

**MATHEMATICS –
COMPONENT 2
CALCULATOR – ALLOWED
MATHEMATICS
FOUNDATION TIER**

**THURSDAY,
6 JUNE 2019 – MORNING**

**2 hours 15 minutes
(plus your additional
time allowance)**

**A CALCULATOR WILL
BE REQUIRED FOR
THIS EXAMINATION**

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	7	
2.	5	
3.	5	
4.	8	
5.	6	
6.	4	
7.	4	
8.	6	
9.	8	
10.	2	
11.	5	
12.	4	
13.	4	
14.	5	
15.	3	
16.	3	
17.	6	
18.	4	
19.	5	
20.	3	
21.	3	
22.	8	
23.	5	
24.	5	
25.	2	
Total	120	

Surname:	
Other Names:	
Centre Number:	
Candidate Number:	0

ADDITIONAL MATERIALS

A ruler, a protractor and a pair of compasses may be required.

ITEMS INCLUDED WITH QUESTION PAPER

A separate Formula List.

A separate Diagram Booklet.

A spare Diagram Booklet.

INSTRUCTIONS TO CANDIDATES

Use black ink, black ball – point pen, black felt tip or your usual method.

Write your name, centre number and candidate number in the spaces on the front cover.

Answer ALL questions.

Write your answers in the spaces provided.

If you run out of space, use the continuation pages at the back of the booklet, taking care to number the question(s) correctly.

Take π as 3.14 or use the π button on your calculator.

(Turn over)

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part – question.

You are reminded of the need for good English and orderly, clear presentation in your answers.

1. The table below shows the prices of items in a shop.

PRICE LIST	
Eraser	58p
Revision guide	£3.45
Calculator	£7.25
Pen	35p
Geometry set	£0.95

- (a) Write the prices in order, starting with the cheapest.

Cheapest

[2 marks]

(Turn over)

Question 1 continued

1. (b) What is the cost of 1100 erasers?

[1 mark]

(c) Fred buys some pens.

He pays a total of £4.90

How many pens does Fred buy?

[2 marks]

continued on the next page . . .

(Turn over)

Question 1 continued

1. (d) Salma buys a pen, a geometry set and a calculator.

She pays with a **£10** note.

How much change should she get?

[2 marks]

(Turn over)

2. (a) Write the number **20 056** in words.

[1 mark]

- (b) Here is an inequality.

$$8 > 5$$

Write in words what this inequality means.

[1 mark]

continued on the next page . . .

(Turn over)

Question 2 continued

2. (c) Here are some number cards.

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

(i) Arrange five of these cards to make a 5 – digit number so that there is:

- a 6 in the hundreds place,
- a 4 in the tens place.

Write your 5 – digit number on the cards below.

--	--	--	--	--

[1 mark]

(ii) Multiply your answer to (i) by 10

What is the new place value of the 6?

[1 mark]

(Turn over)

Question 2 continued

2. (d) Which of the fractions below has the same value as the 3 in 0.9375?
Circle your answer.

$\frac{3}{10}$	$\frac{3}{1000}$	$\frac{3}{1}$	$\frac{3}{100}$	$\frac{3}{9}$
----------------	------------------	---------------	-----------------	---------------

[1 mark]

(Turn over)

3. (a) Calculate **56%** of **850**

[2 marks]

(b) Anoosha tries to calculate **7%** of **1250**

She writes the following:

$$\begin{aligned} 7\% \text{ of } 1250 &= 0.7 \times 1250 \\ &= 875 \end{aligned}$$

Anoosha is incorrect.

What should she have written?

[1 mark]

continued on the next page . . .

(Turn over)

Question 3 continued

3. (c) Dieter slept very well last night.

He says,

**“I slept for 9 out of 24 hours,
that’s over 36% of a day.”**

Is Dieter correct?

Yes

☐

No

☐

Give a reason for your answer.

You must show all your working.

[2 marks]

(Turn over)

4. (a) Look at the diagrams for Question 4 (a) in the separate Diagram Booklet.

The diagrams are NOT drawn to scale.

There are three diagrams, Diagram (i), Diagram (ii) and Diagram (iii).

Find the size of each of the angles marked W , X and y in the diagrams.

(i) $W =$ _____ $^{\circ}$

(ii) $X =$ _____ $^{\circ}$

(iii) $y =$ _____ $^{\circ}$

[4 marks]

continued on the next page . . .

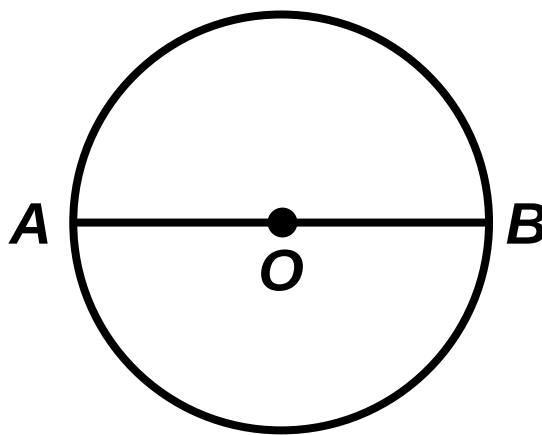
(Turn over)

Question 4 continued

4. (b) Look at the diagram below.

Points A and B are on the circumference of a circle with centre O .

Points A , O and B lie on a straight line.



Circle the special name for the straight line AB .

circumference
diameter
tangent
radius
arc

[1 mark]

(Turn over)

Question 4 continued

- 4. (c) Look at the diagram for Question 4 (c) in the separate Diagram Booklet.**

The diagram is NOT drawn to scale.

Six slices of pizza are shown in the diagram.

Five of the slices make one whole pizza.

One of the slices in the bottom row is from a different pizza.

Which slice is from the different pizza?

You must show all your working.

[3 marks]

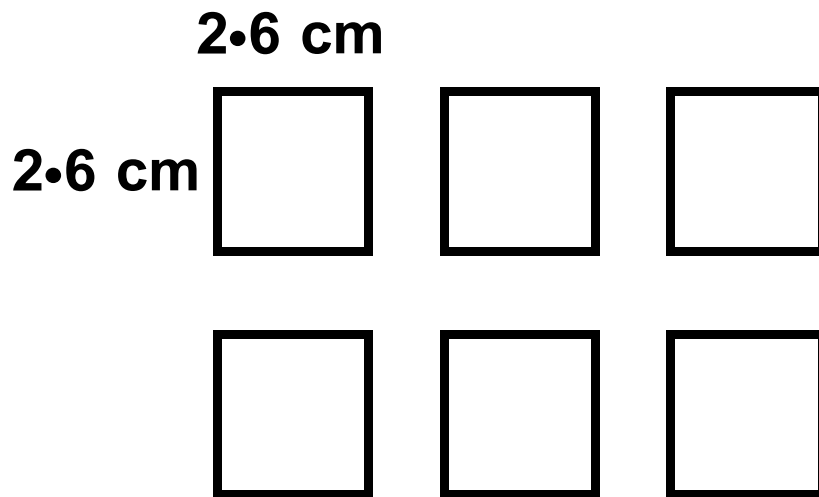
(Turn over)

5. (a) Look at the diagram below.

The diagram is NOT drawn to scale.

Verity is arranging these 6 identical tiles into different shapes.

Each tile is a square with sides of length 2.6 cm.



continued on the next page . . .

Question 5 (a) continued

Look at the diagram for Question 5 (a)

in the separate Diagram Booklet.

The diagram is NOT drawn to scale.

The diagram shows Shape 1 and Shape 2.

Verity makes these shapes by placing tiles side by side.

Calculate the perimeter of each shape.

Perimeter of Shape 1

Perimeter of Shape 2

[3 marks]

continued on the next page . . .

(Turn over)

Question 5 continued

5. (b) Maddie has 9 of the same square tiles.

Maddie arranges her 9 tiles to make a shape that has the smallest possible PERIMETER.

(i) On the blank page provided for Question 5 (b) (i) in the separate Diagram Booklet, sketch Maddie's shape. [1 mark]

(ii) Calculate the AREA of Maddie's shape.

Area = _____ cm² [2 marks]

(Turn over)

- 6. Look at the chart for Question 6 in the separate Diagram Booklet.**
- The chart shows distances between some cities in England, using the best routes.**
- All distances are in miles.**

Answer the following questions.

Use the information in the chart.

- (a) Write down the distance between Birmingham and Liverpool.**

[1 mark]

- (b) Name the two cities that are 71 miles apart.**

 and

[1 mark]

continued on the next page . . .

(Turn over)

Question 6 continued

- 6. (c) One day Dev drives from London to Manchester and then from Manchester to Liverpool.**

How much further is this journey than driving directly from London to Liverpool?

[2 marks]

(Turn over)

7. (a) Shay has B books.

(i) Wilma has 5 fewer books than Shay.

Write an expression to show the number of books that Wilma has.

[1 mark]

(ii) Ellie has 3 times as many books as Wilma.

Write an expression to show the number of books that Ellie has.

[1 mark]

continued on the next page . . .

(Turn over)

Question 7 continued

7. (b) Shay has written this statement in his maths homework.

$$5f + 3g = 8fg$$

Is Shay correct?

Yes ☐

No ☐

Explain how you decide.

[1 mark]

- (c) Find the value of $15x$ when $x = -23$

[1 mark]

(Turn over)

8. (a) James is looking at this set of numbers.

0.45	0.4	0.0005	1.25	0.99
------	-----	--------	------	------

He says,

**“They are all probabilities
because they are decimals.”**

Is James correct?

Yes ☐ No ☐

Give the reason for your answer.

[1 mark]

continued on the next page . . .

(Turn over)

Question 8 continued

- 8. (b) James rolled a fair 6 – sided dice
24 times.**

**How many times would you expect
James to roll a six?**

[1 mark]

continued on the next page . . .

(Turn over)

Question 8 continued

8. (c) Look at the diagrams for Question 8 (c) in the separate Diagram Booklet.

The diagrams show a fair 4 – sided spinner and a fair 6 – sided spinner.

Which spinner has the greater chance of landing on a 2?

4 – sided spinner



6 – sided spinner



Show how you decide.

[1 mark]
(Turn over)

Question 8 continued

8. (d) Jago is using a spinner.

The spinner can only land on one of the colours; purple, red, blue, orange or yellow.

