SCOTTISH QUALIFICATIONS AUTHORITY

2006 Mathematics

Intermediate 1 Units 1, 2 + 3 Paper 1

Finalised Marking Instructions

General Marking Principles

These principles describe the approach to be taken when marking Intermediate 1 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 1: Paper 1, Units 1, 2 and 3

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
1	**Ans: 3·62** •[1] process: calculate $5\cdot42 - 1\cdot8$	•[1] $3\cdot62$ **1 mark**
2	**Ans: 167** •[1] interpret: know to multiply 11 by 12 and then add 35 •[2] process: evaluate rule (multiplication must involve [number > 10] × 12)	•[1] $11\times12+35$ •[2] 167 **2 marks**

NOTES:

1	Correct answer without working	award 2/2
2	132 (11×12) (no working necessary)	award 1/2
3	$11 \times 2 \times 10 + 35$ (working must be shown)	award 1/2

3	**Ans: 4m 10s** •[1] strategy: know to divide 1500 by 6 •[2] process: divide correctly •[3] process: convert to minutes and seconds correctly	•[1] $1500 \div 6$ •[2] 250 •[3] 4m 10s **3 marks**

NOTES:

1	Correct answer without working	award 3/3
2	$1500 \div 6 \rightarrow$2m 50s (working must be shown)	award 2/3
3	$1500 \times 6 = 9000 \div 60 = 150$ (working must be shown)	award 1/3
4	3rd mark is not available for (a) 4 hr 10 min (b) converting a multiple of 60 seconds to minutes	

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
4	**Ans: £162** •[1] interpret: interpret table •[2] strategy: know to calculate 2 × adult + 70% of adult •[3] process: carry out <u>all</u> calculations correctly (must at least involve a percentage calculation)	•[1] 60 •[2] $2 \times 60 + 70\%\ of\ 60$ •[3] 162 **3 marks**

NOTES:

		Final answer	with working	without working	
1	(a)	162	3/3	3/3	✓✓✓
	(b)	60 + 60 + 70% of 120 = 204	2/3	0/3	✓ × ✓
	(c)	60 + 60 + 30% of 60 = 138	2/3	0/3	✓ × ✓
	(d)	70% of 60 = 42	2/3	0/3	✓ × ✓
	(e)	70% of (30 + 30) = 42	1/3	0/3	× × ✓
	(f)	60 + 60 = 120	1/3	0/3	✓× ×

	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
5	**Ans: £46** •[1] strategy/process: correctly subtract 85 from 499 •[2] strategy: know to divide answer by 9 •[3] process: divide correctly	•[1] 414 •[2] 414 ÷ 9 •[3] 46 **3 marks**

NOTE:

Final answer	with working	without working
46	3/3	2/3
$64{\cdot}89, 64{\cdot}88\left(\left[499+85\right]\div 9\right)$	2/3	1/3
$55{\cdot}44, 55{\cdot}45\left(499\div 9\right)$	1/3	0/3
$9{\cdot}44, 9{\cdot}45\left(85\div 9\right)$	1/3	0/3

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
6	**Ans: n = 6** •[1] process: start to collect like terms •[2] process: collect like terms and equate •[3] process: solve equation for n	 •[1] $7n$ or 42 •[2] $7n = 42$ •[3] $n = 6$ **3 marks**

NOTES:

1 For answers without valid working award 0/3
eg (i) $n = 6$ without working
(ii) $5 \times 6 + 9 = 51 - 2 \times 6 \rightarrow n = 6$

2 Only one of the first two marks can be awarded if $7n$ and 42 are not equated

3 For the award of the 3rd mark an answer of the form $n =$ is required

4 Answers acceptable for partial credit (valid working must be shown)

(i) $7n = 42 \rightarrow 6$
(ii) $7n = 60 \rightarrow n = 8{\cdot}5.....$ award 2/3
(Disregard incorrect rounding)
(iii) $3n = 42 \rightarrow n = 14$

(iv) $3n = 60 \rightarrow n = 20$ award 1/3

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
7 (a)	**Ans:** x | **-3** | **0** | **2** y | **-7** | **2** | **8** •[1] process: calculate y •[2] process: complete table	•[1] -7 •[2] -7, 2, 8 **2 marks**
(b)	**Ans: straight line graph of $y = 2 + 3x$** •[1] communicate: prepare to draw line •[2] communicate: draw the line $y = 2 + 3x$	•[1] all three points from the table plotted correctly •[2] draw straight line through the three points (see note 2) **2 marks**

NOTES:

