

2006 Mathematics

Intermediate 2 – Units 1, 2 and Applications 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 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

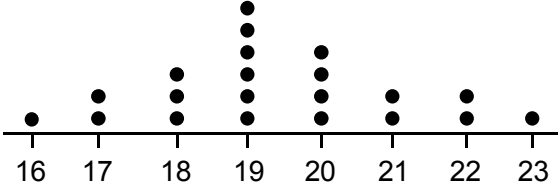
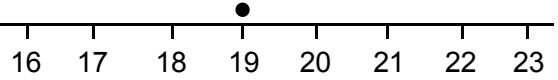
The Marking Instructions should be regarded as a working document and have been developed and expanded on the basis of candidates' responses to a particular paper. While the guiding principles of assessment remain constant, details can change depending on the content of a particular examination paper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

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
1 (a)	<p>Ans: $S = -4T + 130$</p> <ul style="list-style-type: none"> •¹ process: find gradient •² process: state y-intercept or c in $y = mx + c$ •³ communicate: state correct equation of straight line 	<ul style="list-style-type: none"> •¹ $m = -4$ (or equivalent) •² $c = 130$ •³ $S = -4T + 130$ <p style="text-align: right;">3 marks</p>
<p>NOTES:</p> <ul style="list-style-type: none"> 1 For correct answer without working award 3/3 2 For $y = -4x + 130$ award 3/3 3 For $S = -4T$ award 1/3 4 Where m and/or c are incorrect the working must be followed through to give the possibility of awarding 1/3 or 2/3 5 If the equation is stated incorrectly and there is no working, 1/3 can be awarded for correct gradient or correct y-intercept 6 For an incorrect equation (ie both m and c incorrect) without working eg $S = 130T - 4$ award 0/3 		
(b)	<p>Ans: £10</p> <ul style="list-style-type: none"> •¹ process: calculate sales using equation 	<ul style="list-style-type: none"> •¹ $-41 \times 30 + 130 = 10$ <p style="text-align: right;">1 mark</p>

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
2	<p>Ans: £294.40</p> <ul style="list-style-type: none"> •¹ strategy: know how to calculate basic pay •² strategy: know how to calculate overtime •³ process: calculate wage correctly 	<ul style="list-style-type: none"> •¹ $40 \times 6 \cdot 40 (= 256)$ •² $4 \times 1 \cdot 5 \times 6 \cdot 40 (= 38 \cdot 40)$ •³ £294.40 <p style="text-align: right;">3 marks</p>
<p>NOTES:</p> <ol style="list-style-type: none"> 1 For candidates who work out each day separately – Monday, Tuesday, Friday are each £51.20 Wednesday, Thursday are each £70.40 2 The third mark is available for a calculation involving both basic rate and overtime at time and a half 3 Some common wrong answers: <ul style="list-style-type: none"> • £275.20 ($40 \times 6 \cdot 40 + 2 \times 1 \cdot 5 \times 6 \cdot 40$) with working award 2/3 ✓×✓ • £345.60 ($3 \times 51 \cdot 20 + 2 \times 10 \times 1 \cdot 5 \times 6 \cdot 40$) with working award 2/3 ×✓✓ • £192 ($3 \times 51 \cdot 20 + 4 \times 1 \cdot 5 \times 6 \cdot 40$) with working award 2/3 ×✓✓ • £307.20 ($5 \times 51 \cdot 20 + 2 \times 25 \cdot 60$) with working award 1/3 ✓×× • £281.60 ($44 \times 6 \cdot 40$) with working award 1/3 ✓×× 		
3	<p>Ans: $2y^3 + 5y^2 - 14y + 3$</p> <ul style="list-style-type: none"> •¹ process: start to multiply out brackets •² process: complete the process of multiplying out brackets •³ process: collect like terms which must include y^3 	<ul style="list-style-type: none"> •¹ evidence of 3 correct terms (eg $2y^3 + 8y^2 - 2y$) •² $2y^3 + 8y^2 - 2y - 3y^2 - 12y + 3$ •³ $2y^3 + 5y^2 - 14y + 3$ <p style="text-align: right;">3 marks</p>

