FOR OFFICIAL USE

G

	KU	RE
Total marks		

2500/403

NATIONAL QUALIFICATIONS 2003

THURSDAY, 8 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.

4 Full credit will be given only where the solution contains appropriate working.

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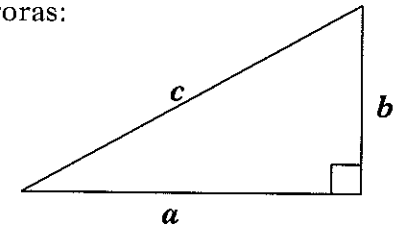
SCOTTISH QUALIFICATIONS AUTHORITY

LIB 2500/403 6/69670

FORMULAE LIST

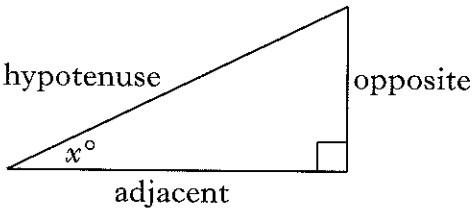
Circumference of a circle:	$C=\pi d$
Area of a circle:	$A=\pi r^2$
Curved surface area of a cylinder:	$A=2\pi rh$
Volume of a cylinder:	$V=\pi r^2 h$
Volume of a triangular prism:	$V=Ah$

Theorem of Pythagoras:



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

Trigonometric ratios in a right angled triangle:

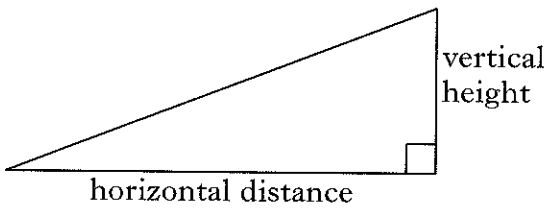


$$\textbf{tan } x^\circ = \frac{\textbf{opposite}}{\textbf{adjacent}}$$

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

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

Gradient:



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

DO NOT WRITE IN THIS MARGIN

Marks	KU	RE

1. Carry out the following calculations.

(*a*) $3{\cdot}58 - 2{\cdot}734$

1

(*b*) $6{\cdot}37 \times 60$

1

(*c*) $13{\cdot}8 \div 4$

1

(*d*) $\frac{3}{4} + \frac{1}{16}$

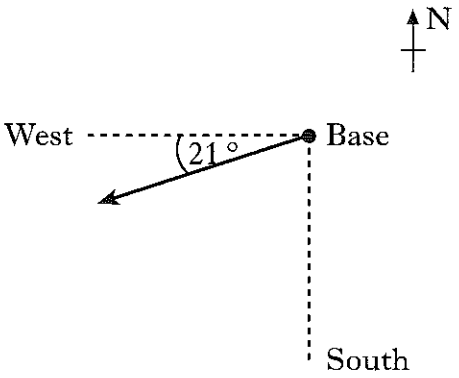
2

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks	KU	RE

2. Bruce sets out from base during an orienteering competition.
The arrow in the sketch below shows the direction in which he is travelling.



What is the three-figure bearing of this direction?

2

3. Nine wooden balls numbered one to nine are placed in a bag.
A ball is removed from the bag.
What is the probability that this ball has a number more than 7?

