AQA

GCSE
APPLICATIONS OF MATHEMATICS (LINKED PAIR)

F

Foundation Tier   Unit 2   Geometry and Measures

Thursday 16 June 2016   Afternoon   Time allowed: 1 hour 30 minutes

Materials
For this paper you must have:
- a calculator
- mathematical instruments.
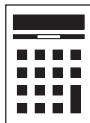
Instructions
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.
- If your calculator does not have a π button, take the value of π to be 3.14 unless another value is given in the question.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- The quality of your written communication is specifically assessed in Questions 16 and 20. These questions are indicated with an asterisk (*).
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

Advice
- In all calculations, show clearly how you work out your answer.

Formulae Sheet: Foundation Tier

Area of trapezium = $\frac{1}{2}(a+b)h$
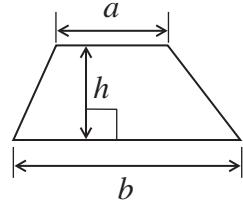
Volume of prism = area of cross section × length
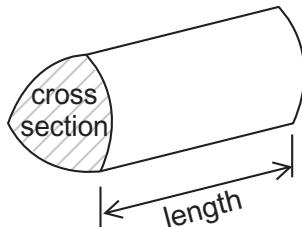
Answer **all** questions in the spaces provided.

1   In each part of the question, circle the best estimate.

1 (a)   The height of a 3-year-old child.

[1 mark]

    0.9 mm   0.9 cm   0.9 m   0.9 km

1 (b)   The weight of this examination booklet.

[1 mark]

    80 mg   80 g   80 kg   80 tonnes

1 (c)   The amount of water in a full drinking glass.

[1 mark]

   2.5 ml   25 ml   250 ml   2500 ml

Turn over for the next question

2 Seven pieces fit together on a centimetre grid.

Three of the pieces have been put on the grid.
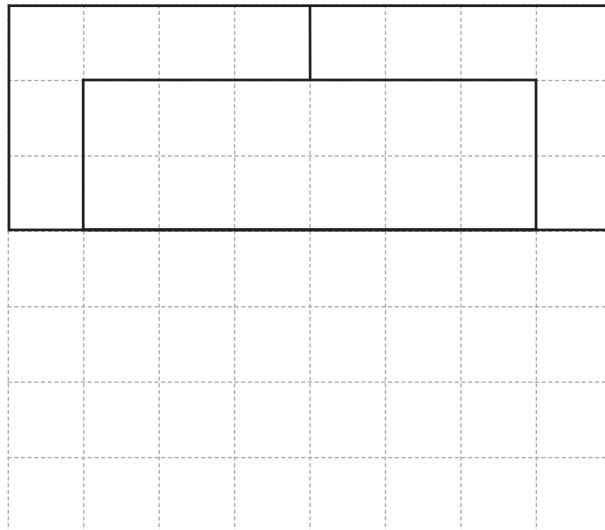
Here are the other four pieces.
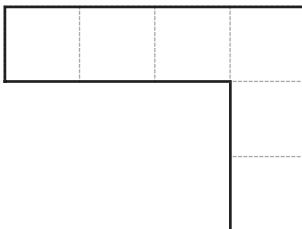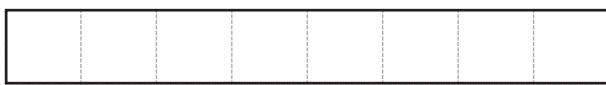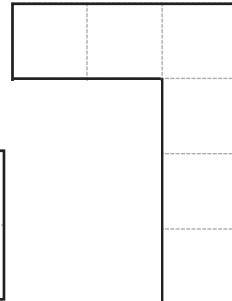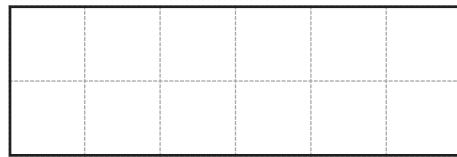
Show how all the pieces fit together to make a pattern with **two** lines of symmetry.

[2 marks]

Turn over for the next question

2
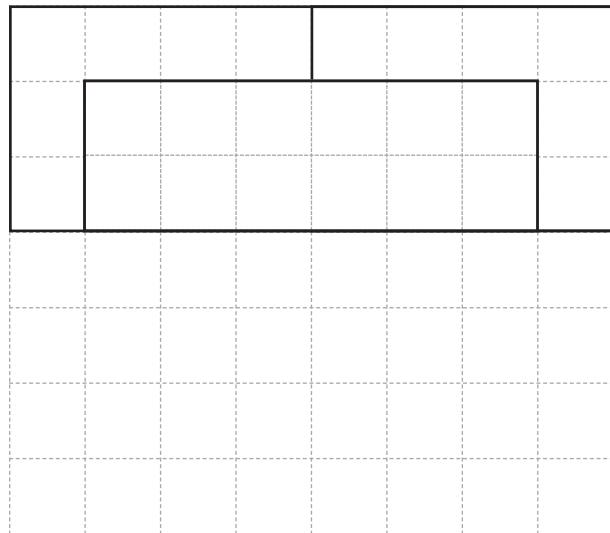
3 Here are the instructions for drawing a logo.

Draw a circle of radius 6 cm

Draw a **vertical** diameter on the circle.

Draw two chords, each of length 10 cm from the top of the vertical diameter.

