SCOTTISH QUALIFICATIONS AUTHORITY

2005 Mathematics

Intermediate 1 – Units 1, 2 and Applications

Finalised Marking Instructions

These Marking Instructions have been prepared by Examination Teams for use by SQA Appointed Markers when marking External Course Assessments.

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2005 Mathematics

Intermediate 1 Units 1, 2 and Applications Paper 1

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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 $\sin x^o = 0.5 = 30^o$
   - 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 the 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 full 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 Applications

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
1 (a)	**Ans: 3·87** •[1] process: calculate 6·17 - 2·3	•[1] 3·87 **1 mark**
(b)	**Ans: £900** •[1] process: calculate 75% of 1200	•[1] 900 **1 mark**
(c)	**Ans: 0·007** •[1] process: convert $\frac{7}{1000}$ to a decimal	•[1] 0·007 **1 mark**
NOTES:		
2	**Ans: 8.50am** •[1] process: subtract 4h30m from 1.20pm	•[1] 8.50 **1 mark**
NOTES: 1 Accept 8.50 pm, 8h 50m		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
3	**Ans: 120** •[1] strategy: know to divide 360 by 6 and then subtract from 180 •[2] process: evaluate formula	•[1] •[2] 120 (award 1 for correct method or 360 ÷ 6 = 60) **2 marks**

NOTES:

1	Final Answer	with working	without working
	120	2/2	0/2
	-30 [(180-360) ÷ 6]	1/2	0/2
	30 [(360-180) ÷ 6]	0/2	0/2

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
4	**Ans: 5·67** •[1] communicate/process: complete table •[2] strategy: know how to find mean •[3] process: correct division of total ($\sum fx$) **3 marks**	•[1] 84 72 Total = 567 •[2] 567 ÷ 100 •[3] 5·67

NOTES:

1

Final answer	With working	Without working
5·67	3/3	2/3
94·5 (567 ÷ 6)	2/3	1/3

2 Award of 1st mark
84, 72 and 567 need not appear in table but must be shown in working.

3 Award of 3rd mark eg 567 ÷ 8
(a) Accept 70·9, 70·8(…)
(b) Do not accept 70*r*7, 70·7, 71, 70

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
5 (a)	**Ans: 5** •[1] interpret: find number of arcs in network diagram	•[1] 5 **1 mark**
(b)	**Ans: eg River Gardens, High Road, Main Street, Hill Crescent, Lomond Drive** •[1] interpret/strategy: find route which starts at shop and goes along each street <u>once</u>	•[1] eg River Gardens, High Road, Main Street, Hill Crescent, Lomond Drive **1 mark**
NOTES:		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
6	**Ans:** • ^{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**

Digital Camera £95	Scanner £75	Printer £70	Cordless Keyboard £45	Pair of Speakers £40	Total Value
✓	✓				170
✓		✓			165
✓			✓	✓	180
	✓	✓	✓		190
	✓		✓	✓	160

NOTES:

1 Allow one addition error or omission in total value column

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
7	**Ans: 67·2cm^2** •^{1} strategy: know how to find total area of rectangular faces •^{2} strategy: know how to find area of a triangular face •^{3} strategy/process: calculate surface area (must involve five faces)	•^{1} $(6 \times 2) \times 3$ •^{2} $\frac{1}{2} \times 6 \times 5{\cdot}2$ •^{3} 67·2 **3 marks**

NOTES:

1 Some common answers (working must be shown)

(a) $(6 \times 2) \times 3 + (6 \times 5{\cdot}2) \times 2 = 98{\cdot}4$

(b) $(6 \times 2) \times 3 + (\frac{1}{2} \times 6 \times 6) \times 2 = 72$

} award 2/3

(c) $(6 \times 2) \times 3 + (\frac{1}{2} \times 6 \times 5{\cdot}2) + (\frac{1}{2} \times 6 \times 6)$
[answer = 69·6]

(d) $(6 \times 2) \times 3 + (6 \times 5{\cdot}2) + (6 \times 6)$
[answer = 103·2]

(e) $(6 \times 2) \times 3 + (6 \times 6) \times 2)$
[answer = 108]

} award 1/3

In (c), (d), (e) the answer to the calculation need not be correct for the award of the mark(s)

