SCOTTISH QUALIFICATIONS AUTHORITY

2004 Mathematics

Intermediate 1 – Units 1, 2 and Applications

Finalised Marking Instructions

Special Instructions

1 The main principle in marking scripts is to give credit for the skills which have been demonstrated. Failure to have the correct method may not preclude a pupil gaining credit for the calculations involved or for the communication of the answer.

Where a candidate has scored zero marks for any question attempted, "0" should be shown against the answer in the place in the margin.

It is of great importance that the utmost care should be exercised in adding up the marks. Where appropriate, all summations for totals and grand totals must be carefully checked.

2 The answer to one part, correct or incorrect must be accepted as a basis for subsequent dependent parts of a question. Full marks in the dependent part is possible if it is of equivalent difficulty.

3 Working after a correct answer should only be taken into account if it provides **firm** evidence that the requirements of the question have not been met.

4 In certain cases an error will ease subsequent working. **Full** credit cannot be given for this subsequent work but **partial** credit may be given.

5 Accept answers arrived at by inspection or mentally, where it is possible for the answer to have been so obtained.

6 Do not penalise omission or misuse of units unless marks have been specifically allocated to units.

7 A wrong answer without working receives no credit unless specifically mentioned in the marking scheme.

The rubric on the outside of the papers emphasises that working must be shown. In general markers will only be able to give credit to partial answers if working is shown. However there may be a few questions where partially correct answers unsupported by working can still be given some credit. **Any such instances will be stated in the marking scheme.**

8 Acceptable alternative methods of solution can only be given the marks specified, ie a more sophisticated method cannot be given more marks.

Note that for some questions a method will be specified.

9 In general do not penalise the same error twice in the one question.

10 Accept legitimate variations in numerical/algebraic questions.

11 Do not penalise bad form eg $\sin x^\circ = 0.5 = 30^\circ$.

12 A transcription error is not normally penalised except where the question has been simplified as a result.

13 Do not penalise inadvertent use of radians in trigonometry questions, provided its use is consistent within the question.

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
1. (a)	**Ans: £69** •[1] process: calculate 30% of 230	•[1] 69 **1 mark**
NOTES:		
1. (b)	**Ans: 60** •[1] process: calculate $\frac{4}{7}$ of 105	•[1] 60 **1 mark**
NOTES:		
1. (c)	**Ans: 200** •[1] process: calculate $380 - 20 \times 9$	•[1] 200 **1 mark**
NOTES:		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
2.	**Ans: £599** •[1] strategy: correct method •[2] process: carry out calculations correctly	•[1] •[2] 599 (award 1 for correct method or $12 \times 45 = 540$) **2 marks**
NOTES: 1. Correct answer with or without working — award 2/2		
3.	**Ans: 12m^3** •[1] strategy: know how to find volume of cuboid •[2] process: multiply $4 \times 2 \cdot 5 \times 1 \cdot 2$ correctly	•[1] $4 \times 2 \cdot 5 \times 1 \cdot 2$ •[2] 12 **2 marks**
NOTES: 1. Correct answer with or without working — award 2/2		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
4. (a)	**Ans: $-1\cdot5$** •[1] strategy: know to order numbers •[2] process: find median	$-5\ \ -4\ \ -3\ \ -3\ \ -2$ •[1] $-1\ \ 0\ \ \ 1\ \ \ 2\ \ \ 3$ •[2] $-1\cdot5$ **2 marks**
NOTES: 1. Correct answer with or without working — award 2/2		
4. (b)	**Ans: 8** •[1] strategy: know to find range •[2] process: find range	•[1] $3-(-5)$ •[2] 8 **2 marks**
NOTES: 1. Correct answer with or without working — award 2/2 2. -8 (no working necessary) — award 1/2		
4. (c)	**Ans: Invergow colder than Abergrange. Temperatures vary more in Invergow** •[1] interpret/communicate: interpret calculated statistics •[2] interpret/communicate: interpret calculated statistics	•[1] Invergow colder than Abergrange •[2] Temperatures vary more in Invergow **2 marks**
NOTES: 1. Do not accept eg The median is smaller in Invergow The range is bigger in Invergow		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
5.	**Ans: £1280** •[1] interpret: know to multiply 9000 by $0 \cdot 07$ and then add 650 •[2] process: find salary	•[1] $650 + 0 \cdot 07 \times 9000$ •[2] 1280 **2 marks**

NOTES:

1.