Draw the logo on the centimetre grid.
Use the point marked with a dot for the centre of your circle.

[3 marks]
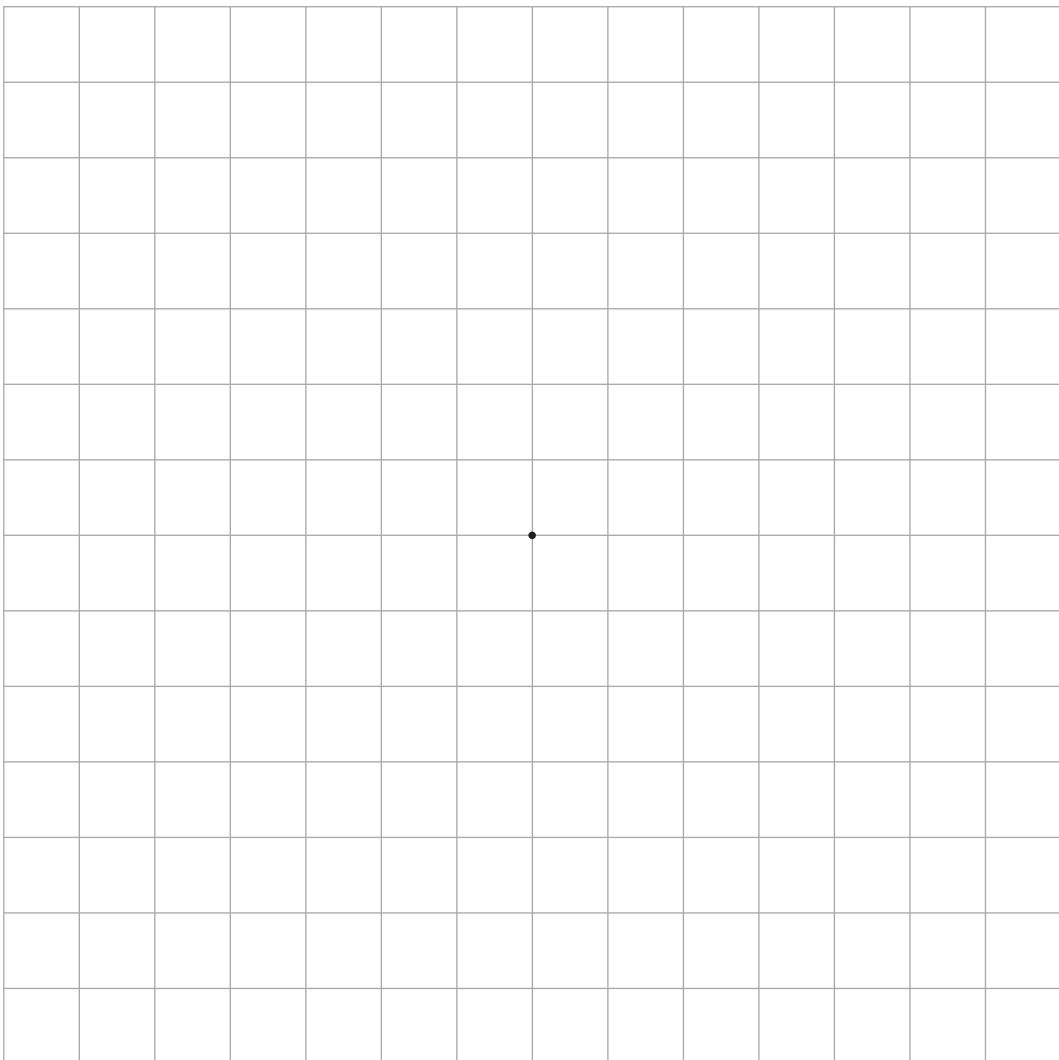
4 The graphs show the cost of hiring a floor polisher from two different shops for up to 8 days.
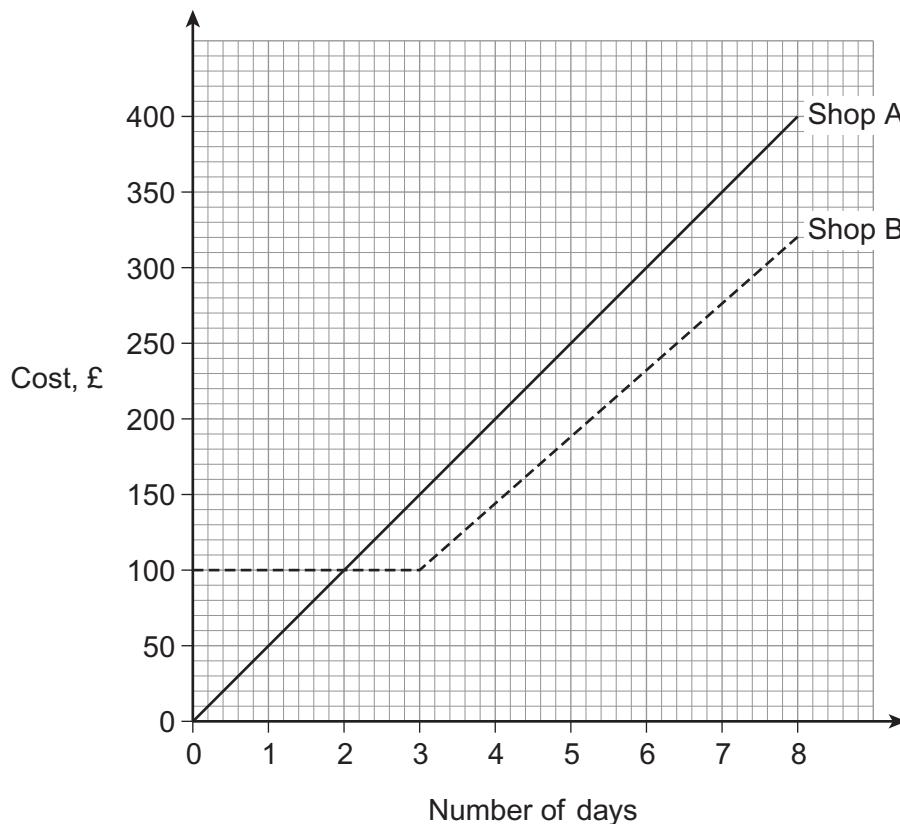
4 (a) How much **per day** is the cost of hiring a floor polisher from Shop A?

