



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Cycle 2025

Marking Scheme

Mathematics

Ordinary Level

Note to teachers and students on the use of published marking schemes

Marking schemes published by the State Examinations Commission are not intended to be standalone documents. They are an essential resource for examiners who receive training in the correct interpretation and application of the scheme. This training involves, among other things, marking samples of student work and discussing the marks awarded, so as to clarify the correct application of the scheme. The work of examiners is subsequently monitored by Advising Examiners to ensure consistent and accurate application of the marking scheme. This process is overseen by the Chief Examiner, usually assisted by a Chief Advising Examiner. The Chief Examiner is the final authority regarding whether or not the marking scheme has been correctly applied to any piece of candidate work.

Marking schemes are working documents. While a draft marking scheme is prepared in advance of the examination, the scheme is not finalised until examiners have applied it to candidates' work and the feedback from all examiners has been collated and considered in light of the full range of responses of candidates, the overall level of difficulty of the examination and the need to maintain consistency in standards from year to year. This published document contains the finalised scheme, as it was applied to all candidates' work.

In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with their Advising Examiners when in doubt.

Future Marking Schemes

Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in a given year. The Chief Examiner in any given year has the responsibility to determine how best to ensure the fair and accurate assessment of candidates' work and to ensure consistency in the standard of the assessment from year to year. Accordingly, aspects of the structure, detail and application of the marking scheme for a particular examination are subject to change from one year to the next without notice.

Structure of the marking scheme

Candidate responses are marked according to different scales, depending on the types of response anticipated. Scales labelled A divide candidate responses into two categories (correct and incorrect). Scales labelled B divide responses into three categories (correct, partially correct, and incorrect), and so on. The scales and the marks that they generate are summarised in this table:

Scale label	B	C	D
No of categories	3	4	5
5-mark scale	0, 2, 5	0, 2, 3, 5	0, 2, 3, 4, 5
10-mark scale	0, 5, 10	0, 3, 7, 10	0, 4, 6, 8, 10
15-mark scale			0, 4, 8, 12, 15

A general descriptor of each point on each scale is given below. More specific directions in relation to interpreting the scales in the context of each question are given in the scheme.

Marking scales – level descriptors

A-scales (two categories)

- incorrect response (no credit)
- correct response (full credit)

B-scales (three categories)

- response of no substantial merit (no credit)
- partially correct response (partial credit)
- correct response (full credit)

C-scales (four categories)

- response of no substantial merit (no credit)
- response with some merit (low partial credit)
- almost correct response (high partial credit)
- correct response (full credit)

D-scales (five categories)

- response of no substantial merit (no credit)
- response with some merit (low partial credit)
- response about half-right (mid partial credit)
- almost correct response (high partial credit)
- correct response (full credit)

In certain cases, typically involving incorrect rounding, omission of units, a misreading that does not oversimplify the work, or an arithmetical error that does not oversimplify the work, a mark that is one mark below the full-credit mark may also be awarded. This level of credit is referred to as *Full Credit –1*. Thus, for example, in Scale 10C, *Full Credit –1* of 9 marks may be awarded.

The only marks that may be awarded for a question are those on the scale above, or *Full Credit –1*.

A rounding penalty is applied only once in each question. A penalty for an omitted unit is applied only once in each question. There is no penalty for omitted units if the question specifies the unit to be used in the answer, and there is generally no penalty for an omitted euro symbol in questions involving money.

In general, accept a candidate's work in one part of a question for use in subsequent parts of the question, unless this oversimplifies the work involved.