The probabilities of yellow and purple occurring on any spin of the spinner are shown in the table below.

Colour	Probability
Purple	0.33
Red	
Blue	
Orange	
Yellow	0.25

continued on the next page . . .

(Turn over)

Question 8 (d) continued

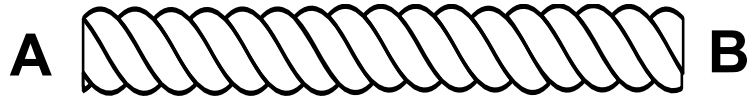
The probabilities of the spinner landing on red, blue and orange are all equal.

Complete the table on the previous page.

[3 marks]

(Turn over)

9. (a) The diagram below shows a piece of string, AB , that is 8 cm long.



The string is to be cut into two pieces
in the ratio 1 : 3

How far from A should the cut be made?

Cut should be made _____ cm from A .
[1 mark]

continued on the next page . . .

Question 9 continued

- 9. (b) Look at the diagram for Question 9 (b) in the separate Diagram Booklet.**
The diagram shows black and white counters.

Use the diagram to help you answer these questions.

- (i) What fraction of the counters are black?**

[1 mark]

- (ii) What is the ratio of the number of black counters to the number of white counters?**

[1 mark]

(Turn over)

Question 9 (b) continued

- 9. (b) (iii) What is the smallest number of extra black and white counters that need to be added to the diagram so that the ratio of black counters to white counters is 2 : 3?**

Extra black _____

Extra white _____

[2 marks]

continued on the next page . . .

(Turn over)

Question 9 continued

9. (c) **£85.75** is being shared between
Zayn and Edith in the ratio **3 : 4**

**How much money would each of
them get?**

[3 marks]

(Turn over)

10. Dave is thinking of a number.

The number is:

- **greater than 200**
- **less than 300**
- **a square number**
- **multiple of 5**

What number is Dave thinking of?

Dave is thinking of the number _____

[2 marks]

(Turn over)

11. Shops **A** and **B** both sell identical boxes of washing powder.

Shop **A** sells boxes of washing powder at a discount of **30%** when two boxes are bought.

Shop **B** sells the same boxes of washing powder in a ‘**Buy one, get the second half price**’ deal.

The two shops display these posters:

SHOP A Washing powder £9.90 Buy 2 and get 30% off the total cost.
--

SHOP B Washing powder £9.20 Buy one, get the second half price.
--

Does shop **A** or shop **B** offer the better value for money when buying two boxes?
Show how you decide.

[5 marks]

(Turn over)

- 12. Look at the diagram for Question 12 in the separate Diagram Booklet. The diagram is an incomplete frequency tree.**

In November 2018, a survey was completed by all the students in Year 11 at THOMAS BEES ACADEMY.

Students were asked their age and whether they had any part – time work.

Some of this information is shown in the frequency tree.

- (a) How many of the students were aged 15 in November 2018?**

[1 mark]

continued on the next page . . .

(Turn over)

Question 12 continued

- 12. (b) In total, how many of the students do not have any part – time work?**

[2 marks]

- (c) The same survey was repeated in April 2019.**

No students had joined or left Year 11.

The number of students aged 15 who had part – time work was only 23

Explain why this change may have happened.

[1 mark]

(Turn over)

- 13. (a) Look at the diagram for Question 13 in the separate Diagram Booklet.**
The diagram is a Venn diagram.

The universal set ($\mathcal{E}$), contains the letters from the word TRAPEZIUM.

Set 1 contains the letters of the word PRIME.

Set 2 contains the letters of the word TERM.

- (a) Show this information in the Venn diagram.**
[2 marks]

- (b) A letter is chosen at random from the word TRAPEZIUM.**

What is the probability that the letter chosen is in both of the words PRIME and TERM?

[2 marks]
(Turn over)

- 14. (a) Look at the diagram for Question 14 in the separate Diagram Booklet.**

The diagram shows a graph.

The graph can be used to convert between Canadian dollars (C\$) and pounds (£).

An exchange rate from 2018 has been used.

- (i) Use the graph to convert C\$ 50 into pounds (£).**

[1 mark]

- (ii) Use the graph to convert £45 into Canadian dollars (C\$).**

[1 mark]

(Turn over)

Question 14 continued

14. (a) (iii) Convert C\$ 325 into pounds (£).

[1 mark]

(b) In 1998 the exchange rate was

£1 = C\$ 2.44

How many more Canadian dollars

would you have received for £45 in 1998

compared with 2018?

[2 marks]

(Turn over)

15. (a) Calculate $\frac{2.4^2}{3 \times 5.1}$

Give your answer correct to 2 decimal places.

[2 marks]

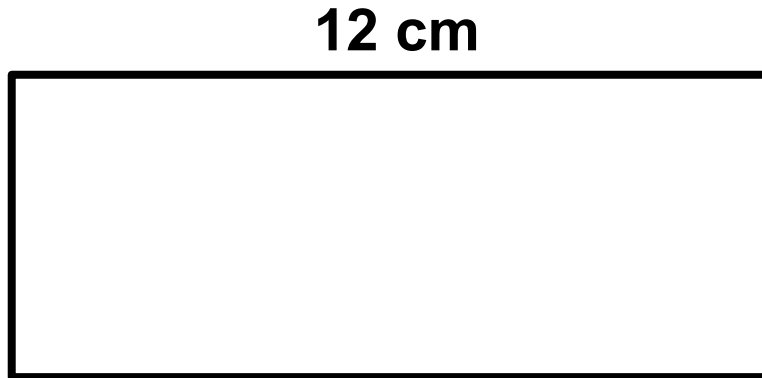
(b) Calculate $(1.8 \times 10^6) \times (2.5 \times 10^8)$
giving your answer in standard form.

[1 mark]

(Turn over)

16. The rectangle below has a length of 12 cm
and an area of 54 cm^2

The diagram is NOT drawn to scale.



The rectangle is enlarged by a scale factor of 3

Calculate the width of the enlarged rectangle.

[3 marks]

(Turn over)

17. (a) The usual time taken to complete a journey is 3 hours.

How long should the same journey take when the speed is doubled?

[1 mark]

continued on the next page . . .

(Turn over)

Question 17 continued

- 17. (b) A cyclist rides a distance of 36 km
at an average speed of 16 km/h.**

**Calculate the time taken to complete
this ride.**

Give your answer in hours and minutes.

[2 marks]

continued on the next page . . .

(Turn over)

Question 17 continued

- 17. (c) Sidney the snail slides a distance of 180 m in 24 hours.**

Calculate Sidney's average speed in cm per hour.

[3 marks]

(Turn over)

18. Harman has written some calculations he needs to work out for his homework.

Write down the calculation needed to work out each of the following using the fewest number of key presses.

Give your answer to each question.

(a) $13 + 13 + 13 + 13 + 13 + 13 - 17 \times 17 \times 17$

Answer: _____

continued on the next page . . .

(Turn over)

Question 18 continued**18. (b) $232 + 34\%$ of 232**

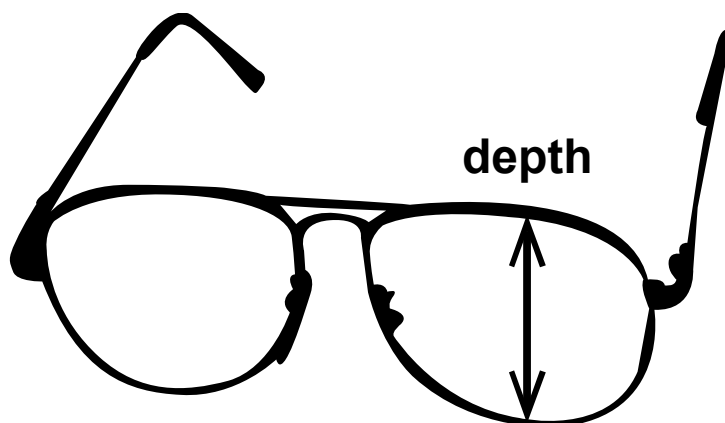
Answer: _____**continued on the next page . . .**

Question 18 continued**18. (c) $4530 - 18\%$ of 4530**

Answer: _____**[4 marks]****(Turn over)**

19. Marie works for an optician.

She records the depth of a lens in each of the 100 pairs of glasses on display.



Her results are summarised in the table below.

Depth of lens, Y mm, to the nearest mm	Number of pairs of glasses
$10 \leq Y < 20$	5
$20 \leq Y < 30$	20
$30 \leq Y < 40$	23
$40 \leq Y < 50$	52

continued on the next page . . .

(Turn over)

Question 19 continued

19. (a) Calculate an estimate for the mean depth of a lens.

[illegible]

(Turn over)

[4 marks]

19. (b) In which group does the median lie?

[1 mark]

(Turn over)

20. Look at the diagram for Question 20 in the separate Diagram Booklet.
The diagram is NOT drawn to scale.

The diagram shows triangle *EFG*.

In the triangle,

$$FG = 12.3 \text{ cm}$$

$$EG = 8.4 \text{ cm}$$

Angle *FEG* is a right angle.

Calculate the size of angle *f*.

[3 marks]

(Turn over)

21. A motorcycle depreciates by 16% per annum.

MOTORCYCLE NOW WORTH £2500

**After how many whole years will this
motorcycle be worth less than £1000?**

You must show all your working.

Motorcycle will be worth less than £1000 after

_____ whole years.

[3 marks]

(Turn over)

22. (a) Expand and simplify $(x + 6y)(3x + 5y)$

[3 marks]

(b) Factorise $x^2 - 13x + 36$

[2 marks]

continued on the next page . . .

(Turn over)

Question 22 continued

22. (c) Solve $w^2 + 7w - 18 = 0$

[3 marks]

(Turn over)

Show that the average speed of the entire journey is just over 50 mph.

[illegible]

[5 marks]

(Turn over)

**24. 7 cartons of apple juice and
2 cartons of grapefruit juice
cost £6.15 altogether.**

**5 cartons of apple juice and
8 cartons of grapefruit juice
cost £9.19 altogether.**

**Use an algebraic method to calculate the
TOTAL cost of 2 cartons of apple juice and
5 cartons of grapefruit juice.**

5 cartons of grapefruit juice is £ _____

(Turn over)

25. The density of glass in a bottle is 2.4 g/cm^3
The volume of glass used to make the bottle
is 13.4 cm^3

Calculate the mass of the glass bottle.