[1 mark]

Answer £_____

4 (b) Meg wants to hire a floor polisher for 8 days.

Complete these sentences.

[2 marks]

Hiring from Shop_____will be cheaper.

It will cost £_____ less.

5 Each seat at a theatre has a letter and a number.

For a show, the seats that have been sold are shaded on the seating plan.

For example, seat J3 has been sold.
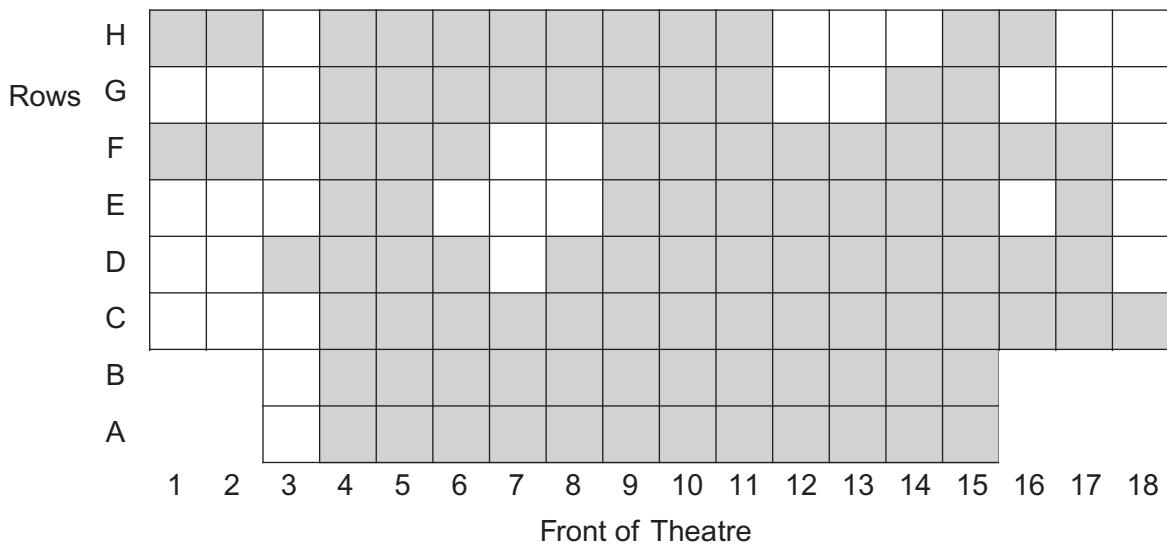
5 (a) Lucy wants two seats for the show.

She wants the seats to be

next to each other in the same row

as near to the front as possible

not in columns 1, 2, 17 or 18

Write down two seats she could choose.

[2 marks]

Answer_____ and _____

5 (b) When the show takes place there are 8 seats **not** sold in row N.

All of the other seats in the theatre are sold.

Seats in rows A to H cost £22.50

Seats in rows J to N cost £16.00

Work out the total ticket sales for the show.

**[4 marks]**

Answer £_____

6

6 A designer makes wall decorations.
Each decoration is a metal framework.

6 (a) This framework shows identical equilateral triangles, each of side 18 cm

←————18 cm————→
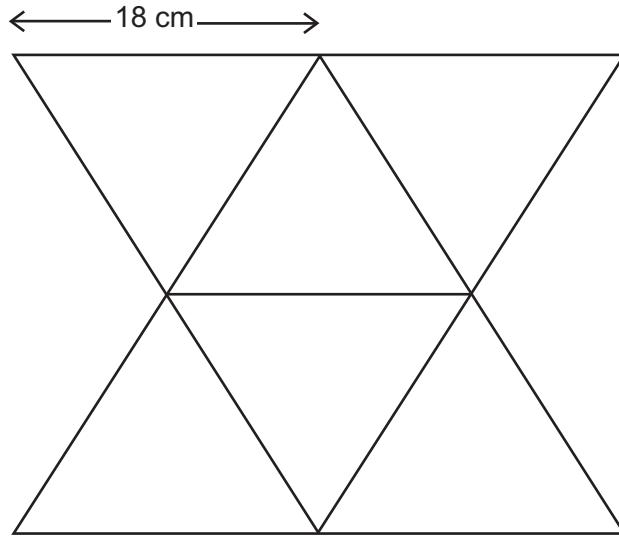
Not drawn accurately

Work out the total length of metal used.

