Methods Higher Tier Practice Paper Unit 1 Markscheme

NOTES ON MARKING PRINCIPLES

1 Types of mark

M marks: method marks
A marks: accuracy marks
B marks: unconditional accuracy marks (independent of M marks)

2 Abbreviations

cao – correct answer only
isw – ignore subsequent working
oe – or equivalent (and appropriate)
indep - independent
ft – follow through
SC: special case
dep – dependent

3 No working

If no working is shown then correct answers normally score full marks
If no working is shown then incorrect (even though nearly correct) answers score no marks.

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If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.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

5 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.

6 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.

7 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.

8 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.

9 Parts of questions

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

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		2 3 5 7	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 × 4 + 4y = 32 + 4y But y cannot be negative	Explanation	3	M1 30 = 8 × 4 + 4y M1 4y = -2 C1 y cannot be negative
4	a	0.2 + 0.25	0.45	2	M1 0.2 + 0.25 A1 cao
		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
	b	200 × 0.25	50		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

Question	Working	Answer	Mark	Notes

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	$17\overline{)39^{5}1}$ $\begin{matrix}23\end{matrix}$	23	2	M1 a fully correct process A1 cao
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, √81 A1 $\frac{0.9}{9}$ A1 0.1 oe
21	a	Width of square = x Area of square = $x \times x$ Area of $BCDE$ = xy Or Width of square = x Length of $ACDF$ = (x + y)	$x^2 + xy$ Or $x(x + y)$	3	B1 Width of square B1 Area of square = $x \times x$ B1 $x^2 + xy$ Or B1 Width of square B1 Length of $ACDF$ = (x + y) B1 $x(x + y)$
	b		6p – 8q	1	B1 cao
	c	6x – 18 = 2x + 10 6x – 2x = 10 + 18 4x = 28	7	3	M1 6×x - 6×3 M1 Rearrange ax +b = 2x + 10 correctly A1 cao
8	a		87.04	1	B1 cao
	b		0.08704	1	B1 cao
	c		64	1	B1 cao

Question	Working	Answer	Mark	Notes

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 cao
	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
11	a		2×10^4	1	B1 cao
	b	$56 \times 10^{5+4}$	5.6×10^{10}	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
			3, 2		M1 $(p - a)(p - b)$ with either $ab = 6$ or $a + b$

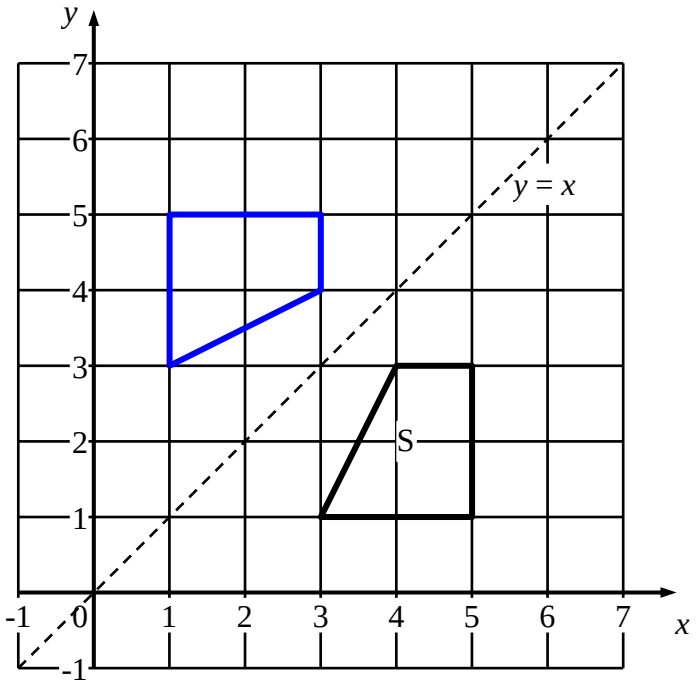
	e	$(p - 3)(p - 2) = 0$			=5 A1 $(p - 3)(p - 2)$ A1 cao
13	a(i) (ii)	 Angle *DBC* = 62° (angle at centre is twice angle at circumference) Angle *ABC* = '62°' + 30° Angle *ADC* = 180° – '92°' (opposite angles in a cyclic quadrilateral are supplementary)	62° 88°	5	B1 cao M1 Angle *DBC* = 124 ÷ 2 M1 Angle *ABC* = '62°' + 30° M1 Angle *ADC* = 180° – '92°' C1 '88' and supported with both reasons

