

2006 Mathematics

Intermediate 1 – Units 1, 2 and Applications Paper 2

Finalised Marking Instructions

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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 $\sin x^\circ = 0.5 = 30^\circ$
 - 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 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	<p>Ans: 12430 pesos</p> <p>•¹ strategy/process: correctly multiply 650 by 19·13</p> <p>•² process: round to nearest ten</p>	<p>•¹ 12434·5</p> <p>•² 12430</p> <p style="text-align: right;">2 marks</p>												
<p>NOTES:</p> <p>1 Answers acceptable for partial credit (no working necessary)</p> <p>(a) 12434, 12435, 12400 award 1/2</p> <p>(b) 30 (650 ÷ 19·13 to nearest 10) award 1/2</p> <p>2 For 12440 with no evidence of 12434(·5) or 12435 award 0/2</p>														
2 (a)	<p>Ans: Correct scale drawing</p> <p>•¹•² interpret/communicate: construct scale drawing</p>	<p>•¹ •² $BC = 10(\pm 0.2)$ cm, $\angle B = 85^\circ(\pm 2^\circ)$ and $\angle C = 30^\circ(\pm 2^\circ)$ (award 1 for any two correct measures)</p> <p style="text-align: right;">2 marks</p>												
2 (b)	<p>Ans: 2.75 m</p> <p>•¹ strategy/process: measure AB and then know to multiply by 50</p> <p>•² process: find actual length of AB in metres</p>	<p>•¹ $5.5 (\pm 0.2) \times 50$</p> <p>•² 2.75</p> <p style="text-align: right;">2 marks</p>												
<p>NOTES:</p> <p>1 Accept 2m 75</p> <p>2 Where candidate's line measures eg 5.2 cm</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Answer</u></th> <th style="text-align: left;"><u>with working</u></th> <th style="text-align: left;"><u>without working</u></th> </tr> </thead> <tbody> <tr> <td>2.5, 2.55, 2.6, 2.65, 2.7</td> <td>2/2</td> <td>2/2</td> </tr> <tr> <td>250, 255, 260, 265, 270</td> <td>1/2</td> <td>1/2</td> </tr> <tr> <td>252 (5.2 × 50 calculated incorrectly)</td> <td>1/2</td> <td>0/2</td> </tr> </tbody> </table>			<u>Answer</u>	<u>with working</u>	<u>without working</u>	2.5, 2.55, 2.6, 2.65, 2.7	2/2	2/2	250, 255, 260, 265, 270	1/2	1/2	252 (5.2 × 50 calculated incorrectly)	1/2	0/2
<u>Answer</u>	<u>with working</u>	<u>without working</u>												
2.5, 2.55, 2.6, 2.65, 2.7	2/2	2/2												
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252 (5.2 × 50 calculated incorrectly)	1/2	0/2												

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •				
3	<p>Ans:</p>  <p>19 27 38 45 51</p> <ul style="list-style-type: none"> •¹ process: arrange numbers in order •² interpret: maximum •³ interpret: median •⁴ interpret: lower quartile 	<ul style="list-style-type: none"> •¹ 19 23 31 34 38 40 43 47 51 •² 51 •³ 38 •⁴ 27 <p style="text-align: right;">4 marks</p>				
<p>NOTES:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 60%;">1 Correctly completed boxplot (no working necessary)</td> <td style="text-align: right;">award 4/4</td> </tr> <tr> <td>2 If maximum, median and lower quartile are correct but not shown correctly in boxplot</td> <td style="text-align: right;">award 3/4</td> </tr> </table>			1 Correctly completed boxplot (no working necessary)	award 4/4	2 If maximum, median and lower quartile are correct but not shown correctly in boxplot	award 3/4
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2 If maximum, median and lower 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 •															
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 $7 \div 4 = 1.75$) 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 <table data-bbox="263 1702 1380 1937" style="margin-left: 40px;"> <thead> <tr> <th><u>Answer</u></th> <th><u>requirements for first mark met</u></th> <th><u>requirements for first mark not met</u></th> </tr> </thead> <tbody> <tr> <td>16.3</td> <td>3/3</td> <td>2/3</td> </tr> <tr> <td>$652 \div 40 = 16$</td> <td>3/3</td> <td>2/3</td> </tr> <tr> <td>16</td> <td>1/3</td> <td>0/3</td> </tr> <tr> <td>$93(\dots) [652 \div 7]$</td> <td>2/3</td> <td>1/3</td> </tr> </tbody> </table> 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.			<u>Answer</u>	<u>requirements for first mark met</u>	<u>requirements for first mark not met</u>	16.3	3/3	2/3	$652 \div 40 = 16$	3/3	2/3	16	1/3	0/3	$93(\dots) [652 \div 7]$	2/3	1/3
<u>Answer</u>	<u>requirements for first mark met</u>	<u>requirements for first mark not met</u>															
16.3	3/3	2/3															
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$93(\dots) [652 \div 7]$	2/3	1/3															

