2008 Mathematics

Intermediate 1 Units 1, 2 & 3 Paper 2

Finalised Marking Instructions

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
1 (a)	**Ans: diagram** •[1] communicate: plot point •[2] communicate: plot points	•[1] plot A or B or C •[2] plot other two points **2 marks**
(b)	**Ans: D(3,2) plotted** •[1] strategy: plot 4th vertex of square	•[1] plot(3,2) **1 mark**

NOTES:

1. Accept (3,2) if D not plotted
2. If D(3,2) is plotted but wrong coordinates are stated then award 1/1
3. Where (y,x) is consistently plotted
   - award 1/2 for (a)
   - award 1/1 for (b) for plotting 4th vertex of square

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
2 (a)	**Ans: £841** •[1] interpret: find basic premium	•[1] 841 **1 mark**
NOTES: 1. Working subsequent to "correct" answer e.g. 841÷12 = 70·08 award 0/1		
2 (b)	**Ans: £277·53** •[1] interpret/strategy/process: find discount •[2] strategy/process: find net premium	•[1] $\frac{67}{100} \times 841 = 563 \cdot 47$ •[2] 277·53 **2 marks**

NOTES:

1. Some common answers

	with working	without working
(a) 277·53	2/2	2/2
(b) 563.47	1/2	1/2
(c) 277·50 (841 – 563·50)	1/2	1/2
(d) 278 (841 – 563)	1/2	1/2
(e) 563·50, 563	see note 2	0/2

2.
(i) $^{67}/_{100} \times 841 = 563 \cdot 47 = 563 \cdot 50$ or 563 award 1st mark
(ii) $^{67}/_{100} \times 841 = 563 \cdot 50$ or 563 do **not** award 1st mark

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
3 (a)	**Ans: $20u + 7$** •[1] process: multiply out brackets •[2] process: collect like terms	•[1] $20u - 8 + 15$ or $20u - 8$ •[2] $20u + 7$ **2 marks**
NOTES: 1. Do not award 1st mark for $20u - 8 + 60$ 2. 20u – 23, 20u +13 (no working necessary) award 1/2 3. $20 - 8 + 15 = 27$ award 0/2 4. Where a candidate creates and then tries to solve an equation the 2nd mark cannot be awarded		
3 (b)	**Ans: $3(3c + 8)$** •[1] process: identify common factor •[2] process: factorise	•[1] 3 or $3c + 8$ •[2] $3(3c + 8)$ **2 marks**
NOTES: 1. 9(c + 2·7), 9(c + 2·66….) award 1/2 2. 9(c + 2·6) award 0/2 [24 ÷9 = 2 remainder 6]		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
4 (a)	**Ans: 2·5** •[1] strategy: know to order numbers •[2] process: find median	•[1] 1 1 1 2 2 3 3 4 6 7 •[2] 2·5 **2 marks**

NOTES:

1. **Answer** | **with valid working** | **without valid working**

Answer	with valid working	without valid working
2·5	2/2	2/2
4 (numbers not ordered)	1/2	0/2
3 (mean)	1/2	0/2

2. If "correct" median is found from ordered list with one missing (or one extra) number award 1/2

3. Accept ordered list written in part (a) or part (b)

4 (b)	**Ans: 6** •[1] strategy/process: find range	•[1] 6 **1 mark**

NOTES:

4 (c)	**Ans: Less weeds remain with Noweed. Number of remaining weeds vary more with Noweed.** •[1] interpret/communicate: interpret calculated statistics •[2] interpret/communicate: interpret calculated statistics	•[1] Less weeds remain with Noweed or Noweed is a better weedkiller, etc. •[2] Number of remaining weeds vary more with Noweed. **2 marks**

NOTES:

1. Answer must be consistent with answers to parts (a) and (b)

2. Do not accept
   eg Weedclear's median is more
   Noweed's range is more

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
5	**Ans: 36 mph**	
	•[1] strategy/process: calculate distance on motorway	•[1] 2 × 68 = 136
	•[2] strategy/process: find distance on other roads	•[2] D = 54
	•[3] strategy: know how to find speed on other roads	•[3] S = 54 ÷ 1h 30m
	•[4] process: calculate speed	•[4] 54 ÷ 1·5 = 36
		4 marks