[2 marks]

Answer _____ cm

6 (b) This framework shows a rectangle inside a rhombus *ABCD*.
The rectangle splits the sides of the rhombus making

two equilateral triangles

and

two isosceles triangles.

A

y

x

Not drawn accurately

B

D

C
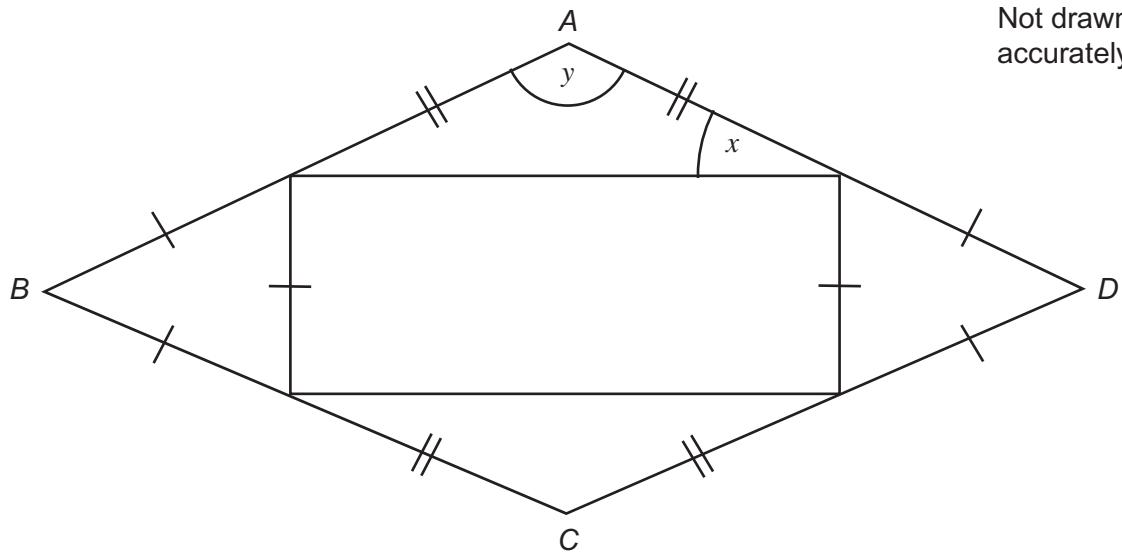
Work out the sizes of angles *x* and *y*.

[4 marks]

_____

_____

_____

_____

_____

_____

Answer *x* = _____ degrees

y = _____ degrees

6

7 Some wallpaper patterns have rotational symmetry.

7 (a) Shade **three** squares so that this pattern has rotational symmetry.

[2 marks]
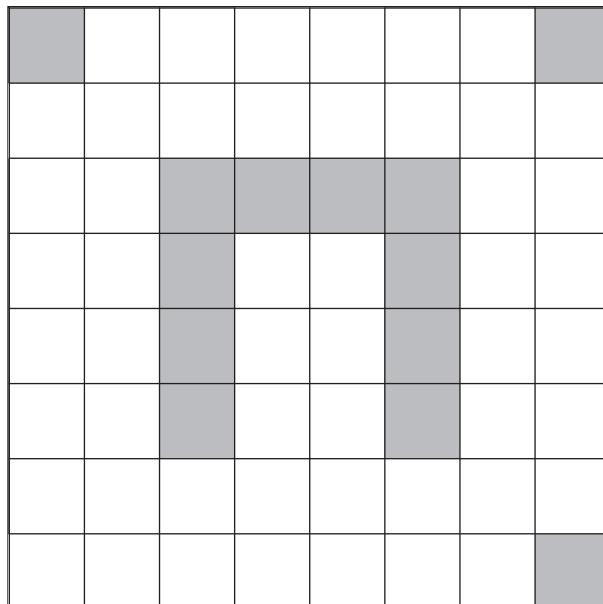
7 (b) What is the order of rotational symmetry of this pattern?

[1 mark]
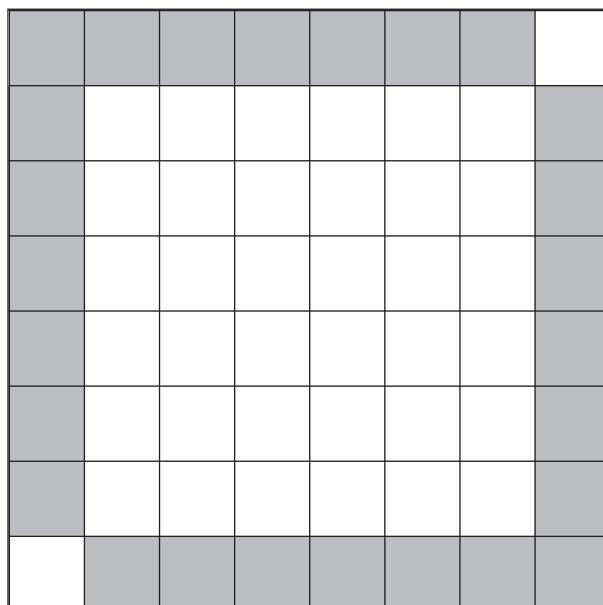
Answer _____

8 Rick is buying bananas and grapes.

He has exactly £6 to spend.