Palette of annotations available to examiners

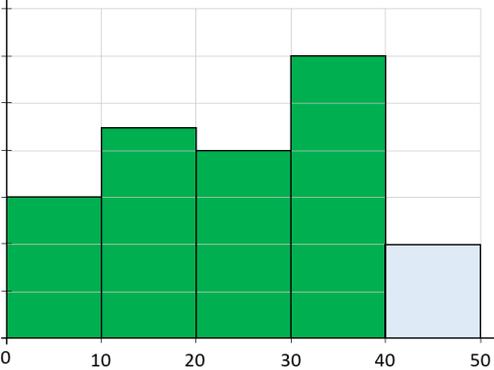
Symbol	Name	Meaning in the body of the work	Meaning when used in the right margin
	Tick	Work of relevance	The work presented in the body of the script merits full credit
	Cross	Incorrect work (distinct from an error)	The work presented in the body of the script merits 0 credit
	Star	Rounding / Unit / Arithmetic error Misreading	
	Horizontal wavy	Error	
	P		The work presented in the body of the script merits a partial credit for B scales
	L		The work presented in the body of the script merits low partial credit
	M		The work presented in the body of the script merits mid partial credit
	H		The work presented in the body of the script merits high partial credit
	F star		The work presented in the body of the script merits Full Credit (- 1)
	Left Bracket		Another version of this solution is presented elsewhere and it merits equal or higher credit
	Vertical wavy	No work on this page (portion of the page)	
WOM			The candidate has presented work or merit
	O	Oversimplified	

Model Solutions & Marking Notes

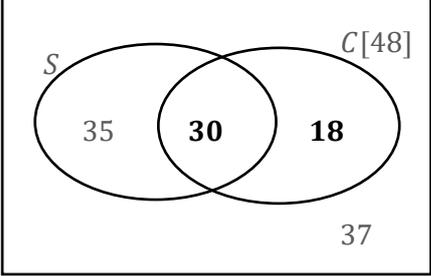
Note: The model solutions for each question are not intended to be exhaustive – there may be other correct solutions. Any Examiner unsure of the validity of the approach adopted by a particular candidate to a particular question should contact his / her Advising Examiner.

Q1	Model Solution – 20 marks	Marking Notes
(a)	<p>(i) 135</p> <p>(ii) $45 \cdot 88$ or $\frac{1147}{25}$ or $45 \frac{22}{25}$</p> <p>(iii) $3 \times (4) = 12$</p>	<p>Scale 10C (0, 3, 7, 10)</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • 1 part correct • Work of merit in part (iii) <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • 2 parts correct <p><i>Full Credit –1:</i></p> <ul style="list-style-type: none"> • Answer in part (ii) rounded
(b)	<p>(i) Jael: 20 Alice: 16 Paul: 15</p> <p>(ii) $\frac{20+16+15}{3} = \frac{51}{3} = 17$</p> <p style="text-align: center;">OR</p> <p>$\frac{16+12+11}{3} + 4$</p> <p>$= \frac{39}{3} + 4 = 13 + 4 = 17$</p>	<p>Scale 10D (0, 4, 6, 8, 10)</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, in (i), one value correct, or shifts all ages by the same incorrect amount; in (ii), adds three ages (now or in 4 years), or divides an age by 3 <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> • 1 part correct • Work of merit in both parts <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • 1 part correct and work of merit in other part

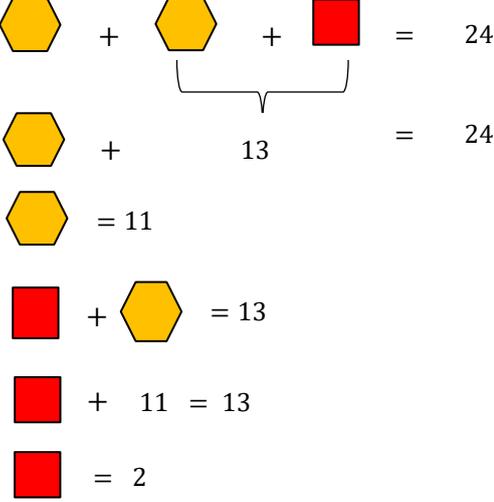
Q2	Model Solution – 15 marks	Marking Notes
(a)	$20 - 13.40 = 6.60$ $6.60 \div 3 = [\text{€}] 2.20$	<p>Scale 10B (0, 5, 10)</p> <p>Accept correct answer without unit</p> <p><i>Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, $20 - 13.40$ or 6.60
(b)	$3 + 2 = 5$ $\frac{1}{5}$ is $\frac{13.40}{5} = 2.68$ $\frac{3}{5}$ is $[\text{€}] 8.04 = \text{Noah}$ $\frac{2}{5}$ is $[\text{€}] 5.36 = \text{Amy}$	<p>Scale 5C (0, 2, 3, 5)</p> <p>Accept correct answers without units</p> <p>Accept correct answer in fraction form</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, $3 + 2 = 5$, or 3×13.40, or 2×13.40 <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • Finds Noah's or Amy's amount