Question		Working	Answer	Mark	Notes
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 = $a + \Delta a(n-1) + \Delta^2(n-1)(n-2)/2$ 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	$\frac{CE}{AD} = \frac{CD}{BD}$; $\frac{CE}{12} = \frac{5}{13}$	$\frac{60}{13}$		M1 $\frac{CE}{AD} = \frac{CD}{BD}$ A1 $\frac{60}{13}$ oe
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	$\frac{25}{16}$	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

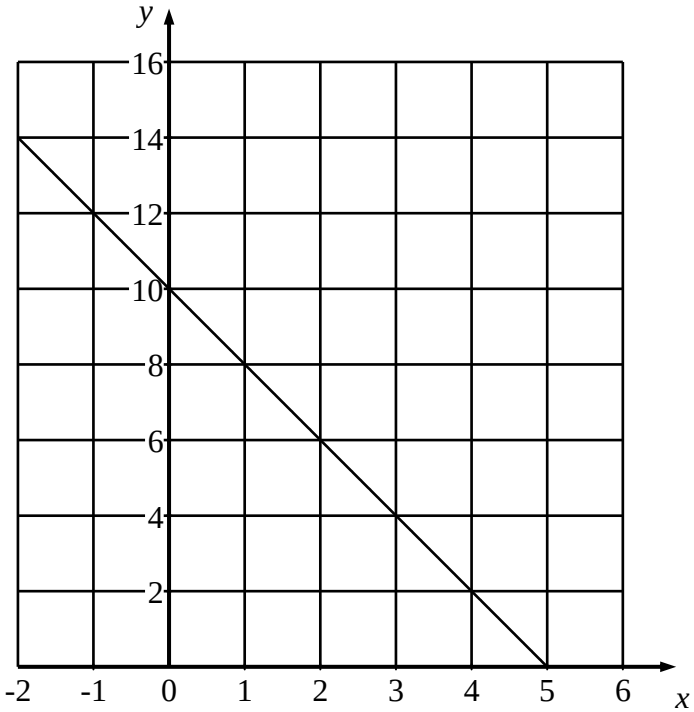
		Area of shape T = 2 × 4			A1 $\frac{25}{16}$ oe
17	a	$\frac{1}{7}\times\frac{6}{6}+\frac{1}{7}\times\frac{5}{6}+\frac{1}{7}\times\frac{4}{6}+\frac{1}{7}\times\frac{3}{6}+\frac{1}{7}\times\frac{2}{6}+\frac{1}{7}\times\frac{1}{6}$	$\frac{21}{42}$	4	M1 any one correct expression for a prob that the tile 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	$\frac{21}{42}-\frac{1}{7}\times\frac{1}{6}$	$\frac{20}{42}$	2	M1 '$\frac{21}{42}$'$-\frac{1}{7}\times\frac{1}{6}$ A1 $\frac{20}{42}$ oe
18	A	15 + 21 = 36	15 + 21 = 36	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
19	a	$1+\sqrt{2}+\sqrt{2}+\sqrt{2}\times\sqrt{2}$	$3+2\sqrt{2}$	2	M1 Correct 3 or 4 out of 4 terms correct A1 fully correct

	b	Substitute in LHS $3+2\sqrt{2}-2\ 1+\sqrt{2}$ = $3+2\sqrt{2}-2\sqrt{2}-2$	QED	2	M1 Substitute in LHS A1 cao
	c		$1-\sqrt{2}$	1	B1 cao

