



2013 Mathematics

Intermediate 2 Units 1, 2 & 3 Paper 1

Finalised Marking Instructions

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**Part One: General Marking Principles for: Mathematics Intermediate 2 Units 1, 2 & 3
Paper 1**

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 $\sin x^\circ = 0.5 = 30^\circ$
 - 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.

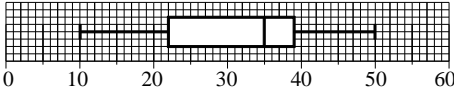
1. Each mark awarded in a question is referenced to one criterion in the marking scheme by means of a bullet point.
2. Where a candidate has scored zero marks for any question attempted, "0" should be shown against the answer in the place in the margin.
3. Where a marker wishes to indicate how the marks 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

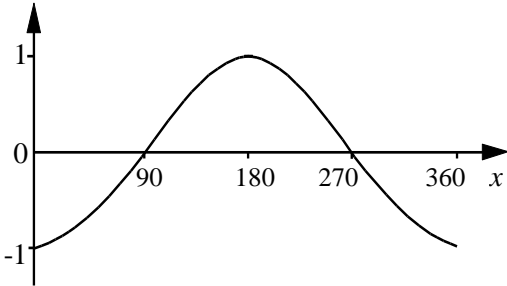
Question		Marking Scheme Give 1 mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
1		Ans: $b(6a - 7c)$ • ¹ process: factorise correctly	1	• ¹ $b(6a - 7c)$
2		Ans: $y = -\frac{4}{3}x + 4$ • ¹ process: state y-intercept or c in $y = mx + c$ • ² process: find gradient • ³ process: state correct equation of line	3	• ¹ $c = 4$ • ² $m = -\frac{4}{3}$ • ³ $y = -\frac{4}{3}x + 4$
Notes: <ol style="list-style-type: none"> For a correct answer without working award 3/3 For $y = -\frac{4}{3}x$ award 1/3 Where m and/or c is calculated incorrectly the working must be followed through with a possibility of awarding 1/3 or 2/3 If the equation is stated incorrectly and there is no working, 1/3 can be awarded for correct gradient or correct y-intercept For an incorrect equation (ie both m and c are incorrect) without working eg $y = 4x - \frac{4}{3}$ award 0/3 				

Question		Marking Scheme Give 1 mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
3		<p>Ans: 6.28 cm</p> <p>•¹ strategy: know to express arc as fraction of a circle</p> <p>•² strategy: know how to find length of arc</p> <p>•³ process: correctly calculate length of arc</p>	3	<p>•¹ $\frac{72}{360}$</p> <p>•² $\frac{72}{360} \times 3.14 \times 2 \times 5$</p> <p>•³ 6.28</p>
<p>Notes:</p> <p>1. For $\frac{72}{360} \times 3.14 \times 5^2$ leading to 15.7 award 2/3</p> <p>2. For the award of the final mark, calculations must involve 3.14 and be of equivalent difficulty</p>				
4		<p>Ans: $x = 4, y = -2$</p> <p>•¹ process: scale system of equations</p> <p>•² process: solve for one variable</p> <p>•³ process: solve for other variable</p>	3	<p>•¹ $10x - 5y = 50$ $4x + 5y = 6$</p> <p>•² $x = 4$</p> <p>•³ $y = -2$</p>
<p>Notes:</p> <p>1. For a correct answer obtained from 2 tables of values or solving 2 equations graphically or trial and improvement award 0/3</p> <p>2. For a correct answer without working award 0/3</p> <p>3. Where an error occurs in scaling the system of equations, working must be followed through with the possibility of awarding 2/3</p> <p>4. An incorrect answer for the first variable must be followed through with the possibility of awarding 2/3</p>				

Question			Marking Scheme Give 1 mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
5			Ans: 121° • ¹ process: know that angle QTV is a right angle • ² process: know that angle in a semi-circle is a right angle • ³ process: calculate the size of angle PQR	3	• ¹ angle QTV = 90° or angle RTQ = 22° • ² angle TPQ = 90° or angle TRQ = 90° • ³ 121°
Notes: 1. For correct answer without working award 3/3 2. Angle QTV, angle RTQ, angle TPQ and angle TRQ may not be explicitly stated: they may be marked in a diagram and can be awarded the first and second marks, as appropriate 3. For the final mark to be awarded the size of the angle PQR must be stated explicitly					
6	a	i	Ans: Q₂ = 35 • ¹ communicate: state median	1	• ¹ 35
6	a	ii	Ans: Q₁ = 22 • ¹ communicate: state lower quartile	1	• ¹ 22
6	a	iii	Ans: Q₃ = 39 • ¹ communicate: state upper quartile	1	• ¹ 39