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
4 (a)	<p>Ans:</p>  <p>•¹ process: start to draw dotplot</p> <p>•² process: complete dotplot</p>	<p>•¹ evidence (see note)</p> <p>•² complete dotplot</p> <p style="text-align: right;">2 marks</p>
<p>NOTE:</p> <p>Minimum acceptable evidence for the award of the first mark</p> 		
(b)	<p>Ans: (i) 19 (ii) 18 (iii) 20.5</p> <p>•¹ communicate: state Q_2</p> <p>•² communicate: state Q_1</p> <p>•³ communicate: state Q_3</p>	<p>•¹ 19</p> <p>•² 18</p> <p>•³ 20.5</p> <p style="text-align: right;">3 marks</p>
(c)	<p>Ans: 15/21</p> <p>•¹ process: find probability</p>	<p>•¹ 15/21</p> <p style="text-align: right;">1 mark</p>
5	<p>Ans: 43 minutes</p> <p>•¹ interpret: correctly interpret diagram</p>	<p>•¹ 43 minutes</p> <p style="text-align: right;">1 mark</p>

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
6	Ans: 77° F • ¹ process: substitute correctly into formula • ² process: carry out calculations correctly	• ¹ $F = 32 + \frac{9}{5} \times 25$ • ² 77 2 marks
NOTE: A correct answer with no working award 2/2		
7	Ans: 40 square centimetres • ¹ process: substitute correctly into area formula • ² process: calculate area correctly	• ¹ $\frac{1}{2} \times 12 \times 10 \times 2/3$ • ² 40 2 marks
NOTES: 1 Alternative correct answers 40.2 cm ² ($\frac{1}{2} \times 12 \times 10 \times 0.67$) award 2/2 39.6 cm ² ($\frac{1}{2} \times 12 \times 10 \times 0.66$) award 2/2 2 ($\frac{1}{2} \times 12 \times 10 \times \sin \frac{2}{3}$) leading to an answer of 40cm ² award 1/2 3 For an answer of 40cm ² without working award 1/2 4 For an answer of 60cm ² ($\frac{1}{2} \times 12 \times 10$) award 0/2		
8 (a)	Ans: $-\frac{1}{2}$ • ¹ strategy: know how to find gradient • ² communicate: state gradient	• ¹ from diagram or $y = -\frac{1}{2}x + 3$ • ² $-\frac{1}{2}$ 2 marks
NOTE: Correct answer without working award 2/2		
(b)	Ans: 3 • ¹ communicate: state y-intercept	• ¹ 3 1 mark
NOTE: For an answer of (0,3) award 1/1		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
9	<p>Ans: $\sin 200^\circ, \sin 0^\circ, \sin 30^\circ$</p> <ul style="list-style-type: none"> •¹ communicate: state correct order •² communicate: state reason 	<ul style="list-style-type: none"> •¹ $\sin 200^\circ, \sin 0^\circ, \sin 30^\circ$ •² $\sin 200^\circ$ is negative and $\sin 30^\circ$ is positive or equivalent <p style="text-align: right;">2 marks</p>

10	<p>Ans: correctly drawn boxplot with lowest = 0, $Q_1 = 5.5 \pm 0.1, Q_2 = 7, Q_3 = 8, \text{highest} = 11$</p> <ul style="list-style-type: none"> •¹ interpret: showing lowest and highest on boxplot •² interpret: showing median on boxplot •³ interpret: showing lower quartile on boxplot •⁴ interpret: showing upper quartile on boxplot 	<ul style="list-style-type: none"> •¹ 0, 11 as endpoints •² 7 as median •³ 5.5 ± 0.1 as Q_1 •⁴ 8 as Q_3 <p style="text-align: right;">4 marks</p>
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NOTES:

- 1 Where a boxplot has not been drawn
 2/4 may be awarded for a correct 5- figure summary
 1/4 may be awarded for any three correct of the 5- figure summary

- 2 Where a candidate uses the wrong scale based on $\frac{1}{2}$ of 11, $\frac{1}{4}$ of 11, $\frac{3}{4}$ of 11
 3 marks out of 4 are available

 Award 3 marks for a **boxplot** based on
 $L = 10 \quad Q_1 = 55 \pm 5 \quad Q_2 = 250 \quad Q_3 = 805 \pm 5 \quad H = 1000$
 Partial marks may be awarded as follows:
 - 1 mark for end-points
 - 1 mark for Q_2
 - 1 mark for Q_1 and Q_3
 } marked on boxplot

- 3 Where a candidate uses the wrong scale based on $\frac{1}{2}$ of 12, $\frac{1}{4}$ of 12, $\frac{3}{4}$ of 12
 2 marks out of 4 are available

 Award two marks for a **boxplot** based on
 $L = 10 \quad Q_1 = 60 \quad Q_2 = 320 \quad Q_3 = 900 \quad H = 1000$
 Partial marks may be awarded as follows:
 - 1 mark for any 3 of the 5- figure summary marked on boxplot

TOTAL MARKS FOR PAPER 1
30

[END OF MARKING INSTRUCTIONS]