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Mark Scheme
Practice papers

GCSE Mathematics
Paper 5MM1H_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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

Question		Working	Answer	Mark	Notes
1	(a)	$\frac{1+2}{2}\times 2$	3	2	M1 $\frac{1+2}{2}\times 2$ A1 3 cao
	(b)		Correct reflection	2	B2 cao (B1 reflection in any line parallel to $y = x$)
2	(a)		3 5 7 9	1	B1 cao
	(b)		1 11	1	B1 cao
	(c)		7 9	1	B1 cao
	(d)	$A \cup B = \{3,5,7,8,9,10\}$	$\frac{6}{8}$	2	M1 $n(A \cup B) \div 8$ A1
3*	(a)	Squares at end are $3x$ each Square in the middle is $2x$ Rectangles are 2y each	Explanation	3	M1 Sight of either $3x$ or $2x$ or $2y$ C1 The $4y$ or $8x$ obtained convincingly C1 the $8x + 4y$ obtained convincingly
	(b)	$30 = 8 \times 4 + 4y = 32 + 4y$ But y cannot be negative	Explanation	3	M1 $30 = 8 \times 4 + 4y$ M1 $4y = -2$ C1 y cannot be negative

Question		Working	Answer	Mark	Notes
4	(a)	0.2 + 0.25	0.45	2	M1 0.2 + 0.25 A1 cao
	(bi)	1 – 0.2 – 0.25 – 0.3 – 0.05 = 0.2	0.1	2	M1 1 – 0.2 – 0.25 – 0.3 – 0.05 A1 cao
	(bii)	200 × 0.25	50	2	M1 200 × 0.25 A1 cao
	(c)		Eri because she threw it more.	1	B1 cao
	(d)	20 + 50 = 70; 3 + 7 = 10	$\frac{10}{70}$	2	M1 uses no of sixes ÷ total number A1 $\frac{10}{70}$ oe
5	(a)	84 = 2 × 42 = 2× 2 × 21 = 2× 2 × 3 × 7	2× 2 × 3 × 7	2	M1 for a method that if carried out correctly would lead to the correct answer (≥2 steps) A1 cao
	(b)	2× 3 × 5 × 7	210	2	M1 for a product of 4 numbers, at least 2 of which are prime. A1 a correct answer
	(c)	$17\overline{)39^{5}1}$ with 23	23	2	M1 a fully correct process A1 cao

Question		Working	Answer	Mark	Notes
6	(a)	$\frac{9.8\times0.091}{\sqrt{80}} \approx \frac{10\times0.09}{9}$ $\frac{0.9}{9}$	0.1	3	M1 for any two of 10, 0.09, 9 A1 $\frac{0.9}{9}$ A1 0.1 oe
7	(a)	Area of square = x^2 Area of rectangle BCDE = xy Area of total = $x^2 + xy$ = length × width of largest rectangle	$x(x + y)$	3	M1 for $x \times x$ or x^2 M1 for $x \times y$ **or** xy A1 for $x^2 + xy$ oe **OR** M2 for $x + y$ A1 for $x^2 + xy$ oe
	(b)		$6p - 8q$	1	B1 cao
	(c)	$6x - 18 = 2x + 10$ $6x - 2x = 10 + 18$ $4x = 28$	7	3	M1 $6\times x - 6\times 3$ M1 Rearrange '$6x$' + '18' = $2x + 10$ correctly A1 cao

Question		Working	Answer	Mark	Notes
8	(a)		87.04	1	B1 cao
	(b)		0.08704	1	B1 cao
	(c)		64	1	B1 cao
9	(a)	<table><tr><td>X</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>y</td><td>16</td><td>14</td><td>12</td><td>10</td><td>8</td><td>6</td><td>4</td><td>2</td><td>0</td></tr></table>	Correct line	3	B1 any correct value pair in the table B1 any other correct value pair in the table B1 correct line
	(b)	$y = 12 - 2x$ or Height ÷ base from their line	−2	2	M1 Rearrange to $y = 12 - 2x$ A1 cao Or M1 or Height ÷ base from their line A1 cao (SC B1 for 2 as answer)
10	a(i)		2^{11}	1	B1 cao
	(ii)		2^4	1	B1 $3^2\,2^4$ or 9
	(b)	$2^{18} \times 2^3 = 2^{x-1}$ $18 + 3 = x - 1$	22	2	M1 $2^{18} \times 2^3 = 2^{x-1}$ A1 cao