Final answer	with working	without working
1280	2/2	2/2
630 $(0 \cdot 07 \times 9000)$	1/2	0/2
5 850 630 $([650 + 0 \cdot 07] \times 9000)$	1/2	0/2
$675 \cdot 5(0)$ $([650 + 9000] \times 0 \cdot 07)$	1/2	0/2
1470 $(750 + [0 \cdot 08 \times 9000])$	1/2	0/2

6. **Ans:**

Carnation	Daffodil	Lily	Iris	Rose	Total Price
✓	✓			✓	£10 · 00
✓		✓		✓	£10 · 50
	✓	✓	✓		£10 · 50
	✓		✓	✓	£11 · 00
	✓	✓		✓	£12 · 00

•[1] interpret: interpret information

•[2] strategy: find some possibilities

•[3] strategy: find all possibilities

•[1] one correct combination

•[2] two more correct combinations

•[3] final two correct combinations

3 marks

NOTES:

1. Allow one addition error or omission in total price column

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
7. (a)	**Ans: 3 · 9**	
	•[1] communicate: complete table	•[1] 245 246 Total = 780
	•[2] strategy: know how to find mean	•[2] $780 \div 200$
	•[3] process: correct division of total (Σfx)	•[3] $3 \cdot 9$ **3 marks**

NOTES:

1.

Final answer	with working	without working
$3 \cdot 9$	3/3	2/3
130 $(780 \div 6)$	2/3	1/3

2. Award of 3rd mark eg $778 \div 6$
   (a) Accept 129 *r* 4, $129 \cdot 7$, $129 \cdot 6$....
   (b) Do not accept $129 \cdot 4$, 130, 129

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

7. (b)	**Ans: 5**	
	•[1] interpret: identify mode	•[1] 5 **1 mark**

NOTES:

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
8.	**Ans: Overtime rate = £7 · 20** **Gross pay = £208 · 80** **Net pay = £175 · 26** •[1] strategy/process: find overtime rate •[2] strategy/process: find gross pay •[3] strategy/process: find net pay	•[1] £7 · 20 •[2] £208 · 80 •[3] £175 · 26 **3 marks**

NOTES:

1. If the payslip is incomplete then marks may be awarded for each correct answer appearing elsewhere on the page

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
9. (a)	**Ans: 1 cm to 10 km** •[1] strategy: know how to find scale •[2] process: find scale	•[1] $8 \cdot 5$ cm •[2] 1 cm to 10 km or equivalent **2 marks**
NOTES: 1. Correct answer with or without working — award 2/2 2. 1 to 10 with or without working — award 1/2		
9. (b)	**Ans: Position of Cairnwell correctly indicated on scale drawing** •[1] interpret/communicate: direction drawn correctly •[2] interpret/communicate: direction drawn correctly •[3] strategy: know to find point of intersection of two directions	•[1] one bearing shown correctly $(\pm 2^\circ)$ •[2] second bearing shown correctly $(\pm 2^\circ)$ •[3] find point of intersection of bearings **3 marks**
NOTES: 1. If both bearings are measured anti-clockwise from north then the final 2 marks are available. 2. If bearing drawn at Allenby = 135º and bearing drawn at Brucefield = 060º award 1/3.		

Question No	Marking Scheme Give 1 mark for each •		Illustrations of evidence for awarding a mark at each •
10.	**Ans: 15**		
	•[1] process:	substitute into expression	•[1] $\frac{2\times -5\times 6}{-4}$
	•[2] process:	correct multiplication involving negative	•[2] $2\times -5\times 6=-60$
	•[3] process:	correct division involving negative	•[3] 15
			3 marks

NOTES:

1. ± 15 without working — award 1/3

2. $\frac{2\times \pm 5\times 6}{\pm 4}=\pm 15$ (working must be shown) — award a minimum of 1/3