Question		Marking Scheme Give 1 mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
6	b	<p>Ans:</p>  <p>•¹ communicate: correct endpoints</p> <p>•² communicate: correct box</p>	2	<p>•¹ endpoints at 10 and 50</p> <p>•¹ box showing Q_1, Q_2, Q_3</p>
<p>Notes:</p> <p>1. Incorrect answers in part (a) must be followed through to give the possibility of awarding 2/2</p> <p>2. The boxplot must be drawn to a reasonable scale</p>				
6	c	<p>Ans: In general, the fourth year pupils spend more time on homework.</p> <p>There is less variation in the times spent on homework in fourth year than in first year.</p> <p>•¹ communicate: valid comment about the average time</p> <p>•² communicate: valid comment about the spread of times</p>	2	<p>•¹ comment</p> <p>•² comment</p>
<p>Notes:</p> <p>1. Do not accept:</p> <p>“The fourth years had a higher median than the first years”</p> <p>“There was a longer period of time spent on homework in the second boxplot”</p>				

Question		Marking Scheme Give 1 mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •									
7		<p>Ans: $\frac{(x+4)}{(x-5)}$</p> <ul style="list-style-type: none"> •¹ process: start to factorise denominator •² process: factorise denominator completely •³ process: correctly simplify fraction 	3	<ul style="list-style-type: none"> •¹ one correct factor •² $(x+4)(x-5)$ •³ $\frac{(x+4)}{(x-5)}$ 									
<p>Notes:</p> <p>1. Where the denominator has been factorised as:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">$(x+1)(x-20)$</td> <td style="width: 33%;">$(x-1)(x+20)$</td> <td style="width: 33%;"></td> </tr> <tr> <td>$(x+2)(x-10)$</td> <td>$(x-2)(x+10)$</td> <td></td> </tr> <tr> <td>$(x-4)(x+5)$</td> <td></td> <td style="text-align: right;">award 1/3</td> </tr> </table>					$(x+1)(x-20)$	$(x-1)(x+20)$		$(x+2)(x-10)$	$(x-2)(x+10)$		$(x-4)(x+5)$		award 1/3
$(x+1)(x-20)$	$(x-1)(x+20)$												
$(x+2)(x-10)$	$(x-2)(x+10)$												
$(x-4)(x+5)$		award 1/3											
8		<p>Ans: 180°</p> <ul style="list-style-type: none"> •¹ communicate: state period 	1	<ul style="list-style-type: none"> •¹ 180° 									
9	a	<p>Ans: (4, 20)</p> <ul style="list-style-type: none"> •¹ communicate: state clearly one coordinate •² communicate: state clearly coordinates of maximum turning point 	2	<ul style="list-style-type: none"> •¹ (4, y) or (x, 20) •² (4, 20) 									
<p>Notes:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 70%;">1. For an answer of $x = 4, y = 20$</td> <td style="text-align: right;">award 1/2</td> </tr> <tr> <td>2. For an answer of 4, 20</td> <td style="text-align: right;">award 1/2</td> </tr> <tr> <td>3. For an answer of (20, 4)</td> <td style="text-align: right;">award 0/2</td> </tr> </table>					1. For an answer of $x = 4, y = 20$	award 1/2	2. For an answer of 4, 20	award 1/2	3. For an answer of (20, 4)	award 0/2			
1. For an answer of $x = 4, y = 20$	award 1/2												
2. For an answer of 4, 20	award 1/2												
3. For an answer of (20, 4)	award 0/2												

Question		Marking Scheme Give 1 mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
9	b	Ans: $x = 4$ • ¹ communicate: state equation	1	• ¹ $x = 4$
Notes: 1. For an answer of (a) $x = 4$ and (b) (4, 20) award 2/2 for (a) award 0/1 for (b) 2. An incorrect answer in part (a) must be followed through 3. For an answer of 4 award 0/1				
10		Ans: The graph of $y = \sin(x - 90)^\circ$ from 0° to 360° 	3	• ¹ evidence from graph • ² evidence from graph eg sine graph from (0, -1) to (90, 0) or sine graph starting at (90, 0) • ³ evidence
Notes: 1. Disregard poor draughtsmanship 2. The 3 rd mark can be awarded for one cycle of any sine or cosine curve being drawn from 0° to 360°				

TOTAL MARKS FOR PAPER 1
30

[END OF MARKING INSTRUCTIONS]