1 If the line $y = 2 + 3x$ is drawn award 2/2

2 Where the three points plotted are consistent with table and are not collinear, the second mark is unavailable.

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
8	**Ans: £1·05**	
	•[1] strategy: correct method	•[1] $\frac{3}{5}$ of $70 \times 2\frac{1}{2}$
	•[2] process: start calculation	•[2] $\frac{3}{5}$ of $70 = 42$ or $70 \times 2\frac{1}{2} = 175$ or $\frac{3}{5}$ of $2\frac{1}{2} = 1 \cdot 5$
	•[3] process: complete calculation	•[3] 105 **3 marks**

NOTES:

1 105 with no working — award 0/3

2 Final answer (working must be shown)

(a) 1·05 (no units necessary) — award 3/3

(b) £105 — award 2/3

3 $150 \times 70 = 10500 \times \frac{3}{5} = 6300$ — award 1/3

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
9	**Ans: 6**	
	•[1] interpret: know how to evaluate formula	•[1] $\sqrt{144 \div 4}$ or $\sqrt{144} \div \sqrt{4}$
	•[2] process: start to evaluate	•[2] $\frac{144}{4} = 36$ or $\sqrt{144} = 12$
	•[3] process: complete evaluation	•[3] 6 **3 marks**

NOTES:

1 Final answer (no working necessary)

(a) $\sqrt{36}$ award 2/3

(b) 36 award 1/3

(c) $\sqrt{\frac{144}{4}}$ award 0/3

2 Award 3rd mark for a good approximation to $\sqrt{n}$ where n is not a perfect square eg $\sqrt{35} = 5{\cdot}\ldots$.

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
10 (a)	**Ans:** **4 | -6 | -2 | -8** •[1] interpret/process: complete number cell	•[1] | | | -2 | -8 **1 mark**
(b)	**Ans:** **-6 | 5 | -1 | 4** •[1] strategy/process: final three numbers consistent •[2] strategy/process: first three numbers consistent	•[1] | 5 | | | •[2] -6 | | | | **2 marks**
(c)	**Ans:** **1 | -4 | -3 | -7** •[1] strategy/process: experiment •[2] strategy/process: complete number cell	•[1]•[2] | -4 | -3 | (award 1 for two attempts where first three or final three numbers are consistent) **2 marks**
NOTE: The correct answer need not appear in the intended number cell for it to be acceptable.		

TOTAL MARKS FOR PAPER 1

30

[END OF MARKING INSTRUCTIONS]

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2006 Mathematics

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   (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, ✓̸.

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Mathematics Intermediate 1: Paper 2, Units 1, 2 and 3

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
1	**Ans: 12430 pesos** •[1] strategy/process: correctly multiply 650 by 19·13 •[2] process: round to nearest ten	•[1] 12434·5 •[2] 12430 **2 marks**
NOTES: 1 Answers acceptable for partial credit (no working necessary) (a) 12434, 12435, 12400 — award 1/2 (b) 30 (650 ÷ 19·13 to nearest 10) — award 1/2 2 For 12440 with no evidence of 12434(·5) or 12435 — award 0/2		
2	**Ans: $5{\cdot}4\times10^{-6}$** •[1] process: express in standard form •[2] process: express in standard form	•[1] $5{\cdot}4\times10^{n}$ •[2] $5{\cdot}4\times10^{-6}$ **2 marks**
NOTE: 54×10^{-7}, $0{\cdot}54\times10^{-5}$, 5×10^{-6} — award 1/2		
3	**Ans: $t>9$** •[1] process: collect constants •[2] process: solve inequality for t	•[1] $4t>36$ •[2] $t>9$ **2 marks**
NOTES: 1 For answers without valid working — award 0/2 eg (i) $t>9$ without working (ii) $4\times9-7>29\rightarrow t>9$ 2 Answers acceptable for partial credit (valid working must be shown) (i) $4t>36\rightarrow>9$ (ii) $4t>36\rightarrow t=9$ or $4t=36\rightarrow t=9$ — award 1/2 (iii) $4t>22\rightarrow t>5{\cdot}5$ or $t>\frac{22}{4}$		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
4	**Ans: 455** •[1] strategy: correct method •[2] process: carry out calculations correctly	•[1]•[2] 455 (award 1 for correct method or $260 \div 4 = 65$ or. $260 \times 7 = 1820$ or $7 \div 4 = 1{\cdot}75$) **2 marks**
5 (a)	**Ans: 15** •[1] process: identify mode	•[1] 15 **1 mark**
(b)	**Ans: $\frac{3}{40}$** •[1] process: find probability	•[1] $\frac{3}{40}$ **1 mark**
NOTES: 1 Accept 3:40, 3 out of 40, 3 in 40, 3 – 40, 0·075 , 7·5%		
(c)	**Ans: 16·3** •[1] communicate: 3 correct entries in table •[2] strategy: know to divide Σfx by 40 •[3] process: all calculations correct (must include division of Σfx)	•[1] any three of 90, 57, 40, 652 (or consistent total) •[2] $652 \div 40$ •[3] 16·3 **3 marks**