2

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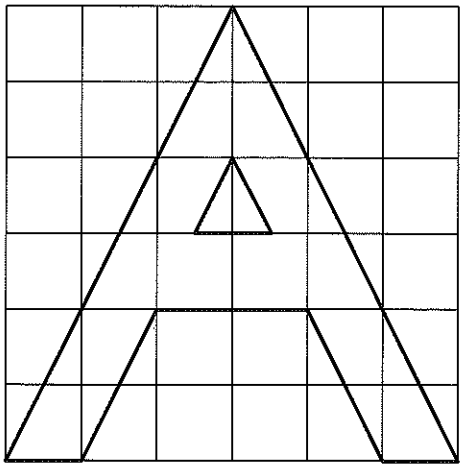
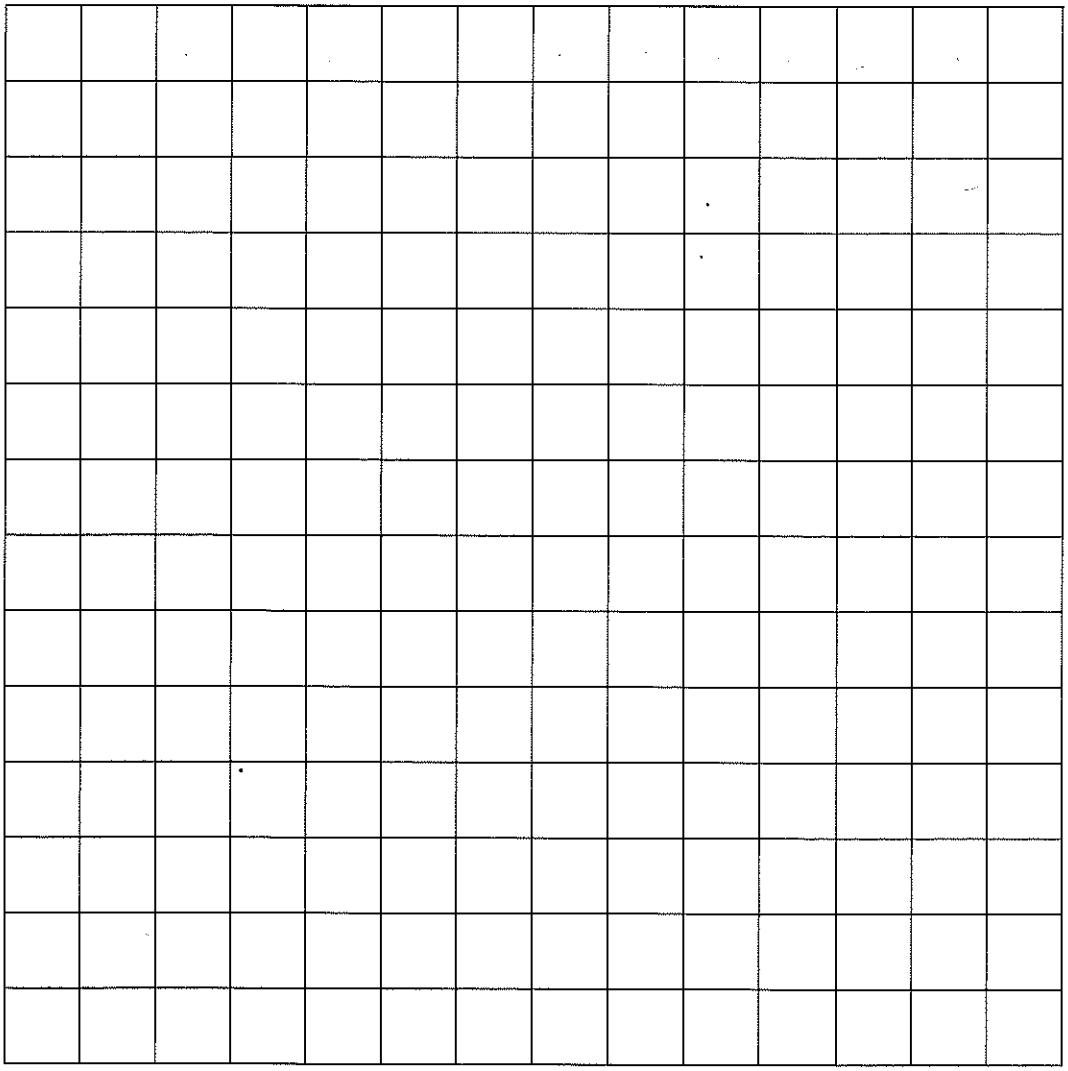
4. The letter A is shown in the diagram.



