



2010 Mathematics

Intermediate 2 – Units 1, 2 and 3 Paper 1

Finalised Marking Instructions

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General Marking Principles

These principles describe the approach to be taken when marking Intermediate 2 Mathematics papers. For more detailed guidance please refer to the notes which are included with the Marking Instructions.

- 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 a 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 s/he has awarded marks, the following should be used:
 - (a) Correct working should be ticked, ✓.
 - (b) Where working subsequent to an error is followed through, if otherwise correct 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.**

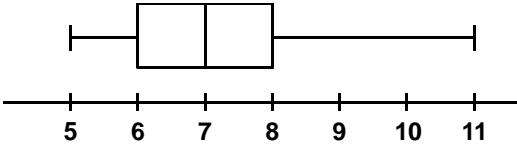
Mathematics Intermediate 2: Paper 1, Units 1, 2 and 3 (non-calc)

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
1.	<p>Ans: $y = -\frac{4}{3}x + 8$</p> <ul style="list-style-type: none"> •¹ process: find gradient •² process: state y-intercept or c in $y = mx + c$ •³ process: state correct equation of the line 	<ul style="list-style-type: none"> •¹ $m = -\frac{4}{3}$ (or equivalent) •² $c = 8$ •³ $y = -\frac{4}{3}x + 8$ <p style="text-align: right;">3 marks</p>

NOTES:

1. For correct answer without working award 3/3
2. For $y = -\frac{4}{3}x$ 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 $y = 8x - \frac{4}{3}$ award 0/3
6. Where a candidate has written the gradient correctly and gone on to 'simplify' it incorrectly, do not penalise eg for $m = -\frac{8}{6} = -1.2$
 $y = -1.2x + 8$ award 3/3

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •																								
2. (a)	<p>Ans:</p> <table border="1" data-bbox="336 277 903 546"> <thead> <tr> <th>Shoe size</th> <th>frequency</th> <th>cumulative frequency</th> </tr> </thead> <tbody> <tr><td>5</td><td>3</td><td>3</td></tr> <tr><td>6</td><td>4</td><td>7</td></tr> <tr><td>7</td><td>7</td><td>14</td></tr> <tr><td>8</td><td>3</td><td>17</td></tr> <tr><td>9</td><td>2</td><td>19</td></tr> <tr><td>10</td><td>0</td><td>19</td></tr> <tr><td>11</td><td>1</td><td>20</td></tr> </tbody> </table> <p>•¹ communicate: table with frequency column (must include 10 in 'shoe size')</p> <p>•² communicate: table with cumulative frequency column</p>	Shoe size	frequency	cumulative frequency	5	3	3	6	4	7	7	7	14	8	3	17	9	2	19	10	0	19	11	1	20	<p>•¹ 3, 4, 7, 3, 2, 0, 1 or correct tally marks</p> <p>•² 3, 7, 14, 17, 19, 19, 20</p> <p style="text-align: right;">2 marks</p>
Shoe size	frequency	cumulative frequency																								
5	3	3																								
6	4	7																								
7	7	14																								
8	3	17																								
9	2	19																								
10	0	19																								
11	1	20																								
NOTES:																										
(b)	<p>Ans: (i) 7 (ii) 6 (iii) 8</p> <p>(i)</p> <p>•¹ process: state median</p> <p>(ii)</p> <p>•¹ process: state lower quartile</p> <p>(iii)</p> <p>•¹ process: state upper quartile</p>	<p>•¹ 7</p> <p>•¹ 6</p> <p>•¹ 8</p> <p style="text-align: right;">3 marks</p>																								
<p>NOTES:</p> <p>1. Where the quartiles have been obtained from (a) 'Shoe size' leading to $Q_2 = 8, Q_1 = 6, Q_3 = 10$ or (b) 'Cumulative frequency' leading to $Q_2 = 17, Q_1 = 7, Q_3 = 19$ or similar</p> <p style="text-align: right;">award 0/3</p>																										