NOTES:

1

Answer	requirement for 1st mark met	requirement for 1st mark not met
16·3	3/3	2/3
$652 \div 40 = 16$	3/3	2/3
16	1/3	0/3
93(·…..) [$652 \div 7$]	2/3	1/3

2 When candidate calculates mean in (a) then award 0/1 for (a) and all 3 marks for (c) are available for calculating the mean.

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
6	**Ans: 240 litres** •[1] strategy: know to multiply $1 \times b \times h$ •[2] strategy/process: find volume in cm^3 (or m^3) •[3] process: convert to litres	•[1] evidence of $1 \times b \times h$ involving 50cm, 1·2 m and 40cm •[2] 240 000 (cm^3) (or 0·24 (m^3)) •[3] 240 **3 marks**
NOTES: 1 Answer acceptable for partial credit (no working necessary) (a) 2400 (50 × 1·2 × 40) award 1/3 (b) 2·4, 2 litres 400 award 2/3		
7 (a)	**Ans: $2x - 5y$** •[1] process: multiply out brackets •[2] process: collect like terms	•[1] $3y + 2x - 8y$ or $2x - 8y$ •[2] $2x - 5y$ **2 marks**
NOTES:		
(b)	**Ans: $4(2d + 3)$** •[1] process: identify common factor •[2] process: factorise	•[1] 4 or $2d + 3$ •[2] $4(2d + 3)$ **2 marks**
NOTES: 1 $2(4d + 6)$, $8(d + 1 \cdot 5)$ award 1/2		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
8 (a)	**Ans: 10·5** •[1] strategy: know to order numbers •[2] process: find median	•[1] 2 6 7 7 8 10 11 12 13 14 14 17 •[2] 10·5 **2 marks**

NOTES:

1

Answer	with working	without working
10·5	2/2	2/2
12 (numbers not ordered)	1/2	0/2
15 (range)	1/2	0/2
10(·083…) (mean)	1/2	0/2

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

(b)	**Ans: 15** •[1] strategy: select largest and smallest values •[2] process: find range	•[1] 17, 2 •[2] 15 **2 marks**

NOTE:

1

Answer	with working	without working
15	2/2	2/2
10·5 (median)	1/2	0/2
10(·083…) (mean)	1/2	0/2

(c)	**Ans: More cars on Monday. Number of cars vary more on Monday.** •[1] interpret/communicate: interpret calculated statistics •[2] interpret/communicate: interpret calculated statistics	•[1] more cars on Monday •[2] number of cars vary more on Monday **2 marks**

NOTES:

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

2 Do not accept eg The median is bigger on Monday.
The range is bigger on Monday.

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
9	**Ans: 1·3m** •[1] strategy: correct form of Pythagoras Theorem •[2] process: calculate $1{\cdot}1^2 + 0{\cdot}7^2$ •[3] process: calculate $\sqrt{1{\cdot}7}$	 •[1] $1{\cdot}1^2 + 0{\cdot}7^2$ •[2] $1{\cdot}7$ •[3] 1·3… **3 marks**

NOTES:

1

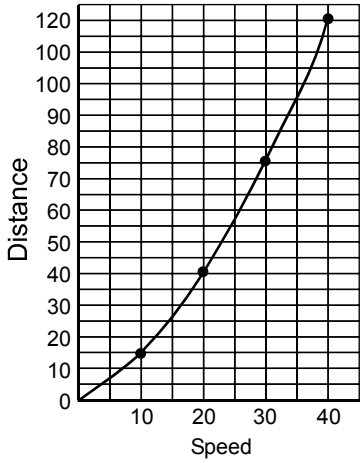
Answer	with working	without working
1.3	3/3	3/3
0·8 (48…) $[1{\cdot}1^2 - 0{\cdot}7^2]$	2/3	0/3
0·77 $[1{\cdot}1^2 \times 0{\cdot}7^2]$	2/3	0/3

2 If candidate uses trigonometry then award marks as follows

•[1] eg $P = \tan^{-1}\left(\frac{1\cdot1}{0\cdot7}\right) \rightarrow \sin P = \frac{1\cdot1}{WP}$

