



**Coimisiún na Scrúduithe Stáit**  
State Examinations Commission

**Junior Cycle 2023**

**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, 3, 4, 5	0, 2, 3, 4, 5
10-mark scale	0, 5, 10	0, 3, 7, 10	0, 3, 5, 8, 10
15-mark scale	0, 10, 15	0, 5, 10, 15	0, 4, 8, 12, 15
20-mark scale			0, 5, 10, 15, 20

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, where necessary.

### Marking scales – level descriptors

#### 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.

### Summary of mark allocations and scales to be applied

**Question 1 (25)**

- (a) 15C
- (b) 10D

**Question 2 (10)**

10C

**Question 3 (15)**

- (a)(b) 10C
- (c) 5C

**Question 4 (20)**

- (a) 5B
- (b) 5B
- (c) 5B
- (d)(e) 5D

**Question 5 (20)**

- (a) 10B
- (b) 5B
- (c) 5C

**Question 6 (25)**

- (a) 15C
- (b)(c)(d) 10C

**Question 7 (20)**

- (a)(b) 15B
- (c) 5C

**Question 8 (20)**

- (a) 5C
- (b) 10C
- (c)(d)(e) 5D

**Question 9 (25)**

- (a)(b)(c) 15D
- (d) 5C
- (e) 5C

**Question 10 (20)**

- (a) (b) 20D

**Question 11 (10)**

10D

**Question 12 (20)**

- (a) 10B
- (b)(c) 10D

**Question 13 (25)**

- (a) 10C
- (b) 5C
- (c) 10C

**Question 14 (15)**

- (a) 10C
- (b) (c) 5D

## 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	
	<b>P</b>		The work presented in the body of the script merits a partial credit for B scales
	<b>L</b>		The work presented in the body of the script merits low partial credit
	<b>M</b>		The work presented in the body of the script merits mid partial credit
	<b>H</b>		The work presented in the body of the script merits high partial credit
	<b>F</b> 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)	
	Oversimplify	The candidate has oversimplified the work	
WOM		The candidate has presented work of merit	

**Note:** Where work of substance is presented in the body of the script, the annotations on the right margin should reflect a combination of annotations in the work.

In a **C scale** that is not marked using steps, where \* and and appear in the body of work, then should appear in the right margin.

In a **D scale** with the same annotations, should appear in the right margin.

A is in the body of the work may indicate a portion of work that has value and has merited one of the levels of merit in the marking scheme. The level of credit is then indicated in the right margin.

## Detailed marking notes

### 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 – 25 Marks	Marking Notes
<b>(a)</b>	<p><b>(i)</b> 491</p> <p><b>(ii)</b> 23.8</p> <p><b>(iii)</b> <math>16 \times 3 = 48</math></p>	<p><b>Scale 15C (0, 5, 10, 15)</b></p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Some work of merit</li> <li>• 1 part correct</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• First 2 parts correct</li> </ul>
<b>(b)</b>	<p><math>3 \times 1.27 = 3.81</math></p> <p><math>4 \times 1.10 = 4.40</math></p> <p><math>0.5 \times 12 = 6</math></p> <p>Total = 14.21</p>	<p><b>Scale 10D (0, 3, 5, 8, 10)</b></p> <p>Accept answers with no or incorrect unit.</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Work of merit, for example, converts 500 grams to kg.</li> <li>• 1 part of the first 2 parts correct</li> </ul> <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• First 2 parts correct</li> <li>• Cost of ham correct</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• 3 parts correct</li> <li>• Cost of ham and <b>one</b> other part correct</li> <li>• Milk and scones correct and adds correctly</li> </ul> <p><i>Full Credit -1</i></p> <ul style="list-style-type: none"> <li>• Adds incorrectly</li> </ul>

Q2	Model Solution – 10 Marks	Marking Notes
	<p>Any valid solution, for example, visually (by discounting matching numbers of bags and marbles), trial and improvement, or using algebra. For example:</p> $2b + 4 = b + 10$ $b = 6$	<p><b>Scale 10C (0, 3, 7, 10)</b></p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Work of merit, for example, some effort at trial and improvement</li> <li>• Some notation on diagram</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Sets up the correct equation</li> </ul>

