

FOR OFFICIAL USE

--	--	--	--	--	--

G

KU RE

Total marks

--	--

2500/403

NATIONAL
QUALIFICATIONS
2001

WEDNESDAY, 16 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

--	--	--	--	--	--	--	--	--	--

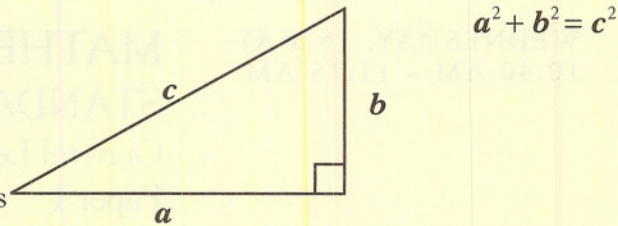
Number of seat

- 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.
- 5 Before leaving the examination room you must give this book to the invigilator. If you do not you may lose all the marks for this paper.

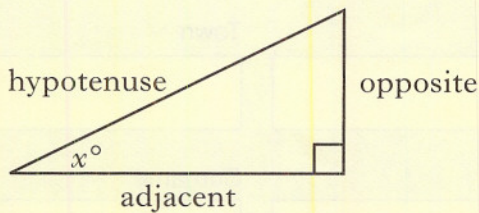
FORMULAE LIST

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

Theorem of Pythagoras:



Trigonometric ratios
in a right angled
triangle:

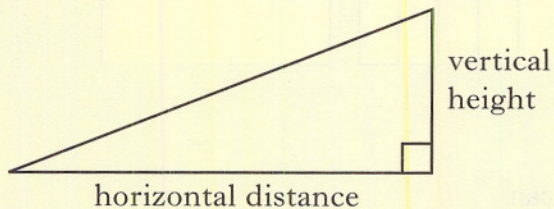


$$\tan x^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

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

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

Gradient:



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

Marks

KU	RE
1	
1	
1	
2	

1. Work out the following.

(a) $18.54 + 0.61 - 5.3$

$= \underline{\underline{13.85}}$

$$\begin{array}{r} 18.54 \\ + 0.61 \\ \hline 19.15 \\ - 5.30 \\ \hline 13.85 \end{array}$$

(b) 3.36×70

$= 3.36 \times 10 \times 7$
 $= 33.6 \times 7$
 $= \underline{\underline{235.2}}$

$$\begin{array}{r} 33.6 \\ \times 7 \\ \hline 235.2 \end{array}$$

(c) $0.296 \div 4$

$= \underline{\underline{0.074}}$

$$4 \overline{) 0.296} \\ \underline{0.074}$$

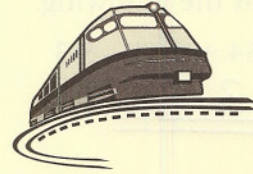
(d) $\frac{3}{4}$ of 480 g

$= \underline{\underline{360g}}$

$$\begin{array}{r} 120 \\ 4 \overline{) 480} \\ \hline 120 \\ \times 3 \\ \hline 360 \end{array}$$

[Turn over

2.



Marks

A student pays a train fare of £24.

If this represents 60% of the full adult fare, what is the full adult fare?

$$\begin{aligned}
 60\% &= \text{£}24 \\
 10\% &= 24 \div 6 \\
 &= \text{£}4 \\
 100\% &= 4 \times 10 \\
 &= \underline{\underline{\text{£}40}}
 \end{aligned}$$

3

3. Brian checks the five day weather forecast for Paris.

PARIS – FORECAST for 15 January			
	Maximum (°C)	Minimum (°C)	
Saturday	3	-3	Cloudy
Sunday	2	0	Sunny
Monday	7	4	Cloudy
Tuesday	7	2	Sunny
Wednesday	5	-2	Sunny

Calculate the **mean** minimum temperature for the five day weather forecast.

$$\begin{aligned}
 \text{Mean} &= \frac{-3 + 0 + 4 + 2 + (-2)}{5} \\
 &= \underline{\underline{\frac{1}{5}^\circ\text{C}}} \quad \text{or} \quad \underline{\underline{0.2^\circ\text{C}}}
 \end{aligned}$$

3

4. (a) Write the number 1.5×10^{-1} in full.