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
6	<p>Ans: 240 litres</p> <ul style="list-style-type: none"> •¹ strategy: know to multiply $l \times b \times h$ •² strategy/process: find volume in cm^3 (or m^3) •³ process: convert to litres 	<ul style="list-style-type: none"> •¹ evidence of $l \times b \times h$ involving 50cm, 1.2 m and 40cm •² 240 000 (cm^3) (or 0.24 (m^3)) •³ 240 <p style="text-align: right;">3 marks</p>
<p>NOTES:</p> <p>1 Answer acceptable for partial credits (no working necessary)</p> <p>(a) 2400 ($50 \times 1.2 \times 40$) award 1/3</p> <p>(b) 2.4, 2 litres 400 award 2/3</p>		

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
7 (a)	<p>Ans: 10.5</p> <p>•¹ strategy: know to order numbers</p> <p>•² process: find median</p>	<p>•¹ 2 6 7 7 8 10 11 12 13 14 14 17</p> <p>•² 10.5</p> <p style="text-align: right;">2 marks</p>

NOTES:

1	<u>Answer</u>	<u>with working</u>	<u>without working</u>
	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)	<p>Ans: 15</p> <p>•¹ strategy: select largest and smallest values</p> <p>•² process: find range</p>	<p>•¹ 17, 2</p> <p>•² 15</p> <p style="text-align: right;">2 marks</p>
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NOTE:

1	<u>Answer</u>	<u>with working</u>	<u>without working</u>
	15	2/2	2/2
	10.5 (median)	1/2	0/2
	10(·083...) (mean)	1/2	0/2

(c)	<p>Ans: More cars on Monday. Number of cars vary more on Monday.</p> <p>•¹ interpret/communicate: interpret calculated statistics</p> <p>•² interpret/communicate: interpret calculated statistics</p>	<p>•¹ more cars on Monday</p> <p>•² number of cars vary more on Monday</p> <p style="text-align: right;">2 marks</p>
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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 •
8	<p>Ans: 1.3m</p> <ul style="list-style-type: none"> •¹ strategy: correct form of Pythagoras Theorem •² process: calculate $1.1^2 + 0.7^2$ •³ process: calculate $\sqrt{1.7}$ 	<ul style="list-style-type: none"> •¹ $1.1^2 + 0.7^2$ •² 1.7 •³ 1.3... <p style="text-align: right;">3 marks</p>

NOTES:

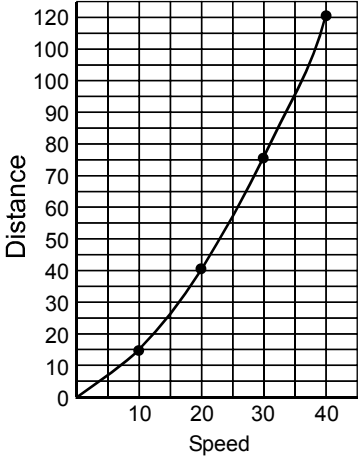
1	<u>Answer</u>	<u>with working</u>	<u>without working</u>
	1.3	3/3	3/3
	0.8 (48...) [$1.1^2 - 0.7^2$]	2/3	0/3
	0.77 [$1.1^2 \times 0.7^2$]	2/3	0/3