Give your answer in grams.

(Turn over)

Mass _____ g

[2 marks]

END OF PAPER
TOTAL 120 MARKS

(Turn over)

Question number	Additional Pages, if required. Write the question number(s) in the left - hand margin.

(Turn over)

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Diagram Booklet

Surname:	
Other Names:	
Centre Number:	
Candidate Number:	0

Question 4 (a)

Diagrams NOT drawn to scale

Diagram (i)

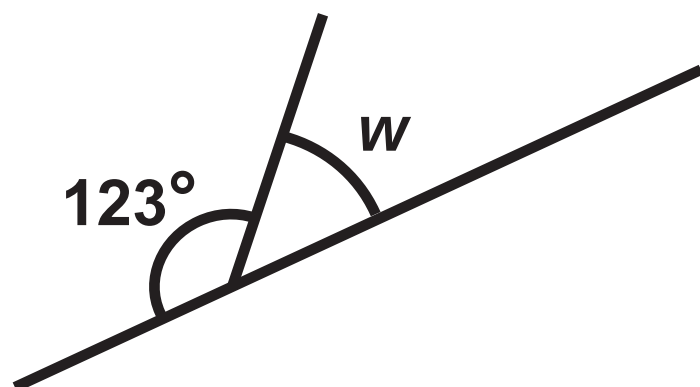


Diagram (ii)

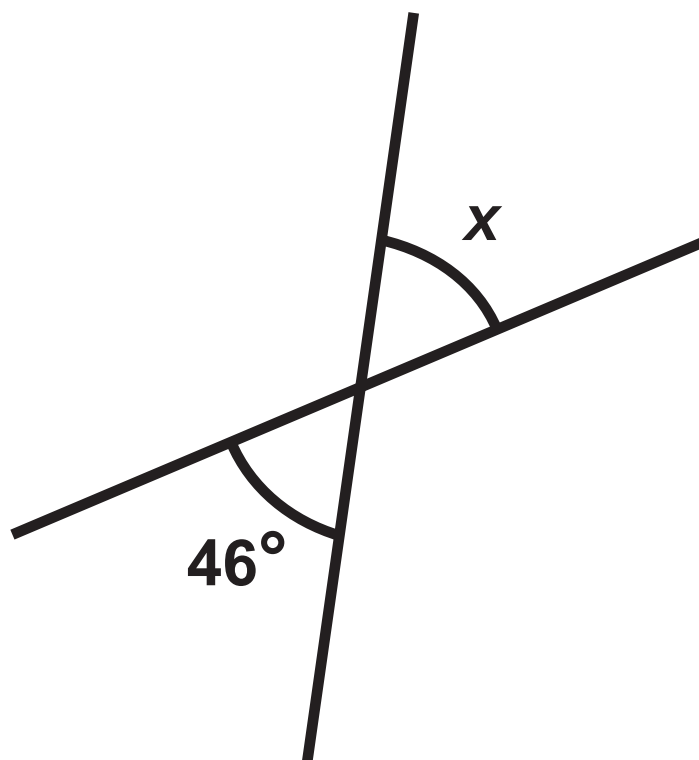
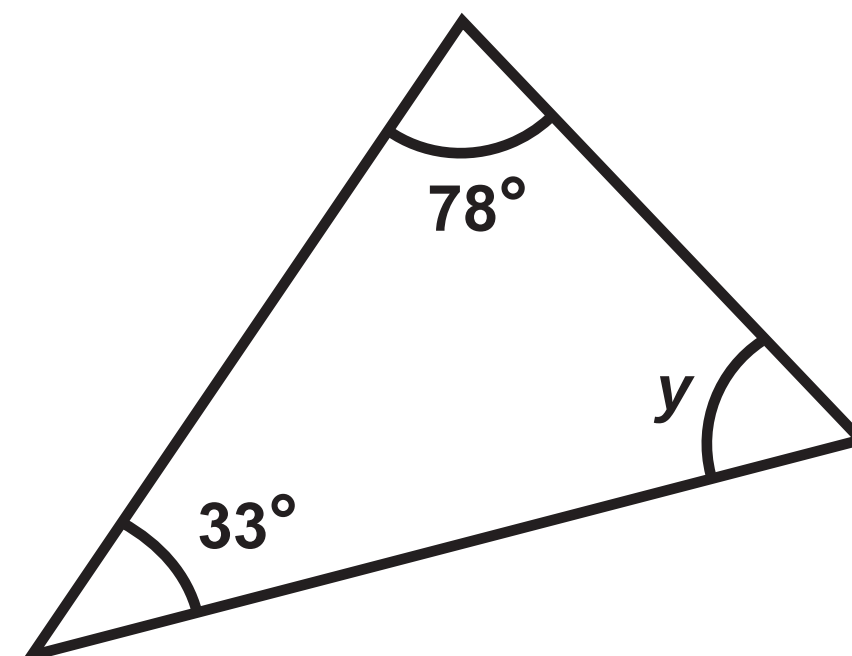
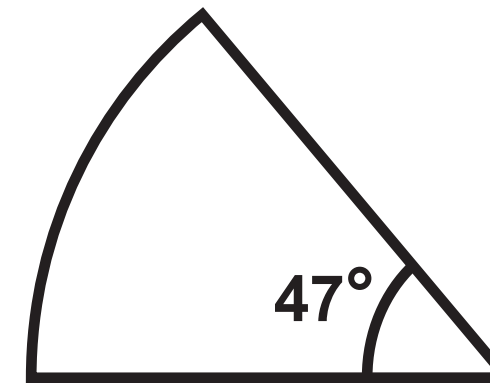
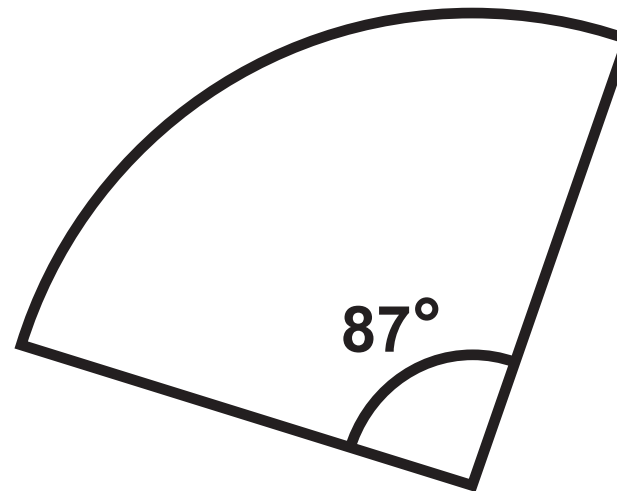
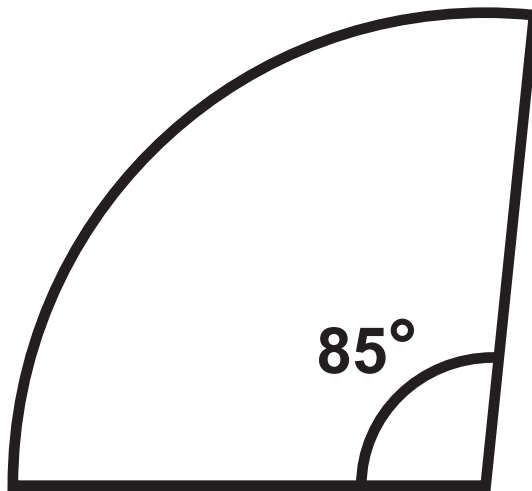
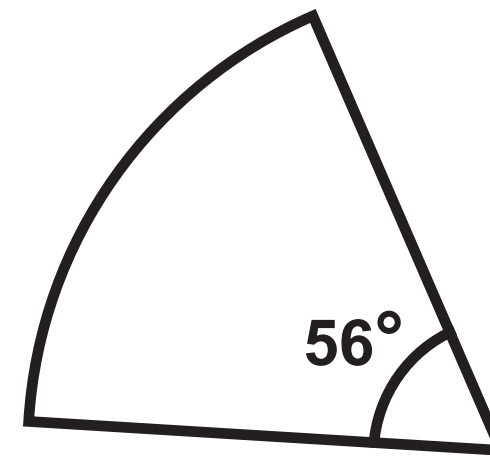
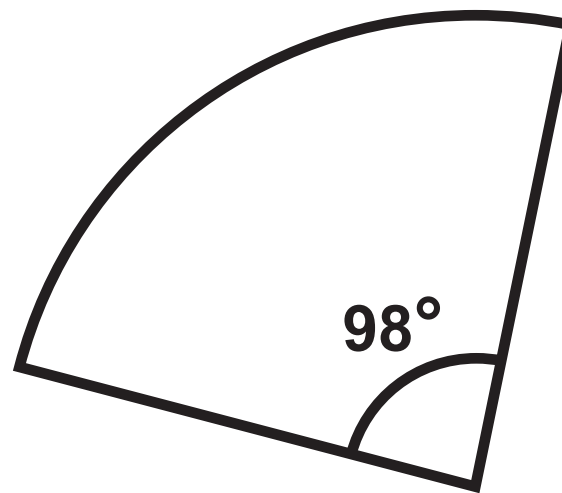
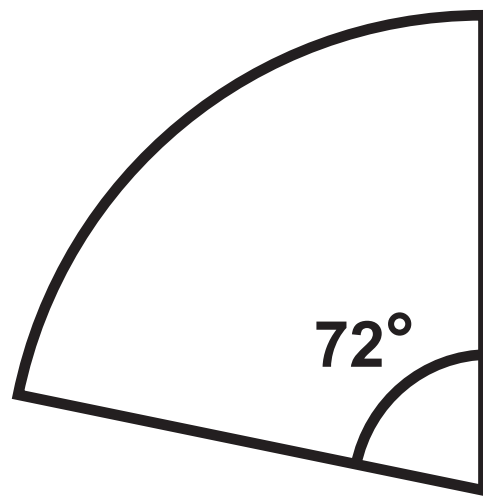


Diagram (iii)



Question 4 (c)

