2009 Mathematics

Intermediate 1 Units 1, 2 & Apps Paper 2

Finalised Marking Instructions

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

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 for each candidate response must always be assigned in line with these general marking principles and the specific Marking Instructions for the relevant question. If a specific candidate response does not seem to be covered by either the principles or detailed Marking Instructions, and you are uncertain how to assess it, you must seek guidance from your Team Leader/Principal Assessor. You can do this by posting a question on the Marking Team forum or by e-mailing/phoning the emarker Helpline. Alternatively, you can refer the issue directly to your Team Leader by checking the 'Referral' box on the marking screen.

2. Marking should always be positive, i.e. marks should be awarded for what is correct and not deducted for errors or omissions.

3. Award one mark for each 'bullet' point shown in the Marking Instructions.

4. Working subsequent to an error must be followed through with the possibility of awarding all remaining marks for the subsequent working, provided the question has not been simplified as a result of the error. In particular, 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 has not been simplified.

5. 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 marks.

6. 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 Instructions)
- bad form, eg sin $x^o = 0{\cdot}5 = 30°$
- legitimate variation in numerical values/algebraic expressions.

7. 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.

8. In general only 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 page one of the question paper states that 'full credit will be given only where the solution contains appropriate working'.

9. 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.

10. 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.

11. Do not penalise the same error twice in the same question.

12. Do not penalise a transcription error unless the question has been simplified as a result.

13. Where a solution has been scored out and not replaced, then provided the solution is legible, marks should be awarded in line with the Marking Instructions for that question.

14. Where more than one solution is given, mark them all and award the least mark.

15. The symbols ✓ and × are used in the Marking Instructions to give guidance regarding the awarding of marks for specific candidate responses to some questions, eg 'award 2/4 ✓××✓' indicates that the 1st & 4th marks should be awarded but the 2nd & 3rd marks should not.

Part Two: Mathematics Intermediate 1: Paper 2, Units 1, 2 and Apps

Question			Expected Answer/s	Max Mark	Additional Guidance
1			**Ans: 225g** •[1] correct strategy: $60 \div 8 \times 30$ •[2] correctly divide then multiply: 225	2	1. Correct answer without working award 2/2 2. $60 \div 8 = 7{\cdot}5$ (no working necessary) award 1/2 3. (a) $30 \div 8 = 3{\cdot}75 \rightarrow 4 \times 60 = 240$ (working must be shown) award 1/2 ×✓ (b) $4 \times 60 = 240$ award 0/2
2	a		**Ans: 48** •[1] evaluate formula: 48	1	
2	b		**Ans: =C4/B4** •[1] state formula: C4/B4	1	1. '=' sign not required. 2. Accept (C4/B4), C4/12 or 384/B4 3. Do not accept C4÷B4, SUM(C4/B4) or 384/12
3			**Ans: £427·50** •[1] calculate interest: $^{14}/_{100} \times 4500 = 630$ •[2]•[3] calculate each payment: $(4500 + 630) \div 12 = 427{\cdot}5(0)$ [award 1 for correct method **or** see Additional Guidance.]	3	1. Correct answer without working award 3/3 2. Award 2/3 for (1st mark and 1 of the final 2 marks) (a) [no working necessary] (i) $4500 + 630 = 5130$ (b) [working must be shown] (i) $(4500 - 630) \div 12 = 322{\cdot}5(0)$ (ii) $4500 + (630 \div 12) = 4552{\cdot}5(0)$ (iii) $(4500 \div 12) + 630 = 1005$ 3. $630 \div 12 = 52{\cdot}5(0)$ award 1/3 ✓×× (no working necessary) 4. $4500 \div 12 = 375$ award 0/3 ×××