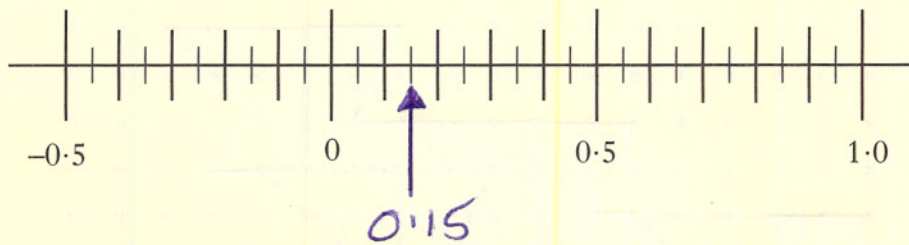
0.15

Marks

KU RE

1

(b) Mark the position of this number on the number line below.



1

[Turn over

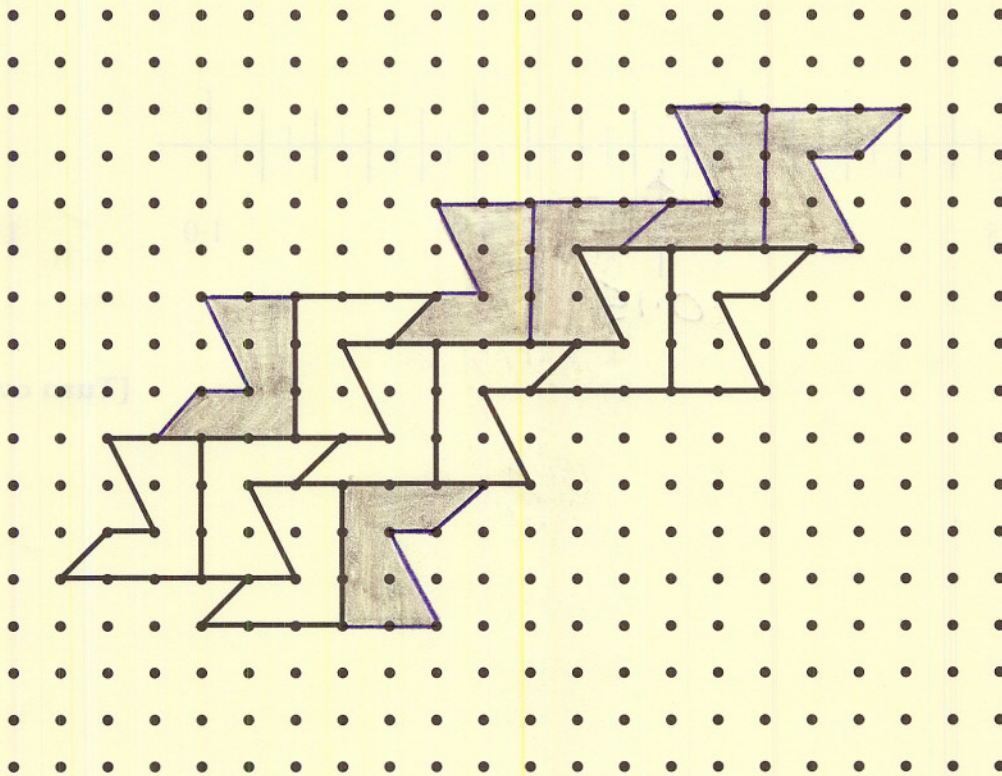
Marks

KU RE

5. A seaside promenade is to be covered with tiles.
All the tiles are shaped like this.



Here is part of the design of tiles.



Draw six more tiles to continue the design.

3

6. Two trains run from Aberdeen to London Kings Cross.
They both have **the same journey time.**



	Train 1	Train 2
Aberdeen Depart	1455	2125
Kings Cross Arrive	2229	

Find the arrival time for Train 2 at Kings Cross.

$$\begin{aligned}
 1455 - 1500 &= 5 \text{ mins} \\
 1500 - 2229 &= \underline{7 \text{ hrs } 29 \text{ mins}} \\
 \text{Total Time} &= 7 \text{ hrs } 34 \text{ mins}
 \end{aligned}$$

$$\begin{aligned}
 2125 - 2159 &= 34 \text{ mins} \\
 2159 - 0459 &= \underline{7 \text{ hrs}} \\
 &= 7 \text{ hrs } 34 \text{ mins}
 \end{aligned}$$