On the grid below, draw an enlargement of this letter A using a scale factor of 2.



3

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks	KU	RE

5. The number of hours of sunshine was recorded daily in a city during a three-week period in June.

The results are shown in the stem and leaf diagram below.

0	8				
1					
2	1	3			
3	2	5	7		
4	1	5	7	8	
5	2	3	6		
6	0	2	2		
7	1	1	3	7	9

n = 21 3 | 2 represents 3·2 hours

Using the above diagram:

(*a*) calculate the range;

2

(*b*) find the median number of hours.

1

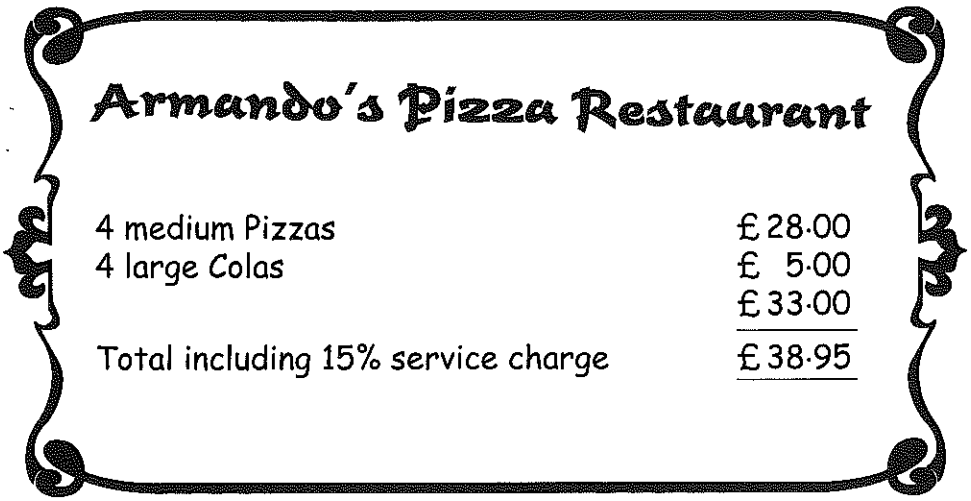
DO NOT WRITE IN THIS MARGIN

Marks	KU	RE

6. Four friends have dinner in a restaurant.

A service charge of 15% is added to their bill.

Their bill is shown below.



One of the friends thinks the service charge has been calculated wrongly.

Is the service charge correct?

Give a reason for your answer.

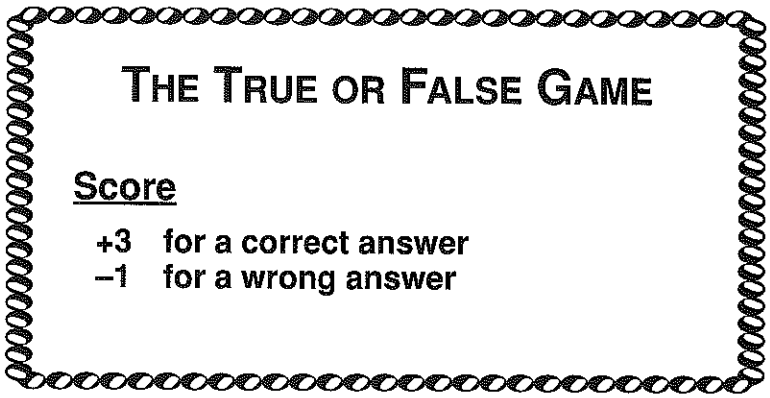
4

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks	KU	RE

7. In a True or False game, players score +3 for a correct answer and –1 for a wrong answer.



(*a*) Ann had 2 questions correct and 8 wrong.

What was her score?

2

(*b*) David answered 10 questions.

His score was 18.