Question		Working	Answer	Mark	Notes
11	(a)		2×10^4	1	B1 cao
	(b)	$56 \times 10^{5+4}$	56×10^9	2	M1 $56 \times 10^{5+4}$ A1 cao
12	(a)		$2x^2 - 3x$	1	B1 cao
	(b)	$y^2 - 3y + 5y - 15$	$y^2 + 2y - 15$	2	M1 4 term expansion with all 4 terms correct ignoring signs or with3 out of 4 terms correct with correct signs A1 cao
	(c)		$(t + 5)(t - 5)$	1	B1 cao
	(d)	$\frac{6}{2x} + \frac{1}{2x}$	$\frac{7}{2x}$	2	M1 $\frac{6}{2x} + \frac{1}{2x}$ A1
	(e)	$(p - 3)(p - 2) = 0$	3, 2	3	M1 $(p - a)(p - b)$ with either $ab = 6$ or $a + b = 5$ A1 $(p - 3)(p - 2)$ A1 cao

Question		Working	Answer	Mark	Notes
*13	a(i)		62^o	1	B1 cao
	(ii)	Angle DBC = 62^o (angle at centre is twice angle at circumference) Angle ABC = '62^o' + 30^o Angle ADC = 180^o – '92^o' (opposite angles in a cyclic quadrilateral are supplementary)	88^o	4	M1 Angle DBC = 124 ÷ 2 M1 Angle ABC = '62^o' + 30^o M1 Angle ADC = 180^o – '92^o' C1 '88' and supported with both reasons
14	(a)		60	1	B1 cao
	(b)	12 21 32 45 60 9 11 13 15 2 2 2 nth term = $12 + 9(n - 1) + 2(n-1)(n-2)\div 2$	$n^2 + 6n + 5$	3	M1 set up difference table to 2nd diff M1 use nth term = $a + \Delta a(n-1) + \Delta^2(n-1)(n-2) \div 2$ A1 fully correct
15	(a)	Angle EDC = angle ABD (alternate angles) Angle DEC = angle DAB (given) Angle ECD = angle ADB (angle sum of a triangle)	Proof	3	B1 Angle EDC = angle ABD B1 Angle DEC = angle DAB C1 completed with reasons
	(b)	$\frac{CE}{AD} = \frac{CD}{BD}$; $\frac{CE}{12} = \frac{5}{13}$	$\frac{60}{13}$	2	M1 $\frac{CE}{AD} = \frac{CD}{BD}$ A1 $\frac{60}{13}$ oe

Question		Working	Answer	Mark	Notes
16	(a)		Correct enlargement	3	B3 fully correct (B2 enlargement with SF 2.5, wrong centre or correct centre, wrong SF) (B1 enlargement, wrong centre, wrong SF)
	(b)	$\frac{\text{area of shape U}}{\text{area of shape T}} = \frac{2.5^2}{1} = \frac{25}{4}$ $\frac{\text{area of shape V}}{\text{area of shape U}} = \frac{0.5^2}{1} = \frac{1}{4}$ $\frac{25}{4} \times \frac{1}{4}$ Or Area of shape U = 5 × 10 Area of shape V = 2.5 × 5 Area of shape T = 2 × 4	$\frac{25}{16}$	3	M1 $\frac{\text{area of shape U}}{\text{area of shape T}} = \frac{2.5^2}{1}$ M1 $\frac{2.5^2}{1} \times \frac{0.5^2}{1}$ A1 $\frac{25}{16}$ oe Or M1 Area of shape U = 5 × 10 M1 Area of shape V = 2.5 × 5 A1 $\frac{25}{16}$ oe