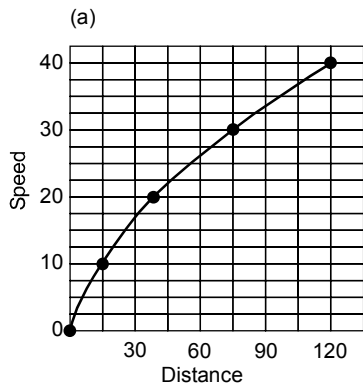
2 If candidate uses trigonometry then award marks as follows

•¹ eg $P = \tan^{-1} \left(\frac{1.1}{0.7} \right) \rightarrow \sin P = \frac{1.1}{WP}$

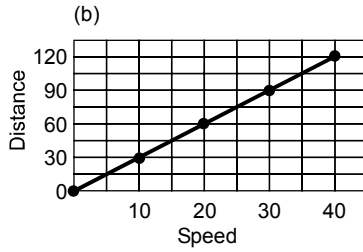
•² $WP = \frac{1.1}{\sin P}$

•³ 1.3

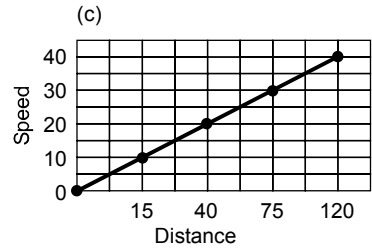
Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •									
9	<p>Ans:</p>  <p>•¹ strategy: use suitable scale</p> <p>•² communicate: scales labelled correctly</p> <p>•³ process: three points correctly plotted</p> <p>•⁴ process: line graph drawn</p>	<p>•¹ see note 1 for acceptable scales.</p> <p>•² “speed” on one axis “distance” on other axis</p> <p>•³ three points correctly plotted</p> <p>•⁴ other two points correctly plotted and line graph drawn</p> <p style="text-align: right;">4 marks</p>									
<p>NOTES:</p> <p>1 Acceptable scales</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;"></td> <td style="text-align: center;"><u>speed</u></td> <td style="text-align: center;"><u>distance</u></td> </tr> <tr> <td>horizontal axis</td> <td>1 box = 5, 10 mph</td> <td>1 box = 15, 20 feet</td> </tr> <tr> <td>vertical axis</td> <td>1 box = 2, 2.5, 5 mph</td> <td>1 box = 5, 10, 15 feet</td> </tr> </table> <p>2 See next page for examples of some common answers</p>				<u>speed</u>	<u>distance</u>	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
	<u>speed</u>	<u>distance</u>									
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									