How many questions did he answer correctly?

2

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8. The international sizes for writing paper are shown in the list below.
All measurements are in millimetres.

A3	297	×	420
A4	210	×	297
A5	148	×	210
A6	105	×	148
A7	74	×	105
A8	52	×	74
A9	37	×	52
A10			

By inspecting the list, write down the measurements for A10 writing paper.

2

9. The planet Pluto is approximately 7364 million kilometres from the Sun.
Write this number in scientific notation.

2

[Turn over for Question 10 on *Page ten*

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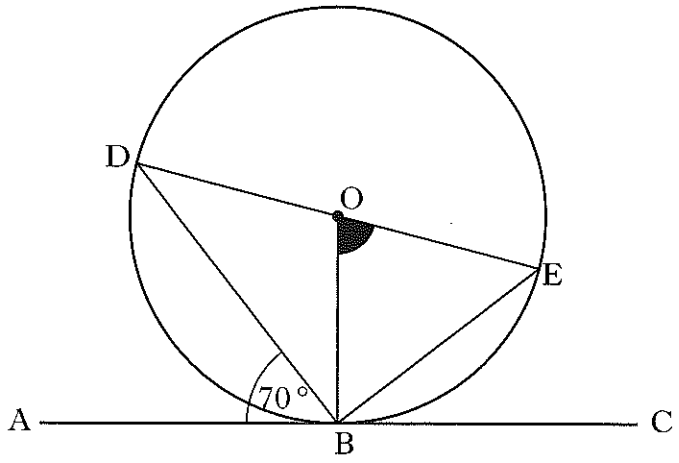
Marks	KU	RE

10.



In the diagram above

- a circle, centre O, is drawn,
- the line AC is a tangent to the circle at B,
- Angle DBA = 70°.

Calculate the size of the shaded angle BOE.

3

[END OF QUESTION PAPER]

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NATIONAL QUALIFICATIONS 2003

THURSDAY, 8 MAY
11.35 AM – 12.30 PM

MATHEMATICS STANDARD GRADE
General Level
Paper 2

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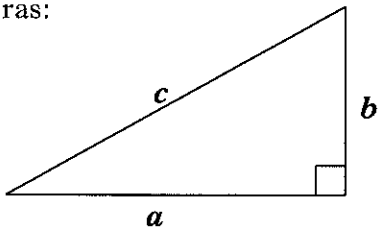

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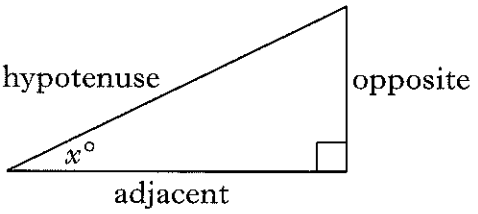

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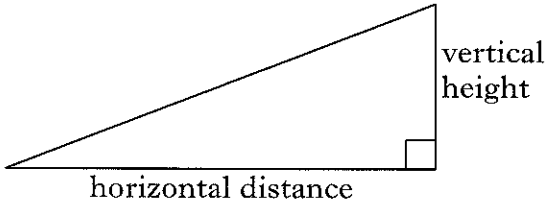

$$\text{Gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$

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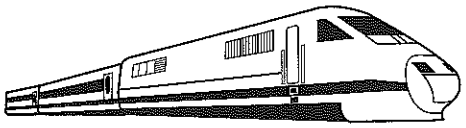
1. The distance between Verona and Milan is 158 kilometres.

A train takes 1 hour 40 minutes to travel between these cities.

Find the average speed of the train.



2

2. Alice Anderson has a part-time job in a call centre.

Her basic rate of pay is £6·50 per hour.

At weekends she gets paid overtime at time and a half.

Last week she was paid £136·50, which included 4 hours overtime.

How many hours did she work at the basic rate?