Question			Expected Answer/s	Max Mark	Additional Guidance
4	**a**		**1 | 9** **2 | 3789** **3 | 234788** **4 | 145** **5 | 0** •[1] stem correct: 1,2,3,4,5 •[2] all leaves on correct level: •[3] leaves ordered correctly:	**3**	1. Accept (a) use of commas as bad form (b) 0 and/or 6 in stem (c) stem in descending order (d) no line drawn between stem and leaves.
4	**b**		**Ans: 34** •[1] find median: 34	**1**	1. Accept 34 irrespective of answer to (a). 2. If stem and leaf diagram in (a) is **ordered** but has missing or additional leaves then accept median found from this diagram.
4	**c**		**Ans:** $\frac{\mathbf{4}}{\mathbf{15}}$ •[1] find probability: $\frac{\mathbf{4}}{\mathbf{15}}$	**1**	1. Accept 4:15, 4 out of 15, 4 in 15, 4-15, 0·26(…), 0·27, 26·6(…)%, 27% 2. If stem and leaf diagram has missing or additional leaves then accept probability found from this diagram.

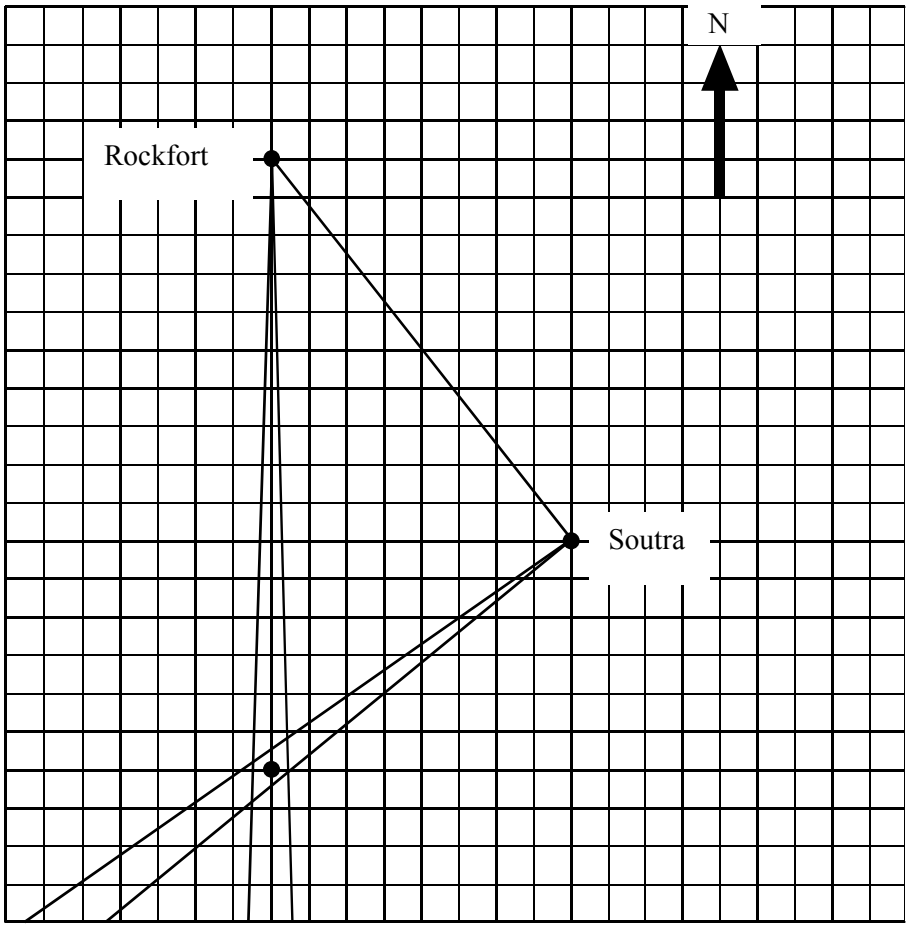
Question			Expected Answer/s	Max Mark	Additional Guidance
5			**Ans: 8·05 am** •[1] know how to find journey time: 3220 ÷ 560 •[2] find journey time: 5h 45m •[3] know how to find arrival time: 9·20(pm) + 5h45m + 5h •[4] find arrival time: 8·05(am)	**4**	1. Correct answer without working award 4/4 2. Minimum requirement for 4th mark: correctly adding a time involving hours and minutes to 9·20 3. Some common answers (no working necessary) (a) 8·05pm or 2005 award 3/4 ✓✓✓× (b) 9·20 + 5·45 − 5 = 10·05(pm) or 2205 award 3/4 ✓✓×✓ (c) 3220 ÷ 560 = 5·75 award 1/4 ✓××× (d) 5·45(am/pm) award 2/4 ✓✓×× (e) 5·45 + 5 = 10·45 award 2/4 ✓✓×× (f) 9·20 + 5 = 2·20 award 0/4 (g) 9·20 + 5·45 = 3·05(am) or 0305 award 3/4 ✓✓×✓ (h) 3·05pm or 1505 award 2/4 ✓✓××