Arrival Time: 0459

Marks

KU RE

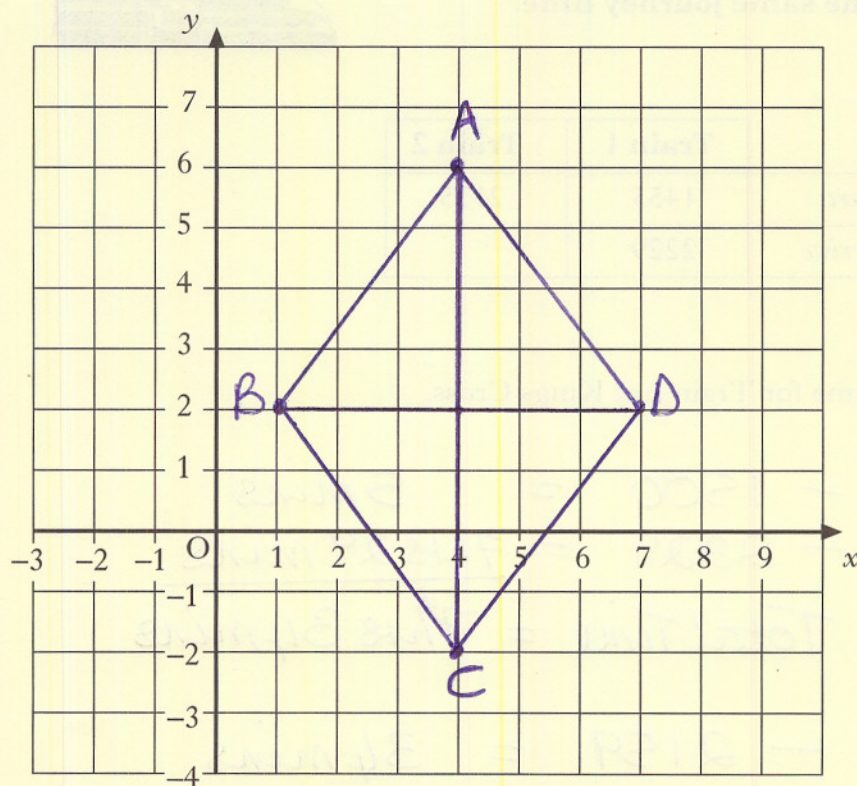
3

[Turn over

7. (a) Plot the points A (4,6) and C (4,-2) on this grid.

Marks

KU RE



1

- (b) ABCD is a rhombus with area 24 square units.

Plot B and D on the grid.

$$\text{Area of rhombus} = \frac{1}{2} d_1 d_2 = 24$$

$$\Rightarrow \frac{1}{2} \times 8 \times d_2 = 24$$

$$\Rightarrow 4 d_2 = 24$$

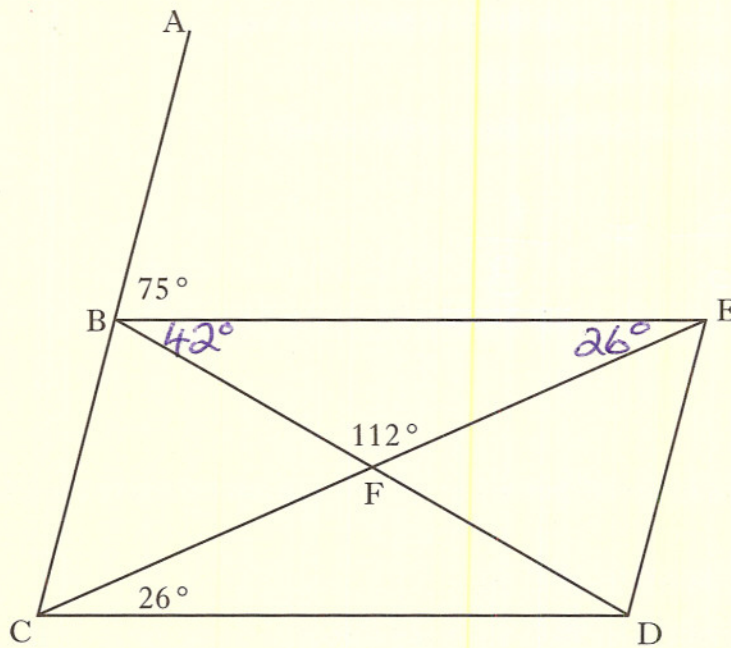
$$\Rightarrow d_2 = 6$$

$$\underline{\underline{B(1,2), D(7,2)}}$$

Marks

KU	RE

8.



BCDE is a parallelogram.

Angle ABE = 75° , angle ECD = 26° , angle BFE = 112° .

Calculate the size of the angle CBD.

$$\begin{aligned} \angle BEC &= 26^\circ \text{ (Z-angle)} \\ \angle EBF &= 180 - (112 + 26) \\ &= 180 - 138 \\ &= 42^\circ \text{ (angles in a } \triangle \text{ add up to } 180^\circ) \\ \angle CBD &= 180 - (75 + 42) \\ &= 180 - 117 \\ &= \underline{\underline{63^\circ}} \text{ (straight line is } 180^\circ) \end{aligned}$$

3

[Turn over

Marks

9. There are 1 blue, 2 red and 3 yellow counters in a bag.

(a) A counter is taken from the bag.

