2012 Mathematics

Intermediate 2 – Units 1, 2 and Applications Paper 1

Finalised Marking Instructions

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 $\sin x° = 0.5 = 30°$
- 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.
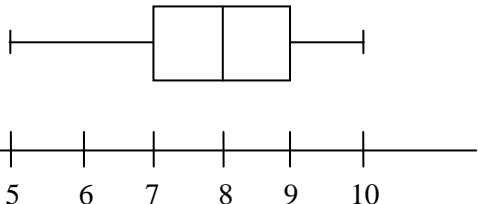
Practical Details

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.**

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

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
1	**Ans: £1 158 000 000 000** •[1] process: round correctly	•[1] 1 158 000 000 000 **1 mark**
NOTES:		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
2 (a)	**Ans: mark frequency cumulative frequency** 5 2 2 6 5 7 7 6 13 8 11 24 9 9 33 10 2 35 •[1] communicate: table with cumulative frequency column	•[1] 2,7,13,24,33,35 **1 mark**

NOTES:

(b)	**Ans: (i) 8 (ii) 7 (iii) 9** •[1] process: state median •[2] process: state lower quartile •[3] process: state upper quartile	•[1] 8 •[2] 7 •[3] 9 **3 marks**

NOTES:

1. Where the quartiles have been obtained from:
   (i)   *Marks* leading to $Q_2 = 7\cdot5$, $Q_1 = 6$, $Q_3 = 9$ award 0/3
   (ii) *Frequency* (unordered) leading to $Q_2 = 8\cdot5$, $Q_1 = 5$, $Q_3 = 9$ award 0/3
   (iii) *Frequency* (ordered) leading to $Q_2 = 5\cdot5$, $Q_1 = 2$, $Q_3 = 9$ award 0/3
   (iv) *Cumulative frequency* leading to $Q_2 = 18\cdot5$, $Q_1 = 7$, $Q_3 = 33$ award 0/3

(c)	**Ans:** 5 6 7 8 9 10 •[1] communicate: correct end points •[2] communicate: correct box	•[1] end points at 5 and 10 •[2] box showing Q_1, Q_2, Q_3 **2 marks**

NOTES:

1. The boxplot 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 (a)	**Ans: A(0, 12)** ●[1] communicate: state coordinates of A	●[1] (0, 12) **1 mark**
NOTES:		
(b)	**Ans: C(3, 8)** ●[1] strategy: know to substitute in expression ●[2] communicate: state coordinates of C	●[1] $4x + 3(8) = 36$ ●[2] (3, 8) **2 marks**
NOTES: 1. For a correct answer without working. award 2/2		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
4	**Ans: 34º** •¹ process: calculate size of angle OSR •² process: calculate size of angle PSR •³ process: calculate size of angle QRS	•¹ 90º •² 118º •³ 34º **3 marks**

NOTES:

1 Alternative methods

METHOD TWO (USING TRIANGLE ORS)

•¹   process: calculate size of angle OSR   •¹   90º

•²   process: calculate size of angle SOR   •²   56º

•³   process: calculate size of angle QRS   •³   34º

METHOD THREE (USING TRIANGLE QRS)

•¹   process: calculate size of angle OSR   •¹   90º

•²   process: calculate size of angle QSR and SQR   •²   28º AND 118º

•³   process: calculate size of angle QRS   •³   34º

2. For a correct answer without working   award 3/3

3. For marks 1 and 2, angles need not be explicitly stated. They may be marked on a diagram

4. For the final mark to be awarded, the size of angle QRS must be stated explicitly

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
5 (a)	**Ans: 20 160** •[1] process: calculate the mean	•[1] 20 160 **1 mark**
NOTES:		
(b)	**Ans: The median, with reason** •[1] communicate: state median with reason	•[1] median with reason **1 mark**

NOTES:

1. The reason must refer to the fact that the mean is affected by one very high attendance or that the median is closer to the majority of the attendances

2. SOME COMMON ANSWERS

"The median because it is close(r) to all except one of the attendances"   award 1/1
"The median because it is close(r) to most of the numbers"   award 1/1
"The median because it is close(r) to the numbers"   award 0/1

| 6. | **Ans: 1·7**

•[1] process: find upper quartile

•[2] process: find lower quartile

•[3] process: find interquartile range | •[1] 70

•[2] 68·3

•[3] 1·7

3 marks |

NOTES:

1.   For a correct answer without working   award 0/3

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
7	**Ans: 10 centimetres** •¹ strategy: substitute into correct formula •² process: correctly calculate BC	•¹ $20 = \frac{1}{2} \times a \times 16 \times \frac{1}{4}$ •² BC = 10 (cm) **2 marks**

NOTES:

1. For $(20 = \frac{1}{2} \times a \times 16 \times \sin\frac{1}{4})$ leading to an answer of 10 (cm)   award 1/2
2. For a correct answer without working   award 0/2

8 (a)	**Ans:** $(a + b)^2$ •¹ process: factorise $a^2 + 2ab + b^2$	•¹ $(a + b)^2$ **1 mark**

NOTES:

(b)	**Ans: 10 000** •¹ strategy: know to substitute in expression •² process: evaluate expression	•¹ $(94 + 6)^2$ •² 10 000 **2 marks**

NOTES:

1. <u>Alternative method for 1st mark</u>

   •¹ strategy: know correct order of operations   •¹ evidence

2. For a correct answer without working   award 0/2

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
9 (a)	**Ans:** **=D8*0·16** •[1] communicate: state formula	•[1] =D8*0·16 **1 mark**

NOTES:

   1. Accept E8 = D8*0·16

(b)	**Ans:** **=G8*0·05** •[1] communicate: state formula	•[1] =G8*0·05 **1 mark**

NOTES:

   1. An equals sign is required in each formula but its omission should not be penalised twice

(c)	**Ans:** **£53·37** •[1] process: calculate VAT •[2] process: calculate total cost	•[1] £2·54 •[2] £53·37 **2 marks**

NOTES:

1.   For a correct answer without working   award 0/2

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
10.	**Ans: 5 hours** •[1] strategy: know how to calculate basic hourly rate of pay •[2] strategy: know how to calculate overtime rate of pay •[3] strategy/ process: calculate number of hours overtime worked	•[1] $296 \div 40$ •[2] $(296 \div 40) \times 1{\cdot}5$ •[3] 5 **3 marks**

NOTES:

1.   For a correct answer without working   award 0/3

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TOTAL MARKS FOR PAPER 1
30

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[END OF MARKING INSTRUCTIONS]

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