•[2] $WP = \frac{1\cdot1}{\sin P}$

•[3] 1·3

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
10	**Ans:**  •[1] strategy: use suitable scale •[2] communicate: scales labelled correctly •[3] process: three points correctly plotted •[4] process: line graph drawn	•[1] see note 1 for acceptable scales. •[2] "speed" on one axis "distance" on other axis •[3] three points correctly plotted •[4] other two points correctly plotted and line graph drawn **4 marks**

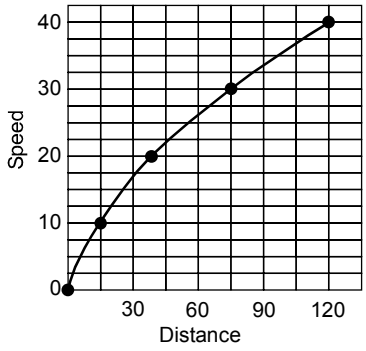
NOTES:

1 Acceptable scales

	speed	distance
horizontal axis	1 box = 5, 10 mph	1 box = 15, 20 feet
vertical axis	1 box = 2, 2·5, 5 mph	1 box = 5, 10, 15 feet

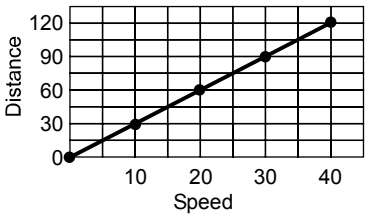
2 See next page for examples of some common answers

(a)



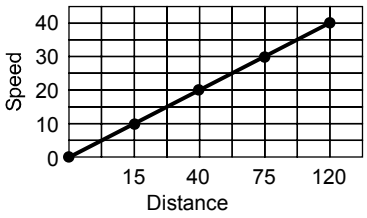
✓✓✓✓ 4/4

(b)



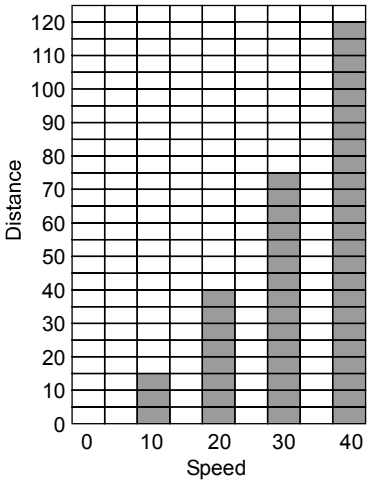
✗✓✗✓ 2/4

(c)



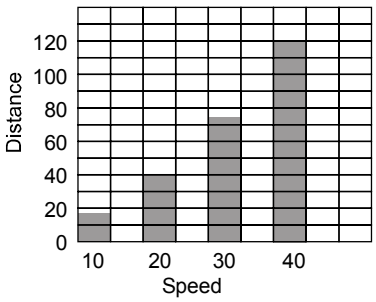
✗✓✗✓ 2/4

(d)



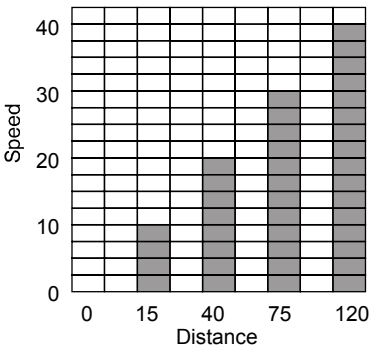
✓✓✓✗ 3/4

(e)



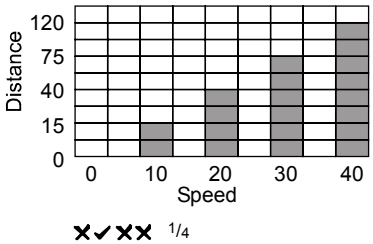
✗✓✓✗ 2/4

(f)



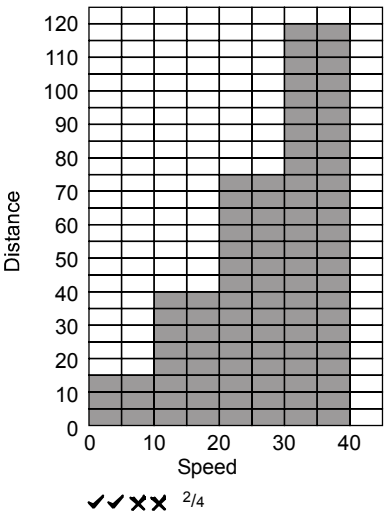
✗✓✗✗ 1/4

(g)



✗✓✗✗ 1/4

(h)



