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Total Mark

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NATIONAL QUALIFICATIONS 2013

MATHEMATICS INTERMEDIATE 1

Units 1, 2 and
Applications of Mathematics
Paper 1 (Non-calculator)



* X 1 0 1 1 0 0 1 *

X101/10/01

WEDNESDAY, 22 MAY 9.00 AM – 9.35 AM

Fill in these boxes and read what is printed below.

Full name of centre

Town

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Forename(s)

Surname

Number of seat

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Date of birth

Day

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Year

Scottish candidate number

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- 2 Write your working and answers in the spaces provided. Additional space is provided at the end of this question-answer book for use if required. If you use this space, write clearly the number of the question involved.
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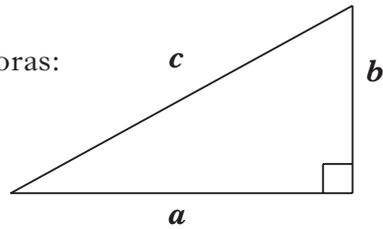


* X 1 0 1 1 0 0 1 0 1 *

FORMULAE LIST

Circumference of a circle: $C = \pi d$
Area of a circle: $A = \pi r^2$
Curved surface area of a cylinder: $A = 2\pi r h$

Theorem of Pythagoras:



$$a^2 + b^2 = c^2$$



Marks

All questions should be attempted.

1. (a) Find $16 \cdot 7 + 5 \cdot 83$.

1

(b) Find $9 \times 2 \cdot 13$.

1

(c) Find 70% of 340.

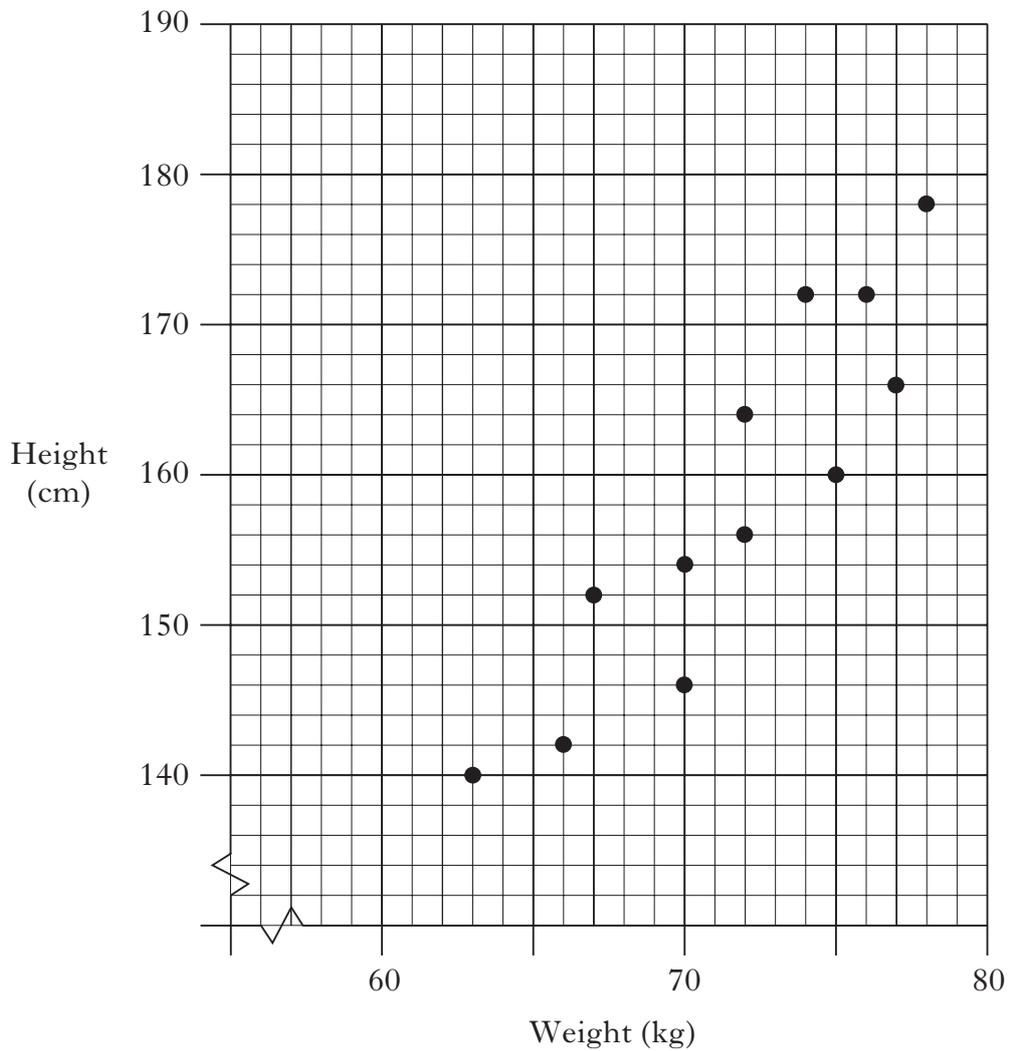
1

[Turn over



Marks

2. The scattergraph shows the weights and heights of a group of teenagers.



- (a) Draw a line of best fit through the points on the graph.

1

- (b) Use your line of best fit to estimate the height of a teenager whose weight is 80 kilograms.

1



Marks

3. Anna's basic rate of pay is £8·60 per hour for a 35 hour week.
Her overtime rate of pay is time and a half.
Complete her payslip for a week in which she works 3 hours overtime.

Payments				Deductions	
	Hours	Rate	Amount		Amount
Basic	35	£8·60	£301·00	Tax	£39·40
Overtime	3			National Insurance	£23·88
			Gross Pay	Total Deductions	£63·28
				Net Pay	

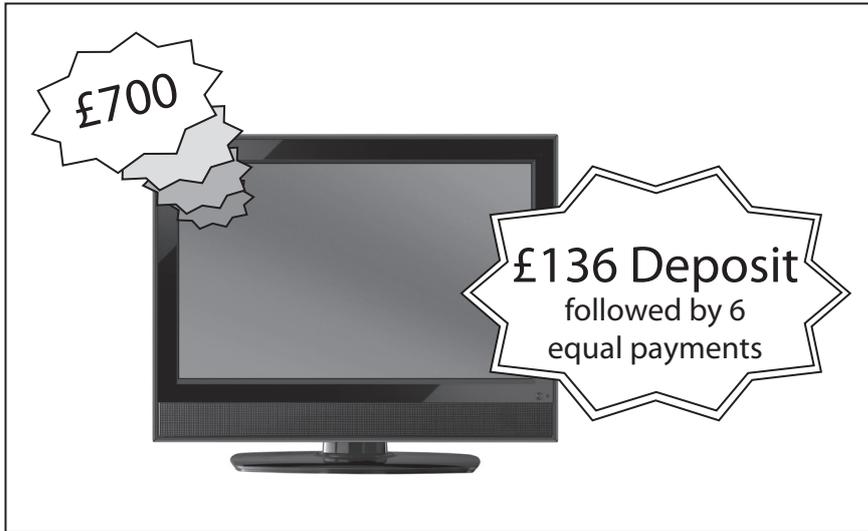
3

[Turn over



Marks

4. The hire purchase price of this television is £700.



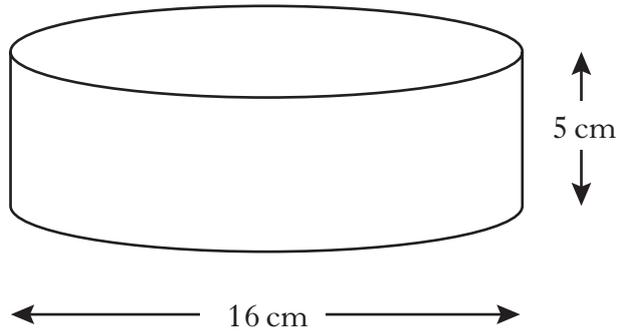
How much will each payment be?

3



Marks

5. A cylinder has diameter 16 centimetres and height 5 centimetres.



Calculate the **curved** surface area of the cylinder.

Use $\pi = 3.14$.

3

[Turn over



Marks

6. Fifty students completed a fitness test known as a “Beep Test”.
The fitness levels they achieved are shown in the frequency table below.

Fitness Level	Number of Students	Fitness Level \times Number of Students
5	4	20
6	5	30
7	9	63
8	21	
9	6	
10	5	
	Total = 50	Total =

- (a) Complete the table above.
- (b) Find the mean fitness level achieved by these students.

1

2



Marks

7. A bag contains 8 blue marbles, 5 red marbles and 2 yellow marbles.

(a) A marble is taken from the bag.

What is the probability that the marble is yellow?

1

(b) This marble is put back in the bag.

One red marble and one blue marble are then removed.

What is the probability that the next marble taken from the bag is blue?

2

[Turn over



Marks

8. Two trains run from Glasgow to London.
They both have the same journey time.

	1st Train	2nd Train
Glasgow depart	1650	2215
London arrive	2125	

What time does the 2nd train arrive in London?

3

9. Evaluate $2gh - w$ when $g = -10$, $h = 4$ and $w = -30$.

3



Marks

10. (a) Before he went on holiday to Australia, Jack changed £2000 into Australian dollars.

The exchange rate was £1 = AU\$1.58.

How many Australian dollars did Jack receive for £2000?

2

(b) While in Australia he changed a further £400 into Australian dollars.

He received AU\$620.

What was the new exchange rate?

2

[END OF QUESTION PAPER]



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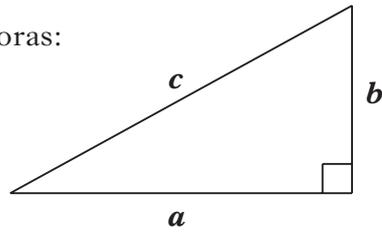
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1. On the “PayforGold” website, the price paid for gold is proportional to its weight.

Colleen sells a matching gold bracelet and necklace on this website.

She is paid £95 for the 20 gram bracelet.

How much is she paid for the 24 gram necklace?

2

[Turn over



Marks

2. Frank recorded the number of calories that he consumed last week in the spreadsheet below.

	A	B	C	D	E	F
1		Breakfast	Lunch	Dinner	Snacks	Total Calories
2	Mon	400	600	850	400	
3	Tue	400	600	900	400	
4	Wed	400	650	850	350	
5	Thu	350	600	950	450	
6	Fri	350	650	1000	400	
7	Sat	450	600	1200	250	
8	Sun	550	500	1150	200	
9						

- (a) The result of the formula =SUM(B2..E2) is to be entered in cell F2.
What number would appear in cell F2?

1

- (b) Frank wants to enter the average number of calories consumed in snacks during last week in cell E9.
What **formula** should he use?

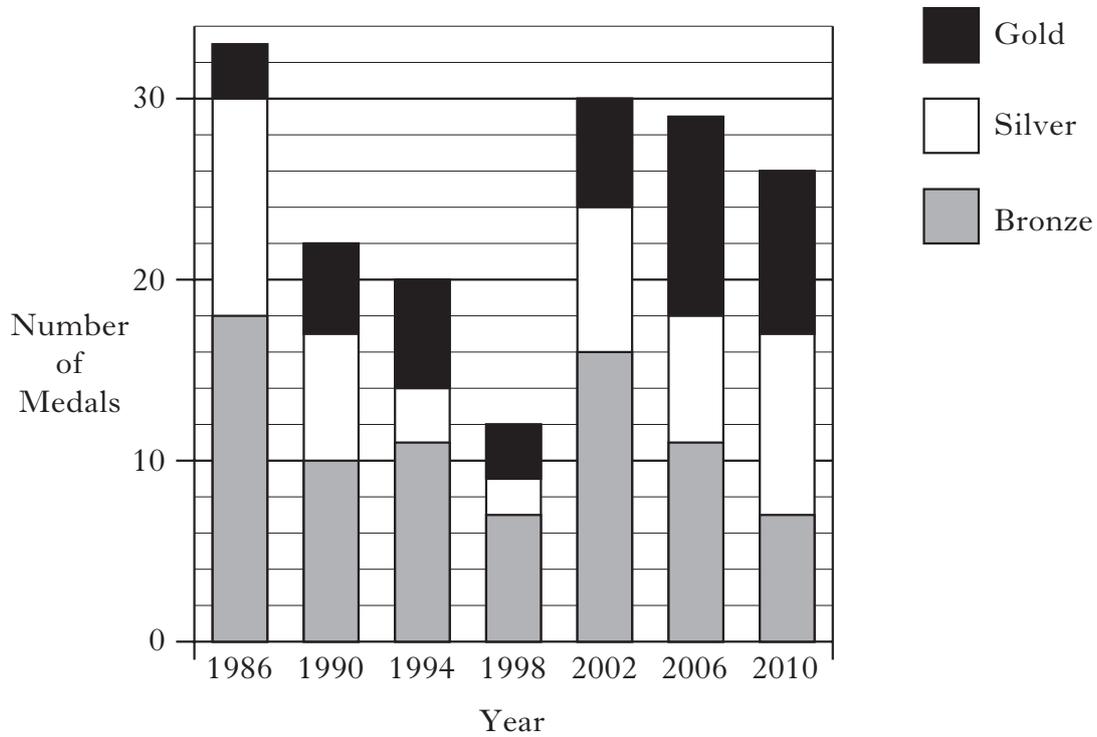
1



* X 1 0 1 1 0 0 2 0 4 *

Marks

3. The bar graph shows the number of medals won by Scotland at the Commonwealth Games since 1986.



(a) In which year were most **gold** medals won by Scotland?