Question		Working	Answer	Mark	Notes
17	(a)	$\frac{1}{7}\times\frac{6}{6}+\frac{1}{7}\times\frac{5}{6}+\frac{1}{7}\times\frac{4}{6}+\frac{1}{7}\times\frac{3}{6}+\frac{1}{7}\times\frac{2}{6}+\frac{1}{7}\times\frac{1}{6}$	$\frac{21}{42}$	4	M1 any one correct expression for a prob that the tile Nellie picks has a bigger number than the tile John picks M1 All correct expressions M1 All correct expression added C1 $\frac{21}{42}$ oe and correct reasoning
	(b)	$\frac{21}{42}-\frac{1}{7}\times\frac{1}{6}$	No, it is now $\frac{20}{42}$	2	M1 $'\frac{21}{42}'-\frac{1}{7}\times\frac{1}{6}$ A1 No and $\frac{20}{42}$ oe
18	(a)	$10 + 15= 25$	$10 + 15= 25$	1	B1 cao
	(b)	$\frac{n(n+1)}{2}+\frac{(n+1)(n+2)}{2}$ $=\frac{n+1}{2}(n+n+2)=\frac{n+1}{2}(2n+2)=(n+1)(n+1)$		4	B1 for $\frac{(n+1)(n+2)}{2}$ M1 for $\frac{n+1}{2}(n+n+2)$ or $\frac{1}{2}(n^2+n+n^2+3n+2)$ M1simplify or collect terms A1 fully correct

Question		Working	Answer	Mark	Notes
19	(a)	$1+\sqrt{2}+\sqrt{2}+\sqrt{2}\times\sqrt{2}$	$3+2\sqrt{2}$	2	M1 3 or 4 out of 4 terms correct A1 fully correct
	(b)	Substitute in LHS $3+2\sqrt{2}-2\left(1+\sqrt{2}\right)$ = $3+2\sqrt{2}-2\sqrt{2}-2$	QED	2	M1 Substitute in LHS A1 cao
	(c)		$1-\sqrt{2}$	1	B1 cao

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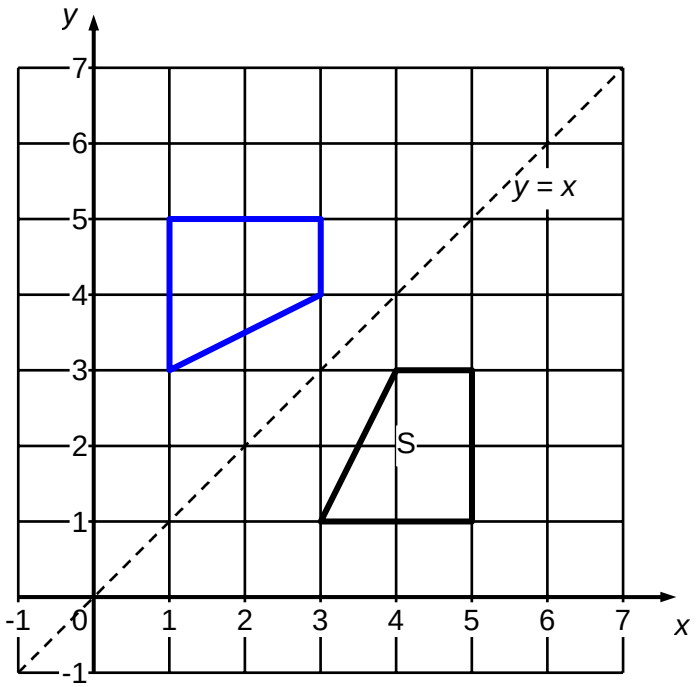

