FOR OFFICIAL USE

G

	KU	RE
Total marks		

2500/403

NATIONAL QUALIFICATIONS 2002

THURSDAY, 9 MAY
10.40 AM – 11.15 AM

MATHEMATICS
STANDARD GRADE
General Level
Paper 1
Non-calculator

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Date of birth
Day Month Year

Scottish candidate number

Number of seat

1 **You may not use a calculator.**

2 Answer as many questions as you can.

3 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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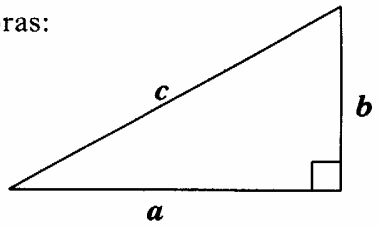
FORMULAE LIST

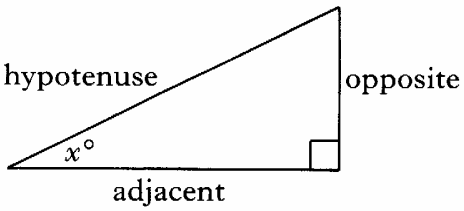
Circumference of a circle: $C = \pi d$
Area of a circle: $A = \pi r^2$
Curved surface area of a cylinder: $A = 2\pi rh$
Volume of a cylinder: $V = \pi r^2 h$
Volume of a triangular prism: $V = Ah$

Theorem of Pythagoras:



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

Trigonometric ratios in a right angled triangle:

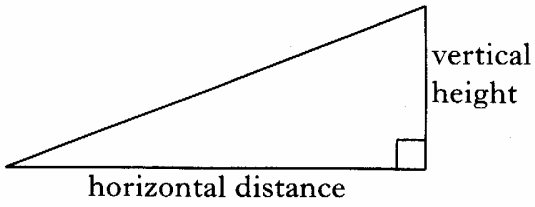


$$\tan x^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

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

$$\cos x^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

Gradient:



$$\text{Gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$

DO NOT WRITE IN THIS MARGIN

Marks	KU	RE

1. Carry out the following calculations.

(*a*) $9{\cdot}2 - 3{\cdot}71 + 6{\cdot}47$

1

(*b*) $7{\cdot}29 \times 8$

1

(*c*) $687 \div 300$

1

(*d*) $3 \times 2\frac{3}{4}$

2

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks	KU	RE

2. Davina has a bag of sweets.

It contains three yellow sweets, four purple sweets, two red sweets and six pink sweets.

The corner of her bag is torn and a sweet falls out.

(*a*) What is the probability that this sweet is yellow?

1

(*b*) The sweet that fell out was yellow and she put it in a bin.