These are the bananas he buys.
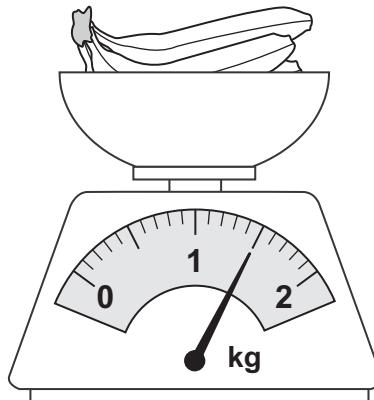
Bananas cost 88p per kg

Grapes cost £1.95 per kg

Work out the maximum weight of grapes he can buy.

[4 marks]

_____

_____

_____

_____

_____

Answer _____ kg

7

Turn over ▶

9 (a) Which distance is approximately equal to 100 kilometres?
Circle your answer.

[1 mark]

25 miles   62.5 miles   160 miles   200 miles

9 (b) Molly sees this road sign in France.

The sign shows the distance to Paris, in kilometres.

Paris 140

Work out the approximate distance to Paris, in miles.
You **must** show your working.

[3 marks]

Answer _____ miles

9 (c)   In Paris, Molly stays at Hotel Avril.

Charges at Hotel Avril

Room   40 euros per night

Breakfast   7.50 euros per day

Evening Meal   12 euros per day

Special offer Stay for 3 nights and all evening meals are half-price

Molly stays for 3 nights.

She has two breakfasts and three evening meals.

How many euros is Molly charged?

[4 marks]

Answer _____ euros

10 A rectangular piece of paper is used to make a cover for a book.

- The two flaps go inside the front of the book and the back of the book.
- Each flap is a rectangle, 23 cm by 8 cm

8 cm

30 cm

Flap

Flap

Not drawn accurately

23 cm
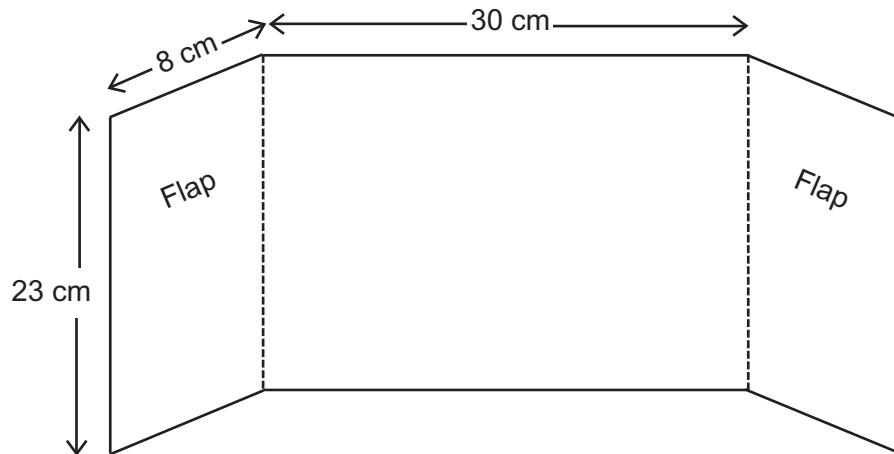
Work out the area of paper needed to make one cover.
State the units of your answer.

[4 marks]

Answer _____

11 Vijay is driving home.

At 5.40 pm he is

20 miles from home

driving at the speed shown below.
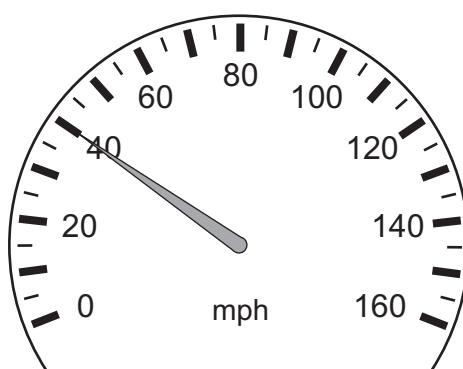
He keeps driving at the same speed.

Will he be home before 6.15 pm?
You **must** show your working.

[3 marks]

_____

_____

_____

_____

_____

_____

12   A fish tank is a cuboid.

   The base of the tank has length 95 cm and width 65 cm

   197.6 litres of water are in the tank.

1 litre = 1000 cm^3

Work out the depth of water in the tank.

[3 marks]