Q3	Model Solution – 15 Marks	Marking Notes
<p><b>(a) &amp; (b)</b></p>	<p><b>(a)</b> <math>C \cap I = 20</math> on Venn diagram  <math>I \setminus C = 41 - 20 = 21</math> on Venn diagram</p> <p><b>(b)</b> 55</p>	<p><b>Scale 10C (0, 3, 7, 10)</b></p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Work of merit, for example, one correct entry in the Venn diagram</li> <li>• A relevant calculation, for example, <math>75 - 20 = 55</math></li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• 2 values in Venn diagram</li> <li>• (b) correct and work of merit in (a)</li> </ul>
<p><b>(c)</b></p>	<p>80 students don't like Chinese food, or similar.</p>	<p><b>Scale 5C (0, 3, 4, 5)</b></p> <p><i>Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Explains part of the statement in context, for example:  "The people who do not like Chinese food" or "80 people"</li> </ul>

Q4	Model Solution – 20 Marks	Marking Notes
(a)	3 [cm]	<p><b>Scale 5B (0, 2, 5)</b> Accept a tolerance of <math>\pm 0.2</math> cm</p> <p><i>Partial Credit:</i></p> <ul style="list-style-type: none"> <li>Some work of merit, for example, measures the length of a diagonal or measures the vertical height of the hexagon</li> </ul> <p><i>Full Credit -1</i></p> <ul style="list-style-type: none"> <li>Answer given in mm</li> </ul>
(b)	$6 \times 3 = 18$ [cm]	<p><b>Scale 5B (0, 2, 5)</b> Accept answer from (a)</p> <p><i>Partial Credit:</i></p> <ul style="list-style-type: none"> <li>Some work of merit, for example, sums the lengths of 2 sides.</li> <li>Finds the product of the 6 sides</li> </ul>
(c)	$18 \times 2 = 36$ [m]	<p><b>Scale 5B (0, 2, 5)</b></p> <p><i>Partial Credit:</i></p> <ul style="list-style-type: none"> <li>Divides the perimeter by 2 to find the actual perimeter</li> </ul>
(d) & (e)	<p>(d) <math>560 \times 0.75 = 420</math></p> <p>(e) <math>\frac{90-80}{80} \times 100 = 12.5\%</math></p>	<p><b>Scale 5D (0, 2, 3, 4, 5)</b></p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>Converts 75% to a decimal</li> <li>Calculates the increase in the number of students</li> <li><math>560 \times 75</math></li> </ul> <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> <li>1 part correct</li> <li>Work of merit in both parts</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>1 part correct <b>and</b> work of merit in the other part</li> </ul> <p><i>Full Credit -1</i></p> <ul style="list-style-type: none"> <li>Increase written as a percentage of the number of students in 2020</li> </ul>



Q5	Model Solution – 20 Marks	Marking Notes						
(a)	<p>(i) 21%</p> <p>(ii) Twitter</p>	<p><b>Scale 10B (0, 5, 10)</b></p> <p><i>Partial Credit:</i></p> <ul style="list-style-type: none"> <li>(a)(i) or (a)(ii) correct</li> </ul>						
(b)	<p>Diagram appropriately filled in:</p> <p>WhatsApp:</p> <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="text-align: center; padding: 5px;"><i>Several times a day</i></td> <td style="text-align: center; padding: 5px;"><i>About once a day</i></td> <td style="text-align: center; padding: 5px;"><i>Less often</i></td> </tr> <tr> <td style="text-align: center; padding: 5px;"></td> <td style="text-align: center; padding: 5px;"></td> <td style="text-align: center; padding: 5px;"></td> </tr> </table>	<i>Several times a day</i>	<i>About once a day</i>	<i>Less often</i>				<p><b>Scale 5B (0, 2, 5)</b></p> <p>Accept answers between <b>51%</b> and <b>74%</b> for ‘Several times a day’ and the other two sections equal.</p> <p><i>Partial Credit:</i></p> <ul style="list-style-type: none"> <li>Work of merit, for example, ‘About once a day’ and ‘Less often’ sections equal.</li> </ul>
<i>Several times a day</i>	<i>About once a day</i>	<i>Less often</i>						
								
(c)	<p>Answer: A</p> <p>Reason: He pays at the start of each month, so it goes up in steps</p> <p style="text-align: center;"><b>OR</b></p> <p>He doesn’t pay continuously over the month</p> <p><i>Or any other valid reason.</i></p>	<p><b>Scale 5C (0, 3, 4, 5)</b></p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>Answer correct, with no justification</li> <li>Work of merit in reason, for example, “The amount increases over time”</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>Correct answer, ‘A’.</li> </ul>						