Q3	Model Solution – 20 marks	Marking Notes
(a)		<p>Scale 10C (0, 3, 7, 10)</p> <p>For 10 – 20 bar, accept height h where $16 < h < 20$</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, 1 bar correct or correct height(s) indicated on graph <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • 3 bars correct <p><i>Full Credit –1:</i></p> <ul style="list-style-type: none"> • Heights all correct but one or more bars an incorrect width.
(b) (c)	<p>(b) $12 + 18 + 16 + 24 + 8 = 78$</p> <p>(c) $12 + 18 = 30$</p>	<p>Scale 10D (0, 4, 6, 8, 10)</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, in (b), adds two relevant numbers; in (c), gives 12 or 18 as answer <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> • 1 part correct • Work of merit in both parts <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • 1 part correct and work of merit in other part

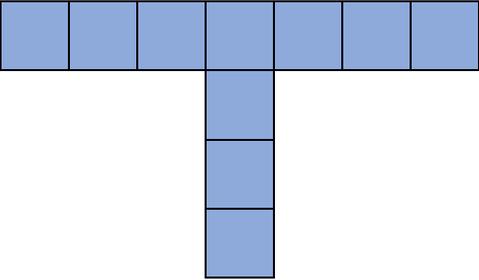
Q4	Model Solution – 10 marks	Marking Notes
(a)	$100 \times 60 = 6000 \text{ [cm}^2\text{]}$	<p>Scale 5B (0, 2, 5)</p> <p>Accept correct answer without unit</p> <p><i>Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example writes down the correct formula
(b)	$A = \pi r^2 = \pi 21^2$ $= 441\pi$ $= 1385.4 \dots = 1385 \text{ [cm}^2\text{]}$ <p style="text-align: right;">[nearest cm²]</p>	<p>Scale 5B (0, 2, 5)</p> <p>Accept correct answer without unit</p> <p><i>Partial Credit:</i></p> <ul style="list-style-type: none"> • Subs 21 into the formula • Finds 441 <p><i>Full Credit –1:</i></p> <ul style="list-style-type: none"> • Apply a * for incorrect or no rounding • 441π

Q5	Model Solution – 20 marks	Marking Notes
<p>(a) (b)</p>	<p>(a)</p>  <p>(b) 37</p>	<p>Scale 15D (0, 4, 8, 12, 15)</p> <p>Consider answer as having three parts:</p> <p>(a) finds $\#(C \cap S)$ (a) finds $\#(C \setminus S)$ (b) 37</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit in one part <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> • 1 part correct Note that, if $\#(S \cap C)$ is incorrect but $\#C = 48$ for the candidate's values, then $\#(C \setminus S)$ is considered correct. <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • 2 parts correct
<p>(c) (d)</p>	<p>(c) 35 play sport but not computer games (or equivalent)</p> <p>(d) $\frac{35+18}{120} = \frac{53}{120}$</p>	<p>Scale 5D (0, 2, 3, 4, 5)</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit in 1 part, for example, in (c), one relevant part of statement (states "35 play sport" or states "35 don't play computer games"), or gives explanation for $C \setminus S$; in (d), $35 + 18$, or any number from the Venn diagram divided by 120 <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> • 1 part correct • Work of merit in both parts <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • 1 part correct and work of merit in the other part <p><i>Full Credit –1:</i></p> <ul style="list-style-type: none"> • Apply a * if (d) is left as $\frac{35+18}{120}$

