



C300U20-1

MONDAY, 3 JUNE 2024 – MORNING

MATHEMATICS – COMPONENT 2

CALCULATOR – ALLOWED MATHEMATICS

FOUNDATION TIER

2 hours 15 minutes plus your additional time allowance

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

Surname: _____

First name(s): _____

Centre Number: _____

Candidate Number: 0 _____

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

(Turn over)

ADDITIONAL MATERIALS

An additional formulae booklet.

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.

Models for Question 5 (b).

The Diagram Booklet MUST be handed in to the invigilators and sent for marking.

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 the questions.

Write your answers in the spaces provided.

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

Take π as 3.142 or use the π button on your calculator.

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. A shop sells bracelets.**

Words can be engraved on the bracelet and charms can be added.

Look at the price list shown for Question 1 in the separate Diagram Booklet.

- (a) Rhian buys a bracelet with a five – letter word engraved on it.**

She also buys a heart charm.

What is the total cost of these items?

[2 marks]

continued on the next page . . .

(Turn over)

Question 1 continued

1. (b) Huw spent **£187.70** on star charms.

How many star charms did he buy?

[1 mark]

- (c) Caitlyn has a special offer voucher.

VOUCHER One bracelet and four flower charms for £95
--

Caitlyn bought one bracelet and four flower charms using the voucher.

How much cheaper is it to buy these items using the voucher than paying the usual price?

(Turn over)

7

[2 marks]

(Turn over)

2. (a) Look at the diagram for Question 2 (a) in the separate Diagram Booklet.

The diagram shows a shape drawn on a square grid.

Each square on the grid represents a **1 cm** square.

What is the area of the shape?

The area of the shape is _____ cm^2

[1 mark]

continued on the next page . . .

Question 2 continued

- 2. (b) Look at the diagram for Question 2 (b) in the separate Diagram Booklet.**
The diagram shows a square grid.
Each square on the grid represents a 1 cm square.

On the grid, draw a RECTANGLE with the same area as the shape given for Question 2 (a).

[1 mark]

3. Look at the list of numbers shown below.

15	20	31	91	169	200
----	----	----	----	-----	-----

From the numbers in the list, write down:

(a) a multiple of 7

[1 mark]

(b) a factor of 100

[1 mark]

(c) a prime number

[1 mark]

continued on the next page . . .

(Turn over)

Question 3 continued

3. (d) a square number

[1 mark]

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

The diagram shows an angle.

Measure and write down the size of angle y .

$y =$ _____ °

[1 mark]

continued on the next page . . .

(Turn over)

Question 4 continued

4. (b) Look at the diagram for Question 4 (b) in the separate Diagram Booklet. The diagram shows a circle, a right – angled triangle and a trapezium.

circumference
parallel
tangent
isosceles
perimeter
radius
perpendicular
diameter

Use the correct words from the list above to complete each of the following sentences.

continued on the next page . . .

(Turn over)

Question 4 (b) continued

4. (b) (i) The line ***AB*** is a _____

[1 mark]

(ii) The lines ***CD*** and ***CE*** are

[1 mark]

(iii) The lines ***ST*** and ***RQ*** are

[1 mark]

continued on the next page . . .

(Turn over)

Question 4 continued

4. (c) Sadia describes a **3D** shape.

She says,

**This 3D shape has 5 vertices,
8 edges and 5 faces.**

**Which one of the 3D shapes listed below
could be the one Sadia is describing?**

Circle your answer.

cuboid
triangular prism
cube
square – based pyramid
cone

[1 mark]

continued on the next page . . .

(Turn over)

Question 4 continued

- 4. (d) Look at the diagram for Question 4 (d) in the separate Diagram Booklet. On the diagram mark all the lines of symmetry.**

[2 marks]

5. Austin owns a cake shop.

(a) He sells his cakes in boxes.

Austin buys some boxes.

Each box costs **£1.35**

He pays a total of **£63.75** which includes
a **£3** delivery charge.

How many boxes did Austin buy?

[2 marks]

continued on the next page . . .

(Turn over)

Question 5 continued

5. (b) Ask for the model for Question 5 (b).

The model is NOT made to scale.

The model represents a cake displayed on two cake boards.