1

(b) How many **silver** medals did Scotland win in 1990?

1

[Turn over



Marks

4. The table below shows the **monthly payments** to be made when money is borrowed from a finance company.
- Borrowers can choose to make payments with or without payment protection.

Loan Amount	Term (Months)	Monthly Payment	
		Without Payment Protection	With Payment Protection
£3000	36	99.58	102.08
£3000	48	80.00	81.88
£3000	180	68.75	70.25
£10 000	36	327.78	336.11
£10 000	48	262.67	268.92
£10 000	180	219.17	224.79
£50 000	60	1083.33	1108.33
£50 000	120	672.92	685.42
£50 000	180	538.19	546.53

- (a) Brad borrows £10 000 over 4 years **with payment protection**.
State his monthly payment.

1

- (b) Over the 4 years, how much would Brad save **in total** if he repaid the loan without payment protection?

2



Marks

5. Chris took part in a track cycling competition.
He completed 6 laps of a 500 metre track.
This took him 4 minutes.
Find his average speed in **metres per second**.

3

[Turn over

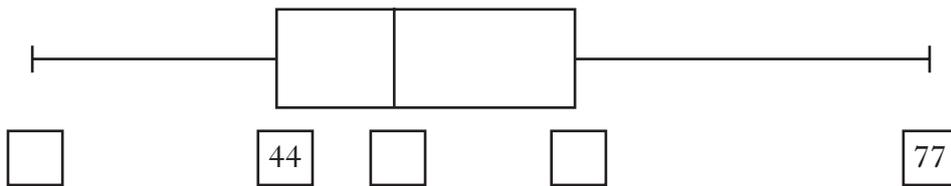


Marks

6. The number of miles that a sample of 13 new cars can travel on one gallon of petrol is listed below.

44 41 44 55 47 77 48 53 50 32 70 62 56

Complete the boxplot, drawn below, to show this information.



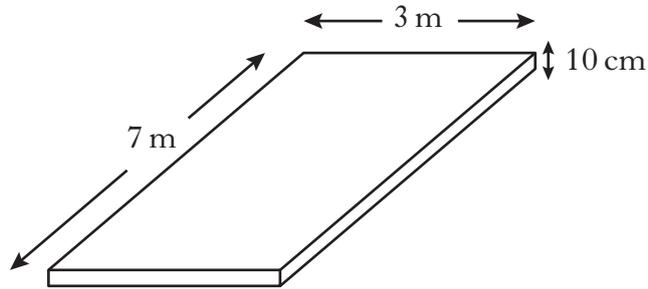
4



Marks

7. Bob is building a patio with a concrete base.

The base of the patio is 7 metres long, 3 metres wide and 10 centimetres deep.



Concrete costs £60 **per cubic metre**.

Find the total cost of the concrete for the base of Bob's patio.

3

[Turn over



Marks

8. John and Steven are playing snooker. They play eight games.
Shown below are the number of points John scored in each game.

21 39 22 53 45 19 43 46

(a) Find the median.

(b) Find the range.

(c) The median number of points Steven scored is 23 and the range is 15.

Make **two** comments comparing the number of points scored by Steven and John.

2

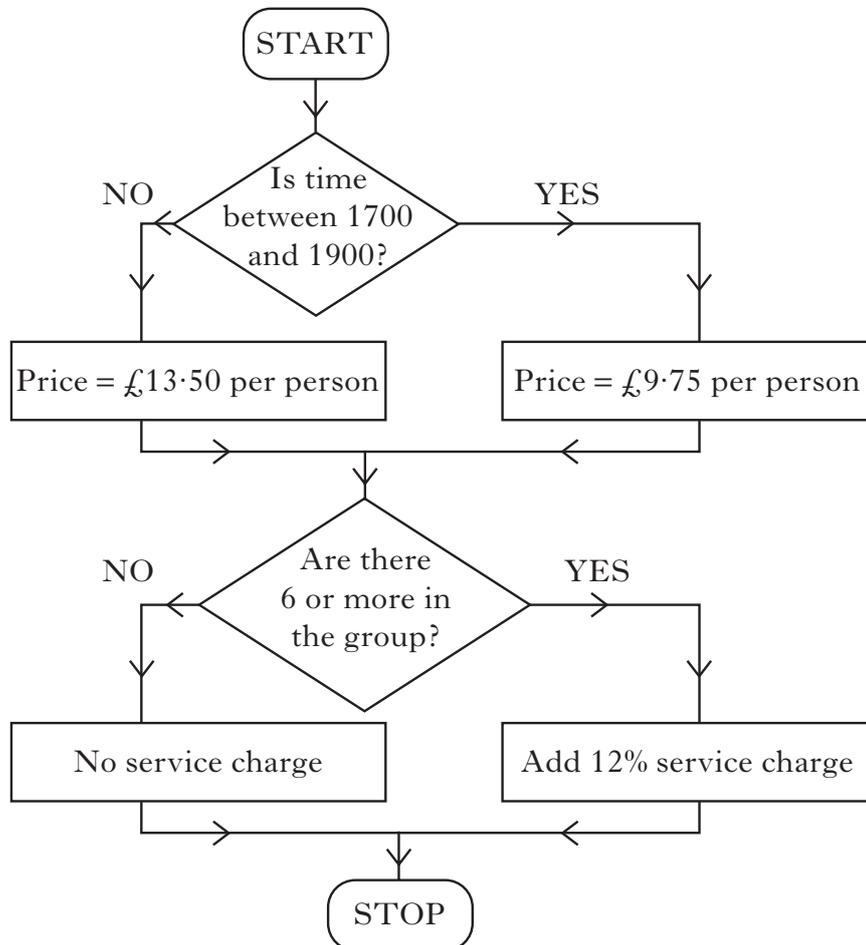
1

2



Marks

9. A group of six people reserve a table in a restaurant for a fixed price meal.
They reserve a table for 6.30 pm.
This flowchart is used to work out the total cost of the meal.



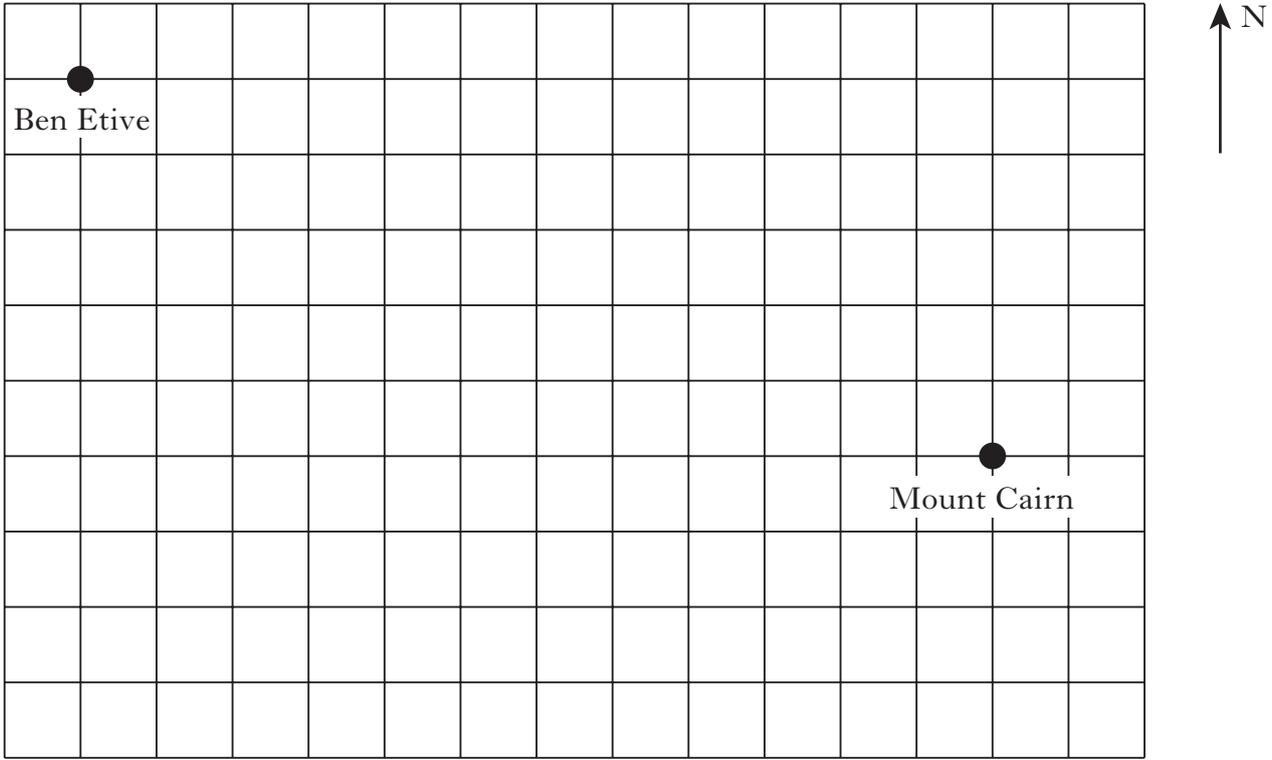
Work out the total cost for the group of six people to have a meal at 6.30 pm.

--	--

3



10. The scale drawing shows the positions of two mountain summits.
The scale of the drawing is **1 centimetre represents 2 kilometres**.



(a) Use the scale drawing to find the distance in kilometres between the summits of Ben Etive and Mount Cairn.

- (b) The summit of Ruthven Law lies on a bearing of
- 135° from Ben Etive
 - 248° from Mount Cairn.

Complete the scale drawing to show the position of Ruthven Law.

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1

3



Marks

11. £4750 was invested in a savings account.
The rate of interest was 2.4% per annum.
How much interest was due after eight months?

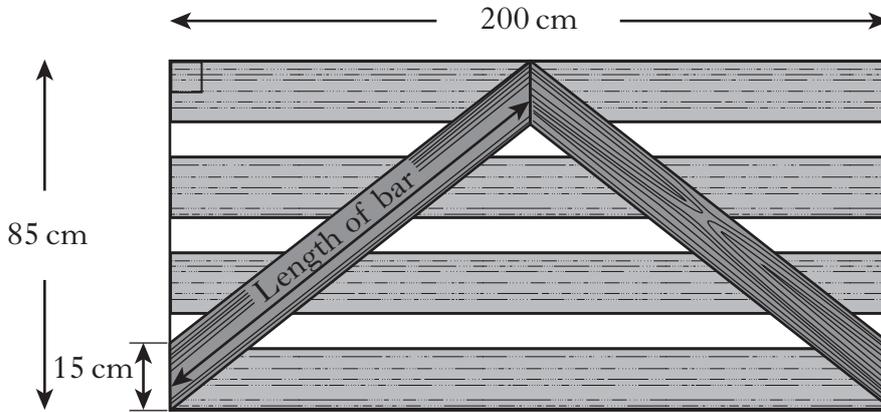
3

[Turn over



Marks

12. A wooden gate is 85 centimetres high and 200 centimetres wide.
The gate is strengthened by two bars which meet half-way across the gate as shown.
The ends of each bar measure 15 centimetres.



Calculate the length of **one** of the bars.
Do not use a scale drawing.

4



Marks

13. Azra bought a washing machine priced £350.
Including the delivery charge she paid a total of £371.
Express the delivery charge as a percentage of the price of the washing machine.

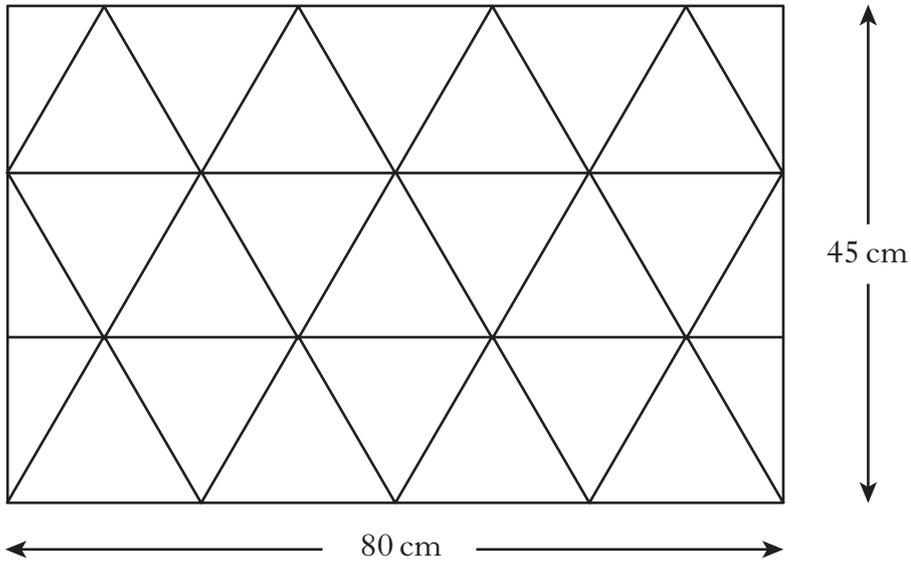
4

[Turn over



Marks

14. Part of a bathroom wall is covered with identical triangular tiles. Some tiles are cut in half.



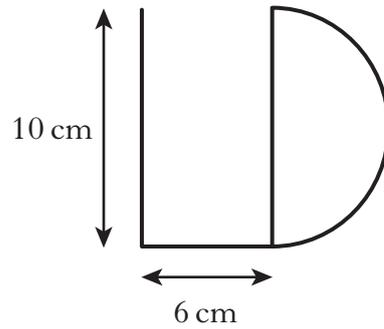
Calculate the area of one complete triangular tile.