_____

_____

_____

_____

_____

Answer _____ cm

13 The scale diagram shows the positions of ship A and ship B at 9 am

Scale 1 cm represents 5 km

North

B

A
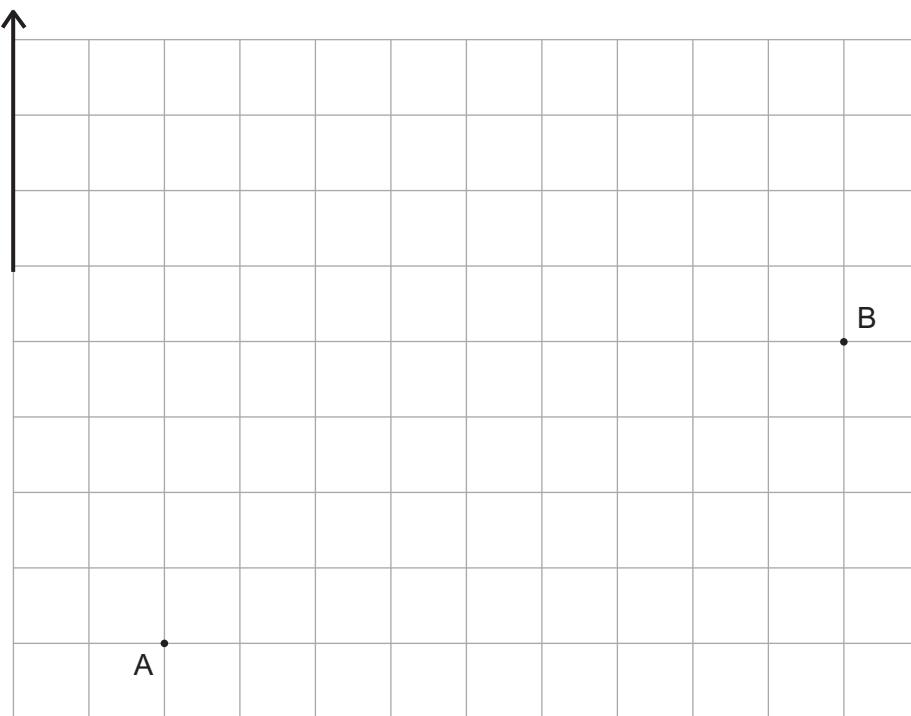
Ship A is travelling on a bearing of 045°

Ship B is travelling on a bearing of 270°

13 (a) On the diagram, show the point where the paths of the ships cross.
Label the point P.
You **must** show the path of each ship.

[2 marks]

13 (b) A lighthouse is

- 35 km from where ship A is at 9 am

- 40 km from where ship B is at 9 am

Using compasses, show the position of the lighthouse on the diagram.
Label the point L.

[2 marks]

7

Turn over ▶

14 In a test,

Alan scored $\frac{2}{3}$ of the total marks

Bashir scored $\frac{3}{5}$ of the total marks

Cathy scored $\frac{13}{20}$ of the total marks.

Work out the **smallest** possible number of total marks in the test.

[2 marks]

Answer _____

15 Suki has four parcels.

Each parcel weighs x kg

Suki weighs 57.6 kg

Suki and the four parcels weigh a total of 67.2 kg

Set up and solve an equation to work out the value of x.

[3 marks]

$x =$ _____

*16   Gabby uses this recipe to make fruit punch.

> *For 30 people*
>
> 5 litres apple juice
> 1.25 litres orange juice
> 1.25 litres pineapple juice

She buys

apple juice in 2 litre cartons

orange juice in 0.75 litre cartons

pineapple juice in 0.5 litre cartons.

She buys the least number of cartons needed to make fruit punch for 30 people.

This gives her enough juice to make fruit punch for **more than 30** people.

How many people can she make fruit punch for?
You **must** show your working.

[4 marks]

Answer _____

9

Turn over ▶

17 Here is a scale drawing of the top and side of a box.

The box is a cuboid.

Scale 1 cm represents 4 cm

Top
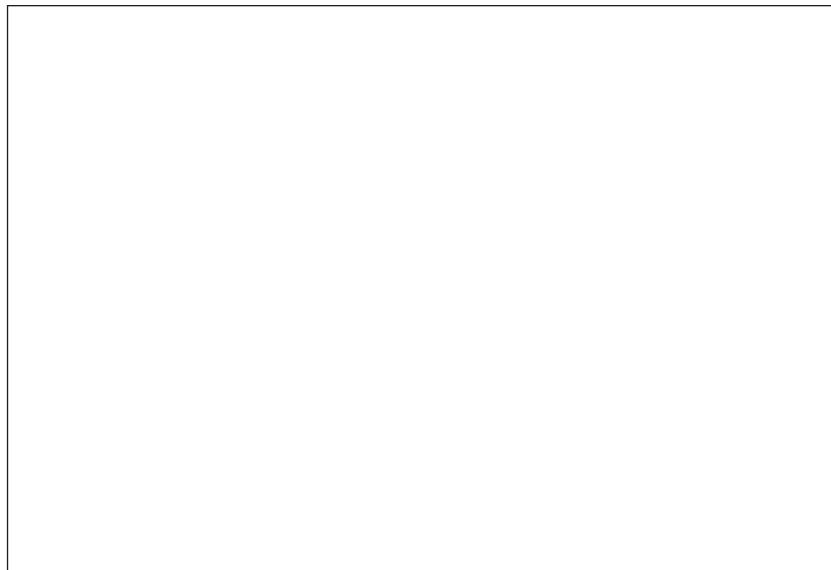
Side
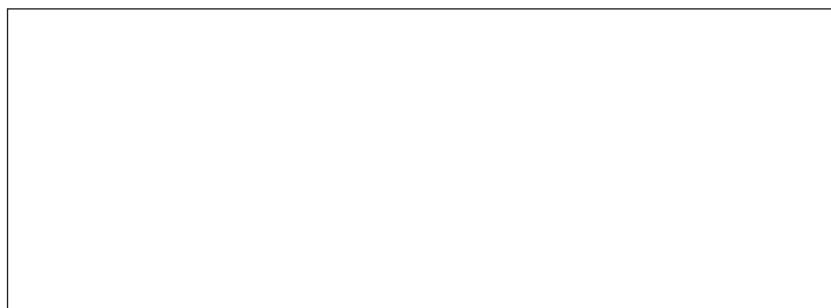
Tom wants to use the box to store cricket balls.