What is the probability that the counter is red?

$$P = \frac{2}{6} = \underline{\underline{\frac{1}{3}}}$$

1

(b) The counter is replaced in the bag and two green counters are added to the bag.

A counter is taken from the bag.

What is the probability that it is **not** yellow?

$$P = \underline{\underline{\frac{5}{8}}}$$

2

KU RE

10. At Dunure Tennis and Golf Club, the ratio of tennis players to golfers is 100:350.

Marks

(a) Express this ratio in its simplest form.

$$\begin{aligned} 100 : 350 \\ 10 : 35 \\ \underline{\underline{2 : 7}} \end{aligned}$$

1

(b) The club has been given £16 200.

This money will be divided between the tennis section and the golf section in the same ratio as above.

How much money will be allocated to the tennis section?

$$\begin{aligned} \text{Total no. of parts} &= 2 + 7 \\ &= 9 \end{aligned}$$

$$\begin{aligned} 1 \text{ part} &= 16200 \div 9 \\ &= \pounds 1800 \end{aligned}$$

$$\begin{array}{r} 1800 \\ 9 \overline{)16200} \end{array}$$

$$\begin{aligned} 2 \text{ parts} &= 2 \times 1800 \\ &= \pounds 3600 \end{aligned}$$

3

$$\underline{\underline{\text{Tennis section} - \pounds 3600}}$$

[END OF QUESTION PAPER]

ADDITIONAL SPACE FOR ANSWERS

$$\begin{array}{r}
 1001.350 \\
 101.32 \\
 \hline
 2.7
 \end{array}$$

Total no. of parts = 2 + 7
 p = 9

$$\begin{array}{r}
 1800 \\
 \hline
 0.00000
 \end{array}$$

1 part = 1800 ÷ 9 = 200
 = £1800

2 parts = 2 × 1800 = 3600
 = £3600

Total section = £5400

--	--	--	--	--	--

	KU	RE
Total marks		

2500/404

NATIONAL
QUALIFICATIONS
2001

WEDNESDAY, 16 MAY
11.35 AM - 12.30 PM

MATHEMATICS
STANDARD GRADE
General Level
Paper 2

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

- You may use a calculator.**
- Answer as many questions as you can.
- 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.
- Full credit will be given only where the solution contains appropriate working.
- Before leaving the examination room you must give this book to the invigilator. If you do not you may lose all the marks for this paper.

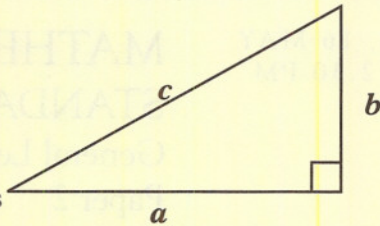


FORMULAE LIST

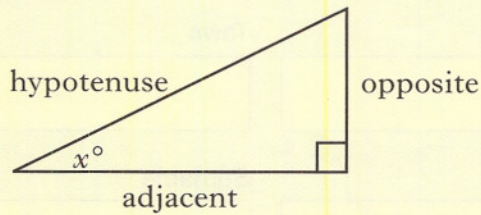
Circumference of a circle:	$C = \pi d$
Area of a circle:	$A = \pi r^2$
Curved surface area of a cylinder:	$A = 2\pi r h$
Volume of a cylinder:	$V = \pi r^2 h$
Volume of a triangular prism:	$V = Ah$

Theorem of Pythagoras:

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



Trigonometric ratios
in a right angled
triangle:

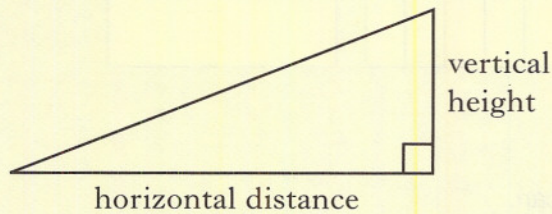


$$\tan x^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

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

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

Gradient:



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

Marks

KU	RE
----	----

1. Jayne is 14 years of age and a member of Kelly's Health Club.
She receives details of next year's subscription rates.
They are as follows:

Category of member	Payment in full	Payment by instalments
Adult	£390	12 payments of £36
Junior (under 16 years of age)	£195	12 payments of £18
Husband and Wife	£695	12 payments of £65

- (a) Jayne decides to pay by instalments.

How much extra will she pay?

$$\text{Payment by instalments} = 12 \times 18 = \pounds 216$$

$$\text{Difference} = 216 - 195 = \pounds 21$$

She will pay £21 extra.

2

- (b) Express this extra cost as a percentage of the payment in full.