TOTAL MARKS FOR PAPER 1

33

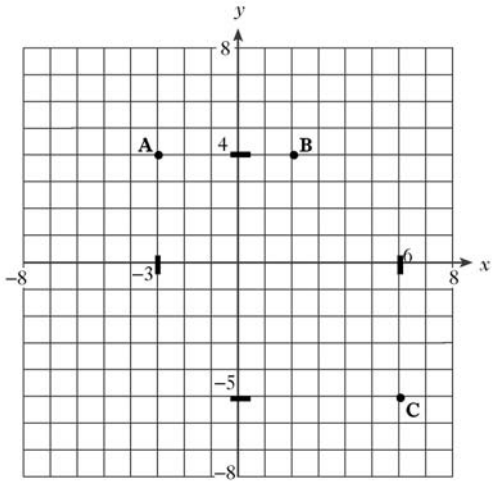
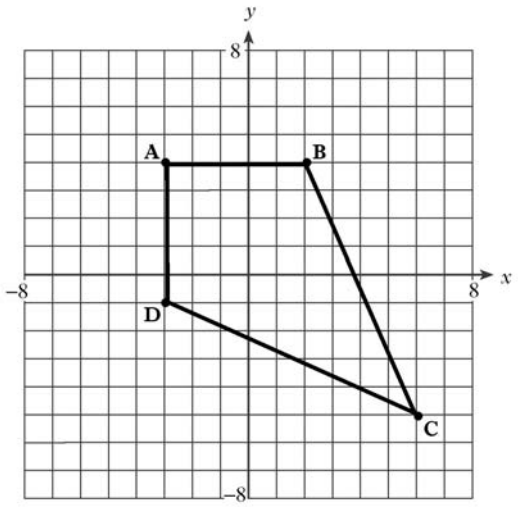
[END OF MARKING INSTRUCTIONS]

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
1.	**Ans:** $\frac{\mathbf{10}}{\mathbf{2000}}$ •[1] process: find probability	•[1] $\frac{10}{2000}$ or equivalent **1 mark**

NOTES:

1. Accept 10:2000, 10 out of 2000, 10 in 2000, 10 – 2000, $0 \cdot 005$ or cancelled down versions of the above

2. Do not penalise a correct answer followed by a cancelling error

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
2. (a)	**Ans:**  •[1] communicate: plot point •[2] communicate: plot points	•[1] plot A or C •[2] plot A, B and C **2 marks**
2. (b)	**Ans:**  •[1] strategy: plot 4th vertex of kite •[2] communicate: state co-ordinates of D	•[1] plot $(-3,-1)$ •[2] $(-3,-1)$ **2 marks**

NOTES:

1. Points need not be labelled
2. If a candidate consistently plots (y,x) instead of (x,y)
   (a) Plot A (4, -3), B (4, 2), C (-5, 6) award 1/2
   (b) Plot D (-1, -3) and write (-3, -1) award 2/2
3. Final mark is not available if D is in first quadrant
4. In (b) if (-3, -1) is written down but not plotted award 2/2

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
3.	**Ans: 48 mph** •[1] strategy: know how to find speed •[2] process: find time •[3] process: find speed	•[1] $S = \frac{D}{T}$ •[2] 11h 30m •[3] 48 **3 marks**

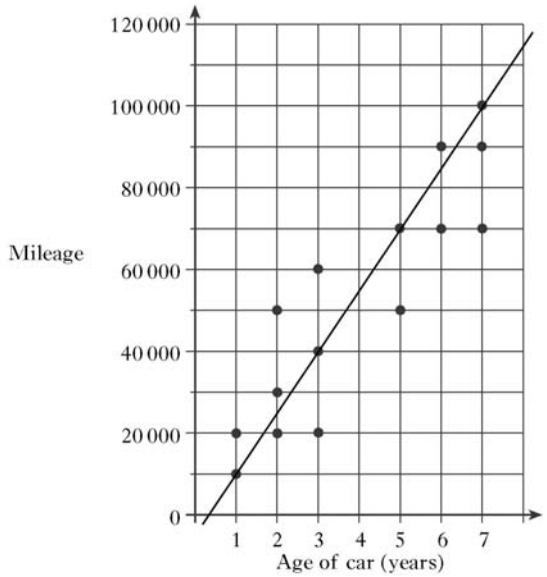
NOTES:

1. 48 without working — award 1/3
2. Examples of some common answers (working must be shown)
   (a) implied time = 11h 30m
   (i) $\frac{552}{11 \cdot 5} = 48$ — award 3/3
   (ii) $\frac{552}{11 \cdot 3(0)} = 48 \cdot 8....$ — award 2/3 ✓✓✗
   (b) implied time = 11h 50m
   (i) $\frac{552}{11 \cdot 83} = 46 \cdot 6....$ — award 2/3 ✓✗✓
   (ii) $\frac{552}{11 \cdot 50} = 48$ — award 1/3 ✓✗✗
3. Divisions which do not give a whole number answer must be rounded or truncated to at least one decimal place
   eg implied time = 12h 30m
   (i) $\frac{552}{12 \cdot 5} = 44 \cdot 16$ or $44 \cdot 2$ or $44 \cdot 1$ — award 2/3 ✓✗✓
   (ii) $\frac{552}{12 \cdot 5} = 44$ — award 1/3 ✓✗✗
   (iii) $\frac{552}{12 \cdot 3(0)} = 44 \cdot 8....$ or $44 \cdot 8$ or $44 \cdot 9$ — award 1/3 ✓✗✗
4. 3rd mark is not available for division by whole number of hours
5. For award of 3rd mark assume answer is in mph unless units are stated
   eg $\frac{552}{690} = 0 \cdot 8$ miles per minute — award 3/3
   $\frac{552}{690} = 0 \cdot 8$ — award 2/3
6. For S = DT the final 2 marks are available
   eg $552 \times 11 \cdot 5 = 6348$ — award 2/3