Austin uses cake boards to display his cakes.

Each board is square with sides of length 35.6 cm.

He puts ribbon around the perimeter of the boards for decoration.

Austin has 4 metres of ribbon.

He puts the ribbon around the perimeter of two cake boards.

The ribbon does not overlap on either board.

How much ribbon will Austin have left over?

Austin will have _____
of ribbon left over.

[4 marks]

continued on the next page . . .

(Turn over)

Question 5 continued

5. (c) Use the information below to convert between ounces and grams.

$$1 \text{ ounce (oz)} = 28.35 \text{ grams (g)}$$

- (i) Look at the diagram for Question 5 (c) (i) in the separate Diagram Booklet.

The diagram represents a set of weighing scales.

The scales show how many OUNCES of butter Austin uses to make 1 cake.

How many grams of butter does Austin need to make 3 cakes?

[2 marks]

5. (c) (ii) Austin buys bags of sugar.

Each bag has a mass of **500 g**.

What is the mass of one bag of sugar

In OUNCES?

Give your answer to the nearest ounce.

[2 marks]

(Turn over)

6. Look at the diagram for Question 6 in the separate Diagram Booklet.

The diagram shows a panel to open a safe.

Jade must enter a code to open her safe by pressing three buttons.

The code consists of one letter, one number and one shape.

continued on the next page . . .

Question 6 continued

6. (a) List all the possible code combinations.

One has been completed for you.

You may not need to use all the lines.

Letter	Number	Shape
A	1	

[2 marks]

continued on the next page . . .

(Turn over)

Question 6 continued

(b) Jade has forgotten her code.

She enters one letter, one number and one shape at random.

What is the probability that she enters the correct code?

[1 mark]

(Turn over)

7. Vikram follows a Mediterranean diet.

Look at the table for Question 7 in the separate Diagram Booklet.

The table shows the proportion of each food group Vikram should eat each day.

(a) What FRACTION of the Mediterranean diet is made up of olive oil and sugar?

Write your answer in its simplest form.

[2 marks]

continued on the next page . . .

(Turn over)

Question 7 continued

- 7. (b) On Monday, Vikram ate 456 grams of fish, meat, and dairy products.
How many grams of sugar should Vikram have eaten on Monday?**

[2 marks]

continued on the next page . . .

(Turn over)

Question 7 continued

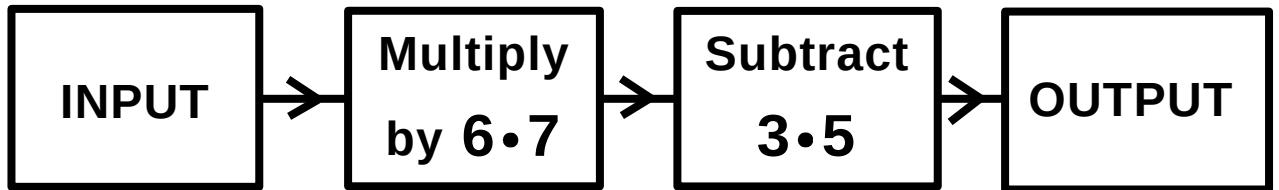
- 7. (c) On Tuesday, Vikram ate a total of 1350 grams of food.**

How many grams of whole grains and pasta should Vikram have eaten on Tuesday?

[2 marks]

(Turn over)

8. (a) (i) The diagram below shows a number machine.



When the OUTPUT is 83.6 , what is the INPUT?

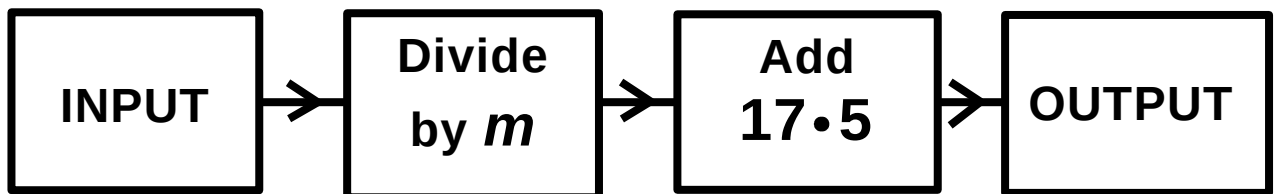
[1 mark]

continued on the next page . . .