Give your answer correct to 1 decimal place.

$$\frac{21}{195} \times 100 = 10.769... = \underline{\underline{10.8\%}}$$

3

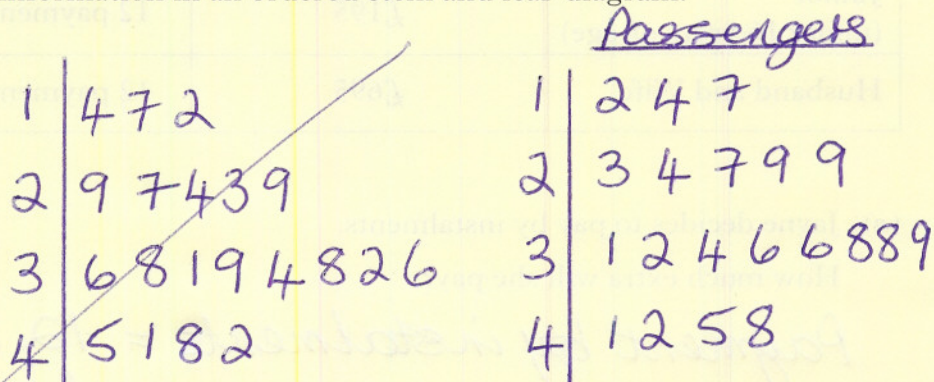
2. The number of passengers travelling by bus from Glasgow to Edinburgh was recorded for 20 journeys.

Marks

KU RE

~~29~~ ~~45~~ ~~36~~ ~~27~~ ~~41~~ ~~38~~ ~~14~~
~~48~~ ~~31~~ ~~39~~ ~~24~~ ~~17~~ ~~23~~ ~~34~~
~~29~~ ~~38~~ ~~42~~ ~~12~~ ~~32~~ ~~36~~

- (a) Display the information in an ordered stem and leaf diagram.



$$n=20$$

3|2 represents
32 passengers 3

- (b) Find the median number of passengers.

Median lies between 10th
and 11th value.

$$\text{Median} = \frac{32 + 34}{2}$$

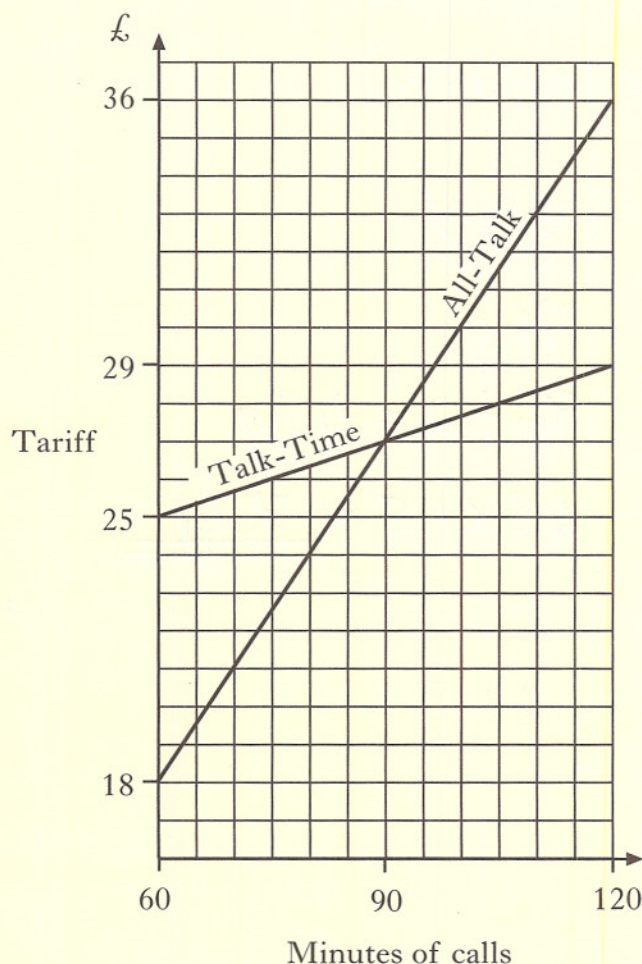
$$= \underline{\underline{33}}$$

1

3. Shona is planning to buy a new mobile phone. She knows that she makes between 60 and 120 minutes of calls each month. Her local phone shop advises that the "All-Talk" or "Talk-Time" tariff are best for her. They give her the graph below to help her decide.

Marks

KU	RE



Shona chooses the All-Talk tariff.

Comment on her choice.

All-Talk is cheaper for less than 90 minutes of calls each month but more expensive than Talk-Time for more than 90 minutes of calls each month.

2

All-Talk is a good choice if Shona mostly uses less than 90 minutes.