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
8 (a)	**Ans: $81** •[1] strategy: know how to change £50 into $ •[2] process: multiply correctly	•[1] 1·62 × 50 •[2] 81 **2 marks**
NOTES: 1 Correct answer without working award 2/2 2 50 ÷ 1·62 = 30·86 award 1/2		
(b)	**Ans: £1 = 1·60** •[1] strategy: know how to find exchange rate •[2] process: divide correctly	•[1] 320 ÷ 200 •[2] 1·6 **2 marks**
NOTES: 1 Correct answer without working award 2/2		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
9 (a)	**Ans: 275m** •[1] strategy: know how to calculate the length of North Street •[2] process: correctly multiply 25 by a number greater than 10	•[1] $25 \times 11(\pm 0{\cdot}2)$ •[2] 275 **2 marks**

NOTES:

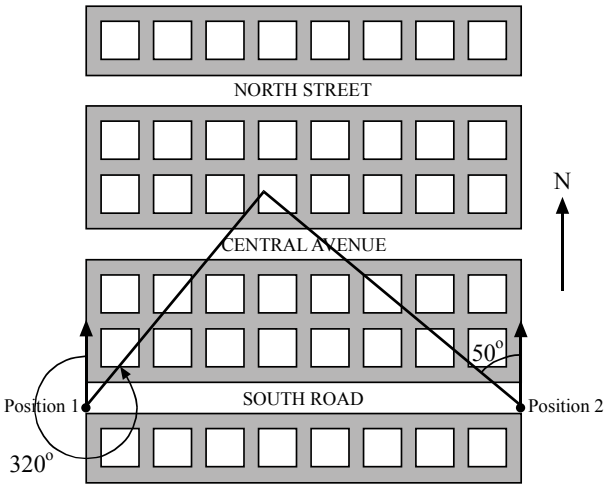
1 Accept 275 without working award 2/2

(b)	**Ans:**  •[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 (±2°) •[2] second bearing shown correctly (±2°) •[3] find point of intersection of bearings **3 marks**

NOTES:

1 If no bearings are indicated but correct house is identified award 1/3

2



award 1/3

<table>
<tr><th>Question No</th><th>Marking Scheme
Give 1 mark for each •</th><th>Illustrations of evidence for awarding a mark at each •</th></tr>
<tr><td>10 (a)</td><td>Ans: -3

•[1] interpret/process: find magic total</td><td>

•[1] -3

1 mark</td></tr>
<tr><td>(b)</td><td>Ans:
<table>
<tr><td>1</td><td>-6</td><td>-1</td></tr>
<tr><td>-4</td><td>-2</td><td>0</td></tr>
<tr><td>-3</td><td>2</td><td>-5</td></tr>
</table>
•[1] interpret/process: one correct line
•[2] strategy/process: another three correct lines
•[3] strategy/process: complete magic square</td><td>•[1] one correct line
•[2] three more correct lines
•[3] final three correct lines

3 marks</td></tr>
<tr><td colspan="3">NOTES:

1 A correct line is any row, column or diagonal adding up to -6.
2 If incorrect magic total is used
(a) award ⅔ for all seven lines equal
(b) award ⅓ for four lines equal</td></tr>
</table>

TOTAL MARKS FOR PAPER 1

30

[END OF MARKING INSTRUCTIONS]

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Mathematics – Intermediate 1: Paper 2, Units 1, 2 and Applications

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
1	**Ans: 166 000 cm^3** •^{1} strategy/process: find volume of cube •^{2} process: round to nearest thousand	•^{1} $55 \times 55 \times 55 = 166\,375$ •^{2} 166 000 **2 marks**

NOTES:

1	Correct answer with or without working	award 2/2
2	2nd mark only available for rounding number greater than 10 000	
3	170 000, 166 400, 166380, 166370 (incorrect rounding) no working necessary	award 1/2
4	$55 \times 55 \times 55 = 166\,375 = \sqrt{166375} = 408$ or 407·…	award 0/2

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
2	**Ans: £2410** •[1] strategy: correct method •[2] process: carry out calculations correctly	•[1] •[2] 2410 (award 1 for correct method or see note 3) **2 marks**