(Turn over)

Question 8 (a) continued

8. (a) (ii) A different number machine is shown below.



When the INPUT is **22**, the OUTPUT is **37.5**

Find the value of ***m***.

[2 marks]

continued on the next page . . .

(Turn over)

Question 8 continued

8. (b) The original price of a toy is $\pounds t$.

In a sale, the toy is one third of its original price.

Write down, in terms of t , the sale price of the toy.

[1 mark]

continued on the next page . . .

(Turn over)

Question 8 continued

8. (c) A bag contains X sweets.

Rona buys 8 of these bags.

She also has 5 sweets left from a previous bag of sweets.

Write down, in terms of X , the total number of sweets Rona has.

Simplify your answer.

[2 marks]

continued on the next page . . .

(Turn over)

Question 8 continued

8. (d) Simplify $5n + 16n \times 7$

[2 marks]

(e) Expand $8(9p - 3)$

[1 mark]

(f) Solve $5x - 2 = 11$

[2 marks]

continued on the next page . . .

(Turn over)

Question 8 continued

8. (g) What is the square root of 31?

**Give your answer correct to
2 decimal places.**

[2 marks]

(Turn over)

9. Look at the table for Question 9 in the separate Diagram Booklet.

The table below shows distances between some places in New Zealand.

All distances are in kilometres (km).

Use the table to answer the following questions.

- (a) Complete the sentence.

The distance between

_____ and
_____ is 414 km.

[1 mark]

continued on the next page . . .

(Turn over)

Question 9 continued

9. (b) Sharon drove from Wellington to Taupo.

The journey took

4 hours and 30 minutes.

**Calculate the average speed of Sharon's
journey in kilometres per hour.**

[3 marks]

(Turn over)

10. (a) Look at the diagram for Question 10 (a) in the separate Diagram Booklet.

The diagram shows a sequence of patterns: Pattern 1, Pattern 2 and Pattern 3.

The sequence of patterns is made using squares and triangles.

- (i) Complete Pattern 5 on the diagram.

[1 mark]

- (ii) Is it possible for one of the patterns in the sequence to have **23** squares and **21** triangles?

Give a reason for your answer.

Yes

☐

No

☐

[2 marks]

continued on the next page . . .

(Turn over)

Question 10 (a) continued

10. (a) (iii) Write down the n th term for the number of SQUARES in the pattern.

[2 marks]

(b) The n th term of a different sequence is

$$4n - 5$$

Write down the first 3 terms of the sequence.

[2 marks]

(Turn over)

11. Mr Gregory plans to buy drinks and crisps for the school shop.

Drinks and crisps are sold in multipacks.

The costs for these are shown below.

Drinks multipack (28 drinks) Price: £5.35	Crisps multipack (35 packets) Price: £4.27
--	---

Mr Gregory buys the LEAST number of each multipack so that he has an equal number of drinks and packets of crisps.

How much will this cost?

You must show all your working.

(Turn over)

Total cost is _____

[5 marks]

(Turn over)

**12. (a) The exterior angle of a regular polygon
is 24°**

(i) How many sides does it have?

[2 marks]

continued on the next page . . .

(Turn over)

Question 12 (a) continued

12. (a) (ii) Calculate the sum of all the interior angles of this polygon.

[2 marks]

continued on the next page . . .

(Turn over)

Question 12 continued

12. (b) Look at the diagram for Question 12 (b) in the separate Diagram Booklet.

The diagram is NOT drawn to scale.

The diagram shows a quadrilateral ***QRST***.

In the diagram:

QS is parallel to ***UT***.

Angle ***QRS*** = 84°

Angle ***RQT*** = 110°

and ***QR*** = ***RS***

Calculate the value of ***X***.

Give a reason for each step of your answer.

$$x = \underline{\hspace{2cm}} \circ$$

[4 marks]

(Turn over)

- 13. (a) Cara wants to find out if people travel abroad each year and how often. She plans to stand outside her local travel agent on Tuesday afternoon and survey **35** people.**

Give TWO reasons why Cara's plan is not likely to give reliable results.

