

Mark Scheme (Results)

November 2011

GCSE Mathematics (5MM1F)
Paper 01

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

5MM1F_01					
Question		Working	Answer	Mark	Notes
1	(a)(i)		One thousand (and) twenty five	1	B1 cao
	(ii)		10301	1	B1 cao
	(b)(i)		25000	1	B1 cao
	(ii)		24600	1	B1 cao
2	(a)		309	1	B1 cao
	(b)		43	1	B1 cao
	(c)		115	1	B1 cao
	(d)		11	1	B1 cao
3	(a)		$6y$	1	B1 cao
	(b)		$2ab$	1	B1 cao
	(c)		$12xy$	1	B1 cao
	(d)		$9a + 3b + 6$	2	M1 $3b$ or $9a$ seen as part of a 2 or 3 term expression A1 cao
4	(a)		Mark at $\frac{1}{2}$	1	B1 for mark at $\frac{1}{2}$ (allow $\pm 2\text{mm}$)
	(b)		Mark at $\frac{1}{6}$	1	B1 for mark at $\frac{1}{6}$ (allow $\pm 5\text{mm}$)

5MM1F_01					
Question		Working	Answer	Mark	Notes
5	(a)	$8 + 4 + 8 + 4 + 8 + 4 + 8 + 4$ OR $(8 \times 4) + (4 \times 4)$ OR $4 + 8 + 4 = 16$ $16 \times 2 + 8 \times 2$	48	3	M1 for 4 and 8 marked on diagram or attempt to find perimeter of small rectangle or addition of at least 2 sides of different lengths of larger rectangle eg $8 + 4 + 8 + 4 + \dots$ M1 for complete method to find the perimeter using any of the methods shown A1 cao
	(b)	16×8 OR $4 \times 8 = 32$ 32×4	128	2	M1 for a complete method to find the area of larger rectangle ie length \times width for larger rectangle or length \times width \times 4 for small rectangle A1
6	(i)		5 or 13	1	B1 cao
	(ii)		4	1	B1 cao
	(iii)		18	1	B1 cao
	(iv)		5 or 13	1	B1 cao
7	(a)		40	1	B1 (allow $\pm 10^\circ$)
	(b)(i)		25	2	B1 cao
	(ii)		Reason		B1 Angles (on a) straight line (add up to) 180°

5MM1F_01					
Question		Working	Answer	Mark	Notes
8	(a)		$y + 40$	1	B1 for $y + 40$ oe
	(b)		10	3	M2 for $4x = 40$ oe or $40 \div 4$ (M1 for sight of $3x$ or $4x$) A1 cao SC B1 for 30 without working
9			Matched angles Diagram1 to Acute Angle Diagram2 to Right Angle Diagram3 to Reflex Angle Diagram4 to Obtuse Angle	3	B3 all correct (B2 two or three correct B1 one correct)
10	(a)(i)		$\frac{4}{5}$	2	B1 cao
	(ii)		$2\frac{2}{3}$		B1 cao

5MM1F_01				
Question	Working	Answer	Mark	Notes
(b)	<p>18 and 20 shaded squares in 6 by 4 rectangles</p> <p>Or</p> <p>0.75 and 0.83333 or 75% and 83(.33...)%</p> <p>Or</p> <p>$\frac{9}{12}$ and $\frac{10}{12}$</p>	$\frac{5}{6}$	3	<p>M1 for eg, drawing 4×6 rectangle and shading 18 squares for $\frac{3}{4}$</p> <p>M1 for eg, drawing 4×6 rectangle shading 20 squares for $\frac{5}{6}$</p> <p>C1 for correct conclusion with supportive evidence (dep M1 and comparison of shaded areas in 2 rectangles/shapes of equal area)</p> <p>Or</p> <p>M1 for writing $\frac{3}{4}$ as 0.75 or 75%</p> <p>M1 for writing $\frac{5}{6}$ as 0.83(333...) or 83(.33.....)%</p> <p>C1 for correct conclusion with supportive evidence (dep M1 and comparison of 2 decimals/percentages)</p> <p>Or</p> <p>M1 for writing $\frac{3}{4}$ or $\frac{5}{6}$ correctly with a common denominator eg $\frac{9}{12}$ or $\frac{10}{12}$</p> <p>M1 for writing $\frac{3}{4}$ and $\frac{5}{6}$ correctly with a common denominator eg $\frac{9}{12}$ and $\frac{10}{12}$</p> <p>C1 for correct conclusion with supportive evidence</p>