NOTES:

1 Correct answer with or without working award 2/2

2 Correct method "$\frac{3}{100} \times 72\,000 + 250$" or equivalent

Do not accept "3% of 72 000 + 250" alone as evidence of correct method

3 Answers acceptable for the award of 1 mark.
No working necessary

(a) 3% calculated correctly but 72 000 and 250 used incorrectly or omitted
- (i) 2160 [3% of 72 000]
- (ii) 257·5(0) [250 + 3% of 250]
- (iii) 2167·5(0) [3% of (250 + 72 000)]
- (iv) 72 007·5(0) [72 000 + 3% of 250]
- (v) 74160 [72 000 + 3% of 72 000]

(b) Incorrect percentage calculation in otherwise correct method
- (i) 21850 [250 + 0·3 × 72 000]
- (ii) 466 [250 + 0·003 × 72 000]
- (iii) 271·6(0) [250 + 0·0003 × 72 000]
- (iv) Working must be shown where any percentage other than those shown above is used
  eg 250 + 1% of 72 000 = 970

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
3 (a)	**Ans: 3h 15m** •[1] interpret: interpret graph	•[1] 3h 15m **1 mark**

NOTES:

1 Accept 3·15

(b)	**Ans: 40mph** •[1] strategy: know how to find speed •[2] interpret: interpret graph •[3] process calculate speed	•[1] $S = \frac{D}{T}$ •[2] $D = 60$, $T = 1\text{h}30\text{m}$ •[3] 40 **3 marks**

NOTES:

1

Final Answer			with working	without working
40			3/3	3/3
46(·…)	(60 ÷ 1·3)	disregard incorrect rounding	2/3	1/3
0.6(….)	(60 ÷ 90)		2/3	1/3
90	(60 × 1·5)		2/3	0/3
78	(60 × 1·3)		1/3	0/3
5400	(60 × 90))		1/3	0/3

2 3rd mark is not available for division by whole number of hours

3 If candidate uses time from part (a) then 1st and 3rd marks are available
eg 60 ÷ 3·25 = 18 (·46…) award 2/3

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
4 (a)	**Ans: =B10 * C10** •[1] communicate: state formula	•[1] B10 * C10 **1 mark**
NOTES: 1 Do not accept B10 × C10, SUM = B10 * C10		
(b)	**Ans: = SUM (D4 .. D10)** •[1] communicate: state formula	•[1] SUM (D4 .. D10) or equivalent **1 mark**
NOTES: 1 Accept any punctuation mark or space between D4 and D10 2 Accept SUM (D4.. D11), D4+ D5 + D6 + D7 + D8 + D9 +D10 [+ D11] 3 Do not accept SUM = (D4.. D10), SUM D4.. D10		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
5 (a)	**Ans: 41 years** •[1] interpret: extract dates from stem and leaf diagram	•[1] 41 **1 mark**
(b)	**Ans: 22 years** •[1] strategy: know to select highest and lowest values •[2] process: calculate range	•[1] 41,19 •[2] 41 – 19 = 22 **2 marks**
(c)	**Ans: eg Kestrels are older** •[1] interpret/communicate: interpret stem and leaf diagram and make valid comparison	•[1] any indication that Kestrels are older **1 mark**

NOTES:

1 Where candidate comments on individual levels, at least two levels must be compared
eg Falcons have more players in their 20s — award 0/1
Falcons have more 20+ players but Kestrels have more 30+ players — award 1/1

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
6 (a)	**Ans: £219·52** •[1] interpret: interpret table	•[1] 219·52 **1 mark**
(b)	**Ans: £1378·08** •[1] strategy: know how to find total saving •[2] process: find total saving	•[1]•[2] 1378·08 (award 1 for correct method or see note 2) **2 marks**

NOTES:

1 Correct answer without working award 2/2

2 Award 1/2 for
- (a) 28·71 [219·52 – 190·81]
- (b) 10536·96 [219·52 × 48]
- (c) 9158·88 [190·81 × 48]
- (d) 114·84 [(219·52 – 190·81) × 4]