Q6	Model Solution – 15 marks	Marking Notes
(a)	$3 \times 4 = 12$ <p style="text-align: center;">OR</p> <i>Lists the different choices / draws tree diagram, and states 12</i>	<p>Scale 5B (0, 2, 5)</p> <p><i>Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, states one choice other than yellow and B; draws a sketch of a tree diagram
(b)	<p>2, 2, 7, 10, 14</p> <p>[2 + 12 = 14]</p>	<p>Scale 10D (0, 4, 6, 8, 10)</p> <p>Numbers do not need to be given in order of magnitude</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, shows understanding of mode, median, or range. <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> • 1 out of mode, median, and range correct <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • 2 out of mode, median, and range correct

Q7	Model Solution – 15 marks	Marking Notes
(a)	<p>(i) $\frac{21}{3} = 7$</p> <p>(ii) $7 + \text{triangle} + 7 = 18$ triangle = 4</p>	<p>Scale 10C (0, 3, 7, 10)</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • (i) correct • Work of merit in (ii), for example, substitutes answer from (i) into (ii). <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • (i) correct and work of merit in (ii) • (ii) correct (based on incorrect answer in (i))
(b)	 <p>  +  +  = 24 } 13 </p> <p>  + 13 = 24  = 11  +  = 13  + 11 = 13  = 2 </p>	<p>Scale 5C (0, 2, 3, 5)</p> <p><i>Low Partial Credit</i></p> <ul style="list-style-type: none"> • Work of merit, for example, values that work in one equation <p><i>High Partial Credit</i></p> <ul style="list-style-type: none"> • Finds value of hexagon or square

Q8	Model Solution – 30 marks	Marking Notes
(a)	<p>(i) 8, 12, 24, 30, or 60</p> <p>(ii) 12, 24, 36, 48, 60, 72, ... 15, 45, 60, 75, ... LCM: 60</p> <p style="text-align: center;">OR</p> <p>12 = 2 × 2 × 3 15 = 3 × 5 LCM = 2 × 2 × 3 × 5 = 60</p>	<p>Scale 10D (0, 4, 6, 8, 10)</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, in (i) gives an even number not in table; in (ii) states a multiple of 12 or 15 greater than 12 or 15, respectively; in (ii) gives a prime factor of 12 or 15 <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> • (i) correct and work of merit in (ii) • in (ii), finds a common multiple of 12 and 15 that is not the LCM <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • (i) correct and, in (ii), finds a common multiple of 12 and 15 that is not the LCM • (ii) correct
(b)	1, 2, 3, 4, 6, 9, 12, 18, 36	<p>Scale 5D (0, 2, 3, 4, 5)</p> <p>Factors do not need to be given in order of magnitude.</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, 1 correct factor, or indicates division of 36 by one of the given factors <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> • 2 or 3 factors correct <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • 4 factors correct

Q8	Model Solution – 30 marks	Marking Notes										
(c)(i) (ii)	<p>(i)</p>  <p>(ii)</p> <table border="1" data-bbox="328 689 786 1122"> <thead> <tr> <th>Pattern</th> <th>Number of squares</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1</td> </tr> <tr> <td>2</td> <td>4</td> </tr> <tr> <td>3</td> <td>7</td> </tr> <tr> <td>4</td> <td>10</td> </tr> </tbody> </table>	Pattern	Number of squares	1	1	2	4	3	7	4	10	<p>Scale 10D (0, 4, 6, 8, 10)</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, in (i), more than 5 squares in the horizontal part, or more than 3 in the vertical part; in (ii), 1 value correct <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> • (i) or (ii) correct • Work of merit in both (i) and (ii) <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • 1 part correct and work of merit in the other part
Pattern	Number of squares											
1	1											
2	4											
3	7											
4	10											
(c)(iii)	<p>Answer: Linear</p> <p>Reason: It goes up by 3 each time <i>or any other valid reason</i></p>	<p>Scale 5B (0, 2, 5)</p> <p>Note that pattern candidate produces in (ii) may be non-linear, leading to “non-linear” being the correct answer here.</p> <p><i>Partial Credit:</i></p> <ul style="list-style-type: none"> • Answer correct • Work of merit in justification, for example, gets 1 first difference for the “Number of squares” column 										