5MM1F_01					
Question		Working	Answer	Mark	Notes
		Or eg $\frac{3}{4}$ of 24 $\frac{5}{6}$ of 24			(dep M1 and comparison of 2 fractions with a correct common denominator) Or M1 for calculating $\frac{3}{4}$ of 'x' or $\frac{5}{6}$ of 'x' correctly with a common 'x' eg $\frac{3}{4}$ of 24 = 18 or $\frac{5}{6}$ of 24 (=20) M1 for calculating $\frac{3}{4}$ of 'x' and $\frac{5}{6}$ of 'x' correctly with a common 'x' eg $\frac{3}{4}$ of 24 = 18 and $\frac{5}{6}$ of 24 =20 C1 for correct conclusion with supportive evidence (dep M1 and comparison of $\frac{3}{4}$ of 'x' and $\frac{5}{6}$ of 'x')
11	(a)	$24 \times 2 = 48$	96	1	B1 cao
	(b)	$48 \times 2 = 96$	35	1	B1 cao
	(c)(i)		$74 + 62$ or $62 + 74$ or $72 + 64$ or $64 + 72$	1	B1 cao
	(ii)		136	1	B1 for 136 or ft from (a) for their total as long as 6 or 7 seen as the first digit of at least one 2 digit number in (a) and 2, 4, 6, 7 used

5MM1F_01					
Question		Working	Answer	Mark	Notes
12	(a)(i)		(4,6)	1	B1 cao
	(ii)		(6,-4)	1	B1 cao
	(b)		Trapezium	1	B1 cao
13	(a)(i)		18	1	B1 cao
	(ii)		add 4 (each time)	1	B1 for a correct reason, e.g. add 4 (each time) (accept goes up in 4s)
	(b)		26	1	B1 cao
	(c)		Yes and reason	1	B1 Yes, because $4 \times 9 - 2 = 34$ or $2 + 4 \times 8 = 34$ or sequence continued to at least 34 or $2 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4$ or building up from previous term found, eg because after 26 you could add four two more times
14	(a)		Circle radius 4 cm drawn	2	M1 for an accurately drawn circle of any radius or attempt to draw a circle of radius 4 cm which has the ends of any diameter between the two circles on the overlay A1 for circle within overlay ($4\text{cm} \pm 2\text{mm}$) (any centre may be used)
	(b)		Diameter drawn	1	B1 correct placement of diameter

5MM1F_01					
Question		Working	Answer	Mark	Notes
15	(a)		(1 A) (2 A) (6 A) (1 C) (2 C) (6 C) (1 E) (2 E) (6 E)	2	B2 for all 9 (no extras, ignore repeats) (B1 for at least 5 correct)
	(b)		$\frac{1}{9}$	2	M1 ft from (a) for denominator of '9' or numerator of 'number of outcomes including 2 and E' seen A1 cao OR M1 for $\frac{1}{3} \times \frac{1}{3}$ A1 cao
16	(a)		Red	1	B1 cao
	(b)		$\frac{1}{6}$	1	B1 cao
	(c)	$\frac{1+3}{6}$	$\frac{4}{6}$	2	M1 1 + 3 or 4 seen A1 $\frac{4}{6}$ oe