[Turn over

Marks

KU RE

4. A manufacturer has changed its washing powder so that less powder will be needed for each wash.

As a result the new 1.5 kilogram box gives the same number of washes as the old 2 kilogram box.

A family wash used 96 grams of powder from the old 2 kilogram box.

How much powder will be used for a family wash now?

(Direct Proportion)

Box	Family Wash
2 kg	96g
1 kg	$96 \div 2 = 48g$
1.5 kg	$48 \times 1.5 = \underline{\underline{72g}}$

4

5. Davina sees this advertisement for CAR HIRE while on holiday in Spain.

Marks

KU RE

UNLIMITED MILEAGE, INSURANCE INCLUDED	
Locus Speedster	3100 pesetas per day
	20 000 pesetas per week
A-Drive Trekcar	5560 pesetas per day
	35 000 pesetas per week
ADD 15% TAX	

She decides to hire the Trekcar for 4 days.

Find the cost, in pounds sterling, of hiring the car if the exchange rate is £1 = 256 pesetas.

$$\begin{aligned}
 \text{Cost (in pesetas)} &= 5560 \times 4 \\
 &= 22240 \\
 15\% \text{ Tax} &= 0.15 \times 22240 \\
 &= 3336 \\
 \text{Total Cost} &= 22240 + 3336 \\
 &= 25576 \text{ pesetas.}
 \end{aligned}$$

$$\begin{aligned}
 \text{Cost (in pounds)} &= 25576 \div 256 \\
 &= 99.90625 \\
 &= \underline{\underline{£99.91}}
 \end{aligned}$$

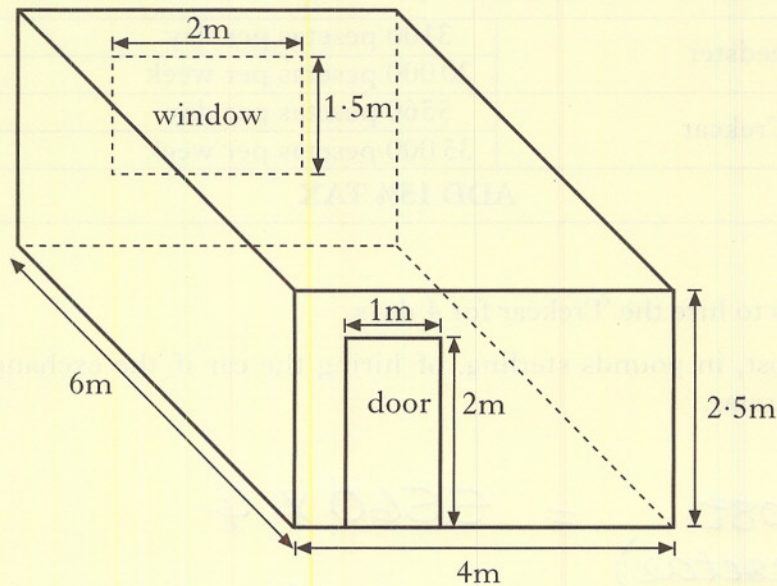
5

[Turn over

Marks

KU RE

6. Mairi is planning to paint the walls of her room with emulsion paint.
The room is in the shape of a cuboid, with the dimensions shown.



- (a) How much paint does Mairi need to paint the walls of her room?

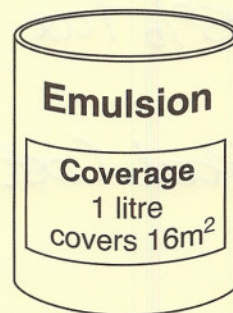
$$\text{Area of side walls} = (6 \times 2.5) + (6 \times 2.5) \\ = 30\text{m}^2$$

$$\text{Area of front wall} = (4 \times 2.5) - (1 \times 2) \\ = 8\text{m}^2$$

$$\text{Area of back wall} = (4 \times 2.5) - (2 \times 1.5) \\ = 7\text{m}^2$$

$$\text{Total Area of walls} = 30 + 8 + 7 \\ = 45\text{m}^2$$

$$45 \div 16 = 2.8 \quad \underline{\underline{2.8 \text{ litres of paint are required}}}$$



- (b) Paint is sold only in 1 litre and 2.5 litre tins.