Q9	Model Solution – 15 marks	Marking Notes
<p>(a)</p> <p>(b)</p>	<p>$100 + 6 \times 25 = 100 + 150 = [\text{€}] 250$</p> <p>(b)(i) $\frac{3}{100} \times 130 = [\text{€}] 3.90$</p> <p>(b)(ii) $130 + 3.90 = [\text{€}] 133.90$</p>	<p>Scale 10D (0, 4, 6, 8, 10)</p> <p>Accept correct answers without units</p> <p>Accept answers given as fractions in (b)</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, indicates two numbers with a relevant operation, for example, in (a) $100 + 25$; in (b)(i), 3×130 or $\frac{3}{100}$ <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> • 1 part correct <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • 2 parts correct • One part correct and work of merit in the other two parts
<p>(c)</p>	<p>$\frac{124.56 - 120}{120} \times 100 = \frac{4.56}{120} \times 100 = 3.8 \text{ [%]}$</p> <p style="text-align: center;">OR</p> <p>$\frac{124.56}{120} \times 100 = 103.8 \text{ [%]}$</p> <p>So interest = 3.8 [%]</p>	<p>Scale 5C (0, 2, 3, 5)</p> <p>Accept correct answer without % sign</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Indicates two numbers with a relevant operation, for example, $124.56 - 120$ or $\frac{124.56}{120}$ or 4.56 • Some understanding of percentages <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • Correct answer without supporting work • Indicates three numbers with two relevant operations, for example, $\frac{124.56 - 120}{120}$ or $\frac{124.56}{120} \times 100$ or $\frac{4.56}{120}$

Q10	Model Solution – 20 marks	Marking Notes
<p>(a) (b)</p>	<p>(a) $3(2) + 7(11) = 6 + 77 = 83$</p> <p>(b) $10a - 6 - 4a + 7$ $= 6a + 1$</p>	<p>Scale 10D (0, 4, 6, 8, 10)</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, in (a), substitutes in correctly for p or q; in (b), indicates distribution of 2, or grouping of like terms <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> • 1 part correct • Work of merit in both parts <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • 1 part correct and work of merit in the other
<p>(c) (d)</p>	<p>(c) $8y - 2y = -8 - 4$ $6y = -12$ $y = -2$</p> <p>(d) $(x - 3)(x - 7)$</p>	<p>Scale 10D (0, 4, 6, 8, 10)</p> <p>Consider solution to (c) as consisting of 3 steps: Step 1. y's to one side, constant terms to other Step 2. Writes $ay = b$ Step 3. Finds y</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, in (c), carries out one operation correctly, or attempts some transposition; in (d), x, 7, or a minus in the 2nd bracket <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> • 2 steps correct in (c) • 1 step correct in (c) and work of merit in (d) • (d) correct <p><i>High partial Credit:</i></p> <ul style="list-style-type: none"> • (c) correct • 2 steps correct in (c) and work of merit in (d) • (d) correct and work of merit in (c)