4

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks | KU | RE

3. The number of letters in each of the first one hundred words of a news story were counted.

The results are shown in the table below.

Number of letters	*Frequency*	*Number of letters × frequency*
1	5	
2	12	
3	18	
4	26	
5	18	
6	11	
7	7	
8	3	
	Total =	Total =

Find the mean number of letters per word.

Give your answer correct to one decimal place.

4

DO NOT WRITE IN THIS MARGIN

Marks	KU	RE

4.

Dayna wants to buy cookery books.

She chooses books from the cookery series shown above.

- She wants to spend between £15 and £20.
- She does not buy more than one copy of any book.

One way Dayna can choose her books is shown in the table below.

Complete the table to show all the different ways Dayna can choose her books.

BOOK TITLE	BOOK TITLE	BOOK TITLE	TOTAL COST (£)
Pasta	Chicken		19·98

3

[Turn over

DO NOT WRITE IN THIS MARGIN

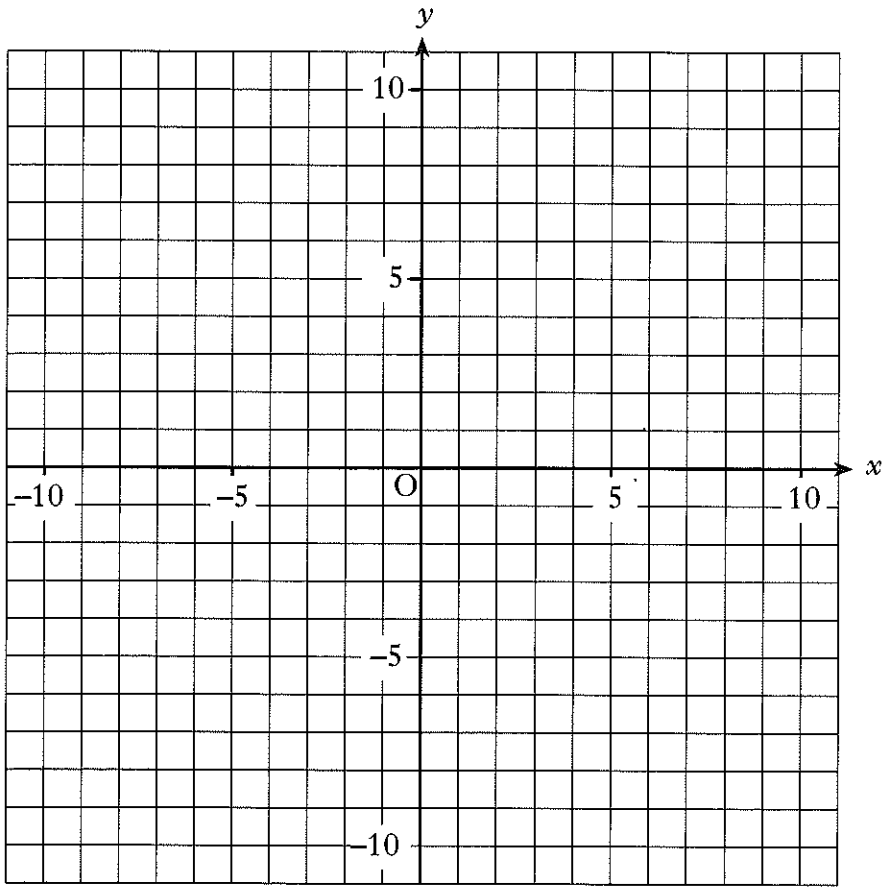
Marks	KU	RE

5. (*a*) Complete the table below for $y = 2x - 1$.

x	-4	0	4
y			

2

(*b*) Using the table in part (*a*), draw the graph of the line $y = 2x - 1$ on the grid below.