The diameter of each cricket ball is 72 mm

Tom says,

"45 cricket balls will fit in the box."

Is he correct?
You **must** show your working.

[4 marks]

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

4

Turn over ▶

18 The diagram shows a bridge with an arch.

arch

Not drawn accurately
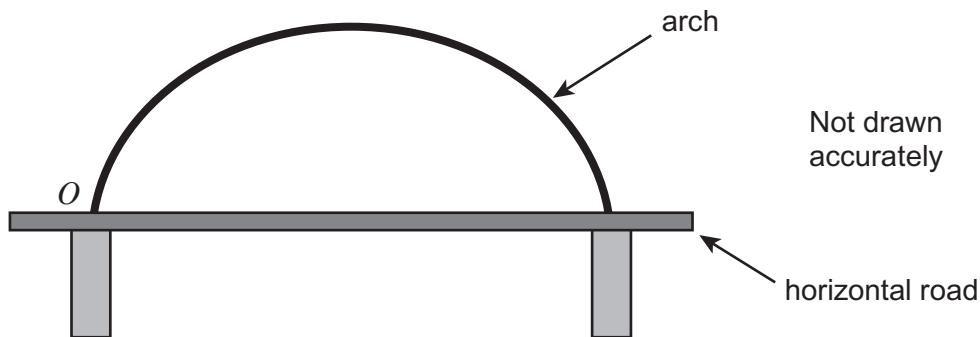
horizontal road

O is a point where the arch meets the road.

The equation of the arch is modelled by the equation $y = 3x - 0.06x^2$

x is the horizontal distance along the road from O, in metres.

y is the vertical height of the arch above the road, in metres.

**18 (a)** Complete this table of values for $y = 3x - 0.06x^2$

[2 marks]

x	0	5	10	20	30	40	45	50
y	0			36		24	13.5	

18 (b) Draw the graph of $y = 3x - 0.06x^2$ for values of x from 0 to 50

[2 marks]
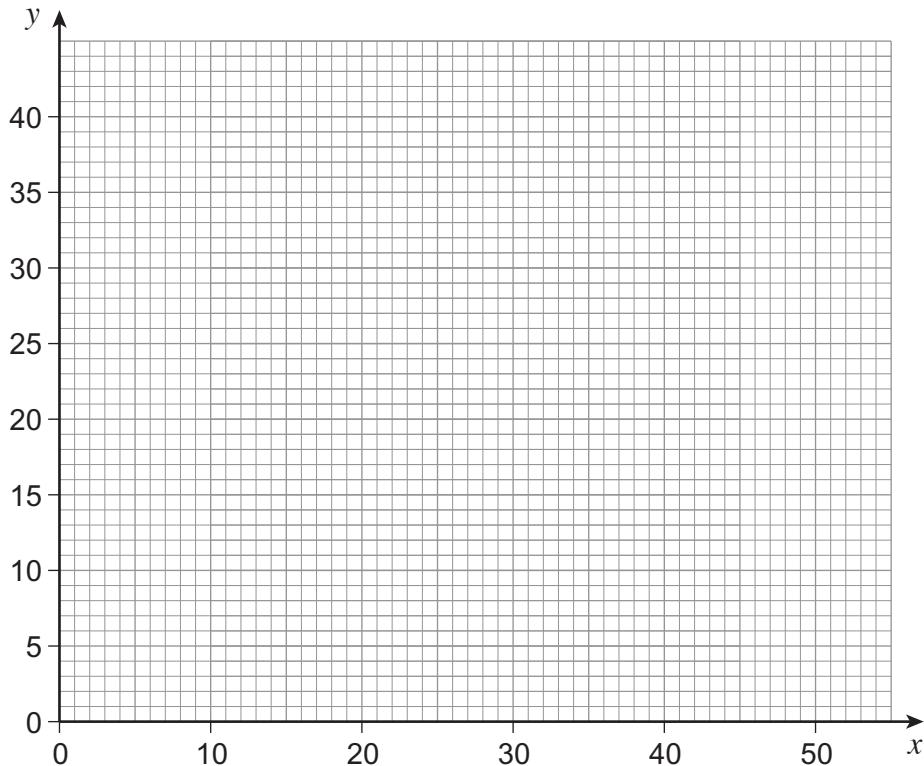
**18 (c)** What is the greatest vertical height of the arch above the road?

[1 mark]

Answer _____ metres

Turn over for the next question

5

Turn over ▶

19 The diagram shows the rim of a hat which is made from felt.
The rim is made by cutting a circle of diameter 18 cm from the centre of a larger circle.