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
7 (a)	**Ans: 75** •[1] process: find mode	•[1] 75 **1 mark**
(b)	**Ans: 72·5** •[1] strategy: know how to order numbers •[2] process: find median	•[1] 67 68 70 70 70 71 74 75 75 75 75 76 •[2] 72·5 **2 marks**

NOTES:

1 Correct answer without working award 2/2

2 Accept ordered list written in part (b) or part (a)

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

4 When a candidate finds median in (a) and mode in (b) then award 0/1 for (a) and both marks for (b) are available for finding the median

(c)	**Ans:** $\frac{3}{12}$ •[1] process: find probability	•[1] $\frac{3}{12}$ or equivalent

NOTES:

1 Accept 3:12, 3 out of 12, 3 in 12, 3-12, 0·25

Question No	Marking Scheme Give 1 mark for each •		Illustrations of evidence for awarding a mark at each •
8	**Ans: 70%**		
	•[1] strategy:	know to express 42 as a fraction of 60	•[1] $\frac{42}{60}$
	•[2] strategy:	know to multiply fraction by 100	•[2] $\frac{42}{60} \times 100$
	•[3] process:	multiply and divide correctly	•[3] 70
			3 marks

NOTES:

1	Final answer	with working	without working
	70	3/3	3/3
	$30\left[\frac{18}{60}\times 100\right]$	2/3	2/3
	142 (·…) $\left[\frac{60}{42}\times 100\right]$	2/3	2/3
	25·2 $\left[\frac{42}{100}\times 60 \text{ or } \frac{60}{100}\times 42\right]$	1/3	1/3
	25 $\left[\frac{42}{100}\times 60 \text{ or } \frac{60}{100}\times 42\right]$	1/3	0/3

Question No	Marking Scheme Give 1 mark for each •		Illustrations of evidence for awarding a mark at each •
9	**Ans: 490**		
	$\bullet^1$ strategy/process:	calculate or measure angle at centre of "large" sector	$\bullet^1$ 140
	$\bullet^2$ strategy:	know how to find number of large eggs	$\bullet^2$ $\frac{140}{360} \times 1260$
	$\bullet^3$ process:	find number of large eggs	$\bullet^3$ 490
			3 marks

NOTES:

1 Correct answer without working — award 3/3

2 Do not penalise premature rounding or truncation

eg $\frac{140}{360} = 0{\cdot}388\ldots \rightarrow 0{\cdot}4 \times 1260 = 504$
$\rightarrow 0{\cdot}38 \times 1260 = 478$
} working must be shown — award 3/3

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
10 (a)	**Ans: 6** •[1] strategy: arrange numbers in order •[2] interpret/process: find lower quartile	•[1] 1 2 2 5 7 8 9 10 11 12 12 13 15 22 23 27 28 •[2] 6 **2 marks**
(b)	**Ans: 12·5** •[1] interpret/process: find upper quartile •[2] strategy/process: calculate interquartile range	•[1] 18·5 •[2] 12·5 **2 marks**

NOTES:

1	Range = 28 – 1 = 27	award 0/2
2	If numbers not ordered then for 14 – 10 = 4 [and award 0/2 in part (a)]	award 2/2

Question No	Marking Scheme Give 1 mark for each •		Illustrations of evidence for awarding a mark at each •
11	**Ans: 419·8 m or 419·9 m**		
	•[1] strategy:	know how to find length of bends	•[1] πd
	•[2] strategy:	substitute correct diameter into circumference formula	•[2] $\pi \times 70$
	•[3] strategy:	know to add $\pi d + 200$	•[3] $\pi \times 70 + 200$
	•[4] process:	carry out all calculations correctly (must include a circle calculation and an addition)	•[4] 419·9…..(π) 419·8 (3·14) **4 marks**

NOTES:

1 Correct answer without working award 3/4

2 Where the following incorrect strategies are used, working should be followed through with the possibility of awarding the marks indicated below (working must be shown)

strategy	maximum mark available
$2\pi d + 200$, $\pi r + 200$, $\pi d + 7000$	3/4
$\pi r^2 + 200$, $\pi r^2 + 7000$	3/4
$2\pi r^2 + 200$, $\frac{1}{2}\pi r^2 + 200$	2/4
$2\pi r^2 + 7000$, $\frac{1}{2}\pi r^2 + 7000$	2/4