REASON 1

continued on the next page . . .

(Turn over)

Question 13 (a) continued

REASON 2

[2 marks]

continued on the next page . . .

(Turn over)

Question 13 continued

13. (b) Cara uses a questionnaire to carry out her survey.

One of the questions is shown below.

How many times do you travel abroad?							
0	☐	1–3	☐	3–4	☐	5 or more	☐

Give TWO criticisms of the question.

CRITICISM 1

continued on the next page . . .

(Turn over)

Question 13 (b) continued

CRITICISM 2

[2 marks]

14. Look at the diagram for Question 14 in the separate Diagram Booklet. The diagram is a scale drawing showing the positions of some places in a town.

- (a) What is the straight – line distance between the post office and the bus station?
Give your answer in METRES.**

[3 marks]

continued on the next page . . .

(Turn over)

Question 14 continued

14. (b) What is the bearing of the shopping centre from the fuel station?

[1 mark]

(Turn over)

15. Frank is making some fruit drinks.

**(a) Frank makes one drink using orange juice
and lemonade in the ratio $1 : 5$**

He pours 390 ml of this drink into a glass.

**How many ml of lemonade will there be
in the glass?**

[2 marks]

continued on the next page . . .

(Turn over)

Question 15 continued

15. (b) Frank makes a different drink using apple juice and lemonade.

He pours **120 ml** of apple juice into a glass.

He then pours lemonade into the glass until there is **390 ml** of drink.

Write down the ratio of apple juice to lemonade in the glass.

Give your answer in its simplest form.

The ratio is _____ :

[2 marks]

(Turn over)

16. Look at the diagram for Question 16 in the separate Diagram Booklet.

The diagram is a frequency diagram.

45 students took part in a 400 m race.

Their times, in seconds, were recorded.

The frequency diagram shows the results.

The groups used are as follows:

$70 \leq \text{time} < 80$, $80 \leq \text{time} < 90$,

$90 \leq \text{time} < 100$, $100 \leq \text{time} < 110$

and $110 \leq \text{time} < 120$

Calculate an estimate for the mean time it took to complete the race.

[5 marks]

17. (a) Factorise $x^2 - 5x - 24$

[2 marks]

(b) Simplify $(3h^2)^3$

[2 marks]

continued on the next page . . .

(Turn over)

Question 17 continued

17. (c) Look at the diagram for Question 17 (c) in the separate Diagram Booklet.

The diagram shows a number line.

Represent the inequality

$-2 < x \leq 3$ on the number line.

[1 mark]

18. Look at the diagram for Question 18 in the separate Diagram Booklet.

The diagram is NOT drawn to scale.

The diagram shows two right-angled triangles ***ABC*** and ***BCD***.

In the diagram:

$$AB = 5.4 \text{ cm,}$$

$$AC = 7.2 \text{ cm and}$$

$$CD = 4.9 \text{ cm.}$$

Calculate the area of triangle ***BCD***.

Area of triangle ***BCD*** is _____ cm^2

[5 marks]

(Turn over)

19. For her lunch, Gina sometimes eats a salad and sometimes drinks a coffee.

The probability she eats a salad for lunch on a given day is 0.4

The probability she drinks a coffee on a given day is 0.25

Eating a salad for lunch and drinking a coffee are independent.

(a) Look at the diagram for Question 19 (a) in the separate Diagram Booklet.

The diagram shows an incomplete tree diagram.

Complete the tree diagram.

[2 marks]

continued on the next page . . .

Question 19 continued

- 19. (b) Calculate the probability that, on a given day, Gina does not eat a salad for lunch but does drink a coffee.**

[2 marks]

(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 that when a ball is dropped, the maximum height it reaches after each bounce decreases.

Maddox says,

“Each time the ball bounces it reaches a height that is 55% of the maximum height reached on its previous bounce.”

- (a) The ball is dropped from a height of 4 m.**
What height will the ball reach above the ground after its 7th bounce?

[3 marks]

20. (b) (i) State any assumptions you have made in answering part (a).

[1 mark]

(ii) What effect could your assumption have on your answer to part (a)?

[1 mark]

(Turn over)

21. (a) Look at the diagram for Question 21 (a) in the separate Diagram Booklet.