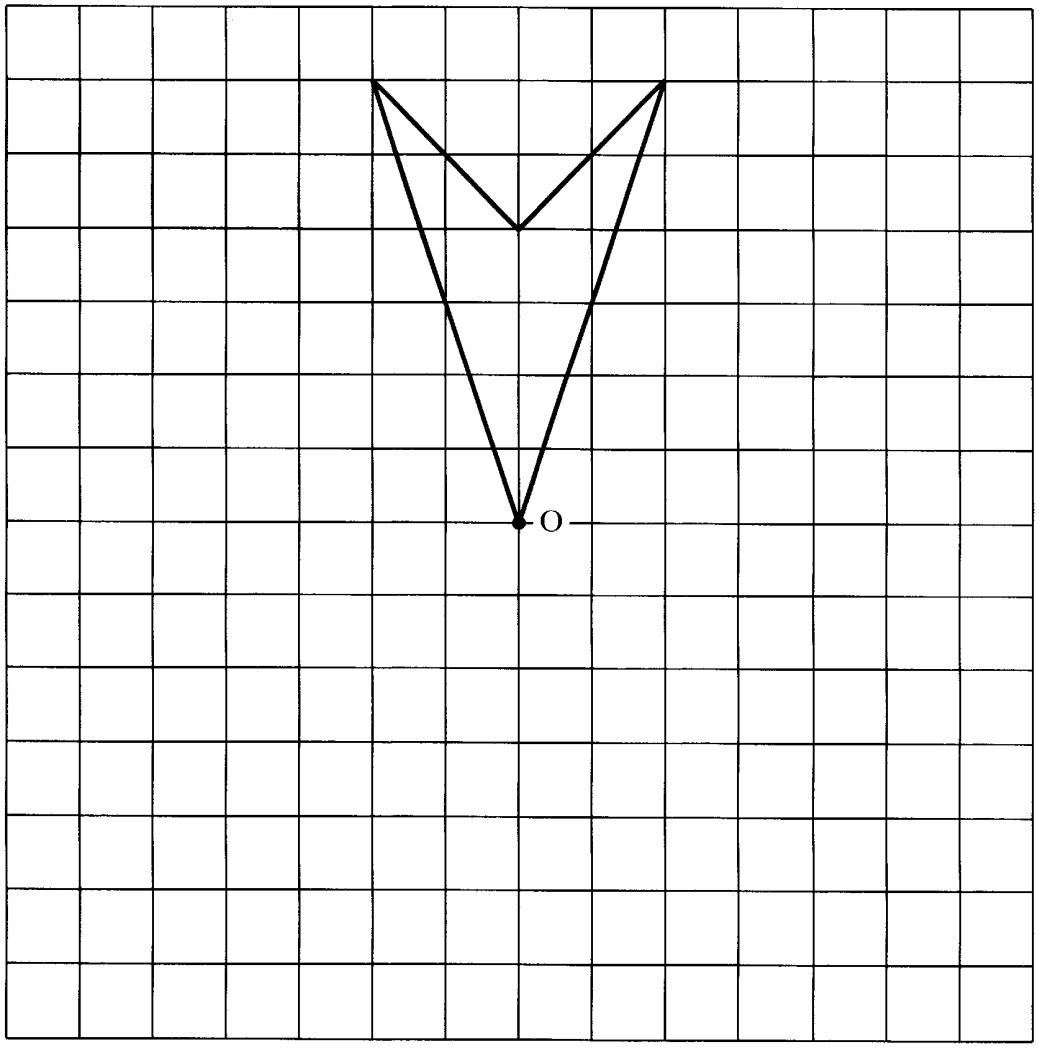
What is the probability that the next sweet to fall out is pink?

2

DO NOT WRITE IN THIS MARGIN

Marks | KU | RE

3. Complete this shape so that it has quarter-turn symmetry about O.



3

4. There are five million people in the United Kingdom aged 15–19.
30% of these five million people regularly watch cartoons.
How many people is this?

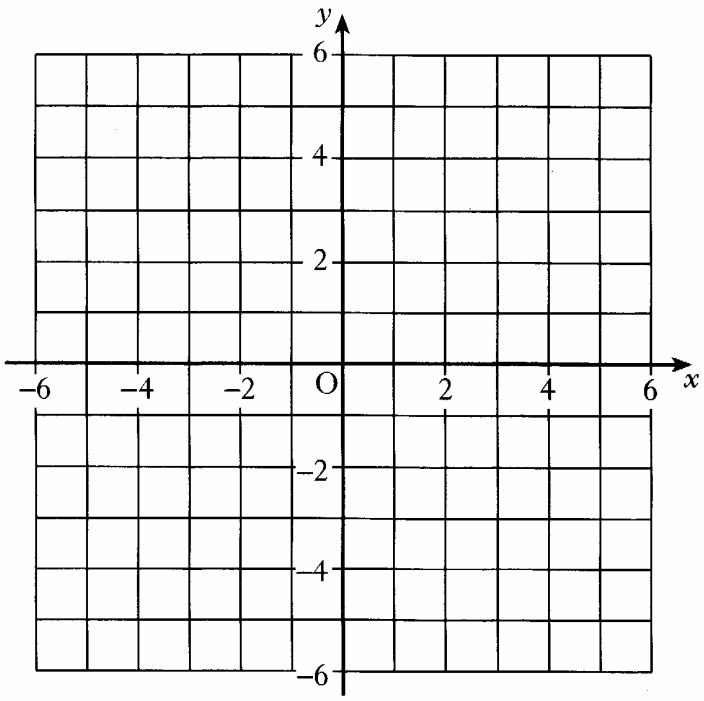
2

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks	KU	RE

5. (*a*) On the grid below, plot the points A(–4, –3), B(3, –1) and C(4, 4).