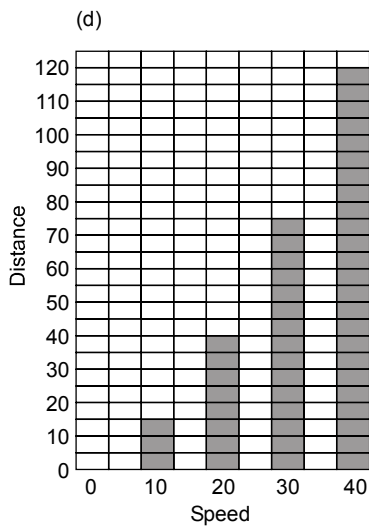
✓✓✓✓ $4/4$



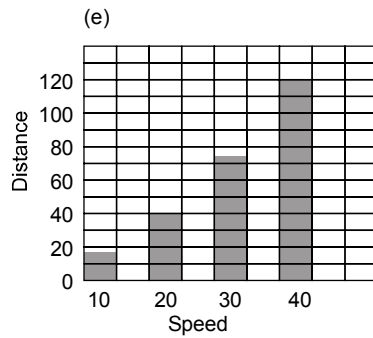
✗✓✗✓ $2/4$



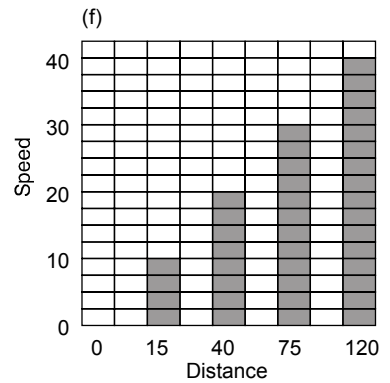
✗✓✗✓ $2/4$



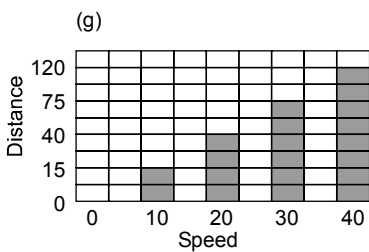
✓✓✓✗ $3/4$



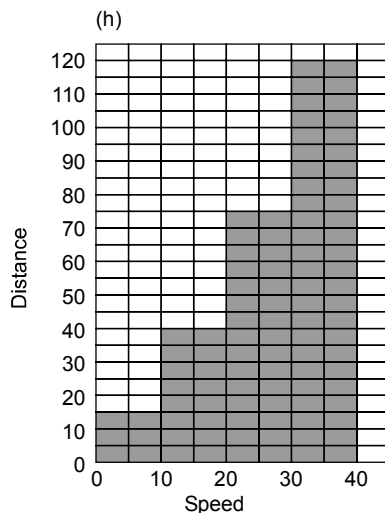
✗✓✓✗ $2/4$



✗✓✗✗ $1/4$



✗✓✗✗ $1/4$



✓✓✗✗ $2/4$

Spaces between bars not necessary in bar graphs

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •								
10	<p>Ans: £78</p> <p>•¹•² strategy: know how to calculate interest</p> <p>•³ process: carry out percentage and fraction calculations correctly</p>	<p>•¹•² $\frac{4.5}{100} \times 2600 \times \frac{8}{12}$</p> <p>(award 1 for $\frac{4.5}{100} \times 2600$</p> <p>or $\frac{8}{12} \times 4.5$</p> <p>or $\frac{8}{12} \times 2600$)</p> <p>•³ 78</p> <p style="text-align: right;">3 marks</p>								
<p>NOTES:</p> <p><u>Answer (no working necessary)</u></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 60%;">78</td> <td style="width: 40%; text-align: right;">award 3/3</td> </tr> <tr> <td>2678(2600 + 78)</td> <td style="text-align: right;">award 3/3</td> </tr> <tr> <td>117(4.5% of 2600)</td> <td style="text-align: right;">award 1/3</td> </tr> <tr> <td>936(117 × 8)</td> <td style="text-align: right;">award 1/3</td> </tr> </table>			78	award 3/3	2678(2600 + 78)	award 3/3	117(4.5% of 2600)	award 1/3	936(117 × 8)	award 1/3
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117(4.5% of 2600)	award 1/3									
936(117 × 8)	award 1/3									