What will be the minimum cost of painting Mairi's room with emulsion?

$$\text{Minimum Cost} = 12.75 + 6.50 \\ = \underline{\underline{\pounds 19.25}}$$

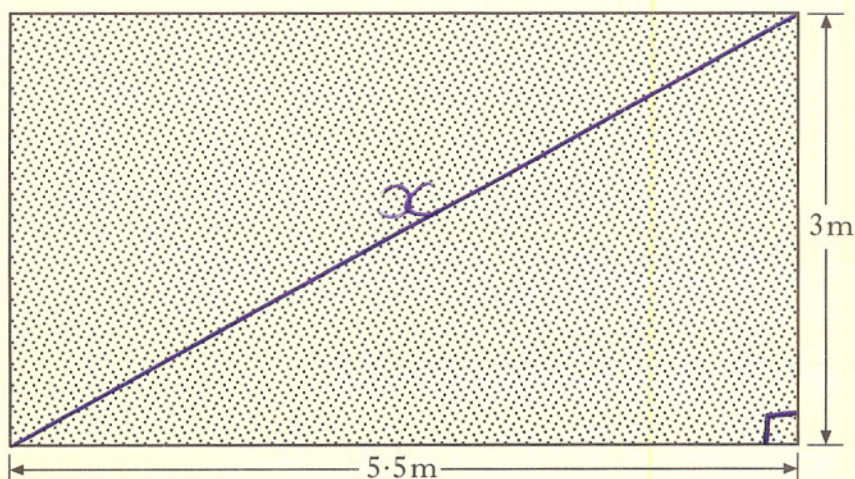
$$(3 \times 1 \text{ litre tins} = 3 \times 6.50 = \pounds 19.50)$$



7. John is laying a concrete floor for his garage.
The floor is to be a rectangle 5.5 metres by 3 metres.

Marks

KU RE



To check the floor is rectangular, John measures a diagonal.

What should this measurement be?

$$x^2 = 3^2 + 5.5^2 \text{ (by Pythagoras' Theorem)}$$

$$x^2 = 9 + 30.25$$

$$x^2 = 39.25$$

$$x = \sqrt{39.25}$$

$$x = 6.264\dots$$

$$\underline{\underline{x = 6.26m}}$$

3

[Turn over

8. At the Ewington Athletic Club the length of one lap of the track is 400 metres.

In the 10000 metres race a runner takes an average of 65.2 seconds to complete each lap.

At this pace, will this runner break the race record of 27 minutes 12 seconds?

Marks

KU RE

$$10000\text{m} = 25 \text{ Laps } (10000 \div 400)$$

$$25 \times 65.2 = 1630 \text{ seconds}$$

$$1630 \div 60 = 27.16 \text{ minutes}$$

$$= 27 \text{ mins } 10 \text{ seconds} \\ (0.16 \times 60)$$

Yes, the runner will break
the race record by 2 seconds

4

9. (a) Simplify

$$\begin{aligned}
 & 3(2x + 4) + 4(x - 2) \\
 &= 6x + 12 + 4x - 8 \\
 &= \underline{\underline{10x + 4}}
 \end{aligned}$$

Marks

KU RE

(b) Solve algebraically the inequality

$$6x + 2 \leq 20.$$

$$6x \leq 18$$

$$\underline{\underline{x \leq 3}}$$

3

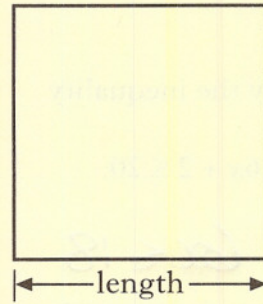
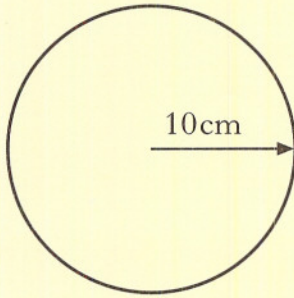
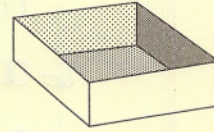
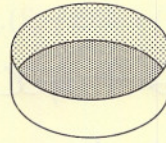
2

[Turn over

Marks

KU RE

10. The base of a round cake tin has the same area as the base of a square cake tin.
The round cake tin has a radius of 10 centimetres.



What is the length of the base of the square cake tin?

$$\begin{aligned} \text{Area of circle} &= \pi r^2 \\ &= \pi \times 10^2 \\ &= 314 \text{ cm}^2 \end{aligned}$$

$$\text{Area of square} = L^2 = 314$$

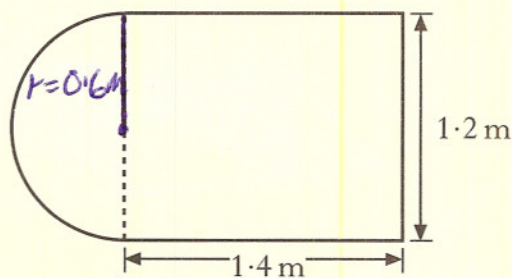
$$\Rightarrow L = \sqrt{314}$$

$$\Rightarrow \underline{\underline{L = 17.7 \text{ cm}}}$$

3

11. (a) The base of a lift is in the shape of a rectangle with a semi-circular end as shown.