5MM1F_01				
Question	Working	Answer	Mark	Notes
17		$\frac{1}{4}, 0.5, \frac{2}{3}, 1, \frac{6}{5}$	2	<p>M1 for using a common denominator for all numbers, eg 60, at least one number correct A1 for correct order</p> <p>OR</p> <p>M1 for changing all numbers to decimals (at least 1dp) or % (at least 2sf) with at least one of $\frac{1}{4} \frac{2}{3} \frac{6}{5}$ correct A1 for correct order</p> <p>Answer can be written with original fractions or any equivalent form</p> <p>SC B1 for 3 numbers in the correct position or for all numbers listed correctly from highest to lowest</p>
18	(a)	3	1	B1 cao
	(b)	4	1	B1 cao
	(c)	2	2	<p>M1 for $a = \frac{(1+5)}{3}$</p> <p>or $3a = '1 + 5'$ or intention to add 5 to each side or intention to divide both sides by 3 A1 cao</p>
	(d)	32	1	B1 cao

5MM1F_01					
Question		Working	Answer	Mark	Notes
19	(a)		4	1	B1 cao
	(b)	$14 - 4 - 8 = 2$	2	3	M1 for $4 \times 2 (=8)$ blue counters M1 for $14 - "8" - 4$ or $10 - "8"$ A1 cao OR M1 for $P(B) = 2 \times \frac{4}{14}$ oe ($= \frac{8}{14}$ oe) M1 for $1 - \frac{"8"}{14} - \frac{4}{14}$ oe or $P(Y) = \frac{2}{14}$ oe or $\frac{2}{14} \times 14$ oe A1 cao
20	(a)		A and D	2	B2 both correct (B1 for 1 correct)
	(b)		A	1	B1 cao
	(c)		'Vertical' line through the centre and a 'horizontal' line through the centre.	1	B1 cao

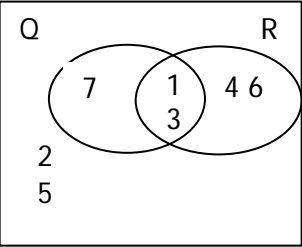
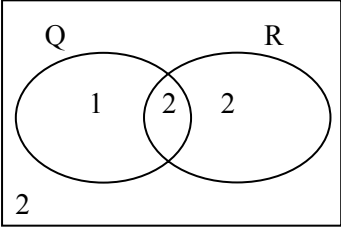
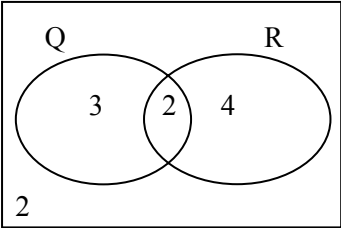
5MM1F_01				
Question	Working	Answer	Mark	Notes
21	(a)(i)	-28	2	B1 cao
	(ii)	15		B1 cao
	(b)	5842	3	M1 for a complete method with relative place value correct. Condone one multiplication error, addition not necessary OR M1 for complete grid. Condone one multiplication error, addition not necessary OR M1 for sight of complete partitioning method. Condone one multiplication error. Final addition not necessary M1 (dep) for addition. Condone one addition error A1 cao (SC B1 for attempting to add 23 lots of 254)

$$\begin{array}{r}
 254 \\
 \underline{23 \times} \\
 762 \\
 5080 \\
 \hline
 5842
 \end{array}$$

×	200	50	4
20	4000	1000	80
3	600	150	12

$$4000 + 1000 + 600 + 150 + 80 + 12$$

	2	5	4	
	0 4	1 0	0 8	2
	0 6	1 5	1 2	3
5	8	4	2	

5MM1F_01				
Question	Working	Answer	Mark	Notes
22			4	<p>M1 for an attempt at classification, eg by writing Q in an appropriate shape or writing an appropriate shape number next to set Q</p> <p>M1 for placement of any shape number in the Venn diagram</p> <p>A1 for shape numbers in sets Q and R correctly placed</p> <p>A1 for 2 and 5 outside of Q and R</p> <p>SC B2 for giving correct number of elements in each part of Venn diagram.</p>  <p>SC B1 for</p> 