NOTES:

1. Answers without working
   (a) 36 award 4/4
   (b) 136 award 1/4 ✓×××

2. For a **final answer** of 54
   (a) 54 [190 – 136] award 2/4 ✓✓××
   (b) 54(·2…) [190 ÷ 3·5] award 1/4 ×××✓
   (c) 54 with no working award 1/4 ×××✓

3. Examples of answers (working must be shown)

(a)	42, 41(·…)	[54 ÷ 1·3]	3/4 (disregard incorrect rounding)	✓✓✓×
(b)	0·6	[54 ÷ 90]	3/4	✓✓✓×
(c)	0·4…	[54 ÷ 130]	3/4	✓✓✓×
(d)	81	[54 × 1·5]	3/4	✓✓×✓
(e)	4860	[54 × 90]	2/4	✓✓××
(f)	70(·2)	[54 × 1·3]	2/4	✓✓××
(g)	7020	[54 × 130]	2/4	✓✓××
(i)	81(·3…)	[(190–68)÷1·5]	3/4	×✓✓✓
(j)	1·3(5…)	[(190–68)÷90]	2/4	×✓✓×
(k)	94, 93(·…)	[(190–68)÷1·3]	2/4	×✓✓×
(l)	1, 0·9(…)	[(190–68)÷130]	2/4	×✓✓×
(m)	183	[(190–68)×1·5]	2/4	×✓×✓
(n)	10980	[(190–68) ×90]	1/4	×✓××
(o)	159,158·6	[(190–68) ×1·3]	1/4	×✓××
(p)	15860	[(190–68) ×130]	1/4	×✓××
(q)	91, 90(·…)	[(68×2)÷1·5]	3/4	✓×✓✓
(r)	127, 126(·..)	[190÷1·5]	2/4	××✓✓
(s)	34	[68÷2]	0/4	

4. 4th mark is not available for division by a whole number.

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
6	**Ans: 77** •[1] strategy/process: find angle at centre of "beetles" sector •[2] strategy: know how to find number of beetles •[3] process: find number of beetles	•[1] 126 •[2] $\frac{126}{360} \times 220$ •[3] 77 **3 marks**
	Alternative Strategy •[1] strategy: know to calculate 220 – (flies + ants + spiders) •[2] strategy: know how to find number of flies, ants and spiders •[3] process: find number of beetles	•[1] 220 – (flies + ants + spiders) •[2] flies = 220 ÷ 2, ants = 220 ÷ 10, spiders = ants ÷ 2 or equivalent •[3] 77 **3 marks**

NOTES:

1. Correct answer without working — award 3/3
2. 143 [flies + ants + spiders] (no working necessary) — award 2/3
3. 57 [$^{126}/_{220} \times 100$] (no working necessary) — award 1/3
4. ⅓ of 220 = 73(·3…) — award 0/3

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
7	**Ans: 117 cm**	
	•[1] strategy: correct form of Pythagoras Theorem	•[1] $80^2 + 55^2$
	•[2] process: calculate sum of two squares	•[2] 9425 (the **only** cases where this mark is available for calculating the difference of two squares are shown in notes 2a and 3b)
	•[3] process: calculate square root of sum (or difference) of two squares	•[3] 97(·08….) (correctly rounded or truncated)
	•[4] strategy/process: add 20 to previously **calculated** value	•[4] 117
		4 marks

NOTES:

1. Some common answers (no working necessary)
   (a) 117 4/4
   (b) 97 3/4 ✓✓✓×

2. Some common answers (working must be shown) where correct horizontal distance of 80 is used
   (a) 78(·…) $[\sqrt{(80^2 - 55^2)} + 20]$ 3/4 ×✓✓✓
   (b) 156(·…) $[\sqrt{(80^2 + 110^2)} + 20]$ 3/4 ×✓✓✓
   (c) 95(·…) $[\sqrt{(110^2 - 80^2)} + 20]$ 2/4 ××✓✓