2

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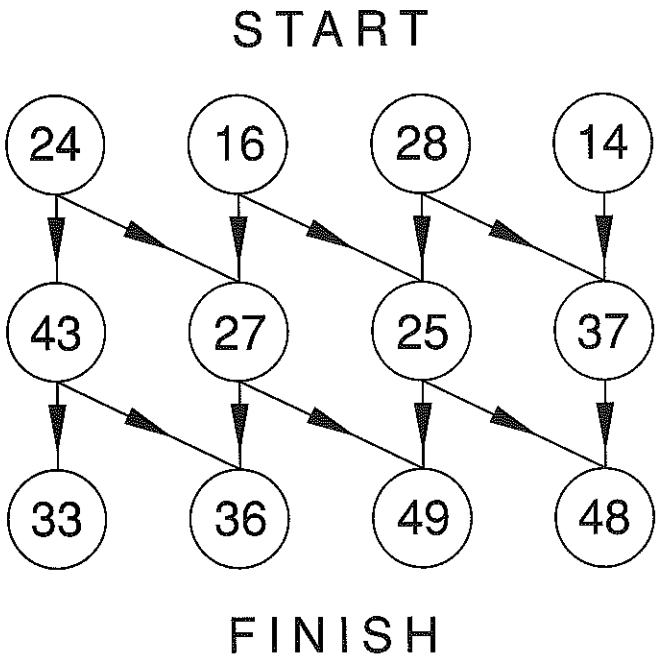
6.



Following the arrows, use the instructions below.

Find the path which

- starts with a multiple of 4,
- moves to a prime number,
- finishes with a square number.

Write your numbers in the boxes below.

First number ☐ Second number ☐ Third number ☐

3

[Turn over

DO NOT WRITE IN THIS MARGIN

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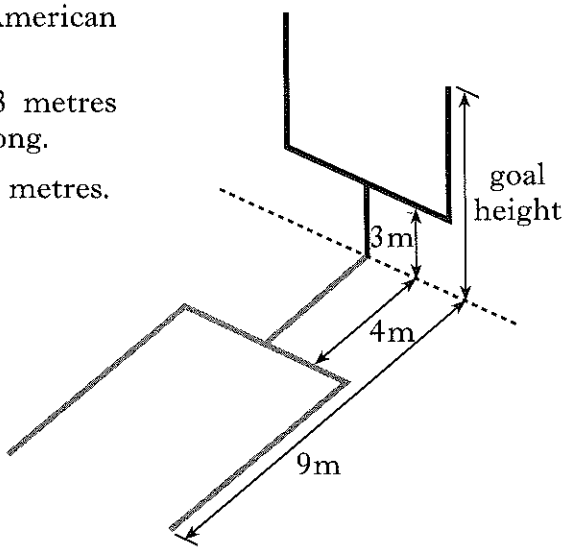
7. The diagram shows the goal in American Football and its shadow.

The post below the crossbar is 3 metres high and casts a shadow 4 metres long.

The total length of the shadow is 9 metres.

Find the total goal height.



3

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8. Alison has started a small business making wax candles.

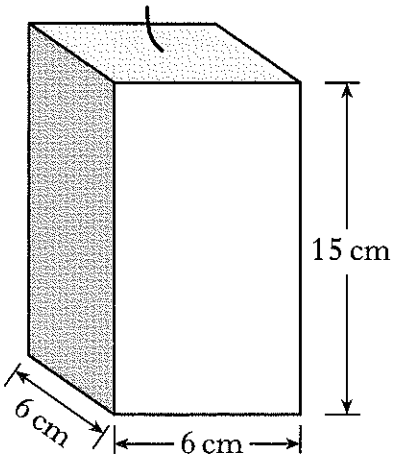
She makes only one size of candle and it is in the shape of a cuboid.

The base of the candle is a square of side 6 centimetres.

The height of the candle is 15 centimetres.

Alison buys her wax in 10 litre tubs.

How many candles can she make from a tub of wax?



