3	2	7	12															



5MM1F_01				
Question	Working	Answer	Mark	Notes
26	$\angle DBF = 180 - 52 - 78 = 50$ angles on a line = 180 $\angle BFD = (180 - '50') \div 2$ $= 65$ isosceles triangle angles in a triangle add up to 180 $x = 180 - 92 - 65 = 23$	23 with reasons	5	M1 for $\angle DBF = 180 - 52 - 78$ <b>or</b> 50 seen <b>or</b> $x = 180 - 92 - '65'$ M1 for $\angle BFD = (180 - '50') \div 2$ (= 65) A1 for $y = 23$  C2 (dep on M1) for correct reasons – <u>angles</u> on a straight <u>line</u> sum to <u>180°</u> , base <u>angles</u> in an <u>isosceles triangle</u> are <u>equal</u> , and <u>angles</u> in a <u>triangle</u> add up to <u>180</u> (C1 (dep on M1) for any one reason used correctly)
27	$(x + 8) + (2x - 3) + (x + 1) +$ $(x + 5) + 7 + (3x + 2)$  $8x + 20 = 68$ $8x = 68 - 20 = 48$	6 with working	5	M1 for attempt to work out missing length of vertical side <b>or</b> sight of $2x - 3 + x + 5$ <b>or</b> $3x + 2$  M1 for attempt to work out missing length of horizontal side <b>or</b> sight of $x + 8 - (x + 1)$ <b>or</b> 7  M1 adding at least 4 sides e.g. $x + 8 + 2x - 3 + x + 1 + x + 5$  M1 for attempt to add all their 6 sides and form equation e.g. ' $8x + 20 = 68$ '  C1 (dep on M1) indicating that $x = 6$ (cm)  <b>OR</b> M1 for using any value for $x$ , substituting to find lengths of at least 4 sides and clear intent to add M3 for a complete method using $x = 6$ C1 (dep on M1) indicating that $x = 6$ (cm)

5MM1F\_01

Question	Working	Answer	Mark	Notes
28	<p>(a) <b>Fail Venn diagram</b></p>  <p><b>Pass Venn diagram</b></p> 	Venn diagram	4	<p>M1 for two overlapping ovals  M1 for 4 shown in the intersection  M1 for attempt to show <math>10 - 4</math>  <b>or</b> <math>50 - 32 - 10</math>  A1 for 6 and 32 in the correct places.</p> <p><b>OR</b></p> <p>M1 for two overlapping ovals  M1 for 32 shown in the intersection  M1 for attempt to show <math>50 - 10 - 32 (= 8)</math>  <b>or</b> <math>50 - 40 - 4 (= 6)</math>  A1 for 6 and 4 in the correct places.</p>
	(b)	$\frac{12}{50}$	2	<p>M1 (ft from diag) for <math>4 +</math> their value for 8  (do <b>not</b> ft if their value for 8 is zero)  A1 ft for <math>\frac{12}{50}</math> oe</p>





Further copies of this publication are available from  
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467

Fax 01623 450481

Email [publication.orders@edexcel.com](mailto:publication.orders@edexcel.com)

Order Code UG032691 June 2012

For more information on Edexcel qualifications, please visit  
[www.edexcel.com/quals](http://www.edexcel.com/quals)

Pearson Education Limited. Registered company number 872828  
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE

Ofqual  




Llywodraeth Cynulliad Cymru  
Welsh Assembly Government



Rewarding Learning