2014 Mathematics

Intermediate 2 Units 1, 2 and 3
Paper 1 (Non-Calculator)

Finalised Marking Instructions

Part One: General Marking Principles for Mathematics Intermediate 2 Units 1, 2 and 3 Paper 1 (Non-calculator)

This information is provided to help you understand the general principles you must apply when marking candidate responses to questions in this Paper. These principles must be read in conjunction with the specific Marking Instructions for each question.

1. Marks must be assigned in accordance with the Marking Instructions. The main principle in marking scripts is to give credit for the skills demonstrated and the criteria met. Failure to have the correct method may not preclude a candidate gaining credit for the calculations involved or for the communication of the answer.

2. The answer to one part of a question, even if incorrect, must be accepted as a basis for subsequent dependent parts of the question. Full marks in the dependent part(s) may be awarded provided the question is not simplified.

3. The following should not be penalised:

- working subsequent to a correct answer (unless it provides firm evidence that the requirements of the question have not been met)
- omission or misuse of units (unless marks have been specifically allocated for the purpose in the marking scheme)
- bad form, eg sin $x° = 0{\cdot}5 = 30°$
- legitimate variation in numerical values/algebraic expressions

4. Solutions which seem unlikely to include anything of relevance must nevertheless be followed through. Candidates still have the opportunity of gaining one mark or more provided the solution satisfies the criteria for the mark(s).

5. Full credit should only be given where the solution contains appropriate working. Where the correct answer may be obtained by inspection or mentally, credit may be given, but reference to this will be made in the Marking Instructions.

6. In general markers will only be able to give credit for answers if working is shown. A wrong answer without working receives no credit unless specifically mentioned in the Marking Instructions. The rubric on the outside of the question papers emphasises that working must be shown.

7. Sometimes the method to be used in a particular question is explicitly stated; no credit should be given where a candidate obtains the correct answer by an alternative method.

8. Where the method to be used in a particular question is not explicitly stated, full credit must be given for alternative methods which produce the correct answer.

9. Do not penalise the same error twice in the same question.

10. A transcription error is taken to be the case where the candidate transcribes incorrectly from the examination paper to the answer book. This is not normally penalised except where the question has been simplified as a result.

11. Do not penalise inadvertent use of radians in trigonometry questions, provided their use is consistent within the question.

12. When multiple solutions are presented by the candidate **and** it is not clear which is intended to be the final one, mark all attempts and award the lowest mark.

Practical Details

The Marking Instructions should be regarded as a working document and have been developed and expanded on the basis of candidates' responses to a particular paper. While the guiding principles of assessment remain constant, details can change depending on the content of a particular examination paper in a given year.

1. Each mark awarded in a question is referenced to one criterion in the marking scheme by means of a bullet point.

2 Where a candidate has scored zero marks for any question attempted, "0" should be shown against the answer in the place in the margin.

3 Where a marker wishes to indicate how the marks have been awarded, the following should be used:

(a) Correct working should be ticked, ✓.

(b) Where working subsequent to an error is followed through and can be awarded marks, it should be marked with a crossed tick, ✓̸.

(c) Each error should be underlined at the point in the working where it first occurs.

4 Do not write any comments, words or acronyms on the scripts.

Part Two: Mathematics Intermediate 2: Paper 1, Units 1, 2 and 3 (Non-calculator)

Question			Marking Scheme Give 1 mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
1.			**Ans:** $y = \frac{3}{4}x + 3$	**3**	
			•^{1} process: find gradient		•^{1} $m = \frac{3}{4}$ (or equivalent)
			•^{2} process: state y-intercept or c in $y = mx + c$		•^{2} $c = 3$
			•^{3} communicate: state correct equation of straight line		•^{3} $y = \frac{3}{4}x + 3$

Notes:

1. For a correct answer without working — award 3/3
2. For $y = \frac{3}{4}x$ — award 1/3
3. Where m and/or c are incorrect the working must be followed through to give the possibility of awarding 1/3 or 2/3
4. If the equation is stated incorrectly and there is no working, 1/3 can be awarded for correct gradient or correct y-intercept
5. For an incorrect equation (ie both m and c incorrect) without working eg $y = 3x + \frac{3}{4}$ — award 0/3

Question	Marking Scheme Give 1 mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
2.	**Ans: $3x^2 - 5x - 10$**	**3**	
	•[1] process: start to multiply out brackets		•[1] evidence of 2 correct terms (eg $3x^2 - 15x$)
	•[2] process: complete process of multiplying out brackets		•[2] $3x^2 - 15x + 2x - 10$
	•[3] process: collect like terms which must include x^2 term		•[3] $3x^2 - 5x - 10$