5MM1F_01												
Question		Working						Answer	Mark	Notes		
23	(i)	+	1	2	3	4	5	6	$\frac{1}{18}$	6	M1 for listing / identifying the 2 outcomes (5,6) and (6,5) or $(\frac{1}{6} \times \frac{1}{6}) + (\frac{1}{6} \times \frac{1}{6})$ A1 for $\frac{2}{36}$ oe	
		1	2	3	4	5	6	7				
		2	3	4	5	6	7	8				
		3	4	5	6	7	8	9				
		4	5	6	7	8	9	10				
		5	6	7	8	9	10	11				
		6	7	8	9	10	11	12				
	(ii)							Incorrect and reason			M1 for identifying there are 36 outcomes, eg 36 seen or outcomes listed or shown in a table (can be earned in (i)) M1 for attempt to list or find the number of outcomes giving a total of 5 or more (allow one error, omission or extra outcome),eg 30 (or 29 or 31) seen or outcomes listed or identified in table A1 $\frac{30}{36}$ oe C1 (dep M2) for conclusion that Savio is incorrect with supportive evidence (including clear reference to their probability for a total of 5 or more) Alternative M1 for identifying there are 36 outcomes eg 36 seen or outcomes listed or shown in a table (can be earned in (i)) M1 for outcomes giving a total of <u>less</u> than 5 eg 6 total outcomes, outcomes listed or identified in table A1 $\frac{30}{36}$ oe C1 (dep M2) for conclusion that Savio is incorrect with supportive evidence (including clear reference to their P(5 or more) or comparison of P(less than 5) with $\frac{1}{4}$ oe)	

5MM1H_01				
Question	Working	Answer	Mark	Notes
24	(a) 2 -1 0 1 2 3 4 1 3 5 7 9 11 13 Or Using $y = mx + c$, gradient =2, y intercept = 5		3	<p>(Table of values) M1 for at least 2 correct attempts to find points by substituting values of x M1 (dep) ft for plotting at least 2 of their points (any points plotted from their table must be correct) A1 for correct line between -2 and 4</p> <p>(No table of values) M2 for at least 2 correct points (and no incorrect points) plotted OR line segment of $y - 2x = 5$ drawn (ignore any additional incorrect segments) (M1 for at least 3 correct points with no more than 2 incorrect points) A1 for correct line between -2 and 4</p> <p>(Use of $y=mx+c$) M2 line segment of $y - 2x = 5$ drawn (ignore any additional incorrect segments) (M1 for line drawn with gradient of 2 OR line drawn with a y intercept of 5 and a positive gradient) A1 for correct line between -2 and 4</p>
	(b)(i)	4		B1 Allow 3.8 to 4.2 inclusive either by substitution or ft from a straight line segment ($\pm 2\text{mm}$)
	(ii)	1.6		B1 Allow 1.4 to 1.8 inclusive either by substitution or ft from a straight line segment ($\pm 2\text{mm}$) Note: Condone alternative or additional value - 1.4 to - 1.8 inclusive ft from straight line segments

5MM1F_01					
Question		Working	Answer	Mark	Notes
25	(i)		$\frac{8}{40}$	1	B1 $\frac{8}{40}$ oe
	(ii)	$\frac{1}{40} + \frac{9}{40}$	$\frac{10}{40}$	3	<p>M1 for $\frac{1}{40}$ or $\frac{9}{40}$ or $1 + 9 (=10)$</p> <p>M1 for $\frac{1}{40} + \frac{9}{40}$</p> <p>A1 for $\frac{10}{40}$ oe</p> <p>Note:</p> <p>Award 0 marks for $\frac{2}{8}$ without working in (ii) if $\frac{1}{8}$ seen in (i)</p>

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November 2011

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