Q11	Model Solution – 20 marks	Marking Notes
(a)(i) (ii)	<p>(i) Distance on diagram = 3 [cm] Actual distance = $3 \times 0.5 = 1.5$ [m]</p> <p>(ii) 10 cm so $10 \times 0.5 = 5$ m</p>	<p>Scale 10C (0, 3, 7, 10)</p> <p>Accept correct answer without units, or with incorrect units, in (i)</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, in (i), 1 value correct, or in (ii), length of 1 side found in cm or m <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • Part (i) or (ii) correct • Work of merit in both parts <p><i>Full Credit –1:</i></p> <ul style="list-style-type: none"> • Apply a * for a missing or incorrect unit in (ii)
(a)(iii)	<p>3 m → 6 cm 1.5 m → 3 cm</p> <p><i>Rectangle measuring 6 cm by 3 cm drawn on the diagram so that it does not overlap with the shed or the flower bed.</i></p>	<p>Scale 5C (0, 2, 3, 5)</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, line segment of 6 cm or 3 cm drawn, or one correct conversion <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • Finds 6 cm and 3 cm • Rectangle of correct size drawn, but overlaps with shed or flower bed, or goes outside the garden • Rectangle drawn in an appropriate place on the diagram, where sides are not correct lengths but are in ratio 1: 2
(b)	<p>$3 \div 0.3 = 10$ $1.5 \div 0.3 = 5$ $10 \times 5 = 50$</p> <p style="text-align: center;">OR</p> $\frac{3 \times 1.5}{0.3 \times 0.3} = \frac{4.5}{0.09} = 50$	<p>Scale 5C (0, 2, 3, 5)</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, indicates two numbers with a correct operation, for example, $3 \div 0.3$ or 3×1.5; mentions 5 or 10 <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • Correct answer without supporting work

Q12	Model Solution – 20 marks	Marking Notes
(a)	$19:50 + 0:45 = 19:95 = 20:35$	<p>Scale 5C (0, 2, 3, 5)</p> <p><i>Low Partial Credit</i></p> <ul style="list-style-type: none"> • Work of merit, for example, splits 45 into 10 and 35, or indicates 0:45 <p><i>High Partial Credit</i></p> <ul style="list-style-type: none"> • 19:95
(b)	<p>(i)</p> $V = 28 \times 25 \times 4 = 2800 \text{ cm}^3$ <p>(ii)</p> $A = 2 \times [(25 \times 28) + (25 \times 4) + (28 \times 4)]$ $= 2 \times [700 + 100 + 112]$ $= 2 \times 912$ $= 1824 \text{ [cm}^2\text{]}$	<p>Scale 10D (0, 4, 6, 8, 10)</p> <p>Accept correct answer without unit in (ii)</p> <p><i>Low Partial Credit</i></p> <ul style="list-style-type: none"> • Work of merit, for example, indicates two numbers with a relevant operation, for example, in either part, 28×25, or in (ii), 2×25 <p><i>Mid Partial Credit</i></p> <ul style="list-style-type: none"> • (i) correct • In (ii), finds area of two faces (this can be area of one face doubled) • Work of merit in both parts <p><i>High Partial Credit</i></p> <ul style="list-style-type: none"> • (i) correct and, in (ii), finds area of two faces • In (ii), finds area of 4 faces, or finds area of three unique faces and does further relevant work <p><i>Full Credit –1:</i></p> <ul style="list-style-type: none"> • Apply a * for no or incorrect unit in (i)
(c)	<p>Answer: London</p> <p>Calculations: <i>Any calculations sufficient to support a conclusion, for example:</i></p> $14 \times 0.93 = 13.02$ <p style="text-align: center;">OR</p> $\frac{12}{0.93} = 12.9 \dots$ <p style="text-align: center;">OR</p> $\frac{12}{14} = 0.85 \dots$	<p>Scale 5B (0, 2, 5)</p> <p><i>Partial Credit:</i></p> <ul style="list-style-type: none"> • Answer correct • Calculations sufficient to support a correct conclusion, but no or incorrect answer given • Work of merit in calculations, for example, multiplies or divides by 0.93