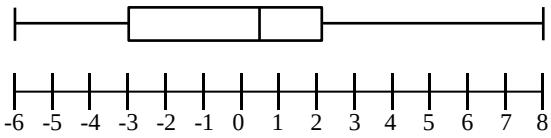
Notes:

1. The 3rd mark can only be awarded for a calculation involving positive and negative terms,
   eg for $3x^2 - 15x - 10 + 8x$ leading to $3x^2 - 7x - 10$, award 2/3 ✓×✓
   for $3x^2 + 2x - 10 + 8x$ leading to $3x^2 + 10x - 10$, award 1/3 ✓××

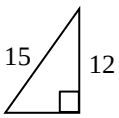
Question	Marking Scheme Give 1 mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
3.	**Ans: $\sqrt{60}$ centimetres**	**3**	
	•[1] process: substitute correctly into cosine rule		•[1] $q^2 = 7^2 + 5^2 - 2 \times 7 \times 5 \times \frac{1}{5}$
	•[2] process: start to evaluate cosine rule		•[2] any 2 correct terms from 49 + 25 − 14
	•[3] process: calculate PR correctly		•[3] $\sqrt{60}$

Notes:

1. For $q^2 = 7^2 + 5^2 - 2 \times 7 \times 5 \times \cos\frac{1}{5}$ leading to an answer of $\sqrt{60}$ award 2/3 ×✓✓
2. For use of Pythagoras' Theorem leading to $\sqrt{74}$ award 0/3

Question			Marking Scheme Give 1 mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
4.	**(a)**		**Ans: (i) 0·5ºC (ii) –3ºC (iii) 2ºC** •[1] communicate: state median •[2] communicate: state lower quartile •[3] communicate: state upper quartile	**3**	•[1] 0·5 •[2] –3 •[3] 2
Notes: 1. An incorrect answer for the median must be followed through with the possibility of awarding 2/3					
4	**(b)**		**Ans:**  •[1] communicate: correct endpoints •[2] communicate: correct box	**2**	•[1] endpoints at −6 and 8 •[2] box showing Q_2, Q_1 and Q_3
Notes: 1. The boxplot must be drawn to a reasonable scale.					
4	**(c)**		**Ans: (In general) the temperatures were higher in 2014 and temperatures in 2014 were less varied.** •[1] communicate: one valid statement •[2] communicate: second valid statement	**2**	•[1] valid statement •[2] valid statement
Notes: 1. **Do not accept:** "The median/mean/average was higher in 2014" "There was a smaller range of temperature in 2014" "The first boxplot was more spread out"					

Question	Marking Scheme Give 1 mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
5.	**Ans:** $9\sqrt{10}$ •[1] process: simplify $\sqrt{40}$ •[2] process: simplify $\sqrt{90}$ •[3] process: state answer in simplest form	**3**	 •[1] $2\sqrt{10}$ •[2] $3\sqrt{10}$ •[3] $9\sqrt{10}$
Notes: 1. For a correct answer without working award 0/3 2. For subsequent incorrect working, the final mark is not available.			
6.	**Ans:** $a = 5$ •[1] strategy: know to substitute $(-3, 45)$ into $y = ax^2$ •[2] process: solve equation for a	**2**	 •[1] $45 = a(-3)^2$ •[2] $a = 5$
Notes: 1. For a correct answer without working award 2/2			
7.	**Ans:** $a = 3, b = 1$ •[1] communicate: state value of a •[2] communicate: state value of b	**2**	 •[1] $a = 3$ •[2] $b = 1$
Notes: 1. For an answer of $y = 3\sin x^o$ award 2/2 2. For an answer of $a = 1$, $b = 3$ award 1/2			

Question			Marking Scheme Give 1 mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
8.	**(a)**		**Ans: (2, −5)** •[1] process: state first coordinate of TP •[2] process: state second coordinate of TP	**2**	 •[1] (2, …) •[2] (…, −5)
Notes: 1. For an answer of $x = 2, y = -5$ award 1/2 2. For an answer of 2, −5 award 1/2 3. For an answer of (−5, 2) award 0/2					
8.	**(b)**		**Ans: Minimum turning point** •[1] process: state nature of turning point	**1**	 •[1] minimum
9.			**Ans: 18 centimetres** •[1] strategy: marshall facts and recognise right angle •[2] strategy: know how to use Pythagoras •[3] process: correct calculation of PA^2 •[4] process: find length of PQ	**4**	 •[1]  •[2] $15^2 - 12^2$ (= PA^2) •[3] 81 •[4] 18

TOTAL MARKS FOR PAPER 1
30

[END OF MARKING INSTRUCTIONS]