3



Marks

15. Lizzie Douglas bends a length of wire into the shape of her initials.



The letter D is a semi-circle.

Calculate the total length of the wire.

Give your answer correct to the **nearest centimetre**.

5

[END OF QUESTION PAPER]



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NATIONAL QUALIFICATIONS 2013

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INTERMEDIATE 1
 Units 1, 2 and 3
 Paper 1 (Non-calculator)



X100/10/01

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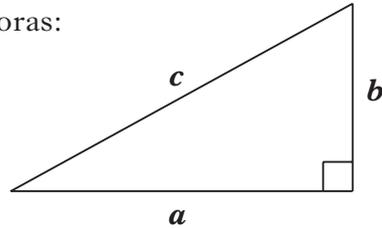
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Area of a circle:

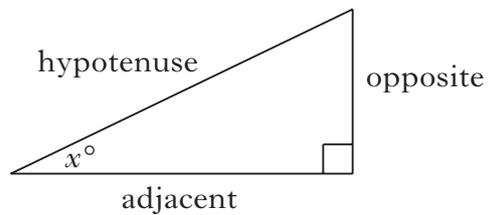
$$A = \pi r^2$$

Theorem of Pythagoras:



$$a^2 + b^2 = c^2$$

Trigonometric ratios
in a right angled
triangle:



$$\tan x^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

$$\sin x^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$

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Marks

All questions should be attempted.

1. (a) Find $16 \cdot 7 + 5 \cdot 83$.

1

(b) Find $9 \times 2 \cdot 13$.

1

(c) Find 70% of 340.

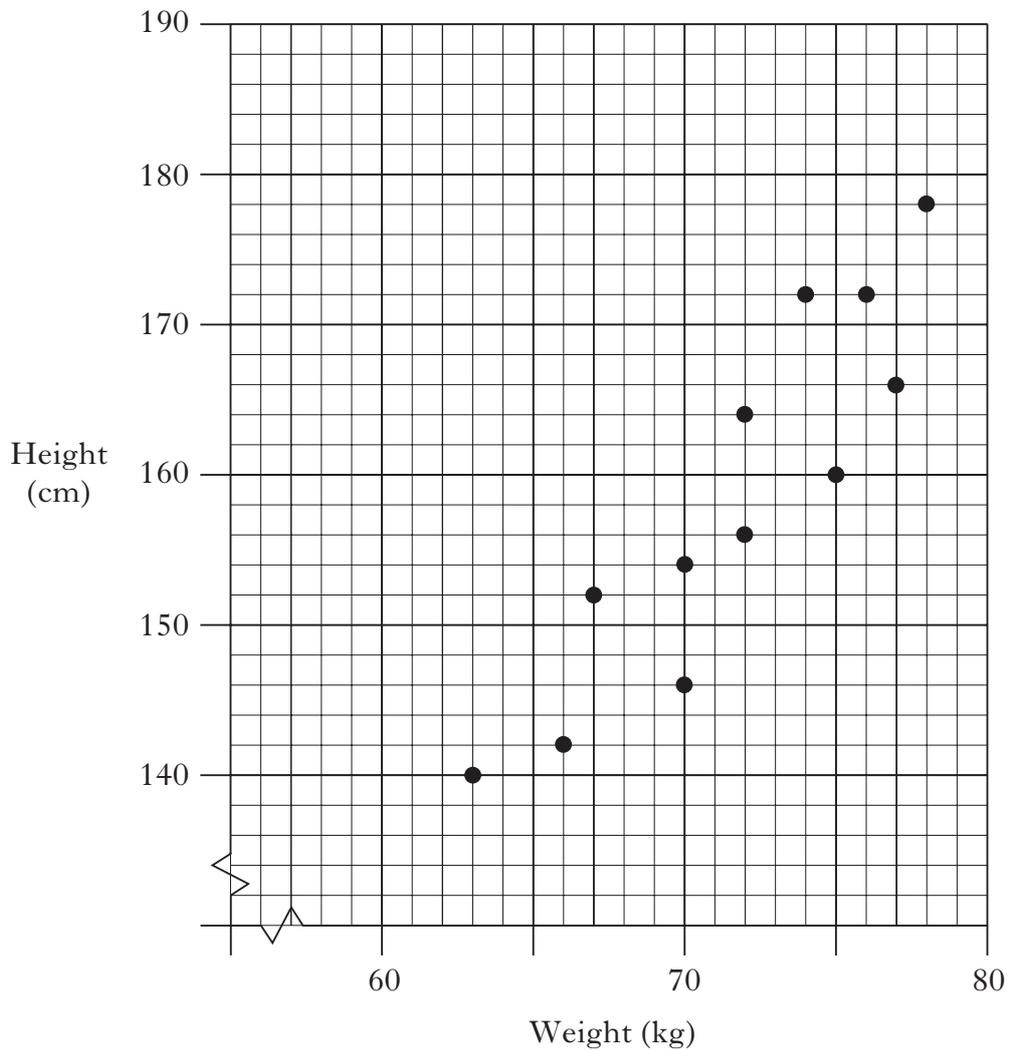
1

[Turn over



Marks

2. The scattergraph shows the weights and heights of a group of teenagers.



- (a) Draw a line of best fit through the points on the graph.

1

- (b) Use your line of best fit to estimate the height of a teenager whose weight is 80 kilograms.

1



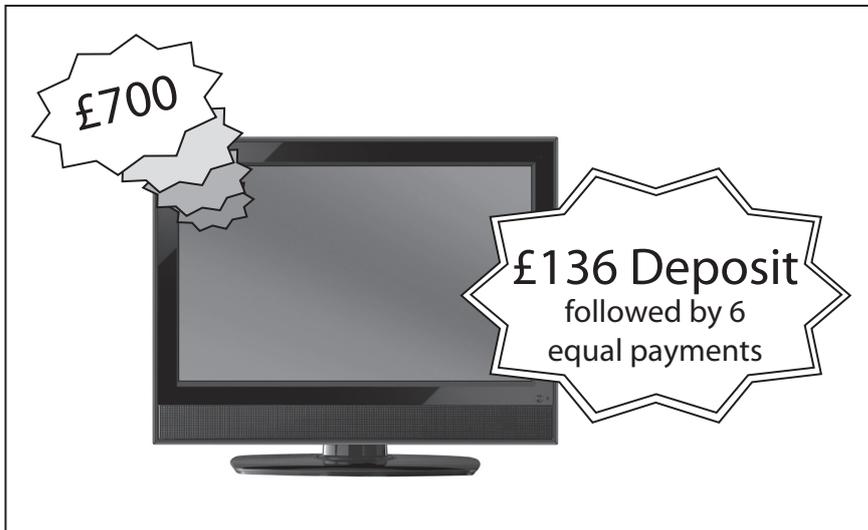
Marks

3. Solve algebraically the inequality

$$8x - 5 > 67.$$

2

4. The hire purchase price of this television is £700.



How much will each payment be?

3



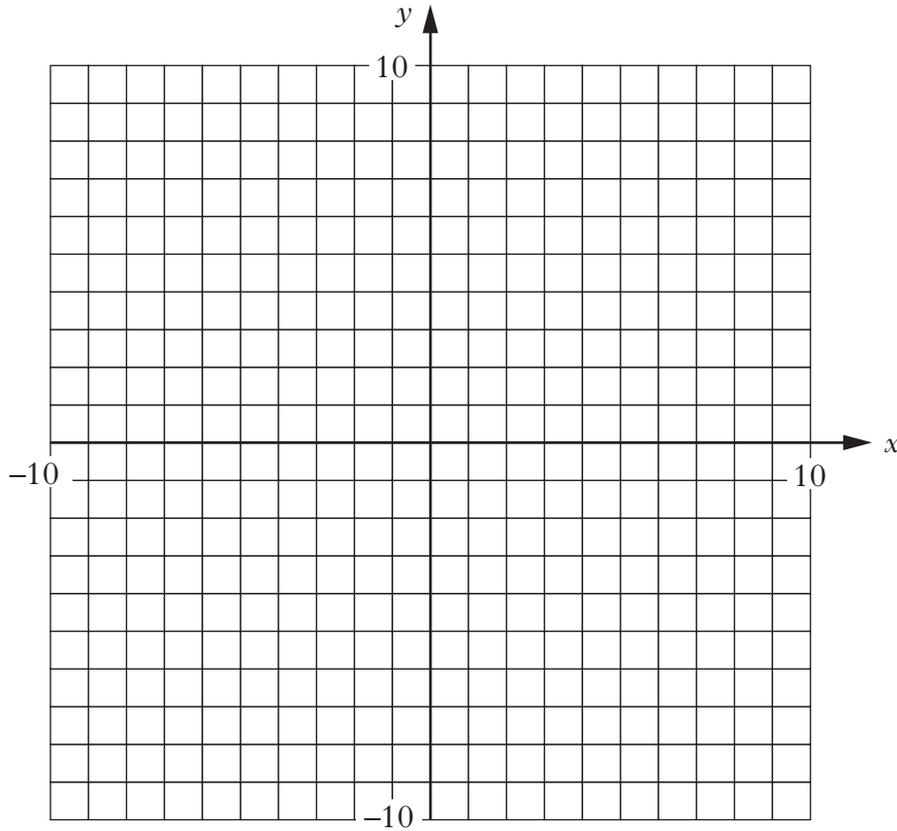
Marks

5. (a) Complete the table below for $y = 2x - 3$.

x	-2	0	4
y			

2

(b) Draw the line $y = 2x - 3$ on the grid.



2



Marks

6. Fifty students completed a fitness test known as a “Beep Test”.
The fitness levels they achieved are shown in the frequency table below.

Fitness Level	Number of Students	Fitness Level \times Number of Students
5	4	20
6	5	30
7	9	63
8	21	
9	6	
10	5	
	Total = 50	Total =

- (a) Complete the table above.
- (b) Find the mean fitness level achieved by these students.

1

2

[Turn over



Marks

7. A bag contains 8 blue marbles, 5 red marbles and 2 yellow marbles.

(a) A marble is taken from the bag.

What is the probability that the marble is yellow?

1

(b) This marble is put back in the bag.

One red marble and one blue marble are then removed.

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2



Marks

8. Two trains run from Glasgow to London.
They both have the same journey time.

	1st Train	2nd Train
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London arrive	2125	

What time does the 2nd train arrive in London?

3

9. Evaluate $2gh - w$ when $g = -10$, $h = 4$ and $w = -30$.

3

[Turn over for Question 10 on Page ten



* X 1 0 0 1 0 0 1 0 9 *

Marks

10. (a) Before he went on holiday to Australia, Jack changed £2000 into Australian dollars.

The exchange rate was £1 = AU\$1.58.

How many Australian dollars did Jack receive for £2000?

2

(b) While in Australia he changed a further £400 into Australian dollars.

He received AU\$620.

What was the new exchange rate?

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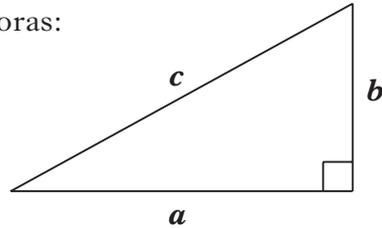
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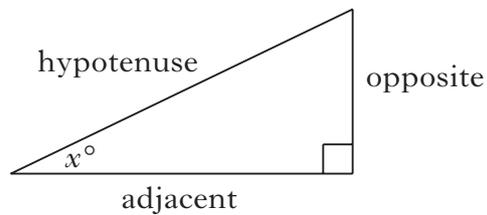
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Colleen sells a matching gold bracelet and necklace on this website.

She is paid £95 for the 20 gram bracelet.

How much is she paid for the 24 gram necklace?