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •																																
11 (a)	Ans: £784 • ¹ interpret: know to multiply 800 by 0.02 • ² strategy/process: find amount to be paid	• ¹ 800×0.02 • ² 784 <p style="text-align: right;">2 marks</p>																																
NOTES: <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;"></th> <th style="width: 35%; text-align: center;"><u>Answer</u></th> <th style="width: 30%; text-align: center;"><u>with working</u></th> <th style="width: 25%; text-align: center;"><u>without working</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">784</td> <td style="text-align: center;">2/2</td> <td style="text-align: center;">2/2</td> </tr> <tr> <td></td> <td style="text-align: center;">16</td> <td style="text-align: center;">1/2</td> <td style="text-align: center;">1/2</td> </tr> </tbody> </table> <p>2 If working in (b) provides clear evidence that shopkeeper pays £784 for weekly order then award 2/2 for (a)</p>				<u>Answer</u>	<u>with working</u>	<u>without working</u>	1	784	2/2	2/2		16	1/2	1/2																				
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1	784	2/2	2/2																															
	16	1/2	1/2																															
(b)	Ans: £48 • ¹ interpret: know to multiply 1600 by 0.05 • ² strategy: know how to find saving • ³ process: carry out all calculations correctly	• ¹ 1600×0.05 • ² $1600 \times 0.05 - 2 \times 16$ or equivalent • ³ 48 <p style="text-align: right;">3 marks</p>																																
NOTES: <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;"></th> <th style="width: 35%; text-align: center;"><u>Answer</u></th> <th style="width: 30%; text-align: center;"><u>with working</u></th> <th style="width: 25%; text-align: center;"><u>without working</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">48</td> <td style="text-align: center;">3/3</td> <td style="text-align: center;">3/3</td> </tr> <tr> <td></td> <td style="text-align: center;">$24 (0.05 \times 800 - 16)$</td> <td style="text-align: center;">2/3</td> <td style="text-align: center;">0/3</td> </tr> <tr> <td></td> <td style="text-align: center;">$64 (0.05 \times 1600 - 16)$</td> <td style="text-align: center;">2/3</td> <td style="text-align: center;">0/3</td> </tr> <tr> <td></td> <td style="text-align: center;">$0 (0.02 \times 1600 - 32)$</td> <td style="text-align: center;">2/3</td> <td style="text-align: center;">0/3</td> </tr> <tr> <td></td> <td style="text-align: center;">$16 (0.02 \times 1600 - 16)$</td> <td style="text-align: center;">1/3</td> <td style="text-align: center;">0/3</td> </tr> <tr> <td></td> <td style="text-align: center;">$80 (0.05 \times 1600)$</td> <td style="text-align: center;">1/3</td> <td style="text-align: center;">1/3</td> </tr> <tr> <td></td> <td style="text-align: center;">$1520 (1600 - 80)$</td> <td style="text-align: center;">1/3</td> <td style="text-align: center;">1/3</td> </tr> </tbody> </table>				<u>Answer</u>	<u>with working</u>	<u>without working</u>	1	48	3/3	3/3		$24 (0.05 \times 800 - 16)$	2/3	0/3		$64 (0.05 \times 1600 - 16)$	2/3	0/3		$0 (0.02 \times 1600 - 32)$	2/3	0/3		$16 (0.02 \times 1600 - 16)$	1/3	0/3		$80 (0.05 \times 1600)$	1/3	1/3		$1520 (1600 - 80)$	1/3	1/3
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Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
12	<p>Ans: 20%</p> <ul style="list-style-type: none"> •¹ strategy: find increase •² strategy: know to express increase as fraction of 250 •³ strategy: know to multiply fraction by 100 •⁴ process: carry out all calculations correctly 	<ul style="list-style-type: none"> •¹ 50 •² $\frac{50}{250}$ •³ $\frac{50}{250} \times 100$ •⁴ 20 <p style="text-align: right;">4 marks</p>

NOTES:

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

Question No	Marking Scheme Give 1 mark for each •	Illustrations of evidence for awarding a mark at each •
13	<p>Ans: 21.9m²</p> <ul style="list-style-type: none"> •¹ strategy: know to calculate area of semi-circle •² strategy: substitute correct radius into area formula •³ strategy: know to subtract area of semi-circle from area of rectangle •⁴ process: carry out all calculations correctly (must include a circle calculation and either the squaring of a number or a division by 2) •⁵ process: round to one decimal place 	<ul style="list-style-type: none"> •¹ $A = \frac{1}{2} \pi r^2$ •² $\frac{1}{2} \times \pi \times 3^2$ •³ $(8 \times 4.5) - \left(\frac{1}{2} \times \pi \times 3^2 \right)$ •⁴ 21.862...(π) (21.87 (3.14)) •⁵ 21.9 <p style="text-align: right;">5 marks</p>

NOTES:

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

2 Examples of some common answers

	<u>with working</u>	<u>without working</u>
(a) $36 - \frac{1}{2} \times \pi \times 3^2 = 21.9$	5/5	4/5
(b) $36 - \pi \times 3^2 = 7.7$	4/5	0/5
(c) $36 - \frac{1}{2} \times \pi \times 6^2 = -20.5$	4/5	0/5
(d) $36 - \pi \times 6^2 = -77.1$	3/5	0/5
(e) $36 - 3.14 \times 6^2 = -77.0$	3/5	0/5
(f) $36 - \frac{1}{2} \times \pi \times 6 = 26.6$	3/5	0/5
(g) $36 - \pi \times 6 = 17.2$	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]