Q6	Model Solution – 25 Marks	Marking Notes																		
(a)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; text-align: center;">1A</td> <td style="width: 33%; text-align: center;">1B</td> <td style="width: 33%; text-align: center;">1C</td> </tr> <tr> <td style="text-align: center;">2A</td> <td style="text-align: center;">2B</td> <td style="text-align: center;">2C</td> </tr> <tr> <td style="text-align: center;">3A</td> <td style="text-align: center;">3B</td> <td style="text-align: center;">3C</td> </tr> <tr> <td style="text-align: center;">4A</td> <td style="text-align: center;">4B</td> <td style="text-align: center;">4C</td> </tr> <tr> <td style="text-align: center;">5A</td> <td style="text-align: center;">5B</td> <td style="text-align: center;">5C</td> </tr> <tr> <td style="text-align: center;">6A</td> <td style="text-align: center;">6B</td> <td style="text-align: center;">6C</td> </tr> </table>	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	6C	<p><b>Scale 15C (0, 5, 10, 15)</b></p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• One correct entry</li> <li>• Work of merit</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• 10 correct entries</li> </ul> <p><i>Full Credit –1:</i></p> <ul style="list-style-type: none"> <li>• 14 correct entries</li> </ul>
1A	1B	1C																		
2A	2B	2C																		
3A	3B	3C																		
4A	4B	4C																		
5A	5B	5C																		
6A	6B	6C																		
(b), (c) & (d)	<p>(b) 18</p> <p>(c) 2B, 4B, 6B</p> <p>(d) <math>\frac{3}{18}</math> or <math>\frac{1}{6}</math></p>	<p><b>Scale 10C (0, 3, 7, 10)</b></p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• 1 part correct</li> <li>• Work of merit in any part</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• 2 parts correct</li> <li>• 1 part correct and work of merit in the other 2 parts</li> </ul> <p><i>Full Credit –1:</i></p> <ul style="list-style-type: none"> <li>• Excludes given values (i.e. uses a total of 15 possible outcomes), otherwise correct</li> </ul>																		

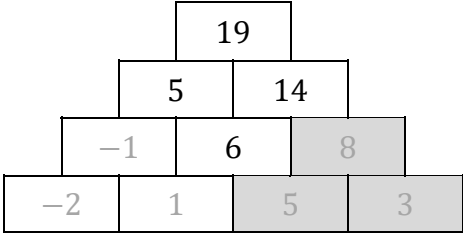
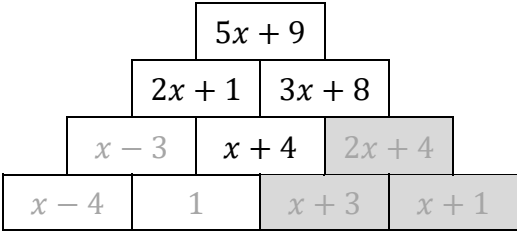
Q7	Model Solution – 20 Marks	Marking Notes
(a) & (b)	<p>(a) 3</p> <p>(b) Any combination of 5 letters. Does not have to be a recognisable word, for example, “Ghoti”</p>	<p><b>Scale 15B (0, 10, 15)</b></p> <p><i>Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• One correct part</li> </ul>
(c)	$5 - 3 \times 3 + 2 \times 5^2 = 46$	<p><b>Scale 5C (0, 3, 4, 5)</b></p> <p><i>Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Any correct substitution</li> </ul>