2

2. (a) Multiply out the brackets and simplify

$$6(2n - 3) + 11.$$

2

- (b) Factorise

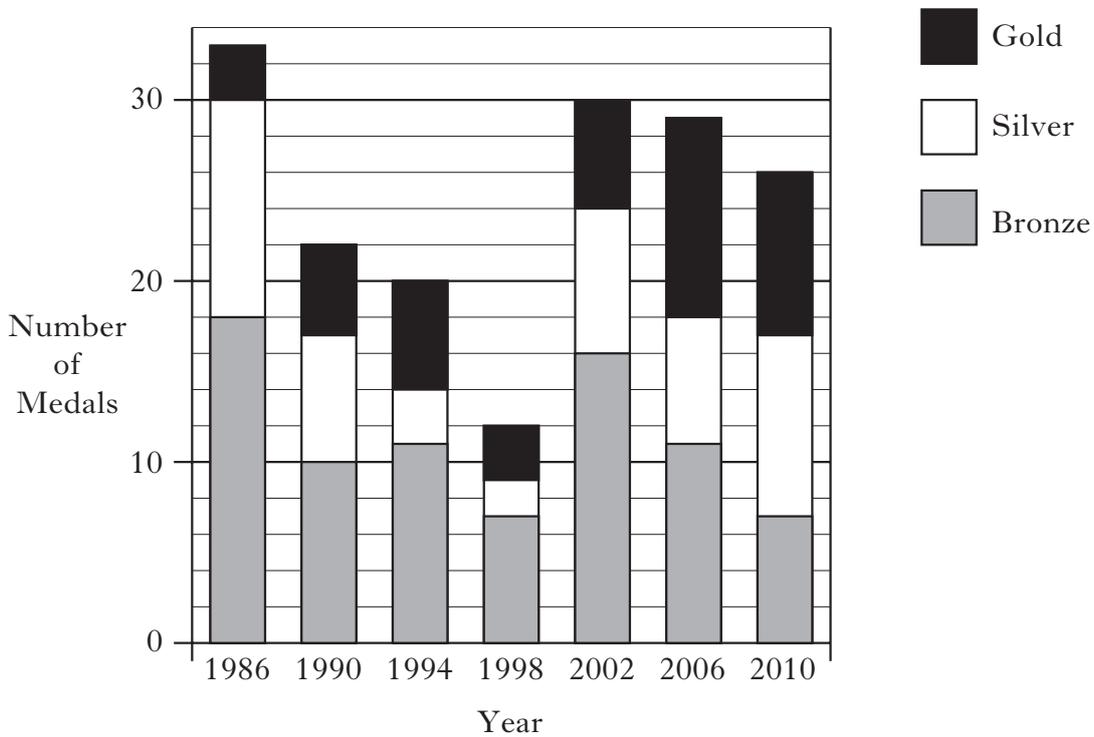
$$20s + 45.$$

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3. The bar graph shows the number of medals won by Scotland at the Commonwealth Games since 1986.



(a) In which year were most **gold** medals won by Scotland?

1

(b) How many **silver** medals did Scotland win in 1990?

1



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4. Solve algebraically the equation

$$8d + 7 = 5d + 58.$$

3

5. Chris took part in a track cycling competition.
He completed 6 laps of a 500 metre track.
This took him 4 minutes.
Find his average speed in **metres per second**.

3

[Turn over



Marks

6. (a) The population of China is 1.352×10^9 .
Write this number in full.

1

- (b) The population of Scotland is 5.2 million.
How many times bigger is the population of China than that of
Scotland?

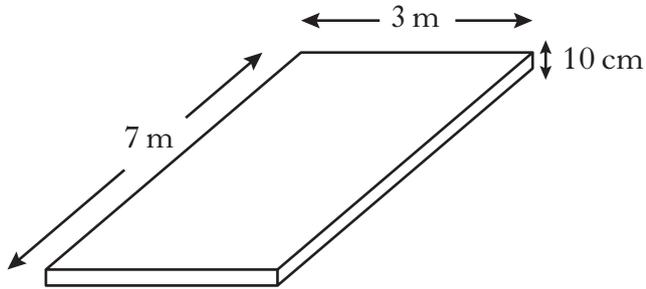
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(a) Find the median.

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2

1

2

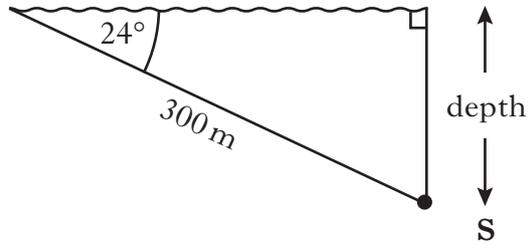


Marks

9. A submarine, **S**, dives for 300 metres at an angle of 24° to the surface.

Calculate the depth of the submarine as shown in the diagram.

Do not use a scale drawing.



3

[Turn over



Marks

10. Use the formula below to find the value of S when $n = 25$, $a = 1.5$, and $L = 6.3$.

$$S = \frac{n(a+L)}{2}$$

3

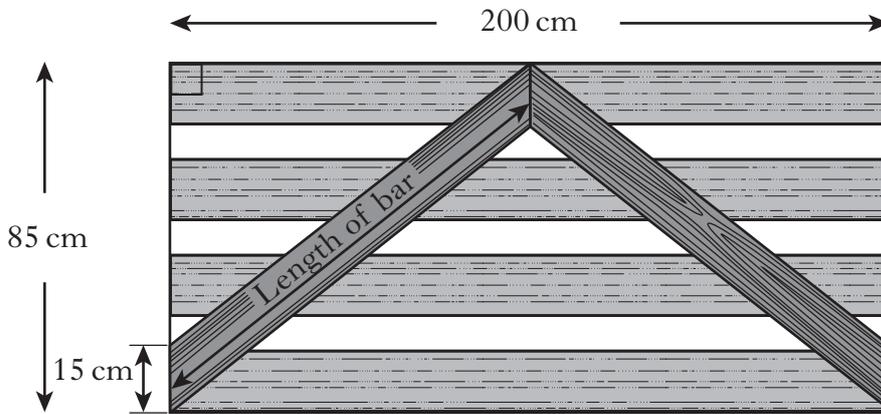
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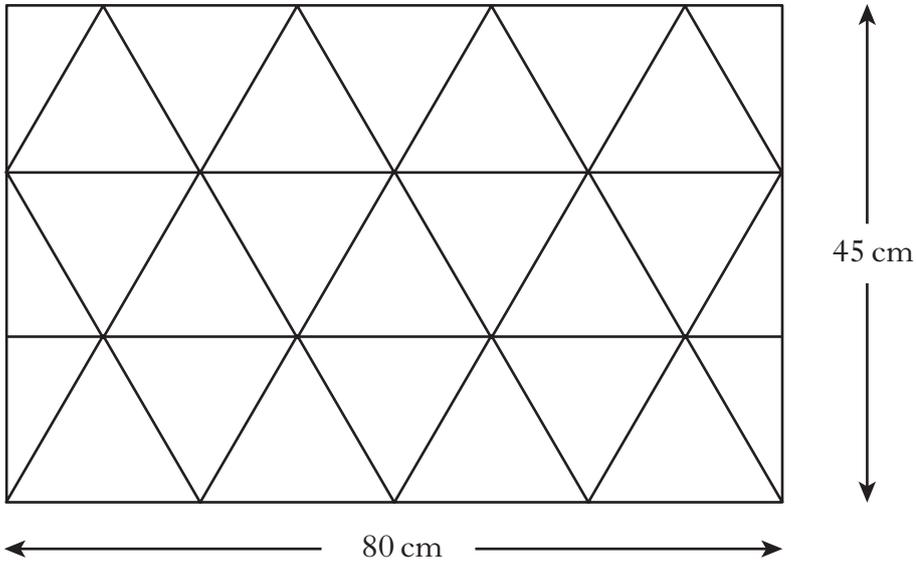
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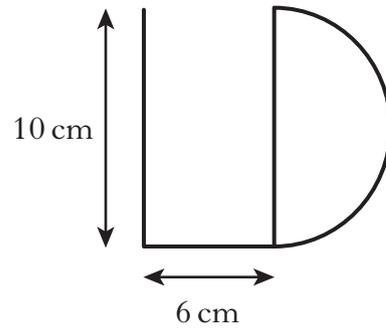
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The letter D is a semi-circle.

Calculate the total length of the wire.

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5

[END OF QUESTION PAPER]





2013 Mathematics

Intermediate 1 Units 1,2 & Applications Paper 1

Finalised Marking Instructions

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Part One: General Marking Principles for Mathematics Intermediate 1 Units 1, 2 & 3 Paper 1

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Instructions on how to use the message system and raise an exception are on SQA Academy: e-marking 2013 training course.
2. Marking should always be positive ie, marks should be awarded for what is correct and not deducted for errors or omissions.
3. Award one mark for each 'bullet' point shown in the Marking Instructions.
4. Working subsequent to an error must be followed through with the possibility of awarding all remaining marks for the subsequent working, provided the question has not been not simplified as a result of the error. In particular, 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 has not been not simplified.
5. 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 marks.
6. 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 Instructions)
 - bad form, eg $\sin x^\circ = 0.5 = 30^\circ$
 - legitimate variation in numerical values/algebraic expressions.
7. 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.
8. In general only 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 page one of the question paper states that 'full credit will be given only where the solution contains appropriate working'.
9. 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.
10. 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.

11. Do not penalise the same error twice in the same question.
12. Do not penalise a transcription error unless the question has been simplified as a result.
13. Where a solution has been scored out and not replaced then provided the solution is legible marks should be awarded in line with the Marking Instructions for that question.
14. Where more than one solution is given, mark them all and award the least mark.
15. The symbols ✓ and ✗ are used in the Marking Instructions to give guidance regarding the awarding of marks for specific candidate responses to some questions, eg ‘award 2/4 ✓✗✗✓’ indicates that the 1st & 4th marks should be awarded but the 2nd & 3rd marks should not.

Part Two: Mathematics Intermediate 1 Units 1, 2 & Applications

Paper 1

Question		Expected Answer/s	Max Mark	Additional Guidance
1	a	<p>Ans: 22.53</p> <p>•¹ calculate $16 \cdot 7 + 5 \cdot 83$: 22.53</p>	1	
1	b	<p>Ans: 19.17</p> <p>•¹ calculate $9 \times 2 \cdot 13$: 19.17</p>	1	
1	c	<p>Ans: 238</p> <p>•¹ calculate 70% of 340: 238</p>	1	
2	a	<p>Ans: line of best fit drawn</p> <p>•¹ draw line of best fit</p>	1	1. Accept straight lines with $1 \leq \text{gradient} \leq 2$ and $ (\text{points above line}) - (\text{points below line}) \leq 2$
2	b	<p>Ans: consistent with line of best fit</p> <p>•¹ consistent with line of best fit</p>	1	1. You may have to extend candidate's line to check answer
3		<p>Ans: £276.42</p> <p>•^{1,2} find gross pay: 339.70 [award 1 for knowing how to find overtime amount: $1.5 \times 8.60 \times 3$ or equivalent]</p> <p>•³ find net pay: $339.70 - 63.28 = 276.42$</p>	3	<p>1. If the payslip is incomplete then marks may be awarded for each correct answer appearing elsewhere on the page.</p> <p>2. Award of the first two marks: (a) For gross pay $\neq 339.70$ award one mark only where there is evidence of $1.5 \times 8.60 \times 3$ or equivalent (b) no marks are available for simply adding basic pay + overtime pay</p> <p>3. Some common answers (no working necessary) (a) 38.70 [$1.5 \times 8.60 \times 3$] award 1/3 (b) 12.90 [1.5×8.60] award 0/3</p>

Question	Expected Answer/s	Max Mark	Additional Guidance
4	<p>Ans: £94</p> <ul style="list-style-type: none"> •¹ subtract $700 - 136$ correctly: 564 •² know to divide by 6: $564 \div 6$ •³ divide correctly: $564 \div 6 = 94$ 	3	<ol style="list-style-type: none"> 1. Correct answer without working award 3/3 2. Some common answers [working must be shown] <ul style="list-style-type: none"> (a) 139.33 [$(700 + 136) \div 6$] award 2/3 $\times\checkmark\checkmark$ (b) 116.67 or 116.66 [$700 \div 6$] award 1/3 $\times\times\checkmark$ (c) 22.67 or 22.66 [$136 \div 6$] award 1/3 $\times\times\checkmark$ (d) 3384 [564×6] award 1/3 $\checkmark\times\times$ (e) 1516 [$700 + 136 \times 6$] award 0/3 3. 3rd mark is only available for correct division rounded or truncated to nearest penny where appropriate
5	<p>Ans: 251.2 cm^3</p> <ul style="list-style-type: none"> •¹ know how to find curved surface area: $2\pi rh$ or πdh •² substitute 3.14, correct radius (or diameter) and correct height into formula: $2 \times 3.14 \times 8 \times 5$ or $3.14 \times 16 \times 5$ •³ carry out all calculations correctly (must involve 3.14): 251.2 	3	<ol style="list-style-type: none"> 1. Correct answer without working award 3/3 2. If an incorrect formula is used then the 2nd mark is only available for correctly substituting 3.14, radius (or diameter) and height into a previously stated formula e.g. <ul style="list-style-type: none"> (a) $\pi rh = 3.14 \times 8 \times 5 = 125.6$ $\times\checkmark\checkmark$ (b) $3.14 \times 8 \times 5 = 125.6$ $\times\times\checkmark$ (c) $\pi r^2 = 3.14 \times 8^2 = 200.96$ $\times\times\checkmark$ [no height in formula] (d) $\pi d = 3.14 \times 16 = 50.24$ $\times\times\checkmark$ [no height in formula] 3. The 3rd mark is only available for calculations of equivalent difficulty to the intended one e.g. <ul style="list-style-type: none"> (a) $\pi r = 3.14 \times 8 = 25.12$ $\times\times\times$ [calculation eased] (b) $3.14 \times 8^2 + 16 \times 5 = 200.96 + 180 = 380.96$ $\times\times\times$ [not all calculations correct]