2

(*b*) Find the gradient of the line AB.

2

(*c*) Plot the fourth point D so that shape ABCD is a parallelogram.
Write down the coordinates of point D.

2

DO NOT WRITE IN THIS MARGIN

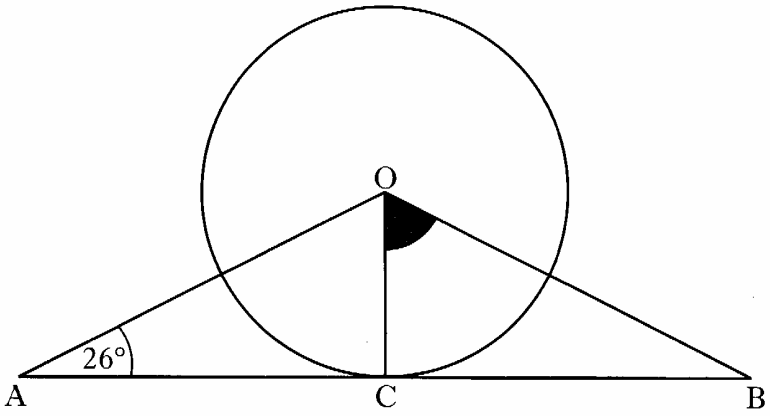
Marks	KU	RE

6. Starting with the smallest, write the following in order.

$0{\cdot}404 \qquad \frac{1}{4} \qquad 41\% \qquad 0{\cdot}04 \qquad \frac{4}{10}$

2

7.



In the above diagram with circle centre O,

- Triangle AOB is isosceles
- AB is a tangent to the circle at C
- Angle CAO is 26°.

Calculate the size of the shaded angle COB.

2

[Turn over

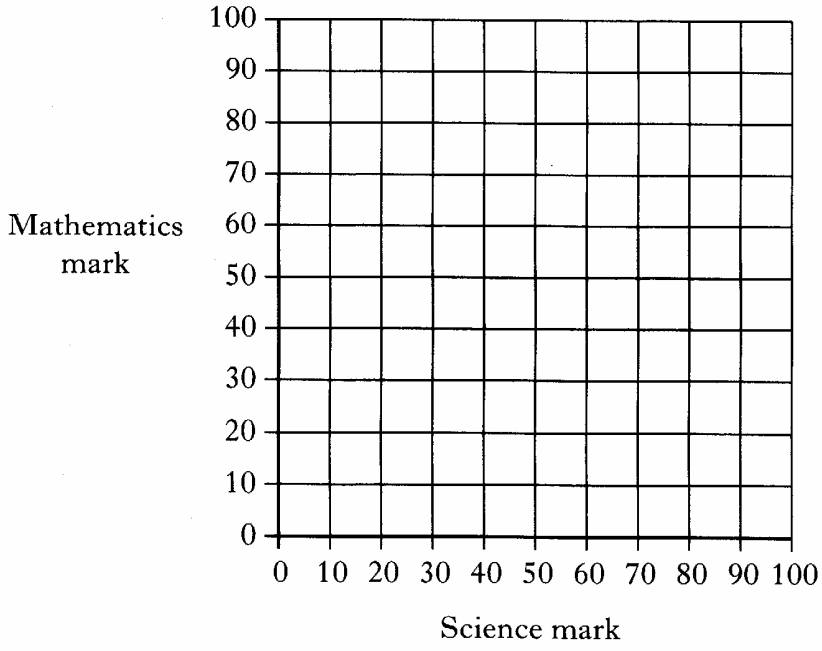
DO NOT WRITE IN THIS MARGIN

Marks | KU | RE

8. The Science and Mathematics marks for 10 students are shown in the table below.

Student	A	B	C	D	E	F	G	H	I	J
Science mark	35	45	65	70	57	25	80	85	10	34
Mathematics mark	41	52	65	75	60	28	84	90	11	37

(*a*) Using these marks draw a Scattergraph.



3

(*b*) Draw a best-fitting line on the graph. **1**

(*c*) A student whose Science mark is 50 was absent from the Mathematics exam.

Using the best-fitting line, estimate this student's Mathematics mark.

1

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9. A gardener has been measuring the weekly growth rates of plants.