Question			Expected Answer/s	Max Mark	Additional Guidance
6	**a**		**Ans: 150 cm^2** •^{1} know how to find total area of rectangular faces: $(6 \times 8{\cdot}5) + (6 \times 7{\cdot}5) + (6 \times 4)$ •^{2} know how to find area of a triangular face: $\frac{1}{2} \times 7{\cdot}5 \times 4$ •^{3} calculate surface area: 150	**3**	1. Correct answer without working award 3/3 2. A common answer (no working necessary) $51 + 45 + 24 + (30 \times 2) = 180$ award 2/3✓×✓
6	**b**		**Ans: 5 cm** •^{1} find area of one face: $150 \div 6 = 25$ •^{2} find length: $\sqrt{25} = 5$	**2**	1. Correct answer without working award 2/2 2. $\sqrt{150} = 12{\cdot}2\ldots$ award 1/2
7			**Ans: 24** •^{1} know how to find volume: $15 \times 10 \times 20$ •^{2} know how to find number of glasses: $(15 \times 10 \times 20) \div 125$ •^{3} carry out calculations correctly: 24	**3**	1. Correct answer without working award 3/3 2. Some common answers (no working necessary) 3000 [$15 \times 10 \times 20$] award 1/3 ✓××

Question			Expected Answer/s	Max Mark	Additional Guidance
8	**a**		**Ans: €1630** •[1] convert £1300 into euros: $1300 \times 1{\cdot}26 = 1638$ •[2] round to nearest appropriate 10: 1630	**2**	1. Correct answer without working award 2/2 2. 1030 [$1300 \div 1{\cdot}26 = 1031{\cdot}74\ldots \rightarrow 1030$] award 1/2 ×✓ (no working necessary)
8	**b**		**Ans: £1293·65** •[1] know how to convert answer to (a) into sterling: $1630 \div 1{\cdot}26$ •[2] convert answer to (a) into sterling rounded to nearest appropriate penny: 1293·65	**2**	1. Correct answer without working award 2/2 2. Alternative method: (working must be shown) (i) $1300 - (8 \div 1{\cdot}26) = 1293{\cdot}65$ award 2/2 (ii) $8 \div 1{\cdot}26 = 6{\cdot}35$ award 1/2 3. If (a) = 1640 then for (b) = 1301·58 or 1301·59 award 2/2 (no working necessary) 4. If (a) = 1030 then for (b) = (i) 817·46 [$1030 \div 1{\cdot}26$] (no working necessary) award 2/2 (ii) 1297·80 [$1030 \times 1{\cdot}26$] (no working necessary) award 1/2 ✓× [2nd mark is only available where answer has to be rounded or truncated to the nearest penny] 5. Some common answers (no working necessary) 1294, 1293·7(0), 1293·6(0) award 1/2 ✓×