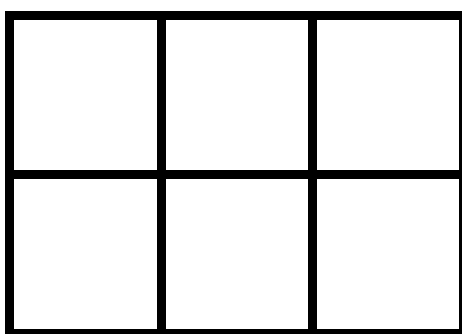
Diagram NOT drawn to scale



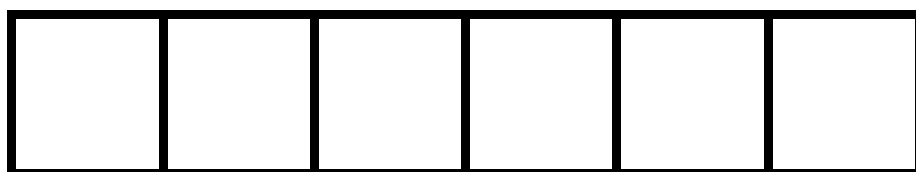
Question 5 (a)

Diagram NOT drawn to scale

Shape 1



Shape 2



Question 5 (b) (i)

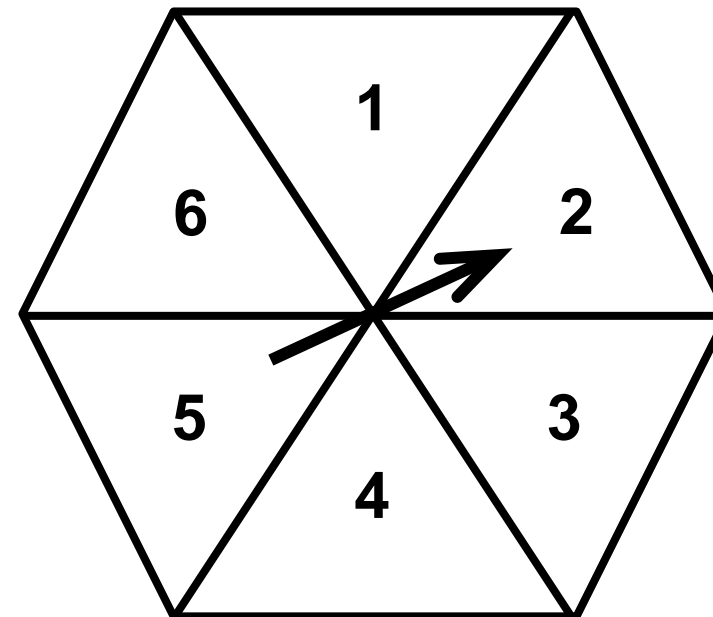
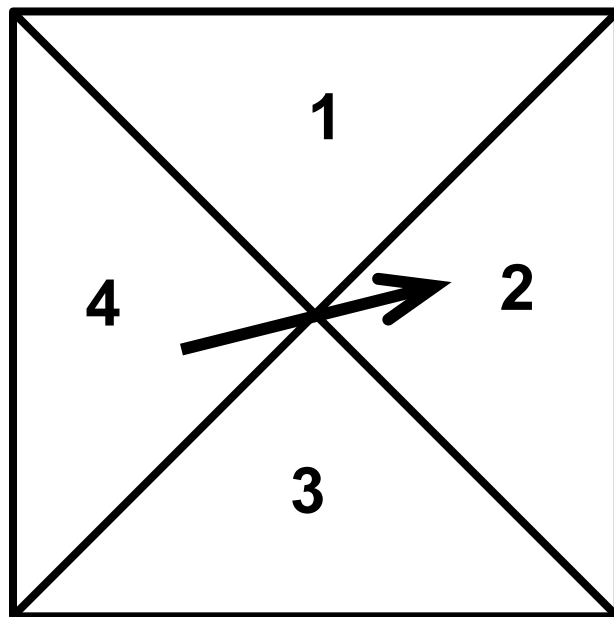
Blank space to sketch Maddie's shape

Question 6

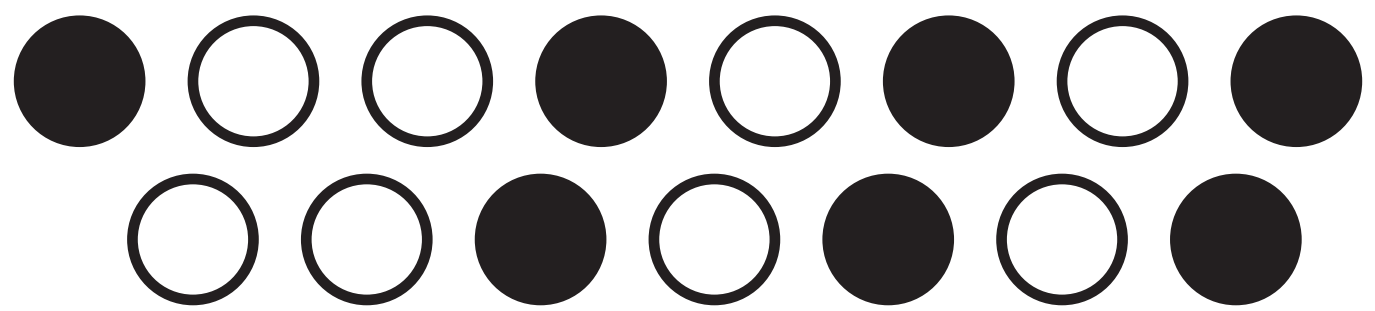
Chart

LONDON				
121	BIRMINGHAM			
204	89	MANCHESTER		
216	101	34	LIVERPOOL	
211	133	71	102	YORK

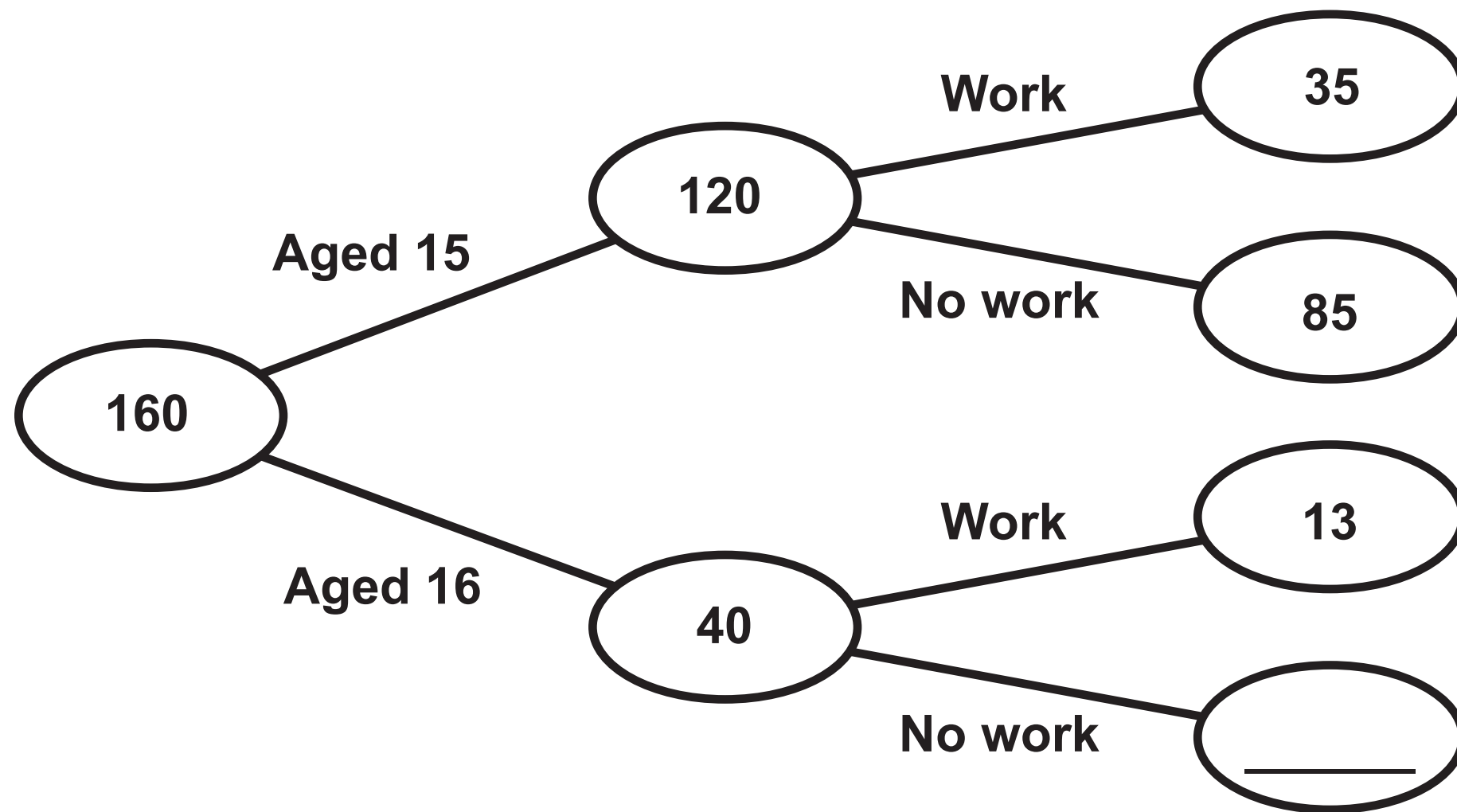
Question 8 (c)