3 Accept answers rounded or truncated to nearest whole number.

Question No	Marking Scheme Give 1 mark for each •		Illustrations of evidence for awarding a mark at each •
12	**Ans: £260**		
	•[1] strategy/process:	find number of basic hours	•[1] 34
	•[2] strategy/process:	find basic pay	•[2] $34 \times 6{\cdot}50 = 221$
	•[3] strategy/process:	find overtime pay	•[3] $4 \times 1{\cdot}5 \times 6{\cdot}50 = 39$
	•[4] strategy/process:	find total pay	•[4] $221 + 39 = 260$
			4 marks

NOTES:

1	Final answer	with working	without working
	260	4/4	3/4
	$113{\cdot}75\ [(11{\cdot}5 \times 6{\cdot}50) + 39]$	3/4	2/4

Question No	Marking Scheme Give 1 mark for each •		Illustrations of evidence for awarding a mark at each •	
13	**Ans: 8·5 cm**			
	•[1]	strategy: know to use right-angled triangle	•[1]	use 4 and 7·5 in right angled triangle diagram or formula
	•[2]	strategy: correct form of Pythagoras theorem	•[2]	$4^2 + 7{\cdot}5^2$
	•[3]	process: calculate square root of sum or difference of two squares	•[3]	8·5
				3 marks

NOTES:

1 Correct answer without working award 2/3

2 If candidate uses trigonometry then requirement for award of 2nd mark is
$\tan x° = \frac{4}{7 \cdot 5} \rightarrow PQ = \frac{7 \cdot 5}{\sin x°}$ or equivalent

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
14	**Ans: £52** •[1] strategy/process: find number of tablets •[2] strategy/process: find number of boxes •[3] strategy/process: find cost	•[1] $4 \times 365 = 1460$ •[2] $1460 \div 200 = 7{\cdot}3$ •[3] $8 \times 6{\cdot}50 = 52$ **3 marks**

NOTES:

1 Do not accept 52 without working — award 0/3

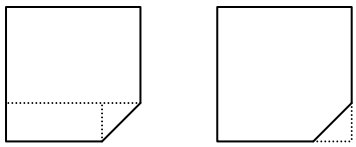
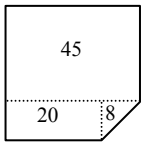
2 Answers acceptable for partial credit
- (i) 47·45 ($7{\cdot}3 \times 6{\cdot}50$)
- (ii) 7·3, 8

} no working necessary — award 2/3

- (iii) $(4 \times 365) \div 200 = 7{\cdot}3 \rightarrow 7 \times 6{\cdot}50 = 45{\cdot}5(0)$ working must be shown — award 2/3
- (iv) $45{\cdot}5(0)$ or $7 \times 6{\cdot}50 = 45{\cdot}5(0)$ — award 1/3

3 First 2 marks may be awarded for
- •[1] $200 \div 4 = 50$ (days per box)
- •[2] $365 \div 50 = 7{\cdot}3$

4 Award of first mark (no working necessary)
- (a) Accept 1456 $[(4 \times 7) \times 52]$
- (b) Do not accept 1344 $[(4 \times 7) \times 4 \times 12]$

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
15 (a)	**Ans: 9** •[1] strategy/process: find number of slabs along edge AB	 •[1] 9 **1 mark**
(b)	**Ans: 73** •[1] strategy: split shape into rectangles and triangles •[2] strategy/process: find number of slabs in **one** rectangle •[3] strategy/process: find number of slabs in triangle •[4] process: find total number of slabs	 •[1]  •[2] •[3] eg  •[4] 73 **4 marks**

NOTES:

1 Apply instructions above for alternative method

eg area $= (5{\cdot}4 \times 3) + (2{\cdot}4 \times 3) + (\frac{1}{2} \times 2{\cdot}4 \times 2{\cdot}4) = 26{\cdot}28$

slabs $= 26{\cdot}28 \div (0{\cdot}6 \times 0{\cdot}6) = 73$

2 Award of 4th mark: Candidates must correctly find number of slabs in remaining rectangle(s) as well as total number of slabs

TOTAL MARKS FOR PAPER 2
50

[END OF MARKING INSTRUCTIONS]