Question			Expected Answer/s	Max Mark	Additional Guidance
9	**a**		**Ans: 85** •[1] find angle at centre of "cycle" sector: 34 •[2] know how to find number of pupils who cycled: $34 \div 360 \times 900$ or $900 \div 360 \times 34$ or $34 \div (360 \div 900)$ •[3] find number of pupils who cycled: 85	**3**	1. Correct answer without working award 3/3 2. 815 [car + bus + walk] award 2/3 ×✓✓ (no working necessary) 3. Some common answers (working must be shown) (a) 34% of 900 = 306 award 1/3 (b) 34 ÷ 360 = 0·094…. award 2/3 (c) 34 ÷ 360 = 0·09 award 1/3 (d) 900 ÷ 360 = 2·5 award 1/3 (e) 360 ÷ 900 × 34 = 13·6, 14 or 13 award 2/3 (f) 360 ÷ 900 = 0·4 award 0/3
9	**b**		**Ans: After the campaign ……** **…more walked** **…more cycled** **…fewer travelled by car** **…fewer travelled by bus** •[1] state any **one** of the above : •[2] state **another one** of the above:	**2**	1. Answer **must** imply comparison of **both** pie charts (a) increase, decrease, now, before, etc. ⇒ comparison eg award 2/2 for (i) **now** more walk and cycle (ii) more travelled by car or bus **before** (b) most, more, less ⇒ only one pie chart may have been considered eg award 0/2 for (i) more walk and cycle (ii) less travelled by car or bus 2. Disregard invalid statements

Question			Expected Answer/s	Max Mark	Additional Guidance
10	**a**		**Ans: 630 km** •[1] find distance: 630	**1**	1. The only acceptable answers are 610, 620, 630, 640, 650.
10	**b**		**Ans: see diagram** •[1] one bearing shown correctly (within limits shown) •[2] second bearing shown correctly (within limits shown) •[3] find point of intersection of two bearings	**3**	1. If lines RT and/or ST are not visible (a) and Tern Island is in correct position award 3/3 (b) and it is not possible to see if Tern Island is at the point of intersection of two bearings enter – (dash) and when you finish marking this script click on the 'Exception Script SQA' icon.



Question			Expected Answer/s	Max Mark	Additional Guidance
11			**Ans: 4%** •[1] find increase: 700 •[2] know to express increase as a fraction of 17500: $^{700}/_{17500}$ •[3] know to multiply fraction by 100: $^{700}/_{17500} \times 100$ •[4] carry out all calculations correctly: 4	**4**	1. Correct answer without working award 3/4 2. 4th mark is only available for calculations of the form $^{a}/_{b} \times 100$ or $^{a}/_{100} \times b$ where a,b = calculated increase or 17500 or 18200 3. Some common answers (working must be shown) (a) 4, 3·8(…) $[^{700}/_{18200} \times 100]$ award 3/4 ✓×✓✓ (b) 104 $[^{18200}/_{17500} \times 100]$ award 3/4 ×✓✓✓ (c) 2500 $[^{17500}/_{700} \times 100]$ award 3/4 ✓×✓✓ (d) 96(·…) $[^{17500}/_{18200} \times 100]$ award 2/4 ××✓✓ (e) 122 500 $[^{700}/_{100} \times 17500]$ award 2/4 ✓××✓ (f) 127400 $[^{700}/_{100} \times 18200]$ award 2/4 ✓××✓ (g) 3185000 $[^{17500}/_{100} \times 18200$ or $^{18200}/_{100} \times 17500]$ award 1/4 ×××✓