Question		Expected Answer/s	Max Mark	Additional Guidance				
6	a	<p>Ans: 168 54 <u>50</u> 385</p> <p>•¹ complete table</p> <table style="margin-left: 100px;"> <tr><td>168</td></tr> <tr><td>54</td></tr> <tr><td><u>50</u></td></tr> <tr><td>385</td></tr> </table>	168	54	<u>50</u>	385	1	
168								
54								
<u>50</u>								
385								
6	b	<p>Ans: 7·7</p> <p>•¹ know to divide $\sum fx$ by 50: $385 \div 50$</p> <p>•² correctly divide $\sum fx$ by 50: $385 \div 50 = 7·7$</p>	2	<ol style="list-style-type: none"> 1. Correct answer without working subsequent to part (a) award 2/2 2. 1st mark may only be awarded for attempting $\sum fx \div 50$ 3. Award 0/2 for e.g. $385 \div 6 = 64$ or $64·2$ or $64·1(6\dots)$ 4. Accept $\sum fx \div 10 \times 5$ or $\sum fx \div 5 \times 10$ as evidence of knowing to divide $\sum fx$ by 50 5. For $385 \div 5 = 77$ award 0/2 				
7	a	<p>Ans: $\frac{2}{15}$</p> <p>•¹ find probability: $\frac{2}{15}$</p>	1	<ol style="list-style-type: none"> 1. Accept 2:15, 2 out of 15, 2 in 15, 2-15, 0·13(3...), 13(·3....)% 				
7	b	<p>Ans: $\frac{7}{13}$</p> <p>•¹ correct numerator or denominator: $\frac{7}{/}$ or $/_{13}$</p> <p>•² find probability: $\frac{7}{13}$</p>	2	<ol style="list-style-type: none"> 1. Correct answer without working award 2/2 2. Accept 7:13, 7 out of 13, 7 in 13, 7-13, 0·53(8...), 0·54, 53(·8....)%, 54% 3. For (a) = $\frac{15}{2}$ followed by (b) = $\frac{13}{7}$ award 0/1 for (a) and 2/2 for (b) 				

Question	Expected Answer/s	Max Mark	Additional Guidance
8	<p>Ans: 0250 or 2.50am</p> <p><u>Method 1</u></p> <ul style="list-style-type: none"> •¹ correct method $2125 - 1650 + 2215$ •² calculate time interval correctly: $2125 - 1650 = 4\text{h}35\text{m}$ •³ add time correctly $2215 + 4\text{h}35\text{m} = 0250$ <p><u>Method 2</u></p> <ul style="list-style-type: none"> •¹ correct method $2215 - 1650 + 2125$ •² calculate time interval correctly: $2215 - 1650 = 5\text{h}25\text{m}$ •³ add time correctly: $2125 + 5\text{h}25\text{m} = 0250$ 	3	<p>1. Correct answer without working award 3/3</p> <p>2. Some answers (no working necessary) (a) 250, 2.50 award 3/3 (b) 2650, 2.50pm, 1450 award 2/3 ✓✓x</p> <p>3. The 1st mark may only be awarded where there is evidence of a complete correct method</p> <p>e.g. <u>Method 1</u> (a) 4h35m and no subsequent working award 1/3 x✓x (b) 4h35m and subsequent working (i) $2215 + 4\text{h}35\text{m} =$ incorrect answer award 2/3 ✓✓x (ii) $2125 + 4\text{h}35\text{m} = 0200$ award 2/3 x✓✓</p> <p>e.g. <u>Method 2</u> (c) 5h25m and no subsequent working award 1/3 x✓x (d) 5h25m and subsequent working (i) $2125 + 5\text{h}25\text{m} =$ incorrect answer award 2/3 ✓✓x (ii) $2215 + 5\text{h}25\text{m} = 0340$ award 2/3 x✓✓</p> <p>4. The 2nd mark may be awarded for e.g. <u>Method 1</u> 10m → 4h → 25m <u>Method 2</u> 10m → 5h → 15m</p>

Question		Expected Answer/s	Max Mark	Additional Guidance
9		<p>Ans: - 50</p> <ul style="list-style-type: none"> •¹ know to multiply $2 \times (-10) \times 4$: $2 \times (-10) \times 4$ •² multiply three integers correctly (see note 2): $2 \times (-10) \times 4 = -80$ •³ subtract - 30 correctly: $-80 - (-30) = -50$ 	3	<ol style="list-style-type: none"> 1. Correct answer without working award 2/3 2. 2nd mark is only available for correctly multiplying at least three of the numbers 2, -10, 4 and -30. 3. Some common answers <ul style="list-style-type: none"> (a) -80 award 2/3 ✓✓× (b) $-80 - 30 = -50$ award 2/3 ✓✓× (c) $-80 - 30 = -110$ award 2/3 ✓✓× (d) $2 \times (-10) \times 4 = 80 \rightarrow 80 - (-30) = 110$ award 2/3 ✓×✓ (e) $2 \times 10 \times 4 = 80 \rightarrow 80 - (-30) = 110$ award 1/3 ××✓ (f) $2 \times (-10) + 2 \times 4 = -12$ award 0/3
10		<p>Ans: AU\$3160</p> <ul style="list-style-type: none"> •¹ know to multiply 1.58×2000: 1.58×2000 •² multiply correctly: $1.58 \times 2000 = 3160$ 	2	<ol style="list-style-type: none"> 1. Correct answer without working award 2/2 2. $2000 \div 1.58 = 1265.82$ award 1/2 ×✓
10	b	<p>Ans: £1 = AU\$1.55</p> <ul style="list-style-type: none"> •¹ know to divide $620 \div 400$: $620 \div 400$ •² divide correctly: $620 \div 400 = 1.55$ 	2	<ol style="list-style-type: none"> 1. Correct answer without working award 2/2 2. Do not accept $400 \times ? = 620$ alone, as evidence of knowing to divide $620 \div 400$ 3. Accept $620 \div 100 \times 4$ or $620 \div 4 \times 100$ as evidence of knowing to divide $620 \div 400$

TOTAL MARKS FOR PAPER 1

30

[END OF MARKING INSTRUCTIONS]



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Part Two: Mathematics Intermediate 1 Units 1, 2 & Applications

Paper 2

Question		Expected Answer/s	Max Mark	Additional Guidance
1		<p>Ans: £114</p> <p>•¹ find price per gram: $95 \div 20 = 4.75$</p> <p>•² find price for 24 grams: $4.75 \times 24 = 114$</p>	2	<p>1. Correct answer without working award 2/2</p> <p>2. Alternative strategies</p> <p>(a) •¹ $95 \div 20 = 4.75$ •² $95 + 4 \times 4.75 = 114$</p> <p>(b) •¹ $24 \div 20 = 1.2$ •² $1.2 \times 95 = 114$</p> <p>(c) •¹ $95 \div 5 = 19$ [price for 4g] •² $19 \times 6 = 114$</p> <p>(d) •¹ $24 \div (20 \div 95)$ •² 114 [$20 \div 95$ is not enough for the 1st mark]</p> <p>3. A common answer (no working necessary) $99.75 [95 + 4.75]$ award 1/2 ✓×</p>
2	a	<p>Ans: 2250</p> <p>•¹ evaluate formula: 2250</p>	1	
2	b	<p>Ans: =AVERAGE(E2..E8)</p> <p>•¹ state formula: AVERAGE(E2..E8) or equivalent</p>	1	<p>1. Accept any punctuation mark or space between E2 and E8</p> <p>2. Accept abbreviations for AVERAGE eg AV(E2..E8)</p> <p>3. Accept (E2+E3 +E4+E5+E6+E7+E8)/7 or SUM(E2..E8)/7 [must be / not ÷]</p>

Question		Expected Answer/s	Max Mark	Additional Guidance
3	a	<p>Ans: 2006</p> <p>•¹ interpret bar graph: 2006</p>	1	
3	b	<p>Ans: 7</p> <p>•¹ interpret bar graph: 7</p>	1	
4	a	<p>Ans: £268.92</p> <p>•¹ find monthly payment: 268.92</p>	1	
4	b	<p>Ans: £300</p> <p>•¹ start correct method: $268.92 - 262.67$ or 262.67×48</p> <p>•² find extra payment: $(268.92 - 262.67) \times 48 = 300$</p>	2	<p>1. Correct answer without working award 2/2</p> <p>2. Some common answers(no working necessary) award 1/2 ✓ × (a) $268.92 - 262.67 = 6.25$ (b) $262.67 \times 48 = 12608.16$</p> <p>3. A common answer (working must be shown) $25 [(268.92 - 262.67) \times 4]$ award 1/2 ✓ ×</p> <p>4. If part (a) is incorrect allow follow through in part (b) e.g. if (a) = 224.79, then award 2/2 for any of the following answers to (b) (i) correct answer (ii) $(224.79 - 219.17) \times 180 = 1011.6(0)$ (iii) $(224.79 - 219.17) \times 48 = 269.76$</p>

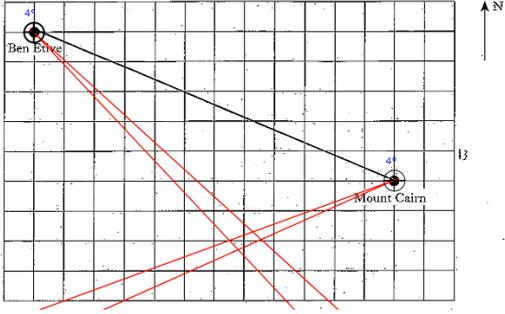
Question	Expected Answer/s	Max Mark	Additional Guidance
5	<p>Ans: 12.5 m/s</p> <ul style="list-style-type: none"> •¹ know how to find speed: $S = D/T$ •² Use $D = 3000$ or $T = 240$ in speed calculation: $3000/T$ or $D/240$ •³ correctly calculate speed in m/s: $3000 \div 240 = 12.5$ 	3	<ol style="list-style-type: none"> 1. Correct answer without working award 3/3 2. Some common answers (no working necessary, rounding or truncation is acceptable) <ul style="list-style-type: none"> (a) 750 [$3000 \div 4$] award 2/3 ✓✓× (b) 2.1, 2.08... [$500 \div 240$] award 2/3 ✓✓× (c) 125 [$500 \div 4$] award 1/3 ✓×× (d) 1.5 [$6 \div 4$] award 1/3 ✓×× (e) 20.83... [$(500 \div 6) \div 4$] award 1/3 ✓×× (f) 720000 [3000×240] award 2/3 ×✓✓ (g) 12000 [3000×4] award 1/3 ×✓× (h) 2000 [500×4] award 0/3

Question	Expected Answer/s	Max Mark	Additional Guidance
6	<p>Ans: min = 32, Q₂ = 50, Q₃ = 59</p> <ul style="list-style-type: none"> •¹ arrange numbers in order: 32 41 44 44 47 48 50 53 55 56 62 70 77 •² show minimum in correct place: 32 •³ show median in correct place: 50 •⁴ show upper quartile in correct place: 59 	4	<ol style="list-style-type: none"> 1. The only acceptable answer for the minimum is 32, even where candidate does not order list. 2. Where there is no working but answers appear in the boxplot and <ol style="list-style-type: none"> (a) Q₂ = 50 or Q₃ = 59 [evidence of ordered list] maximum available mark is 4/4 (b) Q₂ = 48 or Q₃ = 51 [evidence of unordered list] 1st mark is not available e.g. <ol style="list-style-type: none"> (i) min = 32, Q₂ = 48, Q₃ = 51 award 3/4 (ii) min = 44, Q₂ = 48, Q₃ = 51 award 2/4 3. If minimum, Q₂ and Q₃ are not shown on boxplot a maximum of 3/4 is available 4. Where there are missing or extra numbers in an ordered list follow through working with the possibility of awarding <ol style="list-style-type: none"> (a) a maximum of 3 marks (2nd, 3rd & 4th) is available where there is one missing or extra number (b) a maximum of 2 marks (2nd & 3rd) is available where there are two missing or extra numbers 5. If Q₂ is incorrect, working should be followed through with the possibility of awarding the 4th mark.