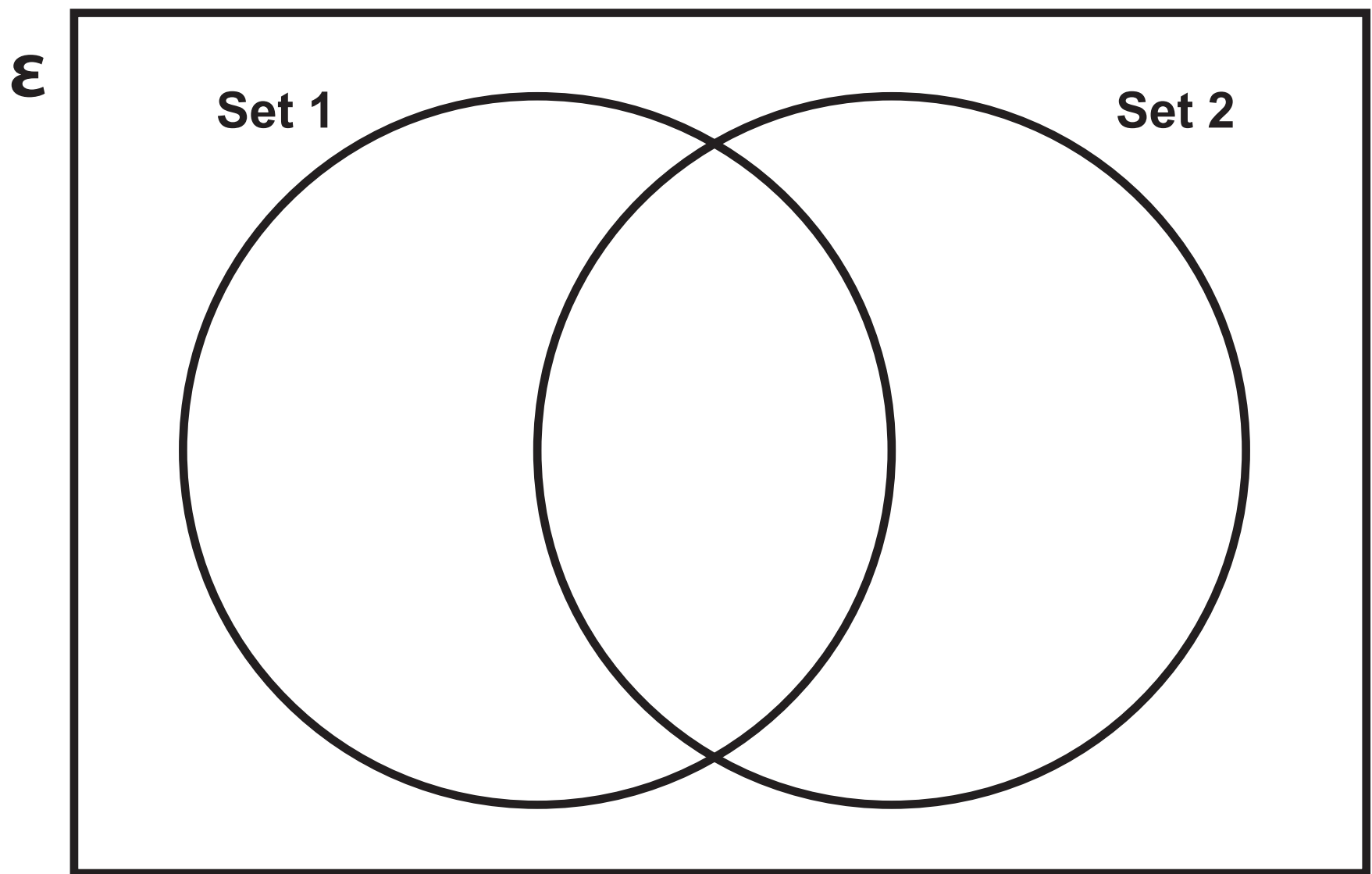
Question 9 (b)



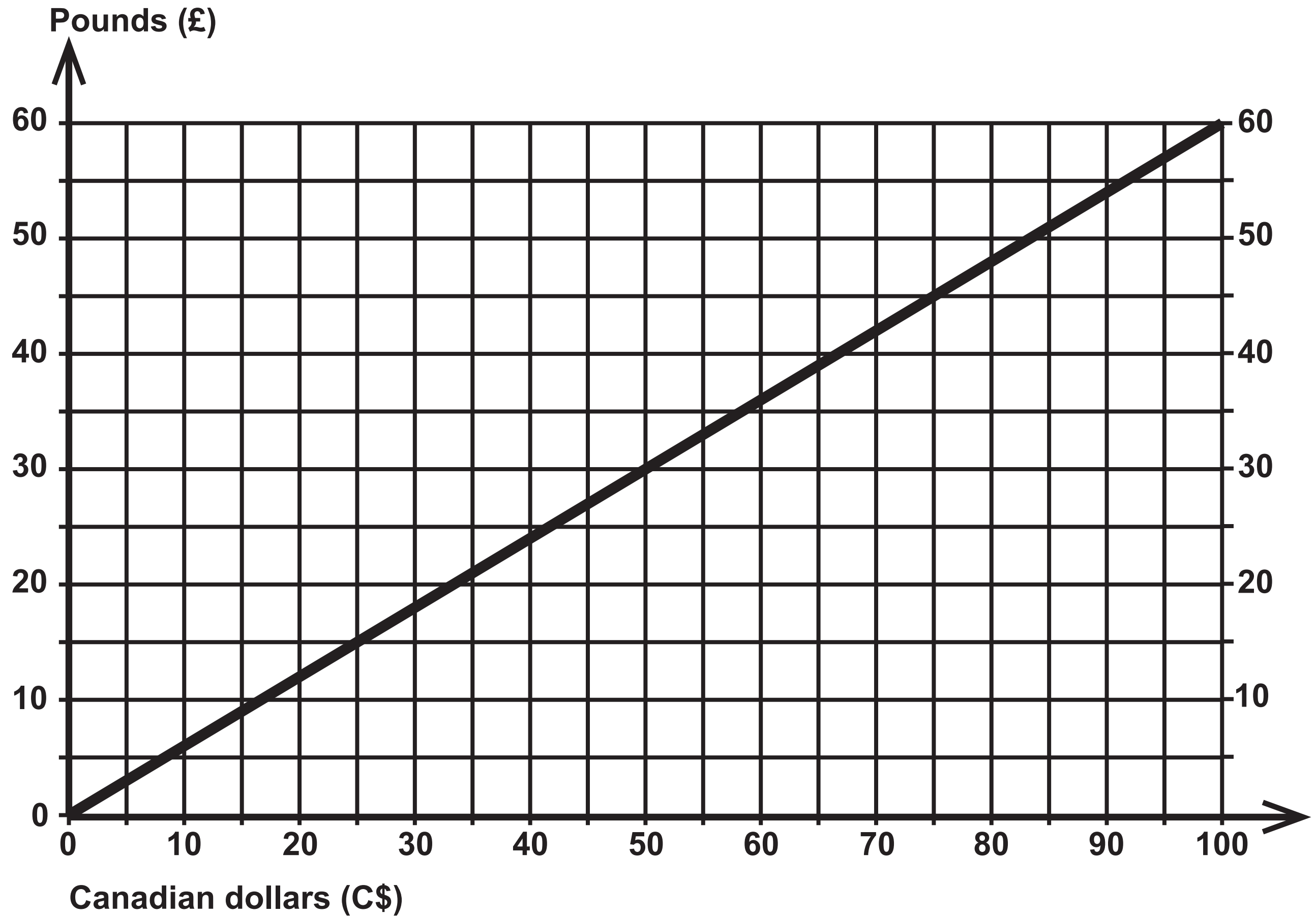
Question 12



Question 13 (a)

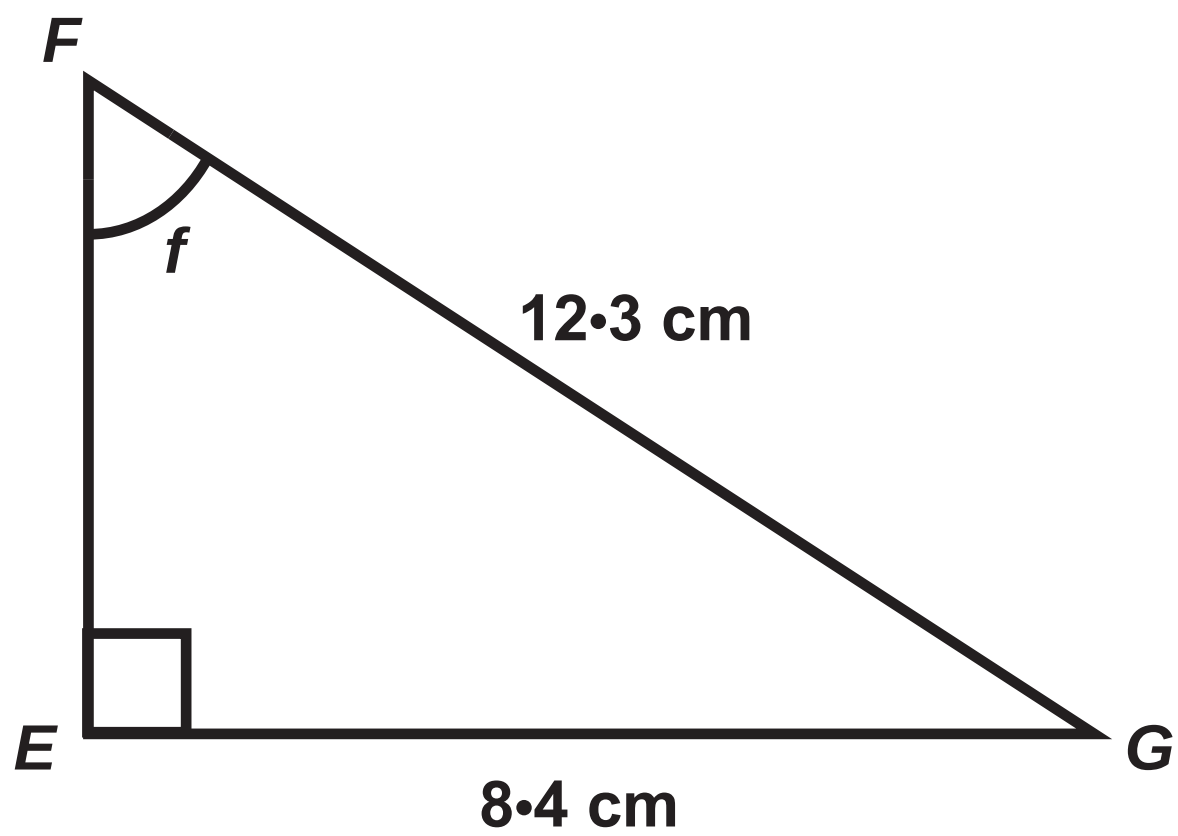


Question 14 (a)



Question 20

Diagram NOT drawn to scale





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Spare Diagram Booklet

Surname:	
Other Names:	
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Candidate Number:	0

Question 4 (a)

Diagrams NOT drawn to scale

Diagram (i)