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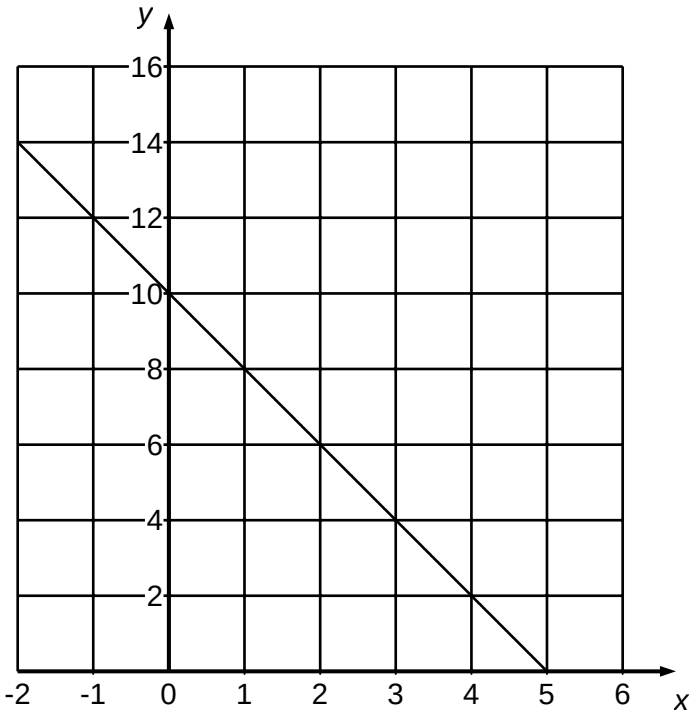
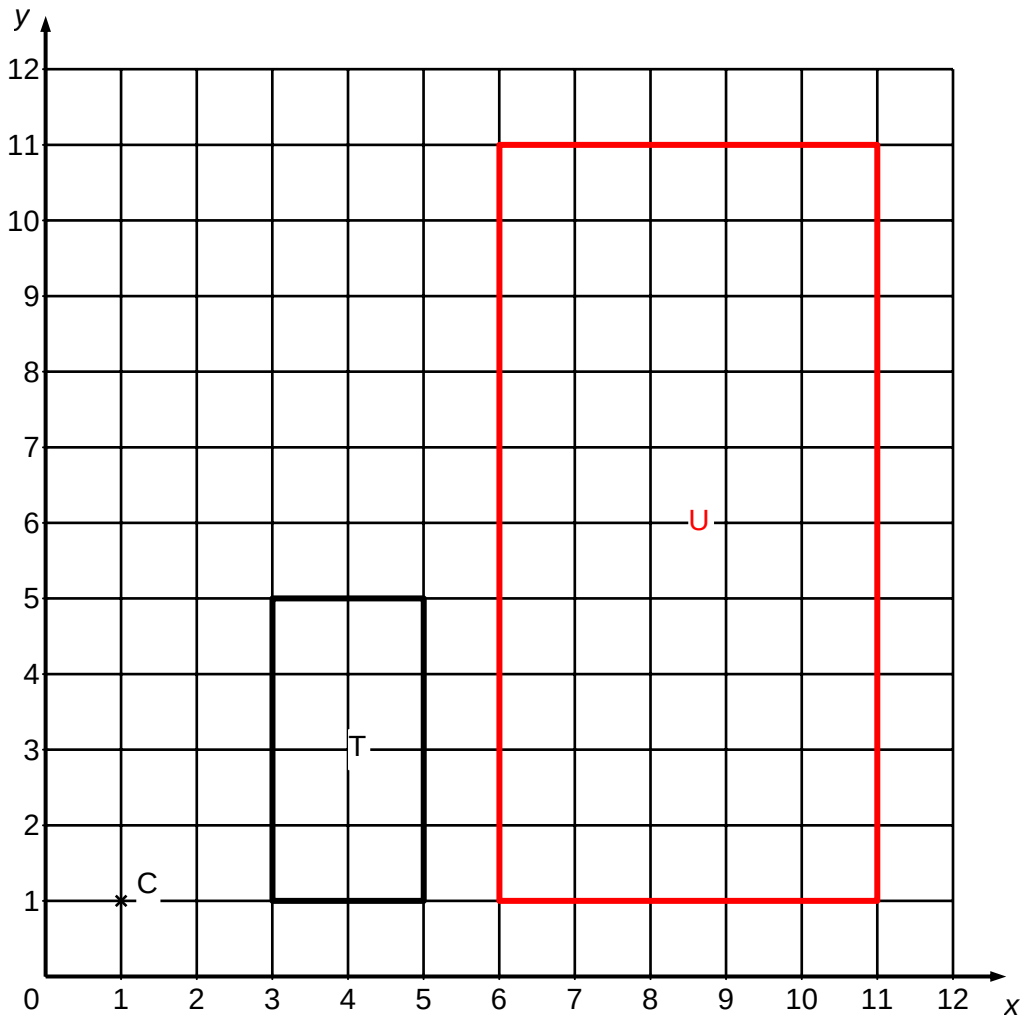