Question	Expected Answer/s	Max Mark	Additional Guidance
7	<p>Ans: £126</p> <ul style="list-style-type: none"> •¹ know to multiply $l \times b \times h$: evidence of $l \times b \times h$ involving 7, 3 and 10 •² find volume in m^3: $7 \times 3 \times 0.1 = 2.1$ •³ find total cost: $2.1 \times 60 = 126$ 	3	<ol style="list-style-type: none"> 1. Correct answer without working award 2/3 2. BEWARE: mixed units in volume calculation and incorrect volume conversion factor $7 \times 3 \times 10 = (210 \div 100) = 2.1$ $2.1 \times 60 = 126$ award 2/3 ✓ x ✓ 3. Some common answers [working must be shown] <ul style="list-style-type: none"> (a) 12 600 [(7 × 3 × 10) × 60] award 2/3 ✓ x ✓ (b) 1 260 000 [(70 × 30 × 10) × 60] award 2/3 ✓ x ✓ (c) 126 000 000 [(700 × 300 × 10) × 60] award 2/3 ✓ x ✓ (c) 1260 [(7 × 3) × 60, area of patio] award 1/3 x x ✓ 4. Special cases: $V = l + b + h$ [working must be shown] <ul style="list-style-type: none"> (a) 606 [10 · 1 × 60] = 606 award 2/3 x ✓ ✓ (b) 1200 [20 × 60] = 1200 award 1/3 x x ✓

Question		Expected Answer/s	Max Mark	Additional Guidance
8	a	<p>Ans: 41</p> <ul style="list-style-type: none"> •¹ order numbers: 19 21 22 39 43 45 46 53 •² find median: 41 	2	<ol style="list-style-type: none"> 1. Correct answer without working award 2/2 2. 49 [numbers not ordered] award 1/2 3. If 'correct' median is found from ordered list with one missing or one extra number award 1/2
8	b	<p>Ans: 34</p> <ul style="list-style-type: none"> •¹ find range: $53 - 19 = 34$ 	1	<ol style="list-style-type: none"> 1. 34 is the only acceptable answer, even with an unordered list.
8	c	<p>Ans: On average Steven scored less than John. Steven's scores varied less than John's.</p> <ul style="list-style-type: none"> •¹ interpret statistics: Steven scored less or equivalent •² interpret statistics: Steven's scores varied less or equivalent 	2	<ol style="list-style-type: none"> 1. Answer must be consistent with answers to parts (a) and (b) 2. Do not accept eg Steven has a lower median Steven has a lower range 3. A common answer: John scored more than Steven as his median and range were higher. award 1/2 ✓✗

Question	Expected Answer/s	Max Mark	Additional Guidance
9	<p>Ans: £65.52</p> <p><u>Method 1</u></p> <ul style="list-style-type: none"> •¹ find price per person excluding service charge: 9.75 •² know how to find service charge per person: $12/100 \times 9.75 (= 1.17)$ •³ find total cost: $6 \times (9.75 + 1.17) = 65.52$ <p><u>Method 2</u></p> <ul style="list-style-type: none"> •¹ find price per person excluding service charge: 9.75 •² know how to find total cost excluding service charge: $6 \times 9.75 (= 58.5(0))$ •³ find total cost: $58.5 + 12\% \text{ of } 58.5 = 65.52$ 	3	1. Correct answer without working award 3/3

Question		Expected Answer/s	Max Mark	Additional Guidance
10	a	<p>Ans: 26 (± 0.4) km</p> <ul style="list-style-type: none"> •¹ find distance: $13(\pm 0.2) \times 2 = 26(\pm 0.4)$ 	1	
10	b	<p>Ans: see diagram</p> <ul style="list-style-type: none"> •¹ one bearing shown correctly ($\pm 2^\circ$): •² second bearing shown correctly ($\pm 2^\circ$): •³ find point of intersection of two bearings: 	3	<p>1. Diagram below shows the acceptable limits for the position of Ruthven Law</p>  <p>2. If the bearings are not drawn on the diagram:</p> <ul style="list-style-type: none"> (i) point of intersection in correct position award 3/3 (ii) point on correct bearing from either Ben Etive or Mount Cairn award 1/3 <p>3. Where two incorrect lines are drawn the 3rd mark is only available if one line originates at Ben Etive and the other originates at Mount Cairn.</p>

Question	Expected Answer/s	Max Mark	Additional Guidance
11	<p>Ans: £76</p> <ul style="list-style-type: none"> •¹•² know how to calculate interest: $2.4/100 \times 4750 \times 8/12$ (award 1 for $2.4/100 \times 4750$ or $8/12 \times 2.4/100$ or $8/12 \times 4750$) •³ carry out percentage and fraction calculations correctly: 76 	3	<ol style="list-style-type: none"> 1. Correct answer without working award 3/3 2. If answer is 4826 [4750 + 76] (no working necessary) <ol style="list-style-type: none"> (a) award 3/3 if candidate states that interest is 76 (b) award 2/3 if candidate does not state that interest is 76 3. Acceptable answers for partial credit (no working necessary) <ol style="list-style-type: none"> (a) 114 [2.4% of 4750] award 1/3 (b) 1.6 [$8/12 \times 2.4$] award 1/3 (c) 3166.67 or 3166.66 [$8/12 \times 4750$] award 1/3 (d) 912 [114 × 8] award 1/3 4. The following common wrong answers illustrate where the 3rd mark is/is not available to candidates, working must be shown. (note: answer must be rounded or truncated to nearest penny) <ol style="list-style-type: none"> (a) 131944.44 [$4750 \times 100/2.4 \times 8/12$] x✓✓ (b) 1319.44 [$4750 \div 2.4 \times 8/12$] x✓x (c) 171 [$4750 \times 2.4/100 \times 12/8$] ✓x✓ (d) 1710 [$4750 \times 0.24 \times 12/8$] xx✓

Question	Expected Answer/s	Max Mark	Additional Guidance
12	<p>Ans: 122 cm</p> <ul style="list-style-type: none"> •¹ find dimensions of triangle: 100 and 70 •² correct form of Pythagoras' Theorem: $100^2 + 70^2$ •³ calculate sum (or difference) of two squares: 14900 •⁴ calculate the square root of a calculated value: 122 (·06...) 	4	<ol style="list-style-type: none"> 1. Correct answer without working award 4/4 2. 2nd mark can only be awarded for using Pythagoras in a right-angled triangle Some examples (working must be shown) <ul style="list-style-type: none"> (a) $71(\cdot 41\dots)$ $[\sqrt{100^2 - 70^2}]$ award 3/4 ✓×✓✓ (b) $131(\cdot 24\dots)$ $[\sqrt{100^2 + 85^2}]$ award 3/4 ××✓✓ (c) $217(\cdot 31\dots)$ $[\sqrt{200^2 + 85^2}]$ award 3/4 ××✓✓ (d) $86(\cdot 31\dots)$ $[\sqrt{15^2 + 85^2}]$ award 2/4 ××✓✓ (e) $141(\cdot 42\dots)$ $[\sqrt{100^2 + 100^2}]$ award 2/4 ××✓✓ 3. Final mark is not available if there is invalid subsequent working e.g. $122 - 30 = 92$ award 3/4 ✓✓✓× 4. Example of alternative strategy involving trigonometry <ul style="list-style-type: none"> •¹ dimensions of triangle = 100 and 70 •² $a^\circ = \tan^{-1}(100/70) = 55^\circ \dots\dots$ •³ $\cos 55^\circ \dots\dots = 70/\text{length}$ •⁴ $\text{length} = 70 \div \cos 55^\circ = 122$ 5. Do not penalise inadvertent use of radians or grads if trigonometry is used

Question	Expected Answer/s	Max Mark	Additional Guidance
13	<p>Ans: 6%</p> <ul style="list-style-type: none"> •¹ find delivery charge: 21 •² know to express delivery charge as a fraction of 350: $\frac{21}{350}$ •³ know to multiply fraction by 100: $\frac{21}{350} \times 100$ •⁴ carry out all calculations correctly: 6 	4	<ol style="list-style-type: none"> 1. Correct answer without working award 2/4 2. 4th mark is only available for calculations of the form $\frac{a}{b} \times c$ where a, b, c = delivery charge or 350 or 371 or 100. 3. Some common answers (working must be shown) <ul style="list-style-type: none"> (a) $5 \cdot 7, 5 \cdot 6(6 \dots)$ [$\frac{21}{371} \times 100$] award 3/4 ✓×✓✓ (b) 106 [$\frac{371}{350} \times 100$] award 3/4 ×✓✓✓ (c) $94(\cdot 3 \dots)$ [$\frac{350}{371} \times 100$] award 2/4 ××✓✓ (d) $73 \cdot 5$ [$\frac{21}{100} \times 350$] award 2/4 ✓××✓ (e) $1298 \cdot 5$ [$\frac{350}{100} \times 371$ or $\frac{371}{100} \times 350$] award 1/4 ×××✓
14	<p>Ans: 150 cm² <u>Method 1</u></p> <ul style="list-style-type: none"> •¹ find base of triangle: $80 \div 4 = 20$ •² find height of triangle: $45 \div 3 = 15$ •³ find area of triangle: $\frac{1}{2} \times 20 \times 15 = 150$ <p><u>Method 2</u></p> <ul style="list-style-type: none"> •¹ find area of rectangle: $80 \times 45 = 3600$ •² find number of triangles: 24 •³ find area of triangle: $3600 \div 24 = 150$ 	3	<ol style="list-style-type: none"> 1. Correct answer without working award 1/3 2. A common answer (no working necessary) 1800 [$\frac{1}{2} \times 80 \times 45$] award 1/3 3. Award 2/3 for correctly calculating $3600 \div t$, $t \neq 2$ or 24 [incorrect number of triangles] (working must be shown) e.g. $3600 \div 21 = 171(\dots)$ (Do not penalise incorrect rounding)

Question	Expected Answer/s	Max Mark	Additional Guidance
15	<p>Ans: 42 cm</p> <ul style="list-style-type: none"> •¹ know how to calculate length of semi-circle: $\frac{1}{2}\pi d$ or πr •² substitute correct diameter into formula: $\frac{1}{2} \times \pi \times 10$ or $\pi \times 5$ •³ know to add lengths of straight edges to previously calculated value: previously calculated value + 10 + 6 + 10 •⁴ carry out all calculations correctly: $15.7... + 26 = 41.7...$ (must include a circle calculation followed by an addition) •⁵ round to nearest whole number: 42 	5	<ol style="list-style-type: none"> 1. Correct answer without working award 0/5 2. Where no formula is stated accept <ol style="list-style-type: none"> (a) $\frac{1}{2} \times \pi \times 10$ or $15.7...$ as evidence of $\frac{1}{2} \pi d$ being used (b) $\frac{1}{2} \times \pi \times 5^2$ or $39.2...$ as evidence of $\frac{1}{2} \pi r^2$ being used 3. Some common answers (working must be shown) <ol style="list-style-type: none"> (a) 32 [$\frac{1}{2} \times \pi \times 10 + 16$] award 4/5 ✓✓×✓✓ (b) 57 [$\pi \times 10 + 26$] award 4/5 ×✓✓✓✓ (c) 65 [$\frac{1}{2} \times \pi \times 5^2 + 26$] award 4/5 ×✓✓✓✓ (d) 99 [$\frac{1}{2} \times \pi \times 5^2 + 60$] award 3/5 ×✓×✓✓ (e) 183 [$\frac{1}{2} \times \pi \times 10^2 + 26$] award 3/5 ××✓✓✓ (f) 34 [$\frac{1}{2} \times \pi \times 5 + 26$] award 4/5 ✓×✓✓✓ (g) 16 [$\frac{1}{2} \times \pi \times 10$] award 3/5 ✓✓××✓ (h) 31 [$\pi \times 10$] award 2/5 ×✓××✓ (i) 39 [$\frac{1}{2} \times \pi \times 5^2$] award 2/5 ×✓××✓ (j) 39 [$\frac{1}{2} \times 5^2 + 26$] award 2/5 ××✓×✓ (k) 79 [$\pi \times 5^2$] award 2/5 ×✓××✓ <p>3. (a) 5th mark is only available where the answer to circle calculation requires rounding (b) Where premature rounding leads to incorrect answer, a maximum of 4/5 is available.</p>

TOTAL MARKS FOR PAPER 2

50

**TOTAL MARKS FOR
PAPER 1&2**

80

[END OF MARKING INSTRUCTIONS]



2013 Mathematics

Intermediate 1 Units 1,2 & 3 Paper 1

Finalised Marking Instructions

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Part One: General Marking Principles for Mathematics Intermediate 1 Units 1, 2 & 3 Paper 1

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4. Working subsequent to an error must be followed through with the possibility of awarding all remaining marks for the subsequent working, provided the question has not been not simplified as a result of the error. In particular, 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 has not been not simplified.
5. 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 marks.
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 - legitimate variation in numerical values/algebraic expressions.
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8. In general only 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 page one of the question paper states that ‘full credit will be given only where the solution contains appropriate working’.
9. 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.
10. 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.

11. Do not penalise the same error twice in the same question.
12. Do not penalise a transcription error unless the question has been simplified as a result.
13. Where a solution has been scored out and not replaced then provided the solution is legible marks should be awarded in line with the Marking Instructions for that question.
14. Where more than one solution is given, mark them all and award the least mark.
15. The symbols ✓ and ✗ are used in the Marking Instructions to give guidance regarding the awarding of marks for specific candidate responses to some questions, eg 'award 2/4 ✓✗✗✓' indicates that the 1st & 4th marks should be awarded but the 2nd & 3rd marks should not.