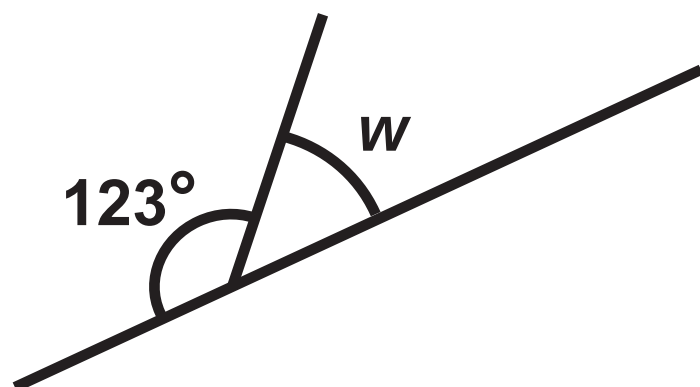


Diagram (ii)

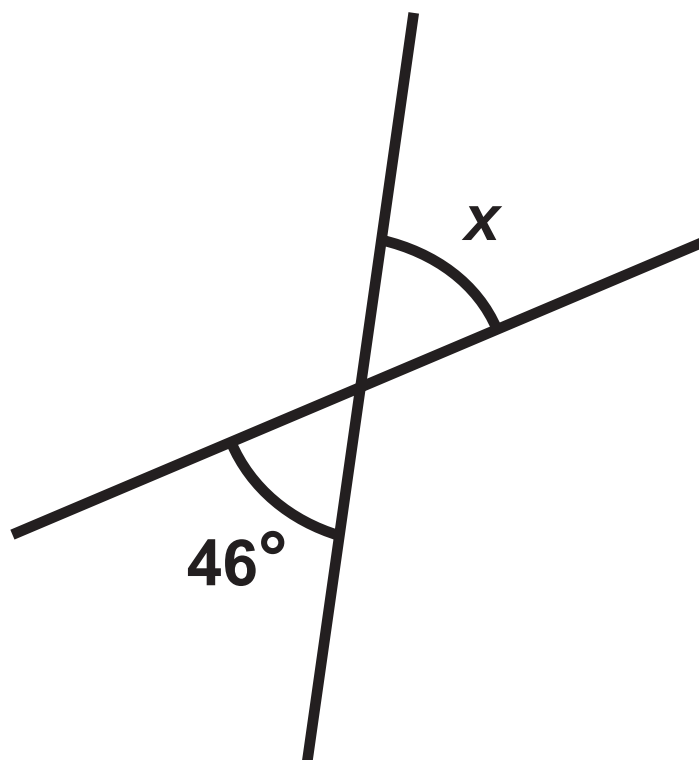
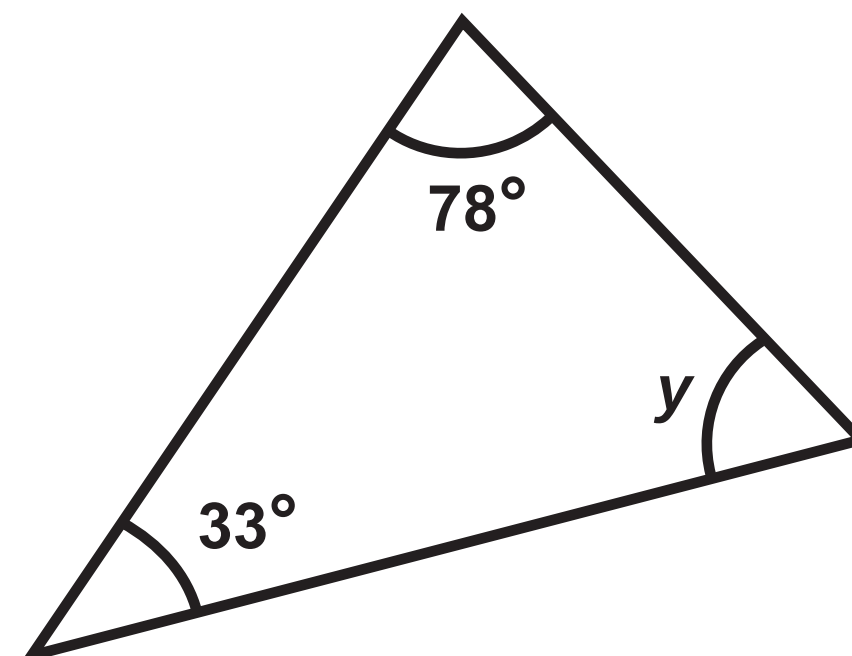
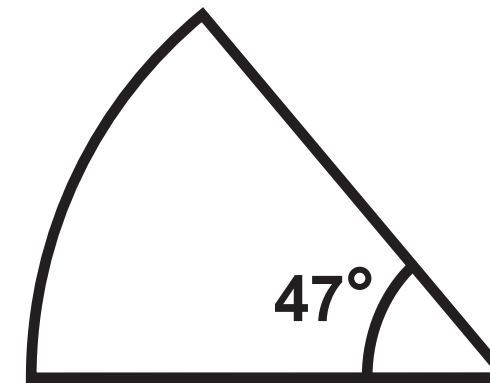
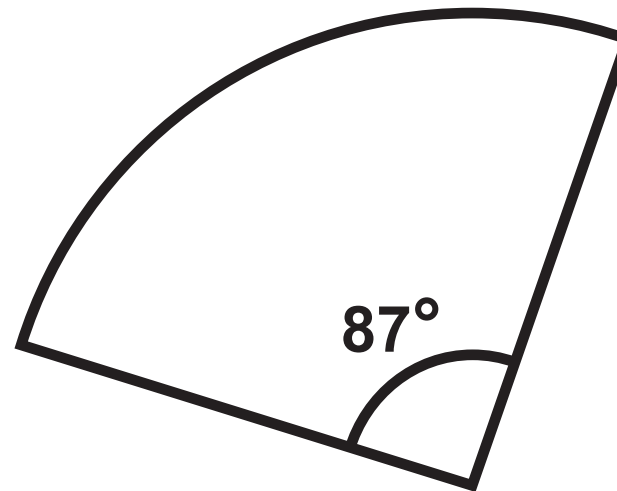
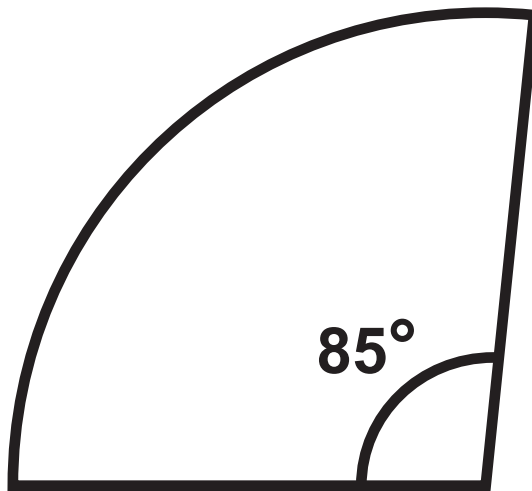
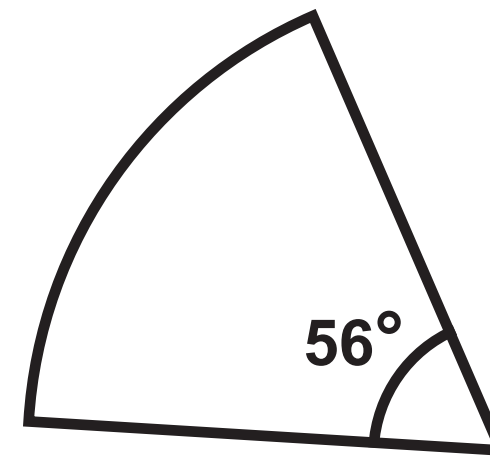
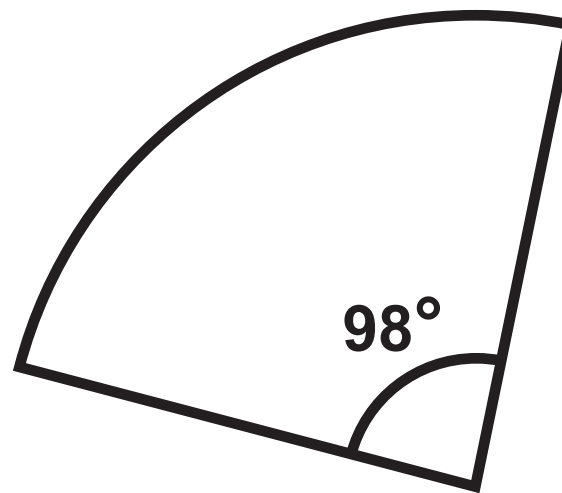
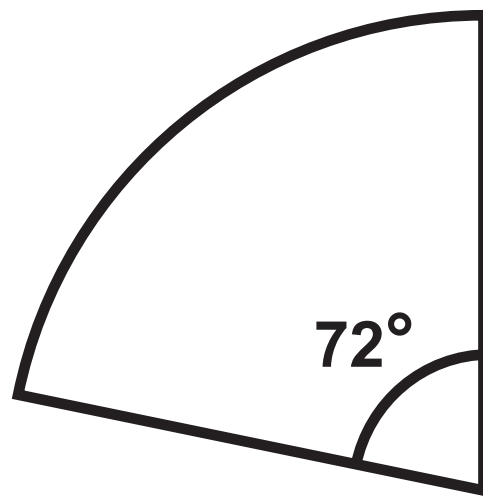


Diagram (iii)



Question 4 (c)

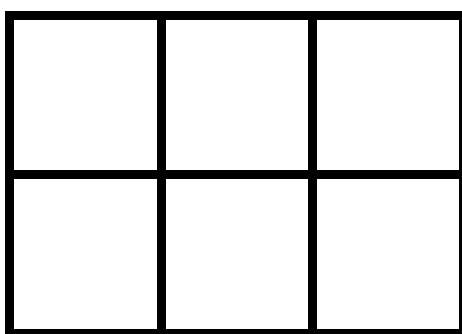
Diagram NOT drawn to scale



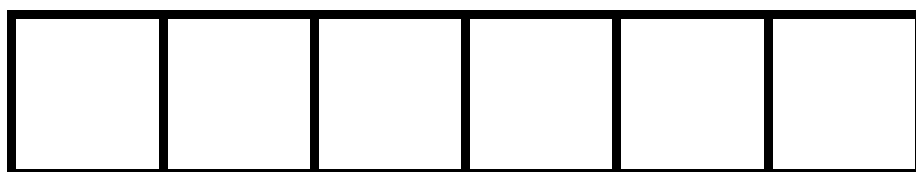
Question 5 (a)