Two of the plants that have been measured are Plant A and Plant B.

One week Plant A is 29 cm high and Plant B is 46 cm high.

The next week Plant A is 57 cm high and Plant B is 71 cm high.

Which plant has grown more in the week and by how much?

Plant A

Plant B

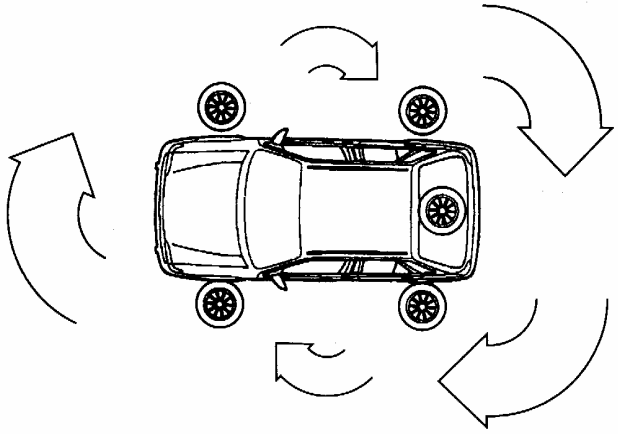
3

[Turn over for Question 10 on *Page ten*

DO NOT WRITE IN THIS MARGIN

Marks	KU	RE

10.



A car has five tyres, one on each of the four road wheels and one on the spare wheel.

Mr Anderson switched his wheels regularly so that all five tyres were used equally.

Last year he travelled 20 000 miles.

How many miles did each tyre do on the road?

3

[END OF QUESTION PAPER]

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NATIONAL QUALIFICATIONS 2002

THURSDAY, 9 MAY
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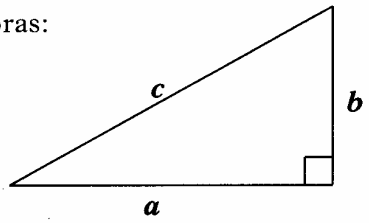

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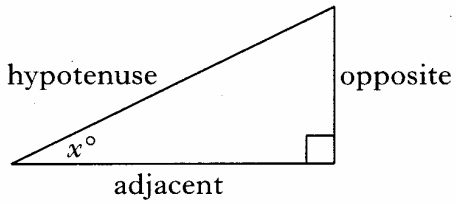

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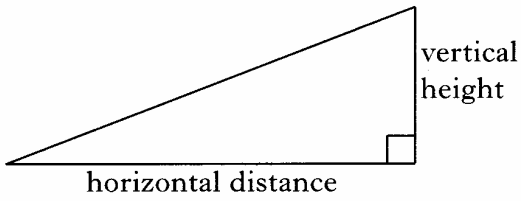

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Marks	KU	RE

1. John drives from Edinburgh to Inverness at an average speed of 76 kilometres per hour.

The journey takes him 3 hours 45 minutes.

How far is it from Edinburgh to Inverness?

2

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks | KU | RE

2. Andrea sees this advertisement for a computer in CompCo.

(*a*) Andrea buys the computer from CompCo.

VAT is 17·5%.

What is the total cost of the computer?

Round your answer to the nearest penny.

3

(*b*) One week later, Andrea sees the same computer in a different shop at £900 including VAT.

She remembers the promise in the CompCo advertisement and returns to the shop to claim a refund.

How much money should be refunded to her?

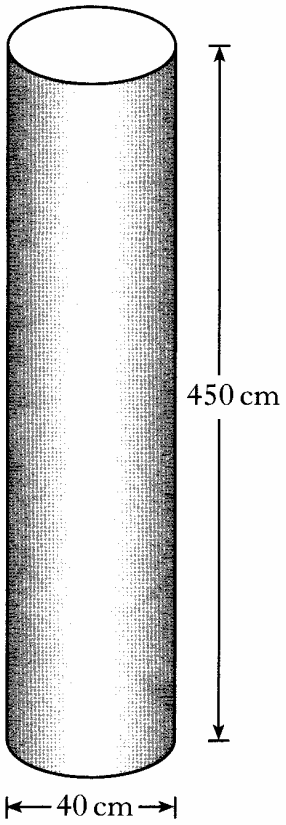
2

DO NOT WRITE IN THIS MARGIN

Marks	KU	RE

3. A column is in the shape of a cylinder.

It is 450 centimetres high and its diameter is 40 centimetres.