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
4. (a)	**Ans: 1228 · 32** •[1] interpret/process: evaluate formula	•[1] 1228 · 32 **1 mark**
4. (b)	**Ans: = SUM (D3 .. D8)** •[1] communicate: state formula	•[1] SUM (D3 .. D8) or equivalent **1 mark**

NOTES:

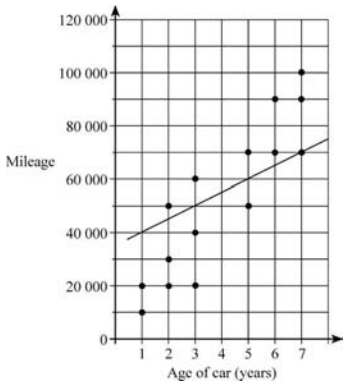
1. Accept any punctuation mark or space between D3 and D8
2. Accept D3 + D4+ D5 + D6 + D7 + D8 or D3 + D5 + D6 + D7 + D8

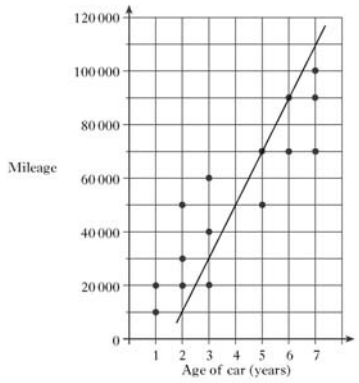
Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
5. (a)	**Ans:**  •[1] communicate: draw line of best fit	•[1] see answer **1 mark**

NOTES:

1. Accept straight lines with $5000 \leq$ gradient $\leq 20\,000$ <u>and</u> |(points above line) – (points below line)| ≤ 2

   eg





5. (b)	**Ans: 55 000 miles** •[1] interpret: interpret scattergraph	•[1] 55 000 (± 2000) **1 mark**

NOTES:

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
6.	**Ans: £4291·20** $\bullet^1$ interpret: interpret table $\bullet^2$ strategy: know how to find total repayments $\bullet^3$ process: find total repayments	$\bullet^1$ $89 \cdot 40$ $\bullet^2$ $\bullet^3$ $4291 \cdot 20$ (award 1 for correct method or $357 \cdot 60$ or $1072 \cdot 80$ or correct answer to sum of money $\times 48$) **3 marks**

NOTES:

1. Examples of some common answers (no working necessary)

$4291 \cdot 20$	3/3
$4291 \cdot 2$	2/3
$357 \cdot 60$ $(89 \cdot 40 \times 4)$	2/3
$357 \cdot 6$	1/3
$1072 \cdot 80$ $(89 \cdot 40 \times 12)$	2/3
$1072 \cdot 8$	1/3

7.	**Ans: £36 000** $\bullet^1$ strategy:	correct method $\bullet^2$ process: carry out calculations correctly	$\bullet^1$ $\bullet^2$ 36 000 (award 1 for correct method or $\frac{90}{2 \cdot 50} = 36$ or $\frac{1000}{2 \cdot 5} = 400$) **2 marks**

NOTES:

1. Correct answer with or without working — award 2/2
2. 36,400 (no working necessary) — award 1/2

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
8. (a)	**Ans: £60** •[1] strategy: know to use proportion •[2] process: carry out calculations correctly	•[1] •[2] 60 (award 1 for correct method or $\frac{40}{16} = 2 \cdot 5$ or $\frac{24}{16} = 1 \cdot 5$) **2 marks**

NOTES:

1. Correct answer with or without working — award 2/2
2. $2 \cdot 5$, $1 \cdot 5$ (no working necessary) — award 1/2

8. (b)	**Ans: $28 \cdot 3$ inches** •[1] strategy: know to use right-angled triangle •[2] strategy: correct form of Pythagoras Theorem •[3] process: calculate square root of sum or difference of two squares	•[1] evidence of use of 20 and 20 in right-angled triangle formula or in diagram •[2] $20^2 + 20^2$ •[3] 28(·28....) **3 marks**

NOTES:

1. Disregard incorrect rounding for answers given to one or more decimal places
2. (a) 28 without working (possible use of scale drawing) — award 0/3
   (b) $28 \cdot 3$, $28 \cdot 28$ ….. without working — award 3/3

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
9.	**Ans: Yes** **EITHER it costs €39·50 in Scotland** **OR it costs £25·33 (or £25·32) in Spain** •[1] strategy: know to convert £→€ (or €→£) •[2] process: convert currency correctly •[3] communicate: state conclusion and valid reason	**Method 1** •[1] $25 \cdot 99 \times 1 \cdot 52$ •[2] $39 \cdot 5048$ •[3] Yes. It costs €39·50 in Scotland **Method 2** •[1] $38 \cdot 50 \div 1 \cdot 52$ •[2] $25 \cdot 328$ ….. •[3] Yes. It costs £25·33 (or £25·32) in Spain **3 marks**

NOTES:

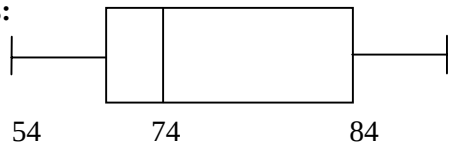
1. Do not accept "Yes" without working/valid reason — award 0/3

2. Acceptable answers (no working necessary)

(a)	Yes. It costs £25·33 (or £25·32)		
	OR Yes. It costs €39·50 in Scotland	award 3/3	
(b)	Yes. It costs £25·328....		
	OR Yes. It costs €39·5048 in Scotland	award 2/3	✓✓✗
(c)	Yes. It costs €39·50	award 2/3	✓✓✗
(d)	He saves 67p (or 66p) OR €1	award 3/3	
(e)	He saves £1	award 2/3	✓✓✗
(f)	It costs 67p (or 66p) or €1 more in Scotland	award 3/3	
(g)	It costs 67p (or 66p) or €1 more	award 2/3	✓✓✗

3. Treat subtraction errors as insignificant.
   eg $25 \cdot 99 - 25 \cdot 33 \rightarrow$ He saves 69p. — award 3/3

4. The final two marks are available for $17 \cdot 09$ ….. $(25 \cdot 99 \div 1 \cdot 52)$ or $58 \cdot 52$ $(38 \cdot 50 \times 1 \cdot 52)$ followed by a consistent conclusion and valid reason

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
10.	**Ans:**  	
	•[1] process: arrange numbers in order	•[1] 54 60 62 69 70 72 73 75 77 83 84 88 91 93
	•[2] interpret: minimum	•[2] 54
	•[3] interpret: median	•[3] 74
	•[4] interpret: upper quartile	•[4] 84
		4 marks

NOTES:

1. Correctly complete boxplot (no working necessary) award 4/4
2. If minimum, median and upper quartile are correct but not shown correctly in boxplot award 3/4

Question No	Marking Scheme Give 1 mark for each •		Illustrations of evidence for awarding a mark at each •
11. (a)	**Ans: 3 · 25 %**		
	•[1] interpret:	interpret line graph	•[1] $3 \cdot 25$ or $3\frac{1}{4}$
			1 mark
11. (b)	**Ans: It went down**		
	•[1] interpret:	interpret trend in line graph	•[1] It went down
			1 mark

NOTES:

1. Disregard numerical errors in an otherwise correct answer

11. (c)	**Ans: £8 · 75**		
	•[1] interpret:	interpret line graph	•[1] $2 \cdot 5$
	•[2] •[3] strategy:	know how to calculate interest	•[2] •[3] $\frac{2 \cdot 5}{100} \times 1400 \times \frac{3}{12}$ (award 1 for an otherwise correct method with one missing or incorrect step)
	•[4] process:	carry out percentage and fraction calculations correctly	•[4] $8 \cdot 75$
			4 marks

NOTES:

1.