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
(c)	<p>Ans:</p>  <ul style="list-style-type: none"> •¹ communicate: correct end points •² communicate: correct box 	<ul style="list-style-type: none"> •¹ end points at 5 and 11 •² box showing Q_1, Q_2, Q_3 <p style="text-align: right;">2 marks</p>
<p>NOTES:</p> <ol style="list-style-type: none"> 1. Where the 5 figure summary is written <u>on</u> the boxplot, the diagram must be drawn to a reasonable scale. 		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
3.	Ans: 113·04 cubic centimetres • ¹ process: substitute correctly into the formula for the volume of a sphere • ² process: correct calculation	• ¹ $V = \frac{4}{3} \times 3 \cdot 14 \times 3^3$ • ² 113·04 2 marks
NOTES: 1. Alternative correct answers with working: $113 \cdot 4 \text{ cm}^3 (4 \times 1 \cdot 05 \times 3 \times 3 \times 3)$ $113 \cdot 01 \text{ cm}^3 (1 \cdot 333 \times 3 \cdot 14 \times 3 \times 3 \times 3)$ 2. The 2 nd mark is for a calculation involving a fraction, 3·14 and a power, eg for $\frac{4}{3} \times 3 \cdot 14 \times 3^2 = 37 \cdot 68$ award 1/2		
4. (a)	Ans: $(x + 3)(x - 2)$ • ¹ process: start to factorise the trinomial • ² process: complete factorisation	• ¹ one correct factor • ² $(x + 3)(x - 2)$ 2 marks
NOTES: 1. For the following answers award 1/2 $(x - 3)(x + 2)$ $(x + 6)(x - 1)$ $(x - 6)(x + 1)$		
(b)	Ans: $3x^3 + 17x^2 + 7x - 2$ • ¹ process: start to multiply out brackets • ² process: complete the process of multiplying out brackets • ³ process: collect like terms which must include a term in x^3	• ¹ evidence of 3 correct terms (eg $3x^3 + 15x^2 - 3x$) • ² $3x^3 + 15x^2 - 3x + 2x^2 + 10x - 2$ • ³ $3x^3 + 17x^2 + 7x - 2$ 3 marks
NOTES:		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
5.	Ans: – 9 • ¹ process: find the value of k	• ¹ – 9 <p style="text-align: right;">1 mark</p>
NOTES:		
6.	Ans: 8 centimetres • ¹ strategy: know to use the sine rule • ² process: correct substitution into sine rule • ³ process: correct calculation of AC	• ¹ $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ • ² $\frac{b}{\frac{1}{3}} = \frac{12}{\frac{1}{2}}$ • ³ 8 <p style="text-align: right;">3 marks</p>
NOTES: 1. For $\frac{b}{\sin \frac{1}{3}} = \frac{12}{\sin \frac{1}{2}}$ leading to an answer of 8 cm award 2/3		
7.	Ans: $p^5 - 1$ • ¹ process: start to remove brackets • ² process: complete removal of brackets and simplify	• ¹ p^5 • ² $p^5 - 1$ <p style="text-align: right;">2 marks</p>
NOTES: 1. For an answer of $p^5 - p^0$ award 1/2		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
8. (a)	Ans: -11 • ¹ process: calculate $b^2 - 4ac$	• ¹ -11 1 mark
NOTES:		
(b)	Ans: The square root of a negative number does not exist • ¹ communicate: state valid reason	• ¹ valid reason 1 mark
NOTES: 1. Another acceptable answer “Because it is negative”		
9.	Ans: 45 • ¹ communicate: state value of a	• ¹ 45 1 mark
NOTES: 1. Alternative correct answers: 405, -315		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
10. (a)	Ans: -5 • ¹ communicate: state value of a	• ¹ -5 <p style="text-align: right;">1 mark</p>
NOTES:		
(b)	Ans: (8, 0) • ¹ communicate: state the coordinates of Q	• ¹ (8, 0) <p style="text-align: right;">1 mark</p>
NOTES:		
10. (c)	Ans: -9 • ¹ strategy: substitute coordinates of P or Q into equation • ² process: calculate the value of b	• ¹ $0 = (2 - 5)^2 + b$ • ² -9 <p style="text-align: right;">2 marks</p>
NOTES: 1. Incorrect answers in parts (a) and (b) must be followed through with the possibility of awarding 2/2.		

TOTAL MARKS FOR PAPER 1 30

[END OF MARKING INSTRUCTIONS]