Q8	Model Solution – 20 Marks	Marking Notes
(a)	$\frac{58 + 60}{2} = 59[^\circ]$	<p><b>Scale 5C (0, 3, 4, 5)</b></p> <p><i>Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Relevant statement, such as, “it is the number in the middle”</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Ranks the measurements in increasing order</li> <li>• Identifies 58 or 60</li> <li>• Finds the mean or the mode</li> </ul>
(b)	<p>Answer: different</p> <p>Reason: The mode is the most frequent number, so the mean will be smaller.</p> <p style="text-align: center;"><b>OR</b></p> <p style="text-align: center;">Mode = <math>63^\circ</math>, mean = <math>59.25^\circ</math></p> <p style="text-align: center;"><i>Or any other valid reason</i></p>	<p><b>Scale 10C (0, 3, 7, 10)</b></p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Writes down the mode</li> <li>• Finds the sum of the measurements</li> <li>• Divides an incorrect sum by 12</li> <li>• Correct answer</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Correct answer, and some work of merit in reason</li> </ul> <p><i>Full Credit -1</i></p> <ul style="list-style-type: none"> <li>• Incorrect answer, but finds the mean and the mode</li> </ul>
(c), (d) & (e)	<p>(c) <math>\frac{x}{4}</math></p> <p>(d) <math>1.539 \dots = 1.54</math> [2 decimal places]</p> <p>(e) <math>6.16 + 1.42 = 7.58</math> [m]</p>	<p><b>Scale 5D (0, 2, 3, 4, 5)</b></p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Some work of merit, identifies the opposite or adjacent sides</li> <li>• Finds <math>\sin 57^\circ</math> or <math>\cos 57^\circ</math></li> </ul> <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• 1 part correct and work of merit in another part</li> <li>• Work of merit in all 3 parts</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• 2 parts correct</li> <li>• 1 part correct and work of merit in the other 2 parts</li> </ul> <p><i>Full Credit -1</i></p> <ul style="list-style-type: none"> <li>• Calculator in rad or grad mode, but otherwise correct</li> </ul>

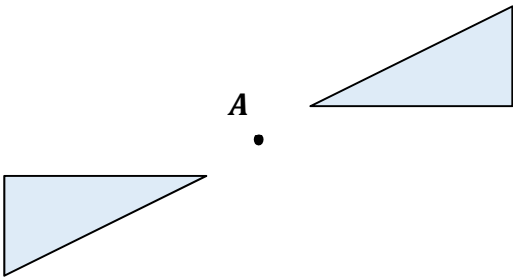
Q9	Model Solution – 25 Marks	Marking Notes
(a), (b) & (c)	<p>(a) Line drawn from (0, 3) to (9, 9)</p> <p>(b) 6</p> <p>(c) Correct values filled into table (5 and 9, respectively), and supporting work on diagram.</p>	<p><b>Scale 15D (0, 4, 8, 12, 15)</b></p> <p>Treat as requiring 4 steps: (a), (b), and two values in (c).</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Work of merit</li> </ul> <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• 2 parts correct</li> <li>• 1 part correct and work of merit in 2 parts</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• 3 parts correct</li> <li>• 2 parts correct and work of merit in 2 parts</li> </ul> <p><i>Full Credit –1:</i></p> <ul style="list-style-type: none"> <li>• All correct, but no supporting work on graph for (c)</li> </ul>
(d)	<p>Each month, the mean weight of the babies goes up by <math>\frac{2}{3}</math> kg</p> <p><i>Or any other valid explanation</i></p>	<p><b>Scale 5C (0, 3, 4, 5)</b></p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Work of merit, for example, some reference increasing in (d)</li> </ul>
(e)	$y = \frac{2}{3}(18) + 3 = 12 + 3 = 15 \text{ kg}$	<p><b>Scale 5C (0, 3, 4, 5)</b></p> <p><i>Low Partial credit:</i></p> <ul style="list-style-type: none"> <li>• Any substitution of <math>x</math> in the given equation</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Substitution of 18 for <math>x</math> in the equation</li> <li>• Any addition of 3 in evaluation</li> </ul> <p><i>Full Credit -1</i></p> <ul style="list-style-type: none"> <li>• All correct but unit omitted or incorrect</li> </ul>

Q10	Model Solution – 20 Marks	Marking Notes
(a) & (b)	<p>(a)  <math>V = \pi(4)^2(11) = \pi(16)(11) = 176\pi</math>  [cm<sup>3</sup>]</p> <p>(b)  <math>4 + 21 = 25</math></p> $\frac{4}{25} \times 450 = 72$ [g]	<p><b>Scale 20D (0 ,5, 10, 15, 20)</b></p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Work of merit in one part</li> </ul> <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Full correct substitution in (a)</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• (a) or (b) correct</li> <li>• Work of merit in both parts</li> </ul> <p><i>Full Credit –1:</i></p> <ul style="list-style-type: none"> <li>• Answer of 176, that is, omits <math>\pi</math></li> <li>• Finds grams of yoghurt, that is, 378</li> </ul>