Final answers	with working	without working
$8 \cdot 75$	4/4	3/4
35 ($2 \cdot 5$% of 1400)	2/4	1/4
105 ($2 \cdot 5$% of 1400×3)	2/4	1/4

2. If amount is found ie $1408 \cdot 75$, a maximum of 3 marks is available unless candidate clearly indicates that interest $= 8 \cdot 75$

3. Do not penalise premature rounding or truncation
eg $2 \cdot 5\%$ of $1400 = 35 \div 12 = 2 \cdot 91 \times 3 = £8 \cdot 73$ award 4/4

Question No	Marking Scheme Give 1 mark for each •		Illustrations of evidence for awarding a mark at each •
12.	**Ans: $460\cdot6$ cm^2 or $460\cdot8$ ….. cm^2**		
	$\bullet^1$ strategy:	know how to find curved surface area of cylinder	$\bullet^1$ $2\pi rh$
	$\bullet^2$ strategy:	substitute correct radius and height into formula involving π	$\bullet^2$ $2\times\pi\times5\times14$
	$\bullet^3$ strategy:	know to add area of overlap	$\bullet^3$ $2\times\pi\times5\times14 + 1\cdot5\times14$
	$\bullet^4$ process:	carry out calculation involving π	$\bullet^4$ $460\cdot6$ or $460\cdot8$ ….. $(3\cdot14)$ (π) **4 marks**

NOTES:

1. Correct answer without working — award 3/4
2. Disregard premature or incorrect rounding
3. Where an incorrect formula for curved surface area of cylinder is used working should be followed through with the possibility of awarding 3/4 eg

(a)	$\pi rh \rightarrow \pi\times5\times14+1\cdot5\times14=240\cdot8$ or $240\cdot9$ ….	award 3/4	✗ ✓ ✓ ✓
(b)	$\pi r^2h \rightarrow \pi\times5^2\times14=1099\cdot....$	award 2/4	✗ ✓ ✗ ✓
(c)	$2\pi d \rightarrow \pi\times20=62\cdot8....$	award 1/4	✗ ✗ ✗ ✓

13.	**Ans: 45%**		
	$\bullet^1$ strategy:	know to express 18 as a fraction of 40	$\bullet^1$ $\frac{18}{40}$
	$\bullet^2$ strategy:	know to how express $\frac{18}{40}$ as a percentage	$\bullet^2$ $\frac{18}{40}\times100$
	$\bullet^3$ process:	divide and multiply correctly	$\bullet^3$ 45 **3 marks**

NOTES:

1. Correct answer without working — award 3/3
2. Acceptable answers for partial credit (no working necessary)

(a)	$\frac{40}{18}\times100=222(\cdot....)$	award 2/3	✗ ✓ ✓
(b)	$\frac{40}{100}\times18$ or $\frac{18}{100}\times40=7\cdot2$	award 1/3	✗ ✗ ✓

Question No	Marking Scheme Give 1 mark for each •		Illustrations of evidence for awarding a mark at each •
14.	**Ans: 1 · 46 m²**		
	•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 $\frac{1}{2}\times\pi\times 0\cdot 3^2$
	•³ strategy:	know to subtract area of semi-circle from area of rectangle	•³ $(2\times 0\cdot 8)-\left(\frac{1}{2}\times\pi\times 0\cdot 3^2\right)$
	•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 1 · 458 …..
	•⁵ process:	round to 2 decimal places	•⁵ 1 · 46 **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)	$1\cdot 6-\frac{1}{2}\times\pi\times 0\cdot 3^2=1\cdot 46$	award 5/5	award 4/5
(b)	$16000-\frac{1}{2}\times\pi\times 30^2=14586\cdot 28$	award 4/5	award 3/5
(c)	$1\cdot 6-\pi\times 0\cdot 3^2=1\cdot 32$	award 4/5	award 0/5
(d)	$1\cdot 6-\frac{1}{2}\times\pi\times 0\cdot 6^2=1\cdot 03$	award 4/5	award 0/5
(e)	$1\cdot 6-\pi\times 0\cdot 6^2=0\cdot 47$	award 3/5	award 0/5
(f)	$1\cdot 6-\frac{1}{2}\times\pi\times 0\cdot 6=0\cdot 66$	award 3/5	award 0/5
(g)	$1\cdot 6-\pi\times 0\cdot 6=-0\cdot 28$	award 2/5	award 0/5

3. (a) Unrounded or incorrectly rounded versions of the above answers should be awarded 1 mark less than those shown above.
   (b) 1 · 4 without working award 0/5.

4. 5th mark only available where candidate is required to round circle calculation to 2 decimal places.

TOTAL MARKS FOR PAPER 2
47

[END OF MARKING INSTRUCTIONS]