Part Two: Mathematics Intermediate 1 Units 1, 2 & 3

Paper 1

Question		Expected Answer/s	Max Mark	Additional Guidance
1	a	<p>Ans: 22.53</p> <p>•¹ calculate $16 \cdot 7 + 5 \cdot 83$: 22.53</p>	1	
1	b	<p>Ans: 19.17</p> <p>•¹ calculate $9 \times 2 \cdot 13$: 19.17</p>	1	
1	c	<p>Ans: 238</p> <p>•¹ calculate 70% of 340: 238</p>	1	
2	a	<p>Ans: line of best fit drawn</p> <p>•¹ draw line of best fit</p>	1	<p>1. Accept straight lines with $1 \leq \text{gradient} \leq 2$ and $(\text{points above line}) - (\text{points below line}) \leq 2$</p>
2	b	<p>Ans: consistent with line of best fit</p> <p>•¹ consistent with line of best fit</p>	1	<p>1. You may have to extend candidate's line to check answer</p>
3		<p>Ans: $x > 9$</p> <p>•¹ collect constants: $8x > 72$</p> <p>•² solve inequality for x: $x > 9$</p>	2	<p>1. For answers without valid working award 1/2 eg</p> <p>(a) $x > 9$ without working $\times \checkmark$</p> <p>(b) $8 \times 9 - 5 > 67 \rightarrow x > 9$ $\times \checkmark$</p> <p>(c) $8x = 72 \rightarrow x > 9$ $\times \checkmark$</p> <p>2. Answers acceptable for partial credit (valid working must be shown) award 1/2</p> <p>(a) $8x > 72 \rightarrow > 9$ $\checkmark \times$</p> <p>(b) $8x > 72 \rightarrow x = 9$ $\checkmark \times$</p> <p>(c) $8x = 72 \rightarrow x = 9$ $\checkmark \times$</p> <p>(d) $8x > 62 \rightarrow x > 7.75$ $\times \checkmark$</p>

Question		Expected Answer/s	Max Mark	Additional Guidance								
4		<p>Ans: £94</p> <ul style="list-style-type: none"> •¹ subtract $700 - 136$ correctly: 564 •² know to divide above by 6: $564 \div 6$ •³ divide correctly: $564 \div 6 = 94$ 	3	<ol style="list-style-type: none"> 1. Correct answer without working award 3/3 2. Some common answers [working must be shown] <ul style="list-style-type: none"> (a) 139.33 [$(700 + 136) \div 6$] award 2/3 $\times\checkmark\checkmark$ (b) 116.67 or 116.66 [$700 \div 6$] award 1/3 $\times\times\checkmark$ (c) 22.67 or 22.66 [$136 \div 6$] award 1/3 $\times\times\checkmark$ (d) 3384 [564×6] award 1/3 $\checkmark\times\times$ (e) 1516 [$700 + 136 \times 6$] award 0/3 3. 3rd mark is only available for correct division rounded or truncated to nearest penny where appropriate 								
5	a	<p>Ans:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>x</td> <td>-2</td> <td>0</td> <td>4</td> </tr> <tr> <td>y</td> <td>-7</td> <td>-3</td> <td>5</td> </tr> </table> <ul style="list-style-type: none"> •¹ calculate y when $x = -2$: -7 •² calculate y when $x = 0$ and 4: -3 and 5 	x	-2	0	4	y	-7	-3	5	2	
x	-2	0	4									
y	-7	-3	5									
5	b	<p>Ans: straight line graph of $y = 2x - 3$</p> <ul style="list-style-type: none"> •¹ correctly plot all three points from the table •² draw straight line through the three points shown in the table 	2	<ol style="list-style-type: none"> 1. If the line $y = 2x - 3$ is drawn (even if this is not consistent with the points in the table) award 2/2 [minimum acceptable length: line joining $(-1, -5)$ to $(2, 1)$] 2. Where the three points plotted are consistent with the table and are not collinear, the 2nd mark is unavailable [check gradients] 3. Where (y, x) is consistently plotted, answer should be followed through with the possibility of awarding the 2nd mark 								

Question		Expected Answer/s	Max Mark	Additional Guidance
6	a	<p>Ans: $\begin{array}{r} 168 \\ 54 \\ \underline{50} \\ 385 \end{array}$</p> <p>•¹ complete table $\begin{array}{r} 168 \\ 54 \\ \underline{50} \\ 385 \end{array}$</p>	1	
6	b	<p>Ans: 7·7</p> <p>•¹ know to divide $\sum fx$ by 50: $385 \div 50$</p> <p>•² correctly divide $\sum fx$ by 50: $385 \div 50 = 7\cdot7$</p>	2	<ol style="list-style-type: none"> 1. Correct answer without working subsequent to part (a) award 2/2 2. 1st mark may only be awarded for attempting $\sum fx \div 50$ 3. Award 0/2 for e.g. $385 \div 6 = 64$ or $64\cdot2$ or $64\cdot1(6\dots)$ 4. Accept $\sum fx \div 10 \times 5$ or $\sum fx \div 5 \times 10$ as evidence of knowing to divide $\sum fx$ by 50 5. For $385 \div 5 = 77$ award 0/2
7	a	<p>Ans: $\frac{2}{15}$</p> <p>•¹ find probability: $\frac{2}{15}$</p>	1	<ol style="list-style-type: none"> 1. Accept 2:15, 2 out of 15, 2 in 15, 2-15, 0·13(3...), 13(·3....)%
7	b	<p>Ans: $\frac{7}{13}$</p> <p>•¹ correct numerator or denominator: $\frac{7}{/}$ or $/13$</p> <p>•² find probability: $\frac{7}{13}$</p>	2	<ol style="list-style-type: none"> 1. Correct answer without working award 2/2 2. Accept 7:13, 7 out of 13, 7 in 13, 7-13, 0·53(8...), 0·54, 53(·8....)%, 54% 3. For (a) = $\frac{15}{2}$ followed by (b) = $\frac{13}{7}$ award 0/1 for (a) and 2/2 for (b)

Question	Expected Answer/s	Max Mark	Additional Guidance
8	<p>Ans: 0250 or 2.50am</p> <p><u>Method 1</u></p> <ul style="list-style-type: none"> •¹ correct method $2125 - 1650 + 2215$ •² calculate time interval correctly: $2125 - 1650 = 4\text{h}35\text{m}$ •³ add time correctly $2215 + 4\text{h}35\text{m} = 0250$ <p><u>Method 2</u></p> <ul style="list-style-type: none"> •¹ correct method $2215 - 1650 + 2125$ •² calculate time interval correctly: $2215 - 1650 = 5\text{h}25\text{m}$ •³ add time correctly: $2125 + 5\text{h}25\text{m} = 0250$ 	3	<p>1. Correct answer without working award 3/3</p> <p>2. Some answers (no working necessary) (a) 250, 2.50 award 3/3 (b) 2650, 2.50pm, 1450 award 2/3 ✓✓×</p> <p>3. The 1st mark may only be awarded where there is evidence of a complete correct method</p> <p>e.g. <u>Method 1</u> (a) 4h35m and no subsequent working award 1/3 ×✓× (b) 4h35m and subsequent working (i) $2215 + 4\text{h}35\text{m} =$ incorrect answer award 2/3 ✓✓× (ii) $2125 + 4\text{h}35\text{m} = 0200$ award 2/3 ×✓✓</p> <p>e.g. <u>Method 2</u> (c) 5h25m and no subsequent working award 1/3 ×✓× (d) 5h25m and subsequent working (i) $2125 + 5\text{h}25\text{m} =$ incorrect answer award 2/3 ✓✓× (ii) $2215 + 5\text{h}25\text{m} = 0340$ award 2/3 ×✓✓</p> <p>4. The 2nd mark may be awarded for e.g. <u>Method 1</u> 10m → 4h → 25m <u>Method 2</u> 10m → 5h → 15m</p>

Question		Expected Answer/s	Max Mark	Additional Guidance
9		<p>Ans: - 50</p> <ul style="list-style-type: none"> •¹ know to multiply $2 \times (-10) \times 4$: $2 \times (-10) \times 4$ •² multiply three integers correctly (see note 2): $2 \times (-10) \times 4 = -80$ •³ subtract - 30 correctly: $-80 - (-30) = -50$ 	3	<ol style="list-style-type: none"> 1. Correct answer without working award 2/3 2. 2nd mark is only available for correctly multiplying at least three of the numbers 2, -10, 4 and -30. 3. Some common answers <ul style="list-style-type: none"> (a) -80 award 2/3 ✓✓× (b) $-80 - 30 = -50$ award 2/3 ✓✓× (c) $-80 - 30 = -110$ award 2/3 ✓✓× (d) $2 \times (-10) \times 4 = 80 \rightarrow 80 - (-30) = 110$ award 2/3 ✓×✓ (e) $2 \times 10 \times 4 = 80 \rightarrow 80 - (-30) = 110$ award 1/3 ××✓ (f) $2 \times (-10) + 2 \times 4 = -12$ award 0/3
10		<p>Ans: AU\$3160</p> <ul style="list-style-type: none"> •¹ know to multiply 1.58×2000: 1.58×2000 •² multiply correctly: $1.58 \times 2000 = 3160$ 	2	<ol style="list-style-type: none"> 1. Correct answer without working award 2/2 2. $2000 \div 1.58 = 1265.82$ award 1/2 ×✓
10	b	<p>Ans: £1 = AU\$1.55</p> <ul style="list-style-type: none"> •¹ know to divide $620 \div 400$: $620 \div 400$ •² divide correctly: $620 \div 400 = 1.55$ 	2	<ol style="list-style-type: none"> 1. Correct answer without working award 2/2 2. Do not accept $400 \times ? = 620$ alone, as evidence of knowing to divide $620 \div 400$ 3. Accept $620 \div 100 \times 4$ or $620 \div 4 \times 100$ as evidence of knowing to divide $620 \div 400$

TOTAL MARKS FOR PAPER 1
30

[END OF MARKING INSTRUCTIONS]



2013 Mathematics

Intermediate 1 Units 1,2 & 3 Paper 2

Finalised Marking Instructions

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Part Two: Mathematics Intermediate 1 Units 1, 2 & 3

Paper 2

Question		Expected Answer/s	Max Mark	Additional Guidance
1		<p>Ans: £114</p> <p>•¹ find price per gram: $95 \div 20 = 4.75$</p> <p>•² find price for 24 grams: $4.75 \times 24 = 114$</p>	2	<p>1. Correct answer without working award 2/2</p> <p>2. Alternative strategies</p> <p>(a) •¹ $95 \div 20 = 4.75$ •² $95 + 4 \times 4.75 = 114$</p> <p>(b) •¹ $24 \div 20 = 1.2$ •² $1.2 \times 95 = 114$</p> <p>(c) •¹ $95 \div 5 = 19$ [price for 4g] •² $19 \times 6 = 114$</p> <p>(d) •¹ $24 \div (20 \div 95)$ •² 114 [$20 \div 95$ is not enough for the 1st mark]</p> <p>3. A common answer (no working necessary) $99.75 [95 + 4.75]$ award 1/2 ✓ ×</p>
2	a	<p>Ans: $12n - 7$</p> <p>•¹ multiply out bracket: $12n - 18$</p> <p>•² collect like terms: $12n - 7$</p>	2	<p>1. Correct answer without working award 2/2</p> <p>2. 2nd mark is not available if there is invalid subsequent working eg $12n - 7 \rightarrow 5n$ award 1/2 $12n - 7 \rightarrow 7/12$ award 1/2</p>
2	b	<p>Ans: $5(4s + 9)$</p> <p>•¹ identify common factor: 5 or $4s + 9$</p> <p>•² factorise: $5(4s + 9)$</p>	2	<p>1. $20(s + 2.25), 10(2s + 4.5)$ award 1/2</p>

Question		Expected Answer/s	Max Mark	Additional Guidance
3	a	<p>Ans: 2006</p> <ul style="list-style-type: none"> •¹ interpret bar graph: 2006 	1	
3	b	<p>Ans: 7</p> <ul style="list-style-type: none"> •¹ interpret bar graph: 7 	1	
4		<p>Ans: d = 17</p> <ul style="list-style-type: none"> •¹ start to collect like terms: $3d$ or 51 •² collect like terms and equate: $3d = 51$ •³ solve for d: $d = 17$ 	3	<p>1. For answers without valid working award 1/3 eg (i) $d = 17$ without working (ii) $8 \times 17 + 7 = 5 \times 17 + 58 \rightarrow d = 17$</p> <p>2. For the award of the 3rd mark an answer of the form '$d =$' is required</p> <p>3. Answers acceptable for partial credit (valid working must be shown)</p> <p>(a) $3d = 51 \rightarrow 17$ award 2/3 ✓✓×</p> <p>(b) $3d = 65 \rightarrow d = 21.7$ or $21.6(\dots)$ award 2/3 ✓×✓</p> <p>(c) $13d = 51 \rightarrow d = 3.9(\dots)$ award 2/3 ✓×✓</p> <p>(d) $13d = 65 \rightarrow d = 5$ award 1/3 ××✓</p>

Question	Expected Answer/s	Max Mark	Additional Guidance
5	<p>Ans: 12.5 m/s</p> <ul style="list-style-type: none"> •¹ know how to find speed: $S = D/T$ •² Use $D = 3000$ or $T = 240$ in speed calculation: $3000/T$ or $D/240$ •³ correctly calculate speed in m/s: $3000 \div 240 = 12.5$ 	3	<ol style="list-style-type: none"> 1. Correct answer without working award 3/3 2. Some common answers (no working necessary, rounding or truncation is acceptable) <ul style="list-style-type: none"> (a) 750 [$3000 \div 4$] award 2/3 ✓✓× (b) 2.1, 2.08... [$500 \div 240$] award 2/3 ✓✓× (c) 125 [$500 \div 4$] award 1/3 ✓×× (d) 1.5 [$6 \div 4$] award 1/3 ✓×× (e) 20.83... [$(500 \div 6) \div 4$] award 1/3 ✓×× (f) 720000 [3000×240] award 2/3 ×✓✓ (g) 12000 [3000×4] award 1/3 ×✓× (h) 2000 [500×4] award 0/3