Q11	Model Solution – 10 Marks	Marking Notes
	<p>Correct graph drawn, that is, the following temperatures on each vertical gridline, joined by straight lines: 10, 7·5, 7·5, 15, 15, 15, 10.</p>	<p><b>Scale 10D (0, 3, 5, 8, 10)</b></p> <p>Tolerance: for 7·5, allow any value between 5 and 10. Allow reasonable freehand joining of points.</p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Some work of merit, for example, one correct point calculated</li> </ul> <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• At least two points correct</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Substantial work of merit, for example, all temperatures calculated, but plotted incorrectly</li> </ul> <p><i>Full Credit –1:</i></p> <ul style="list-style-type: none"> <li>• One point incorrect, otherwise correct</li> <li>• All points plotted correctly but not joined or joined incorrectly</li> </ul>

Q12	Model Solution – 20 Marks	Marking Notes
(a)		<p><b>Scale 10B (0, 5, 10)</b></p> <p><i>Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• 1 value correct</li> </ul> <p><i>Full Credit –1:</i></p> <ul style="list-style-type: none"> <li>• 3 values correct</li> </ul>
(b) & (c)	<p>(b)</p>  <p>(c) <math>x = 2</math> with some supporting work. For example: <math>x - 4 = -2</math> <math>x = 4 - 2 = 2</math></p>	<p><b>Scale 10D (0, 3, 5, 8, 10)</b></p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Some work of merit, for example, one correct box</li> </ul> <p><i>Mid Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• 3 correct boxes in (b)</li> <li>• (c) correct</li> <li>• Work of merit in both parts</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• (b) correct</li> <li>• (c) correct and work of merit in (b)</li> </ul>



Q13	Model Solution – 25 Marks	Marking Notes
(a)	$x^2 = 5^2 + 12^2$ $x^2 = 25 + 144$ $= 169$ $x = \sqrt{169}$ $= 13$	<p><b>Scale 10C (0, 3, 7, 10)</b></p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>Indicates squaring of any relevant term</li> <li>Theorem of Pythagoras correctly stated</li> <li>Finds <math>144 - 25 = 119</math></li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>Correct answer without work</li> <li>Terms squared correctly in correct theorem</li> <li>Solves <math>x^2 = 119</math>, i.e., <math>x = \sqrt{119} = 10.90 \dots</math></li> </ul>
(b)	<p>Correct image drawn:</p> 	<p><b>Scale 5C (0, 3, 4, 5)</b></p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>Some work of merit</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>Correct size and orientation, but incorrect position</li> <li>Carries out a transformation other than specified one (for example, axial symmetry, rotation, central symmetry in a different point)</li> <li>Incorrect triangle, where one side is correct (size and position), and part of a second side is correct (size and position).</li> </ul>
(c)	<p>(i) <math>B = 180 - (27 + 60)</math> <math>B = 93^\circ</math></p> <p>(ii) It's not a right-angled triangle <i>Or another valid explanation</i></p>	<p><b>Scale 10C (0, 3, 7, 10)</b></p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>Some work of merit</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>(i) correct</li> <li>(ii) correct and work of merit in (i)</li> </ul>

Q14	Model Solution – 15 Marks	Marking Notes
(a)	<p>(i) <math>3x - 2</math></p> <p>(ii) <math>2x</math></p> <p>(iii) <math>3(x + 2)</math></p>	<p><b>Scale 10C (0, 3, 7, 10)</b></p> <p><i>Low Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• Work of merit in one part, for example, <math>3x</math> or <math>-2</math> appear in (i)</li> <li>• 1 part correct</li> </ul> <p><i>High Partial Credit:</i></p> <ul style="list-style-type: none"> <li>• 2 parts correct</li> </ul>
(b) & (c)	<p>(b)</p> $3x(2x - 3) - 2(2x - 3)$ $= 6x^2 - 9x - 4x + 6$ $= 6x^2 - 13x + 6$ <p>(c)</p> $x^2 + 2x - 15 = (x + 5)(x - 3)$	<p><b>Scale 5D (0, 2, 3, 4, 5)</b></p> <p><i>Low Partial Credit</i></p> <ul style="list-style-type: none"> <li>• Some work of merit in 1 part, for example, sets up multiplication (including 2 arrows) or any correct multiplication in (b), or finds factors of <math>x^2</math> or <math>\pm 15</math> in (c)</li> </ul> <p><i>Mid Partial Credit</i></p> <ul style="list-style-type: none"> <li>• Work of merit in both parts</li> </ul> <p><i>High Partial Credit</i></p> <ul style="list-style-type: none"> <li>• 1 fully correct part</li> </ul>