(*a*) Find the volume of the column in cubic centimetres.

2

(*b*) Write your answer to (*a*) in scientific notation.

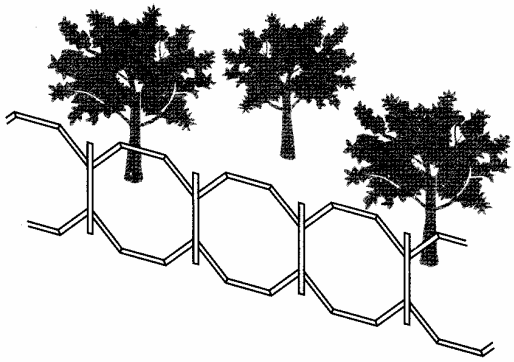
1

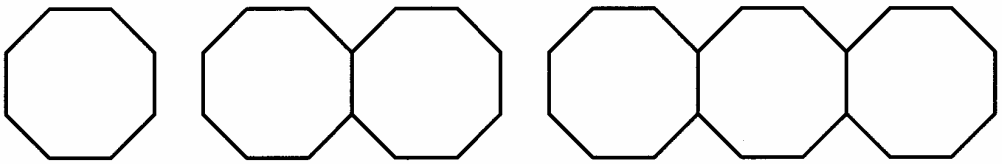
[Turn over

DO NOT WRITE IN THIS MARGIN

Marks | KU | RE

4. A metal fence for a garden is made by joining iron bars as shown below.





1 Section 2 Sections 3 Sections

(*a*) Complete this table.

Number of sections (s)	1	2	3	4		12
Number of iron bars (b)	8		22			

2

(*b*) Find a formula for calculating the number of iron bars (b), when you know the number of sections (s).

2

(*c*) A fence has been made by joining 176 iron bars.

How many sections are in this fence?

2

DO NOT WRITE IN THIS MARGIN

Marks	KU	RE

5. A sum of £1640 is invested in a bank.

The rate of interest is 4·5% per annum.

Calculate the simple interest gained in 9 months.

3

[Turn over

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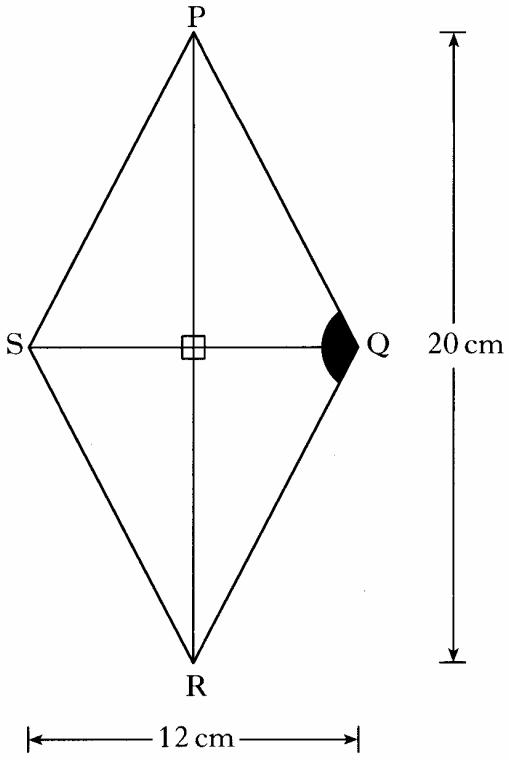
6. PQRS is a rhombus.

Its diagonals PR and SQ are 20 centimetres and 12 centimetres long respectively.



Calculate the size of the shaded angle PQR.

Do not use a scale drawing.