Question		Expected Answer/s	Max Mark	Additional Guidance
6	a	<p>Ans: 1 352 000 000</p> <p>•¹ write 1.352×10^9 in full: 1 352 000 000</p>	1	
6	b	<p>Ans: 260</p> <p>•¹ write 5.2 million in full: 5 200 000</p> <p>•² divide 1352000000 by 5200000 correctly: $1352000000 \div 5200000 = 260$</p>	2	<p>1. Correct answer without working award 2/2</p> <p>2. Alternative strategy: •¹ 5.2×10^6 •² $(1.352 \times 10^9) \div (5.2 \times 10^6) = 260$</p> <p>3. Answer to (b) must be consistent with answer to (a)</p> <p>4. 1 346 800 000 or 1.3468×10^9 [difference of populations] no working necessary award 1/2 ✓✗</p>
7		<p>Ans: £126</p> <p>•¹ know to multiply $l \times b \times h$: evidence of $l \times b \times h$ involving 7, 3 and 10</p> <p>•² find volume in m^3: $7 \times 3 \times 0.1 = 2.1$</p> <p>•³ find total cost: $2.1 \times 60 = 126$</p>	3	<p>1. Correct answer without working award 2/3</p> <p>2. BEWARE: mixed units in volume calculation and incorrect volume conversion factor $7 \times 3 \times 10 = (210 \div 100) = 2.1$ $2.1 \times 60 = 126$ award 2/3 ✓✗✓</p> <p>3. Some common answers [working must be shown] (a) 12 600 [$(7 \times 3 \times 10) \times 60$] award 2/3 ✓✗✓ (b) 1 260 000 [$(70 \times 30 \times 10) \times 60$] award 2/3 ✓✗✓ (c) 126 000 000 [$(700 \times 300 \times 10) \times 60$] award 2/3 ✓✗✓ (d) 1260 [$(7 \times 3) \times 60$, area of patio] award 1/3 ✗✗✓</p> <p>4. Special cases: $V = l + b + h$ [working must be shown] (a) 606 [10.1×60] = 606 award 2/3 ✗✓✓ (b) 1200 [20×60] = 1200 award 1/3 ✗✗✓</p>

Question		Expected Answer/s	Max Mark	Additional Guidance
8	a	<p>Ans: 41</p> <ul style="list-style-type: none"> •¹ order numbers: 19 21 22 39 43 45 46 53 •² find median: 41 	2	<ol style="list-style-type: none"> 1. Correct answer without working award 2/2 2. 49 [numbers not ordered] award 1/2 3. If 'correct' median is found from ordered list with one missing or one extra number award 1/2
8	b	<p>Ans: 34</p> <ul style="list-style-type: none"> •¹ find range: $53 - 19 = 34$ 	1	<ol style="list-style-type: none"> 1. 34 is the only acceptable answer, even with an unordered list.
8	c	<p>Ans: On average Steven scored less than John. Steven's scores varied less than John's.</p> <ul style="list-style-type: none"> •¹ interpret statistics: Steven scored less or equivalent •² interpret statistics: Steven's scores varied less or equivalent 	2	<ol style="list-style-type: none"> 1. Answer must be consistent with answers to parts (a) and (b) 2. Do not accept eg Steven has a lower median Steven has a lower range 3. A common answer: John scored more than Steven as his median and range were higher. award 1/2 ✓ ✗

Question	Expected Answer/s	Max Mark	Additional Guidance
9	<p>Ans: 122m</p> <ul style="list-style-type: none"> •¹ use correct sin ratio: $\sin 24^\circ = \frac{d}{300}$ •² know how to solve equation: $d = 300 \times \sin 24^\circ$ •³ carry out trig. calculation: 122(.02....) 	3	<ol style="list-style-type: none"> 1. Correct answer without working award 3/3 2. Do not penalise inadvertent use of radians or grads -272, 271(.67 ...) (radians used) award 3/3 110(.4...) (grads used) award 3/3 3. Where an incorrect trig ratio is used, working should be followed through with the possibility of awarding 2/3. (a) 274(.06...) [$300 \times \cos 24^\circ$] award 2/3 ×✓✓ (b) 134, 133(.568...) [$300 \times \tan 24^\circ$] award 2/3 ×✓✓ 4. In awarding the 3rd mark, the trig. ratio should not be rounded to any less than 2 decimal places, eg (a) $300 \times \sin 24^\circ = 300 \times 0.41 = 123$ award 3/3 (b) $300 \times \sin 24^\circ = 300 \times 0.4(0) = 120$ award 2/3 ✓✓× 5. Do not award the 3rd mark if there is invalid subsequent working e.g. $300\sin 24^\circ = 122 \rightarrow \sqrt{122} = 11(\dots)$ award 2/3 ✓✓×

Question	Expected Answer/s	Max Mark	Additional Guidance
10	<p>Ans: 97.5</p> <ul style="list-style-type: none"> •¹ know how to evaluate numerator: $25 \times (1.5 + 6.3)$ or $25 \times 1.5 + 25 \times 6.3$ •² evaluate numerator: 195 •³ divide numerator by 2 correctly: $195 \div 2 = 97.5$ 	3	<ol style="list-style-type: none"> 1. Correct answer without working award 3/3 2. Some common answers (working must be shown) <ul style="list-style-type: none"> (a) $116.25 [(25 \times 1.5) + (25 \times 6.3) \div 2]$ $= 37.5 + 157.5 \div 2$ $= 37.5 + 78.75]$ award 2/3 ✓✓x (b) $48.75 [(25 \times 7.8) \div 2 = 12.5 \times 3.9]$ award 2/3 ✓✓x (c) $21.9 [(25 \times 1.5 + 6.3) \div 2]$ award 2/3 x✓✓ (d) $40.65 [25 \times 1.5 + 6.3 \div 2]$ award 1/3 x✓x (e) $16.4 [(25 + 1.5 + 6.3) \div 2]$ award 1/3 xx✓ (f) $118.125 [25 \times 1.5 \times 6.3 \div 2]$ award 0/3 (g) $29.65 [25 + 1.5 + 6.3 \div 2]$ award 0/3

Question	Expected Answer/s	Max Mark	Additional Guidance
11	<p>Ans: £76</p> <ul style="list-style-type: none"> •¹•² know how to calculate interest: $\frac{2.4}{100} \times 4750 \times \frac{8}{12}$ (award 1 for $\frac{2.4}{100} \times 4750$ or $\frac{8}{12} \times \frac{2.4}{100}$ or $\frac{8}{12} \times 4750$) •³ carry out percentage and fraction calculations correctly: 76 	3	<ol style="list-style-type: none"> 1. Correct answer without working award 3/3 2. If answer is 4826 [4750 + 76] (no working necessary) <ol style="list-style-type: none"> (a) award 3/3 if candidate states that interest is 76 (b) award 2/3 if candidate does not state that interest is 76 3. Acceptable answers for partial credit (no working necessary) <ol style="list-style-type: none"> (a) 114 [2.4% of 4750] award 1/3 (b) 1.6 [$\frac{8}{12} \times 2.4$] award 1/3 (c) 3166.67 or 3166.66 [$\frac{8}{12} \times 4750$] award 1/3 (d) 912 [114 × 8] award 1/3 4. The following common wrong answers illustrate where the 3rd mark is/is not available to candidates, working must be shown. (note: answer must be rounded or truncated to nearest penny) <ol style="list-style-type: none"> (a) 131944.44 [$4750 \times \frac{100}{2.4} \times \frac{8}{12}$] x✓✓ (b) 1319.44 [$4750 \div 2.4 \times \frac{8}{12}$] x✓x (c) 171 [$4750 \times \frac{2.4}{100} \times \frac{12}{8}$] ✓x✓ (d) 1710 [$4750 \times 0.24 \times \frac{12}{8}$] xx✓

Question	Expected Answer/s	Max Mark	Additional Guidance
12	<p>Ans: 122 cm</p> <ul style="list-style-type: none"> •¹ find dimensions of triangle: 100 and 70 •² correct form of Pythagoras' Theorem: $100^2 + 70^2$ •³ calculate sum (or difference) of two squares: 14900 •⁴ calculate the square root of a calculated value: 122 (·06..) 	4	<ol style="list-style-type: none"> 1. Correct answer without working award 4/4 2. 2nd mark can only be awarded for using Pythagoras in a right-angled triangle Some examples (working must be shown) <ul style="list-style-type: none"> (a) $71(\cdot 41\dots) [\sqrt{100^2 - 70^2}]$ award 3/4 ✓×✓✓ (b) $131(\cdot 24\dots) [\sqrt{100^2 + 85^2}]$ award 3/4 ××✓✓ (c) $217(\cdot 31\dots) [\sqrt{200^2 + 85^2}]$ award 3/4 ××✓✓ (d) $86(\cdot 31\dots) [\sqrt{15^2 + 85^2}]$ award 2/4 ××✓✓ (e) $141(\cdot 42\dots) [\sqrt{100^2 + 100^2}]$ award 2/4 ××✓✓ 3. Final mark is not available if there is invalid subsequent working e.g. $122 - 30 = 92$ award 3/4 ✓✓✓× 4. Example of alternative strategy involving trigonometry <ul style="list-style-type: none"> •¹ dimensions of triangle = 100 and 70 •² $a^\circ = \tan^{-1}(100/70) = 55^\circ \dots\dots$ •³ $\cos 55^\circ \dots\dots = 70/\text{length}$ •⁴ $\text{length} = 70 \div \cos 55^\circ = 122$ 5. Do not penalise inadvertent use of radians or grads if trigonometry is used

Question	Expected Answer/s	Max Mark	Additional Guidance
13	<p>Ans: 6%</p> <ul style="list-style-type: none"> •¹ find delivery charge: 21 •² know to express delivery charge as a fraction of 350: $\frac{21}{350}$ •³ know to multiply fraction by 100: $\frac{21}{350} \times 100$ •⁴ carry out all calculations correctly: 6 	4	<ol style="list-style-type: none"> 1. Correct answer without working award 2/4 2. 4th mark is only available for calculations of the form $\frac{a}{b} \times c$ where a, b, c = delivery charge or 350 or 371 or 100. 3. Some common answers (working must be shown) <ul style="list-style-type: none"> (a) $5 \cdot 7, 5 \cdot 6(6 \dots) [\frac{21}{371} \times 100]$ award 3/4 ✓×✓✓ (b) $106 [\frac{371}{350} \times 100]$ award 3/4 ×✓✓✓ (c) $94(\cdot 3 \dots) [\frac{350}{371} \times 100]$ award 2/4 ××✓✓ (d) $73 \cdot 5 [\frac{21}{100} \times 350]$ award 2/4 ✓××✓ (e) $1298 \cdot 5 [\frac{350}{100} \times 371 \text{ or } \frac{371}{100} \times 350]$ award 1/4 ×××✓
14	<p>Ans: 150 cm²</p> <p><u>Method 1</u></p> <ul style="list-style-type: none"> •¹ find base of triangle: $80 \div 4 = 20$ •² find height of triangle: $45 \div 3 = 15$ •³ find area of triangle: $\frac{1}{2} \times 20 \times 15 = 150$ <p><u>Method 2</u></p> <ul style="list-style-type: none"> •¹ find area of rectangle: $80 \times 45 = 3600$ •² find number of triangles: 24 •³ find area of triangle: $3600 \div 24 = 150$ 	3	<ol style="list-style-type: none"> 1. Correct answer without working award 1/3 2. A common answer (no working necessary) $1800 [\frac{1}{2} \times 80 \times 45]$ award 1/3 3. Award 2/3 for correctly calculating $3600 \div t, t \neq 2 \text{ or } 24$ [incorrect number of triangles] (working must be shown) e.g. $3600 \div 21 = 171(\dots)$ (Do not penalise incorrect rounding)

Question	Expected Answer/s	Max Mark	Additional Guidance
15	<p>Ans: 42 cm</p> <ul style="list-style-type: none"> •¹ know how to calculate length of semi-circle: $\frac{1}{2} \pi d$ or πr •² substitute correct diameter into formula: $\frac{1}{2} \times \pi \times 10$ or $\pi \times 5$ •³ know to add lengths of straight edges to previously calculated value: previously calculated value + 10 + 6 + 10 •⁴ carry out all calculations correctly: $15.7... + 26 = 41.7...$ (must include a circle calculation followed by an addition) •⁵ round to nearest whole number: 42 	5	<ol style="list-style-type: none"> 1. Correct answer without working award 0/5 2. Where no formula is stated accept <ol style="list-style-type: none"> (a) $\frac{1}{2} \times \pi \times 10$ or 15.7... as evidence of $\frac{1}{2} \pi d$ being used (b) $\frac{1}{2} \times \pi \times 5^2$ or 39.2... as evidence of $\frac{1}{2} \pi r^2$ being used 3. Some common answers (working must be shown) <ol style="list-style-type: none"> (a) 32 [$\frac{1}{2} \times \pi \times 10 + 16$] award 4/5 ✓✓x✓✓ (b) 57 [$\pi \times 10 + 26$] award 4/5 x✓✓✓✓ (c) 65 [$\frac{1}{2} \times \pi \times 5^2 + 26$] award 4/5 x✓✓✓✓ (d) 99 [$\frac{1}{2} \times \pi \times 5^2 + 60$] award 3/5 x✓x✓✓ (e) 183 [$\frac{1}{2} \times \pi \times 10^2 + 26$] award 3/5 xx✓✓✓ (f) 34 [$\frac{1}{2} \times \pi \times 5 + 26$] award 4/5 ✓x✓✓✓ (g) 16 [$\frac{1}{2} \times \pi \times 10$] award 3/5 ✓✓xx✓ (h) 31 [$\pi \times 10$] award 2/5 x✓xx✓ (i) 39 [$\frac{1}{2} \times \pi \times 5^2$] award 2/5 x✓xx✓ (j) 39 [$\frac{1}{2} \times 5^2 + 26$] award 2/5 xx✓x✓ (k) 79 [$\pi \times 5^2$] award 2/5 x✓xx✓ 3. (a) 5th mark is only available where the answer to circle calculation requires rounding (b) Where premature rounding leads to incorrect answer, a maximum of 4/5 is available.

TOTAL MARKS FOR PAPER 2
50

TOTAL MARKS FOR PAPER 1&2
80

[END OF MARKING INSTRUCTIONS]