3. Some common answers (working must be shown) where incorrect horizontal distance of 80+20=100 is used [4th mark is unavailable since 20 has been added inappropriately]
   (a) 114(·…) $\sqrt{(100^2 + 55^2)}$ 3/4 ✓✓✓×
   (b) 84,83(·…) $\sqrt{(100^2 - 55^2)}$ 2/4 ×✓✓×
   (c) 149,148(·…) $\sqrt{(100^2 + 110^2)}$ 2/4 ×✓✓×
   (d) 46,45(·…) $\sqrt{(110^2 - 100^2)}$ 1/4 ××✓×

4. Award of first 2 marks if trigonometry is used:
   (a) $55 \div \sin(\tan^{-1}(^{55}/_{80}))$ or $80 \div \cos(\tan^{-1}(^{55}/_{80}))$ award marks 1 & 2
   (b) eg $110 \div \sin(\tan^{-1}(^{110}/_{80}))$ award 1 of the first 2 marks

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
8	**Ans: 360 grams**	
	•[1] strategy: know to calculate volume	•[1] $10 \times 10 \times 3$
	•[2] process: calculate volume	•[2] 300
	•[3] strategy: know to use proportion	•[3] $\frac{300}{400} \times 480$ or equivalent
	•[4] strategy: carry out calculations correctly	•[4] 360 **4 marks**

1. Correct answer without working award 4/4

2. Some common answers (no working necessary)
   (a) 380 [300 + 80] award 2/4 ✓✓××
   (b) 300 award 2/4 ✓✓××

3. Some common answers (working must be shown)
   (a) 300 ÷ (480 ÷ 400) = 250 award 3/4 ✓✓×✓
   (b) 300 × (400 ÷ 480) = 250 award 3/4 ✓✓×✓
   [Do not penalise premature rounding eg 400 ÷ 480 = 0·8 × 300 = 240]

4. Alternative strategy
   (a) 300 + 300÷5 = 360 (no working necessary) award 4/4
   (b) 300 + 300÷6 = 350 (working must be shown) award 3/4 ✓✓×✓

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
9	**Ans: £183·45** •[1] interpret/process: find cost of tickets in euros •[2] strategy: know how to convert cost into sterling •[3] process: convert cost into sterling to the nearest penny	•[1] 255 •[2] 255 ÷ 1·39 •[3] 183·45 **3 marks**

NOTES:

1. (a) Correct answer without working — award 3/3
   (b) 354·45 [255 × 1·39] (no working necessary) — award 1/3 ✓××

2. Alternative strategy

•[1] interpret/strategy: know how to convert valid number of euros into sterling	•[1] 90÷1·39 **or** 75÷1·39 **or** 180÷1·39
•[2] process: convert valid cost into sterling to the nearest penny	•[2] 90 ÷ 1·39 = 64·74 or 64·75 **or** 75 ÷ 1·39 = 53·95 or 53·96 **or** 180 ÷ 1·39 = 129·49 or 129·50
•[3] interpret/strategy: find total cost of tickets in sterling	•[3] 183·43 **or** 183·44 **or** 183·45 **or** 183·46

3. Where working shows that candidate has used alternative strategy award 3/3 for final answers of 183·43, 183·44 or 183·46

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
10	**Ans: $y > 20$** •[1] process: collect constants •[2] process: solve inequality for y	•[1] $\frac{1}{2}y > 10$ •[2] $y > 20$ **2 marks**

NOTES:

1. For answers without valid working award 1/2

eg (i) $y > 20$ without working
(ii) $\frac{1}{2} \times 20 + 3 > 13 \rightarrow y > 20$

2. Answers acceptable for partial credit (valid working must be shown)
(i) $\frac{1}{2}y > 10 \rightarrow > 20$
(ii) $\frac{1}{2}y > 10 \rightarrow y = 20$ or $\frac{1}{2}y = 10 \rightarrow y = 20$ } award 1/2
(iii) $\frac{1}{2}y > 16 \rightarrow y > 32$