Diagram NOT drawn to scale

Shape 1



Shape 2



Question 5 (b) (i)

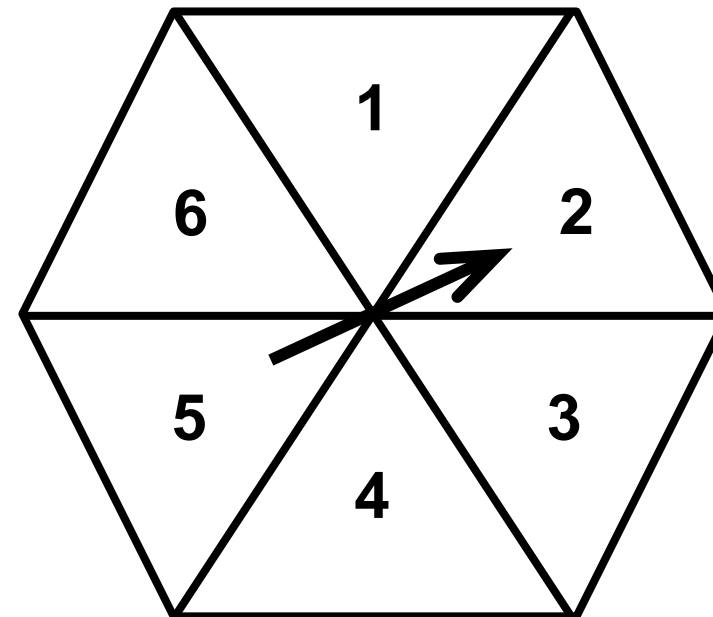
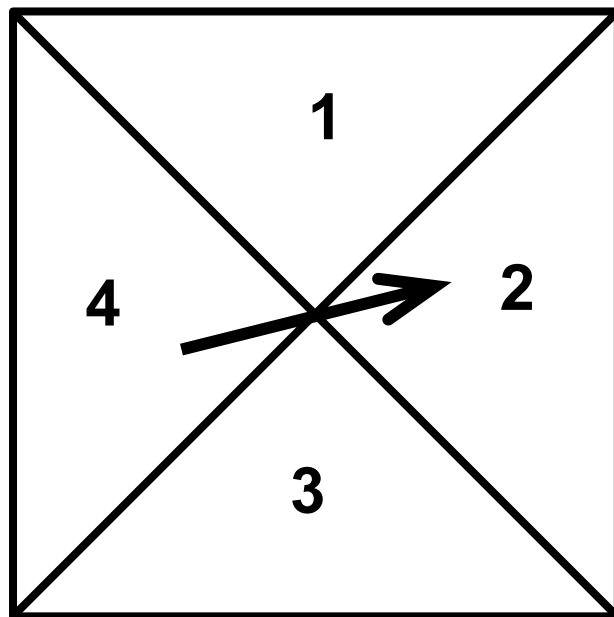
Blank space to sketch Maddie's shape

Question 6

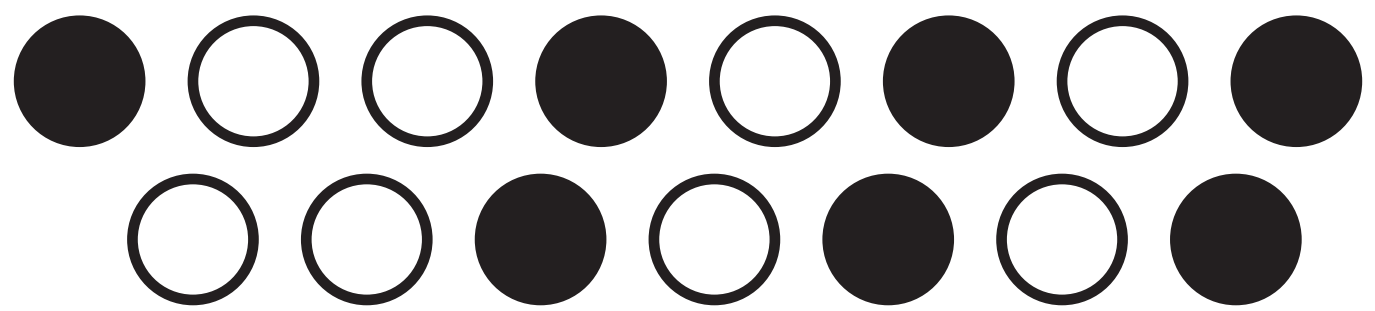
Chart

LONDON				
121	BIRMINGHAM			
204	89	MANCHESTER		
216	101	34	LIVERPOOL	
211	133	71	102	YORK

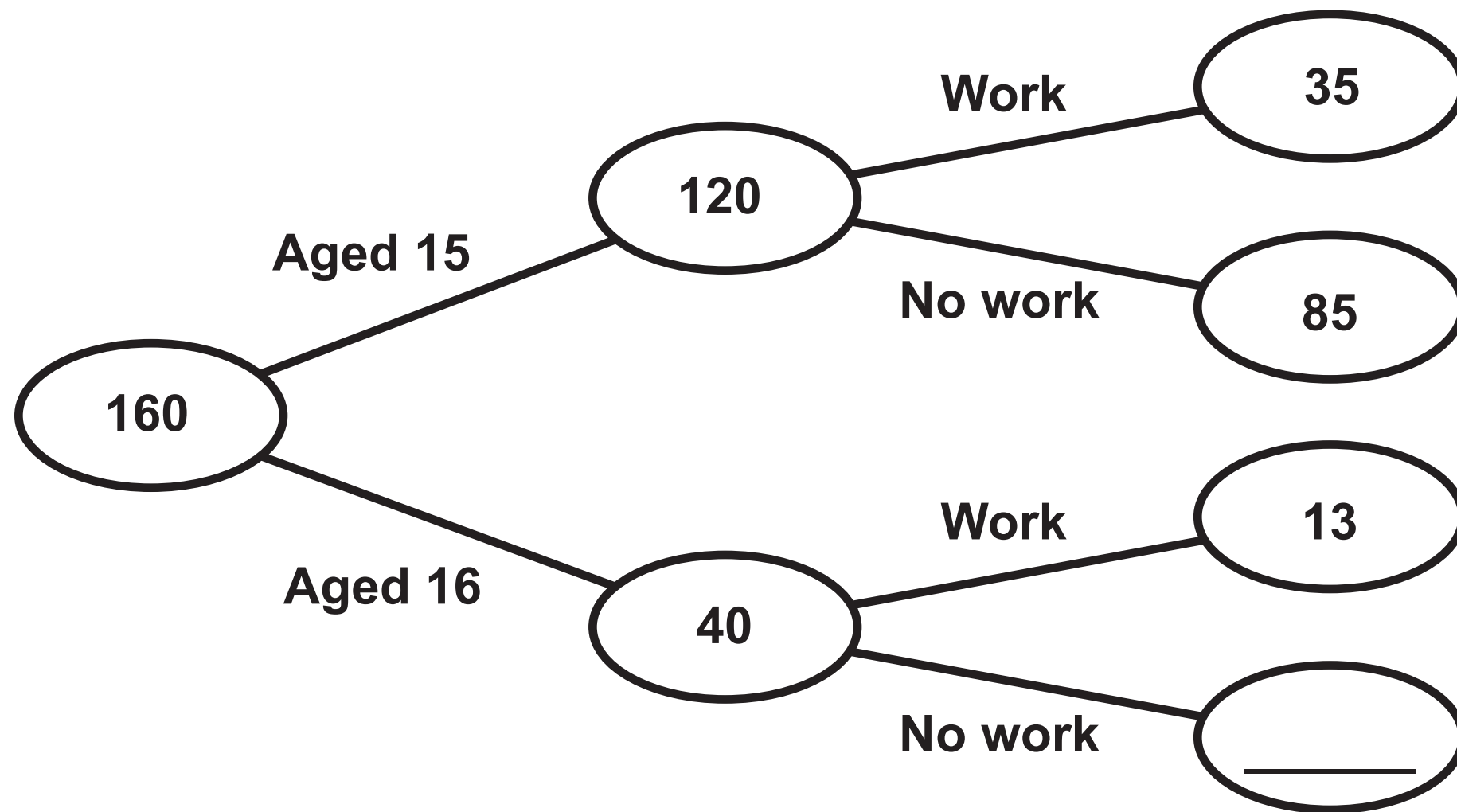
Question 8 (c)