Marks



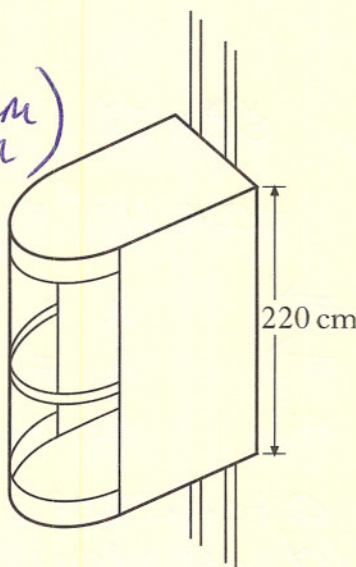
Calculate the area of the base of the lift.

$$\begin{aligned}
 \text{Area of base} &= \text{Area of semi-circle} + \text{Area of rectangle} \\
 &= \frac{1}{2} \pi r^2 + Lb \\
 &= \left(\frac{1}{2} \times \pi \times 0.6^2 \right) + (1.4 \times 1.2) \\
 &= 2.245\dots \\
 &= \underline{\underline{2.25 \text{ m}^2}}
 \end{aligned}$$

3

- (b) The lift is in the shape of a prism and is 220 centimetres high. Find the volume of the lift.

$$\begin{aligned}
 V &= A h \quad (h = 220 \text{ cm} \\
 &= 2.25 \times 2.2 \\
 &= \underline{\underline{4.95 \text{ m}^3}}
 \end{aligned}$$

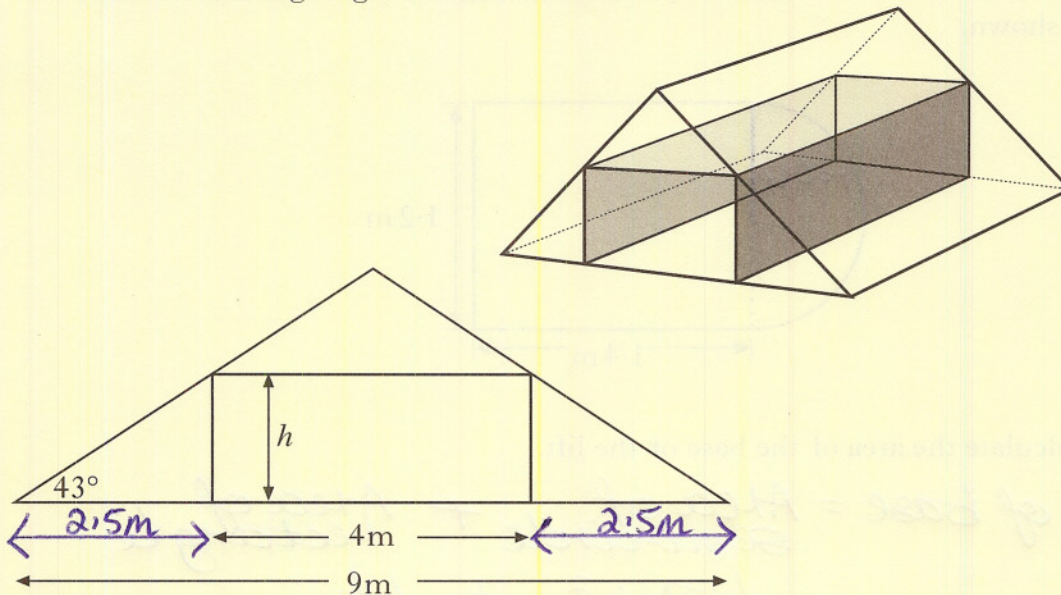


2

Marks

KU RE

12. An architect is designing a room in an attic of a house.



- The room is 4 metres wide.
- The width of the roof is 9 metres.
- The sloping part of the roof makes an angle of 43° with the attic floor.

To satisfy building regulations the height, h , of the room must be **not less than** 2.3 metres.

Does the architect's design satisfy the building regulations?

Give a reason for your answer.

$$\tan 43^\circ = \frac{h}{2.5}$$

$$\Rightarrow h = 2.5 \tan 43^\circ$$

$$\Rightarrow h = 2.3312\dots$$

$$\Rightarrow h = 2.33\text{m}$$

Yes, the architect's design satisfies the building regulations since the height of the room is 2.33m, which is greater than 2.3m, 4

[END OF QUESTION PAPER]