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
11	**Ans: 360 cm^2**	
	•^{1} strategy: use correct tangent ratio	•^{1} $\tan 58° = \frac{L}{15}$
	•^{2} process: know how to solve equation	•^{2} $L = 15\tan 58°$
	•^{3} process: carry out trig. calculation	•^{3} 24
	•^{4} strategy/process: calculate area of rectangle	•^{4} $24 \times 15 = 360$ **4 marks**

NOTES:

1. Some answers without working
   (a) 360 award 4/4
   (b) 24 award 3/4 ✓✓✓×

2. 1,874(·…) (radians used) award 4/4
   290(·…) (grad used) award 4/4

3. Where an incorrect trig ratio is used, working should be followed through with the possibility of awarding 3/4.
   [Do not penalise premature rounding]
   (a) $15\cos 58° \times 15 = 119$(·…) award 3/4 ×✓✓✓
   (b) $15\sin 58° \times 15 = 191$ or 190(·…) award 3/4 ×✓✓✓
   (c) $\tan 58° = {}^{15}/_{L} \rightarrow (15 \div \tan 58°) \times 15 = 141$ or 140(·…) award 3/4 ×✓✓✓
   (d) $\cos 58° = {}^{15}/_{L} \rightarrow (15 \div \cos 58°) \times 15 = 425$ or 424(·…) award 3/4 ×✓✓✓
   (e) $\sin 58° = {}^{15}/_{L} \rightarrow (15 \div \sin 58°) \times 15 = 265$(·…) award 3/4 ×✓✓✓
   (f) $\tan 58° = {}^{15}/_{L} \rightarrow (\tan 58° \div 15) \times 15 = 1{\cdot}6$(…) award 2/4 ××✓✓
   (g) $\tan^{-1}({}^{58}/_{15}) \times 15 = 1132$(·…) award 2/4 ××✓✓

4. 4th mark is available for correctly multiplying previously calculated value by 15

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
12	**Ans: 0·91** •[1] interpret/process: correctly multiply 2·6 × 1·4 •[2]•[3] interpret/process: correctly divide $(2{\cdot}6 \times 1{\cdot}4) \div (2{\cdot}6 + 1{\cdot}4)$	•[1] $2{\cdot}6 \times 1{\cdot}4 = 3{\cdot}64$ •[2]•[3] $(2{\cdot}6 \times 1{\cdot}4) \div (2{\cdot}6 + 1{\cdot}4) = 0{\cdot}91$ [award 1 for $2{\cdot}6 \times 1{\cdot}4 \div 2{\cdot}6 + 1{\cdot}4 = 2{\cdot}8$] **3 marks**

NOTES:

1. Correct answer without working award 3/3

2. Some common answers (no working necessary)
   (a) $2{\cdot}6 \times 1{\cdot}4 \div 2{\cdot}6 + 1{\cdot}4 = 2{\cdot}8$ award 2/3 ✓✓×
   (b) $3{\cdot}64 \div 4 = 0{\cdot}9$ award 2/3 ✓✓×
   (c) $\frac{3{\cdot}64}{4}$ award 1/3 ✓××
   (d) $\frac{2{\cdot}6 \times 1{\cdot}4}{2{\cdot}6 + 1{\cdot}4}$ or $\frac{2{\cdot}6 \times 1{\cdot}4}{4}$ award 0/3

3. Some common answers (working must be shown)
   (a) $\frac{4}{2{\cdot}6 + 1{\cdot}4} = 4 \div 2{\cdot}6 + 1{\cdot}4 = 2{\cdot}9(\ldots)$ award 1/3 ×✓×
   (b) $\frac{4}{4} = 1$ (calculation eased) award 1/3 ×✓×

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
13	**Ans: 7·5%** •[1] strategy: find weight loss •[2] strategy: know to express loss as a fraction of 80 •[3] strategy: know to multiply fraction by 100 •[4] process: carry out all calculations correctly	•[1] 6 •[2] $\frac{6}{80}$ •[3] $\frac{6}{80}\times 100$ •[4] 7·5 **4 marks**

NOTES:

1. Correct answer without working — award 4/4
2. Some common answers (working must be shown)
   - (a) 92·5 [$^{74}/_{80} \times 100$] — award 3/4 — ×✓✓✓
   - (b) 8(·…) [$^{6}/_{74} \times 100$] — award 3/4 — ✓×✓✓
   - (c) 1333(·…) [$^{80}/_{6} \times 100$] — award 3/4 — ✓×✓✓
   - (d) 108(·…) [$^{80}/_{74} \times 100$] — award 2/4 — ××✓✓
   - (e) 4·8 [$^{6}/_{100} \times 80$] — award 2/4 — ✓××✓
   - (f) 4·44 [$^{6}/_{100} \times 74$] — award 2/4 — ✓××✓
   - (g) 59·2 [$^{74}/_{100} \times 80$ or $^{80}/_{100} \times 74$] — award 1/4 — ×××✓

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
14	**Ans: 63 m^2**	
	•^{1} strategy: know to calculate area of semi-circle	•^{1} $\frac{1}{2}\pi r^2$
	•^{2} strategy: substitute correct radius into area formula	•^{2} $\frac{1}{2} \times \pi \times 5^2$
	•^{3} strategy: know to add area of triangle to area of semi-circle	•^{3} $\frac{1}{2} \times \pi \times 5^2 + \frac{1}{2} \times 8 \times 6$
	•^{4} process: carry out all calculations correctly (must include a circle calculation involving either squaring or halving **followed by** an addition or a subtraction)	•^{4} 63(·2699…) or 63(·25) (π) (3·14) **4 marks**

NOTES:

1. Correct answer without working — award 0/4

2. **Beware!!!**
   3rd mark not available for adding 8+6+10=24 to area of semi-circle
   eg (i) $\frac{1}{2}\times\pi\times5^2 + \frac{1}{2}\times8\times6 = 63$ — award 4/4
   (ii) $\frac{1}{2}\times\pi\times5^2 + 8+6+10 = 63$ — award 3/4 ✓✓×✓
   (iii) $\frac{1}{2}\times\pi\times5^2 + 24 = 63$ — award 3/4 ✓✓×✓

3. Some common answers (working must be shown)

(a)	181(·…)	$[\frac{1}{2}\pi r^2 + \frac{1}{2}\times8\times6, r=10]$	award 3/4	✓×✓✓
(b)	157(·…)	$[\frac{1}{2}\pi r^2, r=10]$	award 1/4	✓×××
(c)	102(·…), 103	$[\pi r^2 + \frac{1}{2}\times8\times6]$	award 3/4	×✓✓✓
(d)	87(·…)	$[\frac{1}{2}\pi r^2 + 48]$	award 3/4	✓✓×✓
(e)	79,78(·…)	$[\pi r^2]$	award 1/4	×✓××
(f)	79(·…)	$[\pi d + 48, d=10)]$	award 1/4	×✓××
(g)	63(·…), 64	$[\frac{1}{2}\pi r^2 + 48, r^2=5^2=10)]$	award 2/4	✓✓××
(h)	63(·…), 64	$[\frac{1}{2}\pi d + 48, d=10)]$	award 2/4	×✓×✓
(i)	55(·…)	$[\pi r^2 + \frac{1}{2}\times8\times6, r^2=5^2=10)]$	award 2/4	×✓✓×
(j)	55(·…)	$[\pi d + \frac{1}{2}\times8\times6, d=10)]$	award 2/4	×✓✓×
(k)	39(·…), 40	$[\frac{1}{2}\pi r^2 + \frac{1}{2}\times8\times6, r^2=5^2=10)]$	award 3/4	✓✓✓×
(l)	39(·…), 40	$[\frac{1}{2}\pi d + \frac{1}{2}\times8\times6, d=10)]$	award 3/4	×✓✓✓
(m)	39(·…)	$[\frac{1}{2}\pi r^2]$	award 2/4	✓✓××

TOTAL MARKS FOR PAPER 2
50

TOTAL MARKS FOR PAPER 1 & 2
80

[END OF MARKING INSTRUCTIONS]