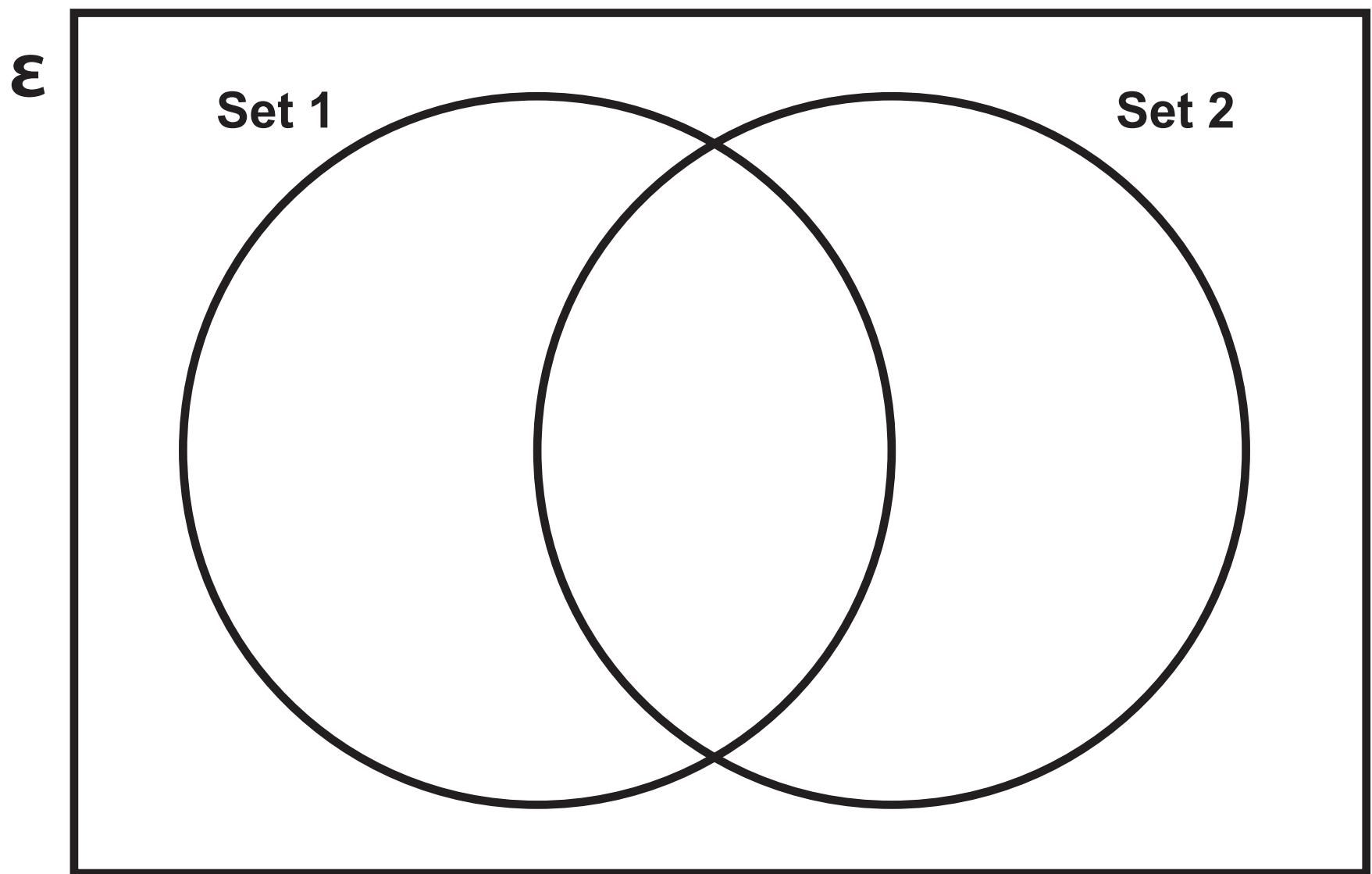
Question 9 (b)



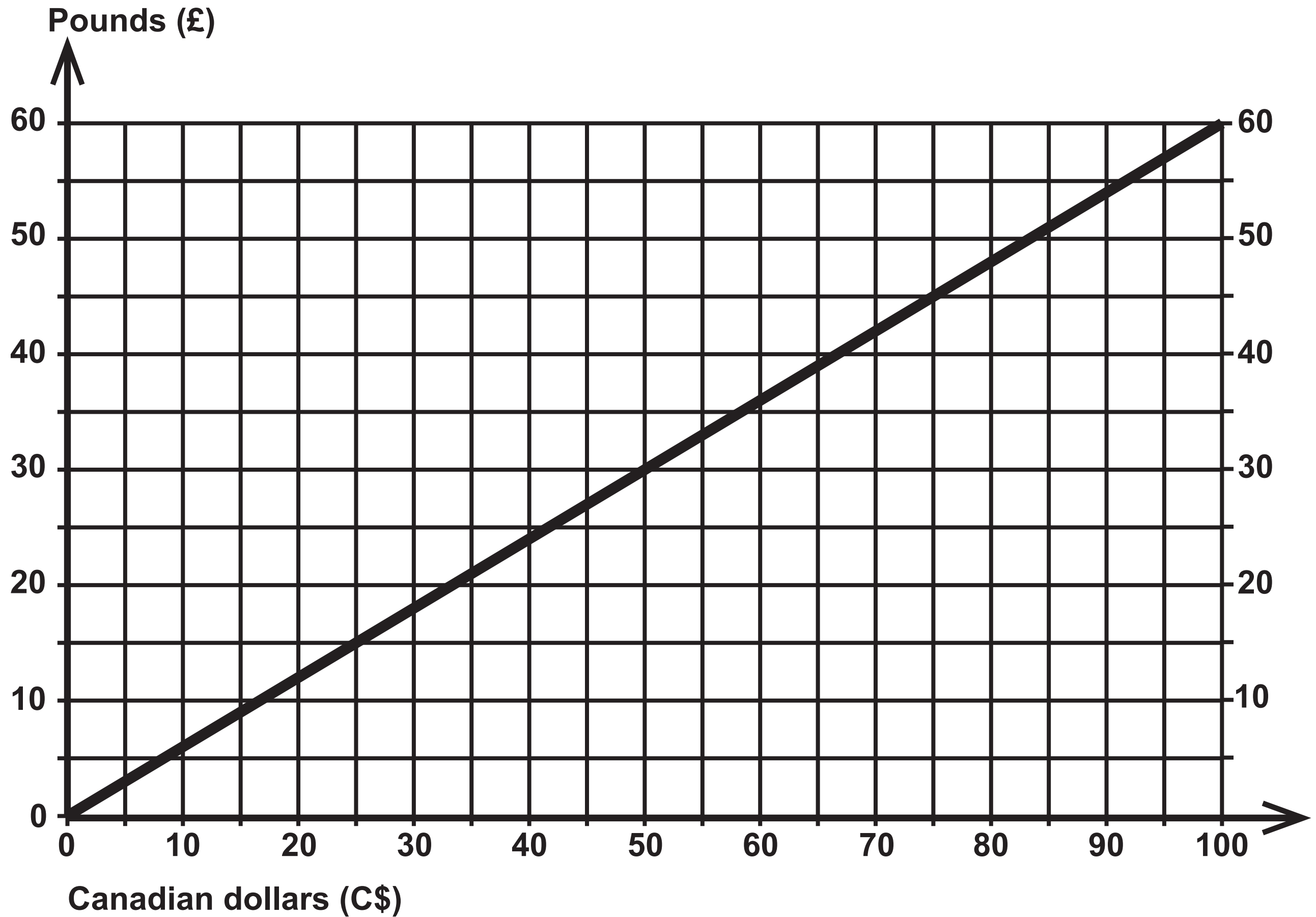
Question 12



Question 13 (a)

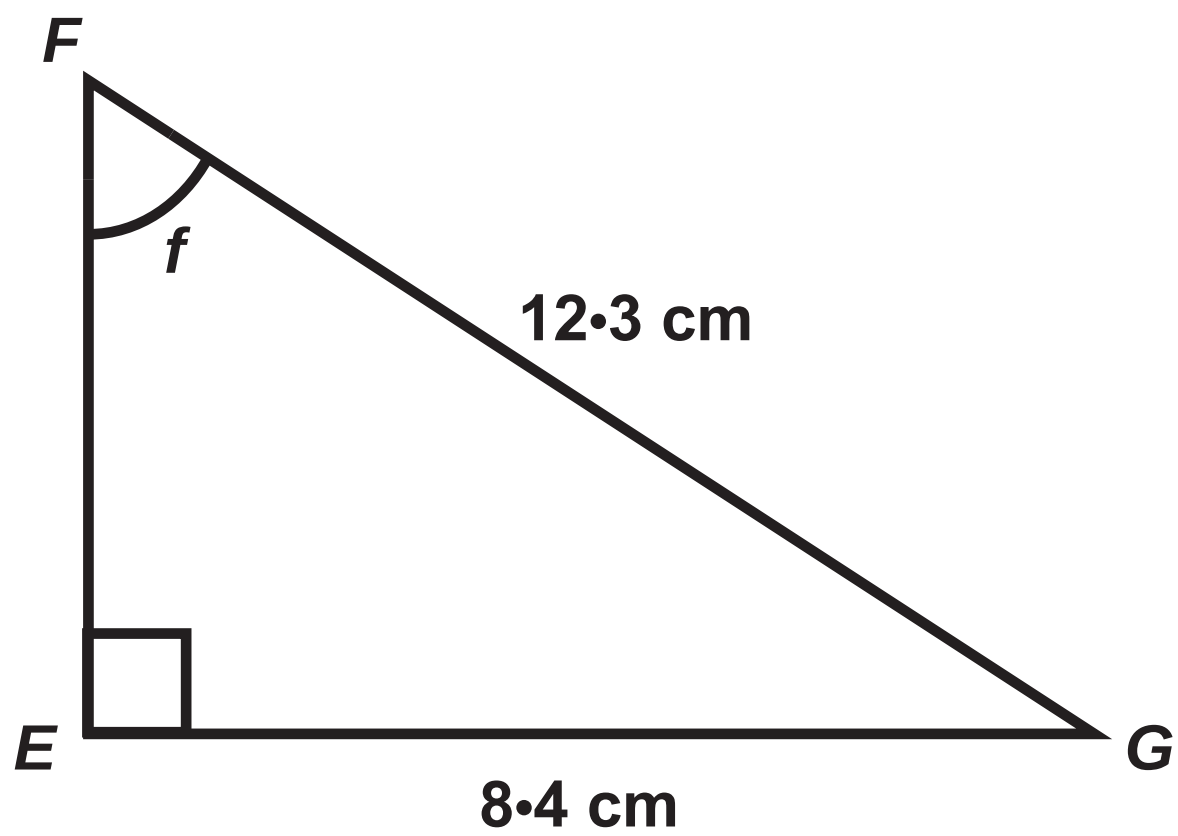


Question 14 (a)



Question 20

Diagram NOT drawn to scale



**FORMULA LIST
FOUNDATION TIER
AND HIGHER TIER
GCSE**

You must not write on these formula pages.

Anything you write on these formulae pages will gain NO credit.

AREA AND VOLUME FORMULAE

Where r is the radius of the sphere or cone,
 l is the slant height of a cone and
 h is the perpendicular height of a cone:

Curved surface area of a cone = $\pi r l$

Surface area of a sphere = $4\pi r^2$

Volume of a sphere = $\frac{4}{3}\pi r^3$

Volume of a cone = $\frac{1}{3}\pi r^2 h$

KINEMATICS FORMULAE

Where a is a constant acceleration,
 u is initial velocity, v is final velocity,
 s is displacement from the position
when $t = 0$ and t is time taken:

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$