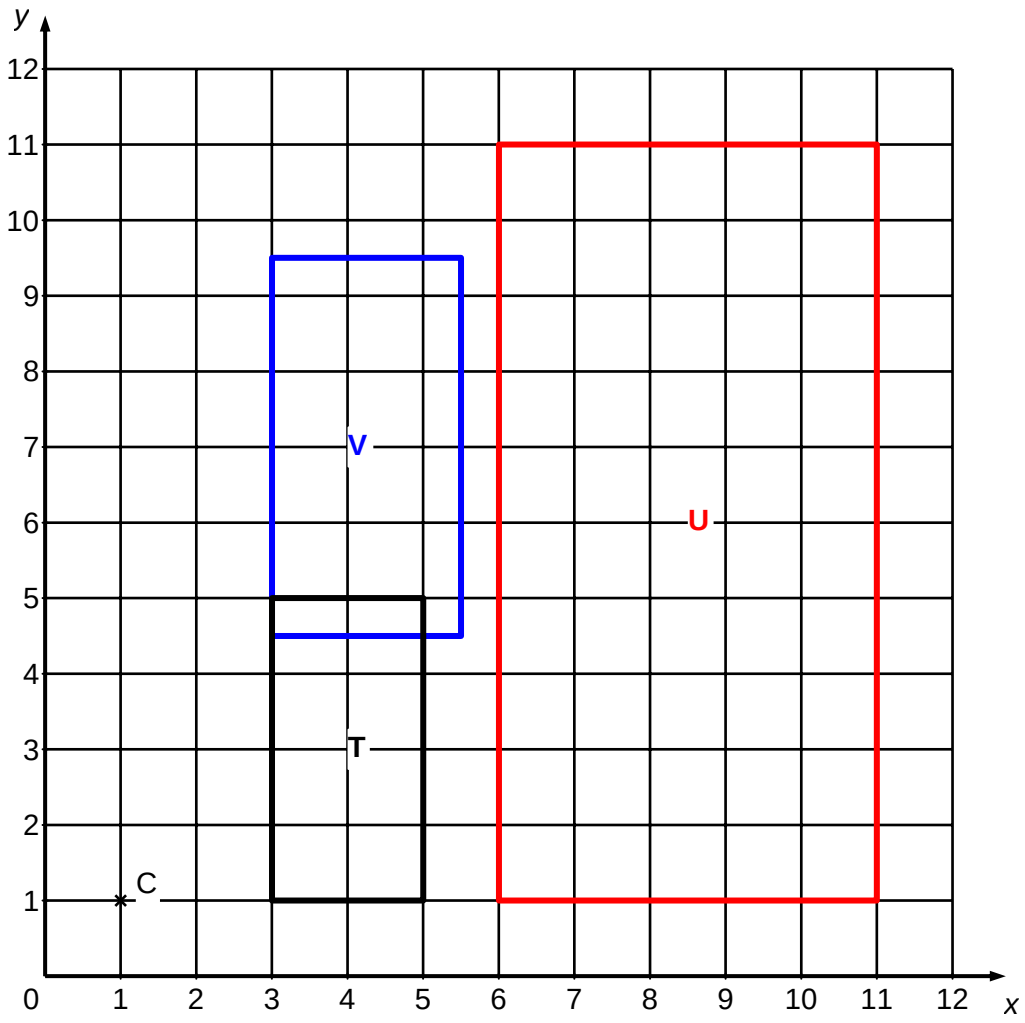


16. (a)



16(b)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