2008 Mathematics

Intermediate 2 – Units 1, 2 and 3 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   Do not penalise a transcription error unless 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.

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	**Ans: gradient is 4** •[1] interpret: find gradient	•[1] 4 **1 mark**

NOTES:

   1.   For an answer of m = 4, c = 5   award 0/1

   2.   For 4x award 0/1

| 2 | **Ans: $3x^2 - 5x - 10$**

•[1]   process: start to multiply out brackets

•[2]   process: complete process of multiplying out brackets

•[3]   process: collect like terms which must include x^2 term | •[1]   evidence of 2 correct terms
(eg $3x^2 - 15x$)

•[2] $3x^2 - 15x + 2x - 10$

•[3] $3x^2 - 5x - 10$

3 marks |

NOTES:

Question No	Marking Scheme Give 1 mark for each ●	Illustrations of evidence for awarding a mark at each ●
3 (a)	**Ans: 12th** ●[1] interpret: interpret diagram	●[1] 12th **1 mark**
NOTES:		
(b)	**Ans: 5/20 or equivalent** ●[1] process: calculate probability	●[1] $\dfrac{5}{20}$ **1 mark**
NOTES: 1. Accept variations eg 5 : 20 0·25 25% 5 out of 20		

Question No	Marking Scheme Give 1 mark for each ●	Illustrations of evidence for awarding a mark at each ●
4 (a)	**Ans:** $(x+y)(x-y)$ ●¹ process: factorise correctly	●¹ $(x+y)(x-y)$ **1 mark**

NOTES:

(b)	**Ans: 86** ●¹ strategy: know to substitute in expression ●² process: evaluate expression	●¹ $(9\cdot3+0\cdot7)(9\cdot3-0\cdot7)$ ●² 86 **2 marks**

NOTES:

1. Alternative method

●¹ strategy: know how to evaluate expression	●¹ evidence of $9\cdot3 \times 9\cdot3$ $-0\cdot7 \times 0\cdot7$
●² process: evaluate expression	●² 86

2. For $9\cdot3^2 - 0\cdot7^2$
   $= 81\cdot9 - 4\cdot9$
   $= 77$, with no additional working, award 0/2

Question No	Marking Scheme Give 1 mark for each ●	Illustrations of evidence for awarding a mark at each ●
5 (a)	**Ans: 1, 3, 6, 11, 16, 22, 24, 25** ●[1] communicate: table with cumulative frequency column	●[1] 1, 3, 6, 11, 16, 22, 24, 25 **1 mark**

NOTES:

(b)	**Ans: $Q_2 = 4, Q_1 = 2 \cdot 5, Q_3 = 5$** ●[1] communicate: state median ●[2] communicate: state lower quartile ●[3] communicate: state upper quartile	●[1] $Q_2 = 4$ ●[2] $Q_1 = 2 \cdot 5$ ●[3] $Q_3 = 5$ **3 marks**

NOTES:

Where the quartiles have been obtained from

(i)   *Number of books* leading to
       $Q_2 = 3 \cdot 5, Q_1 = 1 \cdot 5, Q_3 = 5 \cdot 5$ award 0/3

(ii) *Frequency* (unordered) leading to
       $Q_2 = 5, Q_1 = 2 \cdot 5, Q_3 = 4$ award 0/3

(iii) *Frequency* (ordered) leading to
       $Q_2 = 2 \cdot 5, Q_1 = 1 \cdot 5, Q_3 = 5$ award 0/3

(iv) *Cumulative frequency* leading to
       $Q_2 = 13 \cdot 5, Q_1 = 4 \cdot 5, Q_3 = 23$ award 0/3

(c)	**Ans: $1 \cdot 25$** ●[1] process: calculate SIQR	●[1] $1 \cdot 25$ **1 mark**

NOTES:

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
(d)	**Ans: number of textbooks more spread out for girls** •[1] communicate: a valid statement	•[1] a valid statement **1 mark**

NOTES:

6	**Ans: 40 sq cm** •[1] strategy: know how to find area •[2] process: calculate area correctly	•[1] $area = \frac{1}{2} \times 16 \times 20 \times \frac{1}{4}$ •[2] 40 **2 marks**

NOTES:

1. For ($\frac{1}{2} \times 16 \times 20 \times \sin \frac{1}{4}$) leading to an answer of $40\,cm^2$ award 1/2

2. For an answer of $40\,cm^2$, without working   award1/2

3. For an answer of $160\,cm^2$ ($\frac{1}{2} \times 16 \times 20$)   award 0/2

Question No	Marking Scheme Give 1 mark for each ●	Illustrations of evidence for awarding a mark at each ●
7	**Ans: 19º** ●¹ process: state the size of ∠ABD ●² process: calculate the size of ∠BAD ●³ process: calculate the size of ∠BAC **3 marks**	●¹ 90º ●² 44º ●³ 19º

NOTES:

1. Alternative method

●² process: calculate the size of ∠BEA (where E is the point of intersection of AC and BD)	●² 71º

2. Angle ABD, angle BAD and angle BEA may not be explicitly stated, they may be marked in a diagram and can be awarded the first and second marks.

3. A correct answer, without working.   award 3/3

| 8 | **Ans: a = 5, b = 3**

 ●¹ communicate: state the value of a

 ●² communicate: state the value of b

 2 marks | ●¹ 5

 ●² 3 |

NOTES:

1. For a = 3, b = 5   award 1/2

Question No	Marking Scheme Give 1 mark for each ●	Illustrations of evidence for awarding a mark at each ●
9 (a)	**Ans: a = –5, b = 1** ●[1] communicate: state value of a ●[2] communicate: state value of b **2 marks**	●[1] –5 ●[2] 1

NOTES:

Question No	Marking Scheme Give 1 mark for each ●	Illustrations of evidence for awarding a mark at each ●
(b)	**Ans: $x = 5$** ●[1] communicate: correctly state equation of axis of symmetry **1 mark**	●[1] $x = 5$

NOTES:

  1. For any answer other than $x = 5$ award 0/1

Question No	Marking Scheme Give 1 mark for each ●	Illustrations of evidence for awarding a mark at each ●
(c)	**Ans: $P(0, 26), Q(10, 26)$** ●[1] communicate: state x-coordinates of P and Q ●[2] strategy: know how to find y-coordinate of P (or Q) ●[3] process: find coordinates of P and Q **3 marks**	●[1] (0, ?) and (10, ?) ●[2] $y = (0 - 5)^2 + 1$ ●[3] P (0, 26), Q (10, 26)

NOTES:

  1. Where a candidate substitutes both 0 and 10 into an incorrect equation leading to different y coordinates for P and Q, all 3 marks are available

  2. The third mark is available only when the y coordinates have been obtained by substitution into the quadratic equation

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
10	**Ans:** $\dfrac{4}{3}$ •[1] strategy: know to use $\sin x / \cos x = \tan x$ •[2] process: calculate tan correctly	•[1] $\tan x = 4/5 \div 3/5$ •[2] $\dfrac{4}{3}$ **2 marks**

TOTAL MARKS FOR PAPER 1
30

[END OF MARKING INSTRUCTIONS]