4

[Turn over

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9. (*a*) Multiply out the brackets and collect like terms

$$3(2w + 1) + 2(8 - w).$$

3

(*b*) Solve the inequality

$$3x - 4 < 11.$$

2

10. The cost, c pounds, of a carpet varies directly as its length, l metres. A carpet of length 5 metres costs £340.

(*a*) What will a carpet of length 8 metres cost?

3

(*b*) What length is a carpet which costs £238?

2

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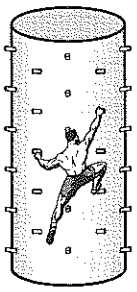
11. An adventure park is installing a climbing wall.

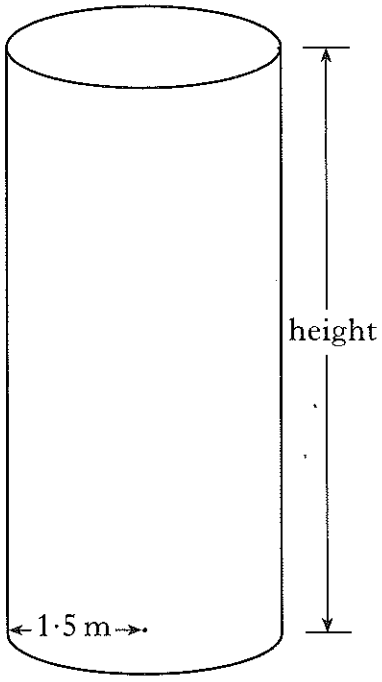


The wall is in the shape of a cylinder to which climbing pegs are attached.

The radius of the cylinder is 1·5 metres.

The cylinder has a curved surface area of 75·5 square metres.

What height will the cylinder be?



4

[Turn over

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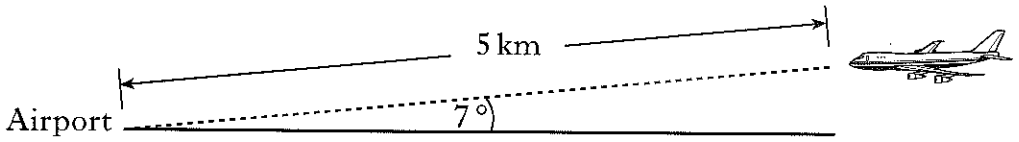
12.



An aircraft is approaching Glasgow airport.

The angle of elevation of the aircraft from the airport is 7°.

The aircraft is at a distance of 5 km from the airport.

Find the height of the aircraft, to the nearest metre.

Do not use a scale drawing.

4

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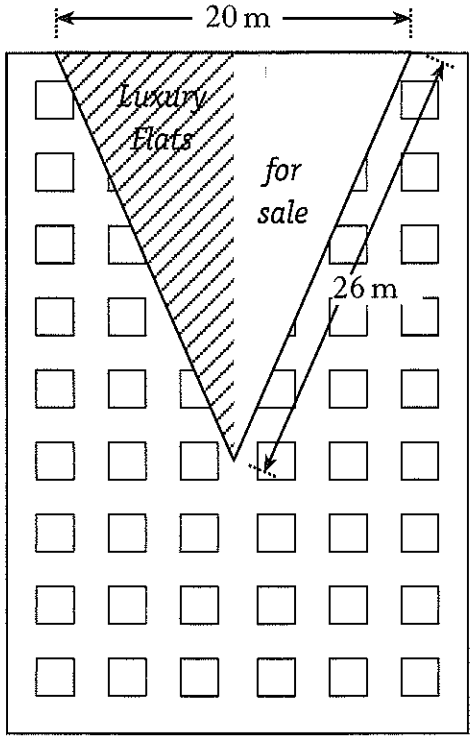
13. A large advertising banner is hanging from a building.

The banner is an isosceles triangle.

The top edge of the banner is 20 metres long and each of the other two sides is 26 metres long.

Find the area of the banner.



4

[END OF QUESTION PAPER]