4

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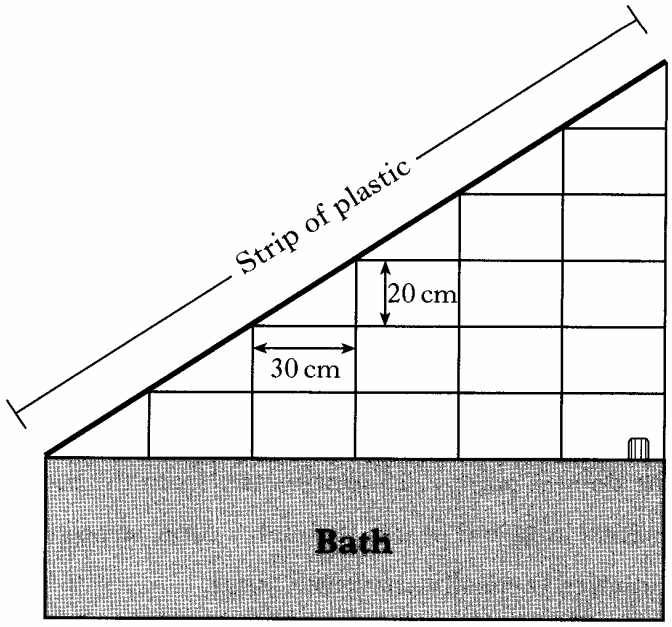
7. The diagram below shows the wall Jamie has tiled above the bath in his house.

He used rectangular tiles, some of which he halved.

The length of each tile is 30 centimetres.

The breadth of each tile is 20 centimetres.



A strip of plastic is fitted along the top of the tiles.

Calculate the length of the strip of plastic.

4

[Turn over

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8.

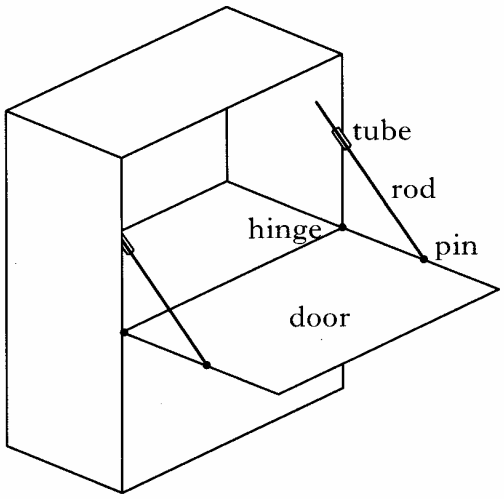

Diagram 1

A cabinet has a door that opens downwards until it is at right angles to the front of the cabinet.

A rod is pinned to the door at point P, 15 centimetres from the hinge, H.

The rod is 35 centimetres long and passes through a tube, at point T.

This tube is 20 centimetres vertically above the hinge.

(*a*) Diagram 2 shows the positions of points P, T and H when the door is fully open.

Draw this diagram to a scale of 1:2.

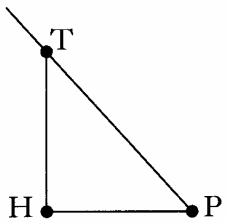

Diagram 2

4

DO NOT WRITE IN THIS MARGIN

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8. (continued)

(*b*) Use your scale drawing to find the actual length of the rod between points P and T.

2

9. (*a*) Solve algebraically the equation

$$4(3x + 2) = 68.$$

3

(*b*) Factorise

$$10y + 15.$$

2

[Turn over

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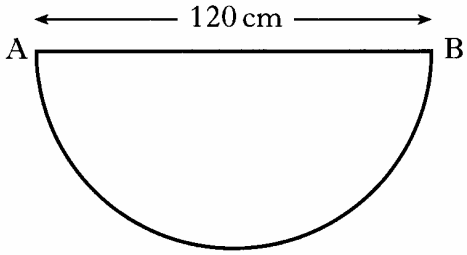
10. A joiner is making tables for a new coffee shop.

The shape of the top of a table is a semi-circle as shown below.

AB = 120 centimetres.



The top of the table is made of wood and a metal edge is to be fixed to its perimeter.

(*a*) Calculate the total length of the metal edge.

3

(*b*) The coffee shop needs 16 tables.

The joiner has 50 metres of the metal edge in the workshop.

Will this be enough for all sixteen tables?

Give a reason for your answer.

2

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11. The Davidson family is planning to buy a new kitchen using hire purchase.

The cash price of the kitchen is £6300.

The hire purchase price is 22% more than the cash price.

The hire purchase agreement requires a deposit, which is 15% of the cash price, followed by 60 equal instalments.

Calculate the cost of each instalment.

4

[*END OF QUESTION PAPER*]