Question	Expected Answer/s	Max Mark	Additional Guidance
12	**Ans: 20 cm** •[1] correct form of Pythagoras Theorem: $85^2 - 40^2$ •[2] calculate difference (or sum) of two squares: 5625 •[3] calculate square root of difference (or sum) of squares: 75 •[4] find gap: 75 – ½ of 110 = 20	**4**	1. Some common answers (no working necessary) (a) 20 award 4/4 (b) 75 award 3/4 ✓✓✓× 2. Some common answers (working must be shown) [Do not penalise premature rounding or truncation] (a) 39, 38(·9…) $[\sqrt{(85^2 + 40^2)} - 55]$ award 3/4 ×✓✓✓ (b) 94, 93·(9…) $[\sqrt{(85^2 + 40^2)}]$ award 2/4 ×✓✓× (c) 20925 $[85^2 + 40^2 + 110^2]$ award 1/4 ×✓×× 3. 4th mark only available for correctly subtracting 55 from previously calculated value (working must be shown) eg 85 + 40 – 55 = 70 award 1/4 ×××✓ 4. Award of first 2 marks if trigonometry is used: •[1] $\cos(\sin^{-1}(^{40}/_{85})) = {}^{x}/_{85}$ •[2] $x = 85 \times \cos(\sin^{-1}(^{40}/_{85}))$ **OR** •[1] $\tan(\sin^{-1}(^{40}/_{85})) = {}^{40}/_{x}$ •[2] $x = 40 \div \tan(\sin^{-1}(^{40}/_{85}))$ **OR** •[1] $\sin(\cos^{-1}(^{40}/_{85})) = {}^{x}/_{85}$ •[2] $x = 85 \times \sin(\cos^{-1}(^{40}/_{85}))$ **OR** •[1] $\tan(\cos^{-1}(^{40}/_{85})) = {}^{x}/_{40}$ •[2] $x = 40 \times \tan(\cos^{-1}(^{40}/_{85}))$

Question	Expected Answer/s	Max Mark	Additional Guidance
13	**Ans: 12·4 m^2** •^{1} know to calculate area of semi-circle: ½ πr^2 •^{2} substitute correct radius into formula: ½ × π × 3^2 •^{3} know to subtract area of rectangle from area of semi-circle: ½ × π × 3^2 – 0·8 × 2·2 •^{4} carry out all calculations correctly: 12·37(7…) (must include a circle calculation involving either squaring or halving **followed by** subtraction or addition) •^{5} round to one decimal place: 12·4	**5**	1. Correct answer without working award 0/5 2. Some common answers (working must be shown) (a)(i) 7·7 [(½πr^2) = ½×π×3^2 – 0·8×2·2 = ½×π×6 – 0·8×2·2] award 4/5 ✓✓✓×✓ (ii) 7·7 [(½πd) = ½×π×6 – 0·8×2·2] award 4/5 ×✓✓✓✓ (b) 14·1 [½×π×3^2] award 3/5 ✓✓×××✓ (c) 15·9 [½×π×3^2 + 0·8×2·2] award 4/5 ✓✓×✓✓ (d)(i) 17·1 [(πr^2) = π×3^2 – 0·8×2·2 = π×6 – 0·8×2·2] award 3/5 ×✓✓×✓ (ii) 17·1 [(πd) = π×6 – 0·8×2·2] award 3/5 ×✓✓×✓ (e) (i) 26·5 [π×3^2 – 0·8×2·2] award **4/5** ×✓✓✓✓ (ii) 26·5 [3·14×3^2 – 0·8×2·2] award **3/5** ×✓✓✓× (f) 28·3 [π×3^2] award 2/5 ×✓××✓ (g) 54·8 [½×π×6^2 – 0·8×2·2] award 4/5 ✓×✓✓✓ (h) 56·5 [½×π×6^2] award 2/5 ✓××××✓ (i) 113·0 [3·14×6^2] award 1/5 ××××✓ (j) 113·1 [π×6^2] award 1/5 ××××✓ 3. (a) 5th mark is only available where the candidate is required to round final answer to one decimal place. (b) Versions of the above answers which are not rounded, incorrectly rounded or not requiring to be rounded should not be awarded the 5th mark.

TOTAL MARKS FOR PAPER 2
50

TOTAL MARKS FOR PAPER 1 & 2
80

[END OF MARKING INSTRUCTIONS]