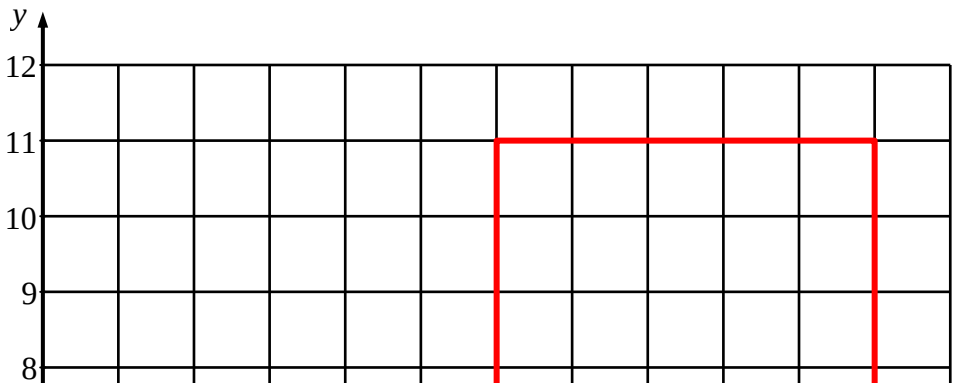
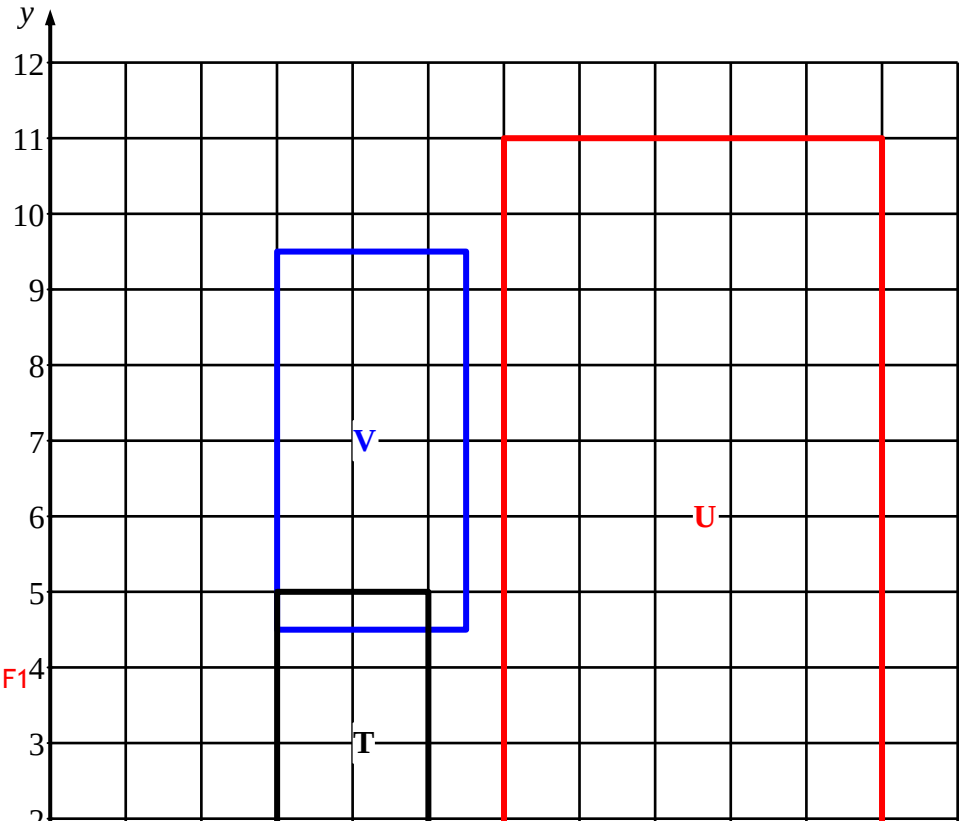
1.



9.



16. (a)



16(b)