✓✓✗✗ 2/4

Spaces between bars not nessesary in bar graphs

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
11	**Ans: £78**	
	$\bullet^1\bullet^2$ strategy: know how to calculate interest	$\bullet^1\bullet^2$ $\frac{4\cdot5}{100}\times 2600\times\frac{8}{12}$ (award 1 for $\frac{4\cdot5}{100}\times 2600$ or $\frac{8}{12}\times 4\cdot5$ or $\frac{8}{12}\times 2600$)
	$\bullet^3$ process: carry out percentage and fraction calculations correctly	$\bullet^3$ 78 **3 marks**

NOTES:

Answer (no working necessary)

78	award 3/3
$2678(\ 2600+78)$	award 3/3
$117(4\cdot5\%\ \text{of}\ 2600)$	award 1/3
$936(117\times 8)$	award 1/3

Question No	Marking Scheme Give 1 mark for each •			Illustrations of evidence for awarding a mark at each •
12	**Ans: 25m**			
	•[1]	strategy:	know that hypotenuse is 20	•[1] 
	•[2]	strategy:	know how to use sine ratio	•[2] $\sin 50° = \frac{x}{20}$
	•[3]	strategy:	know how to solve equation	•[3] $x = 20 \sin 50°$
	•[4]	process:	carry out trigonometric calculation	•[4] $15(\cdot 3\ldots)$
	•[5]	strategy:	add 10 to previously calculated value	•[5] $25(\cdot 3\ldots)$ **5 marks**

NOTES:

1 Correct answer without working — award 0/5

2 4·8 (radians), 24·1 (grad) [working must be shown] — award 5/5

3 Where an incorrect trig ratio is used, working should be followed through with the possibility of awarding 4/5

4 Do not award the 4th mark for
eg $20 \sin 50° = 15·3 = \sqrt{15·3} = 3·9$

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
13	**Ans: 20%** $\bullet^1$ strategy: find increase $\bullet^2$ strategy: know to express increase as fraction of 250 $\bullet^3$ strategy: know to multiply fraction by 100 $\bullet^4$ process: carry out all calculations correctly	$\bullet^1$ 50 $\bullet^2$ $\frac{50}{250}$ $\bullet^3$ $\frac{50}{250}\times 100$ $\bullet^4$ 20 **4 marks**

NOTES:

1 Correct answer without working — award 4/4

2	with working	without working
(a) $\frac{50}{300}\times 100 = 16(\cdot 6\ldots)$ or 17	3/4	0/4
(b) $\frac{300}{250}\times 100 = 120$	3/4	0/4
(c) $\frac{250}{300}\times 100 = 83(\cdot 3\ldots)$	2/4	0/4
(d) $\frac{50}{100}\times 250 = 125$	1/4	0/4
(e) $\frac{50}{100}\times 300 = 150$	1/4	0/4
(f) $\frac{50}{100}\times 550 = 275$	1/4	0/4

Question No	Marking Scheme Give 1 mark for each •		Illustrations of evidence for awarding a mark at each •
14	**Ans: 21·9m²**		
	•[1] strategy:	know to calculate area of semi-circle	•[1] $A=\frac{1}{2}\pi r^2$
	•[2] strategy:	substitute correct radius into area formula	•[2] $\frac{1}{2}\times\pi\times3^2$
	•[3] strategy:	know to subtract area of semi-circle from area of rectangle	•[3] $(8\times4\cdot5)-\left(\frac{1}{2}\times\pi\times3^2\right)$
	•[4] process:	carry out all calculations correctly (must include a circle calculation and either the squaring of a number or a division by 2)	•[4] $21\cdot862\ldots(\pi)$ $(21\cdot87\quad(3\cdot14))$
	•[5] process:	round to one decimal place	•[5] $21\cdot9$ **5 marks**

NOTES:

1 First 2 marks not available if $C=\pi d$ is used

2 Examples of some common answers

	with working	without working
(a) $36-\frac{1}{2}\times\pi\times3^2=21\cdot9$	5/5	4/5
(b) $36-\pi\times3^2=7\cdot7$	4/5	0/5
(c) $36-\frac{1}{2}\times\pi\times6^2=-20\cdot5$	4/5	0/5
(d) $36-\pi\times6^2=-77\cdot1$	3/5	0/5
(e) $36-3\cdot14\times6^2=-77\cdot0$	3/5	0/5
(f) $36-\frac{1}{2}\times\pi\times6=26\cdot6$	3/5	0/5
(g) $36-\pi\times6=17\cdot2$	2/5	0/5

3 Unrounded or incorrectly rounded versions of the above answers should be awarded 1 mark less than those shown above.

4 5th mark only available where candidate is required to round circle calculation to one decimal place.

TOTAL MARKS FOR PAPER 2
50

[END OF MARKING INSTRUCTIONS]