Q13	Model Solution – 30 marks	Marking Notes
(a)	10 min → 3 km 60 mins → 18 km so 18 [km/hour] <p style="text-align: center;">OR</p> $S = D \div T = 3 \div \left(\frac{1}{6}\right) = 18 \text{ [km/hour]}$ <p style="text-align: center;">OR</p> $60 \div \left(\frac{10}{3}\right) = 18$	<p>Scale 5C (0, 2, 3, 5)</p> <p>Accept correct answer without unit</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, states 60, or states $S = D \div T$ <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • $3 \div \left(\frac{1}{6}\right)$ • Calculates speed in km/minute
(b)(i) (ii)	<p>(i) 110 [minutes]</p> <p>(ii) $90 - 10 = 80$ mins = 1 hour 20 mins</p>	<p>Scale 10D (0, 4, 6, 8, 10)</p> <p>Accept correct answers without unit (so, for example, in (ii), answer could be 1: 20)</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, some relevant work on the graph; in (ii), mentions 10 or 90 <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> • (i) correct and work of merit towards (ii) <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • (ii) correct • (i) correct and, in (ii), one error otherwise correct <p><i>Full Credit –1:</i></p> <ul style="list-style-type: none"> • Apply a * for answer in (i) in hours and minutes only • Apply a * for answer in (ii) left in minutes
(b)(iii)	<p>Answer: to training Reason: The graph is steeper</p> <p style="text-align: center;">OR</p> <p style="text-align: center;">He took less time</p> <p style="text-align: center;">OR</p> <p style="text-align: center;">The slope is bigger [in magnitude] <i>or any other valid reason</i></p>	<p>Scale 5B (0, 2, 5)</p> <p><i>Partial Credit:</i></p> <ul style="list-style-type: none"> • Answer correct • Work of merit in reason, for example, mentions slope, steepness, or time taken

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(c)	<p>(i) $\frac{18}{60}$ or $\frac{3}{10}$ or 0.3</p> <p>(ii) $\frac{17+15}{60} = \frac{32}{60}$ or $\frac{8}{15}$ or 0.5333 ...</p>	<p>Scale 10D (0, 4, 6, 8, 10)</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, correct numerator or denominator identified in either part; 17 + 15 indicated in (ii) <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> • (i) correct • Work of merit in both parts <p><i>High Partial Credit</i></p> <ul style="list-style-type: none"> • (i) correct and work of merit in (ii) • (ii) correct

Q14	Model Solution – 20 marks	Marking Notes
(a)(i)	$A = (3, 2)$ $B = (3, -1)$	<p>Scale 10C (0, 3, 7, 10)</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, one x- or y-co-ordinate correct, or co-ordinates for one point swapped but otherwise correct <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • 1 point correct • Co-ordinates for both points swapped but otherwise correct
(a)(ii)- (iv)	<p>(ii) 3</p> <p>(iii) Point C plotted and labelled</p> <p>(iv) $\frac{\text{Rise}}{\text{Run}} = \frac{-3}{7}$</p> <p style="text-align: center;">OR</p> $\frac{-1-2}{3-(-4)} = \frac{-3}{7} \text{ or } \frac{2-(-1)}{-4-3} = \frac{-3}{7}$	<p>Scale 5D (0, 2, 3, 4, 5)</p> <p>Consider solution as requiring 4 steps:</p> <p>Step 1. Part (ii) Step 2. Part (iii) Step 3. Work of merit in (iv) Step 4. Part (iv) completed</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, some correct substitution into a correct formula or extracting correct formula from tables; indication of rise and run in (iv) <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> • 2 steps • One step correct and work of merit in another <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • 3 steps <p><i>Full Credit –1:</i></p> <ul style="list-style-type: none"> • Apply a * for C plotted but not labelled • Apply a * for $AB = \sqrt{9}$

Q14	Model Solution – 20 marks	Marking Notes
(b)	<p>(i) $\tan X = \frac{12}{24}$</p> <p>(ii) $X = \tan^{-1}\left(\frac{12}{24}\right) = 26.5 \dots = 27[^\circ]$ $[\in \mathbb{N}]$</p>	<p>Scale 5C (0, 2, 3, 5)</p> <p>Accept correct answer without unit</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> • Work of merit, for example, labels opposite or adjacent; states $t = \frac{o}{a}$ <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> • 1 part correct <p><i>Full Credit –1:</i></p> <ul style="list-style-type: none"> • Apply a * for incorrect or no rounding in (ii) • Apply a * for calculator in incorrect mode.