10 cm

Not drawn accurately

← 18 cm →
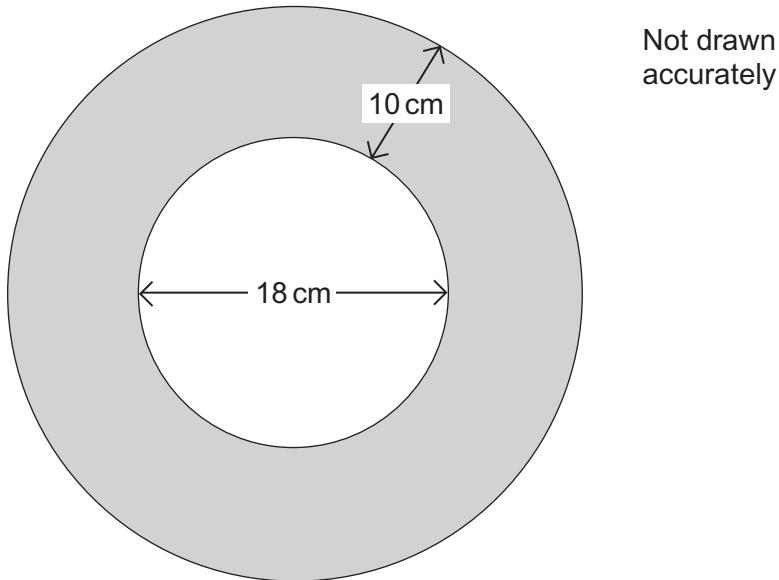
19 (a) Show that the area of the rim, to the nearest 10 cm^2, is 880 cm^2

[3 marks]

19 (b) Two of the rims are cut from a rectangle of felt.

40 cm

85 cm
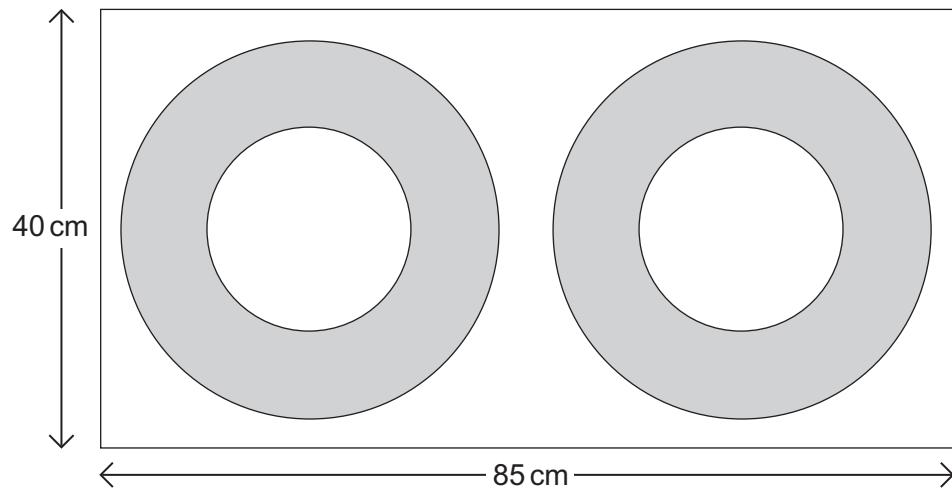
Not drawn accurately

The felt **not** used for the two rims is recycled.

What percentage of the rectangle is recycled?

[3 marks]

Answer _____ %

Turn over for the next question

20   Ed and Finn both run along the same track.

        Ed runs for 12 seconds.

        Finn runs for 10 seconds.

    The graphs show their runs.
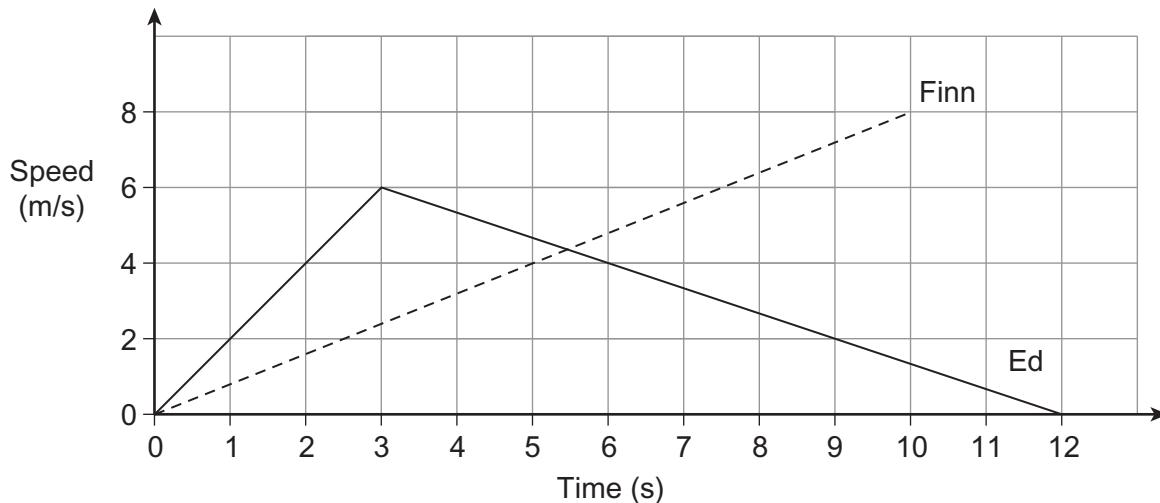
20 (a)   What is Ed's speed after 2 seconds?

[1 mark]

        Answer _____ m/s

*20(b)   Who runs the further distance?
You **must** show your working.

[3 marks]

_____

_____

_____

_____

_____

_____

        Answer _____

END OF QUESTIONS

4