The diagram shows an incomplete Venn diagram.

There are 50 people in a sports club.

Two of the sports the people can take part in are rowing and cycling.

Of these 50 people:

- 27 take part in rowing**
- 32 take part in cycling**
- 8 do not take part in rowing or cycling.**

Complete the Venn diagram to show This information.

[2 marks]

continued on the next page . . .

(Turn over)

Question 21 continued

21. (b) One person is chosen at random from the sports club.

Find the probability that they take part in rowing but not in cycling.

[2 marks]

(Turn over)

22. Abdul is travelling from the UK to Brazil for a holiday.

Abdul has £825 to exchange for Brazilian reals (R\$).

The exchange rate is £1 = 6.27R\$

The bank Abdul uses to exchange his money only has 50R\$ notes.

What is the maximum amount of Brazilian reals Abdul can buy and what will this cost him in pounds?

Give your answer correct to the nearest penny. You must show all your working.

[5 marks]

23. Make **R** the subject of the formula $P = \sqrt[3]{RQ}$

[2 marks]

END OF PAPER

TOTAL 120 MARKS

(Turn over)

[illegible]

(Turn over)

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

C300U20-1

MONDAY, 3 JUNE 2024 – MORNING

MATHEMATICS – COMPONENT 2

CALCULATOR – ALLOWED MATHEMATICS

FOUNDATION TIER

**The Diagram Booklet MUST be handed in
to the invigilators and sent for marking.**

Diagram Booklet

Surname: _____

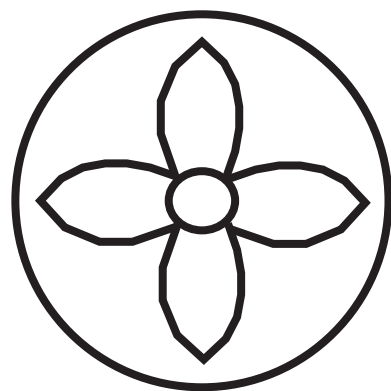
First name(s): _____

Centre Number: _____

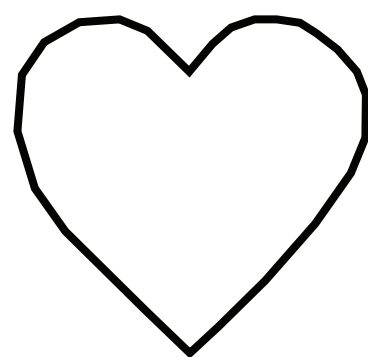
Candidate Number: 0 _____

Question 1

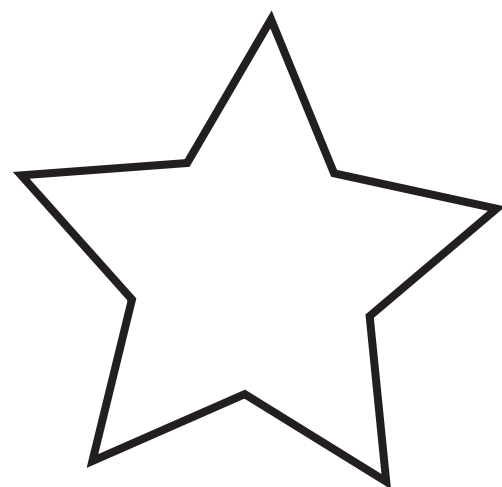
Flower charm £18



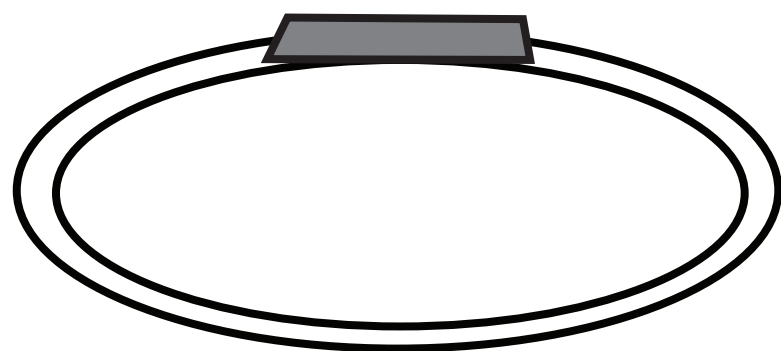
Heart charm £13.20



Star charm £37.54



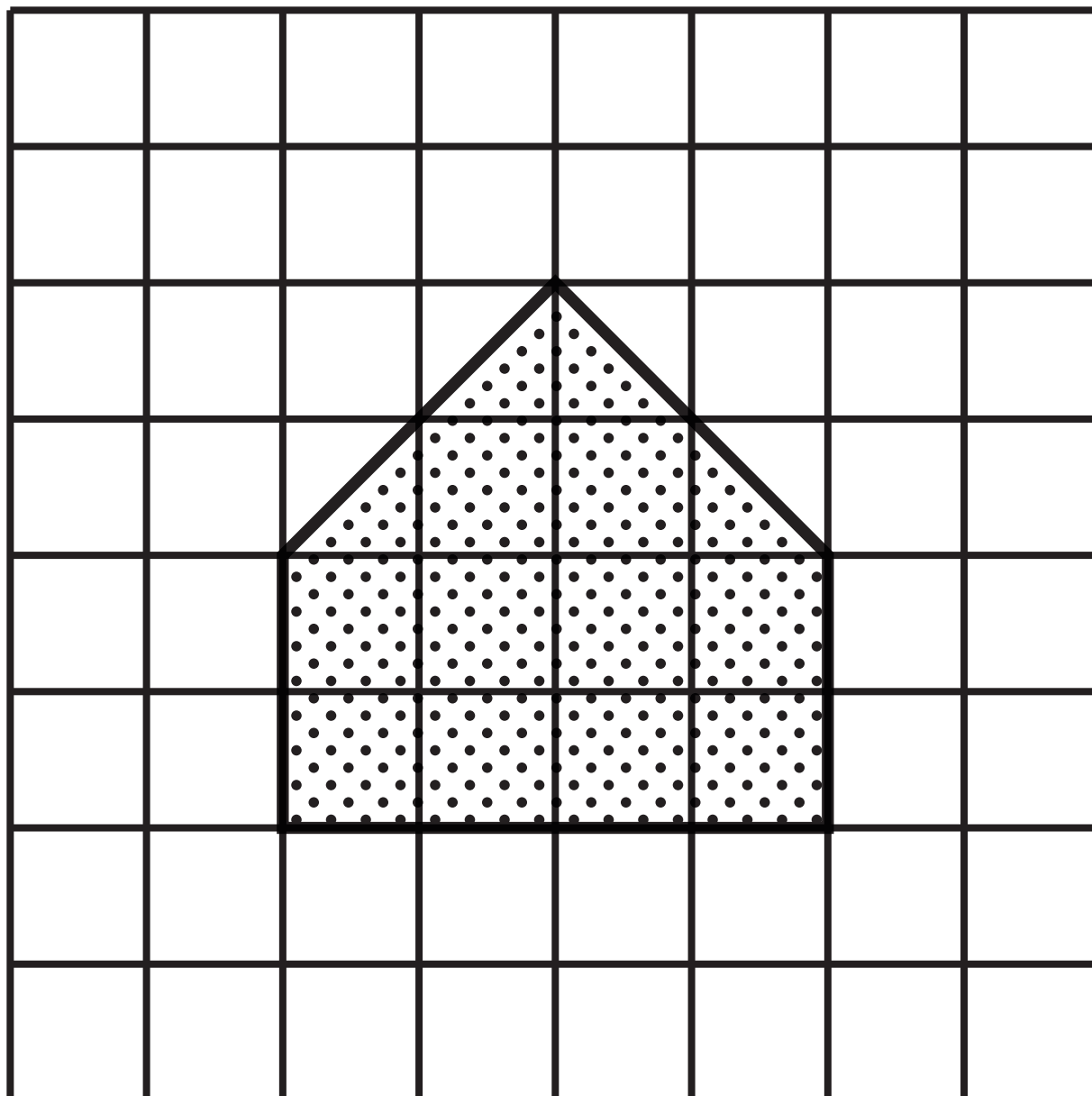
Bracelet £45



Engraving
84p for each letter

A B C D E

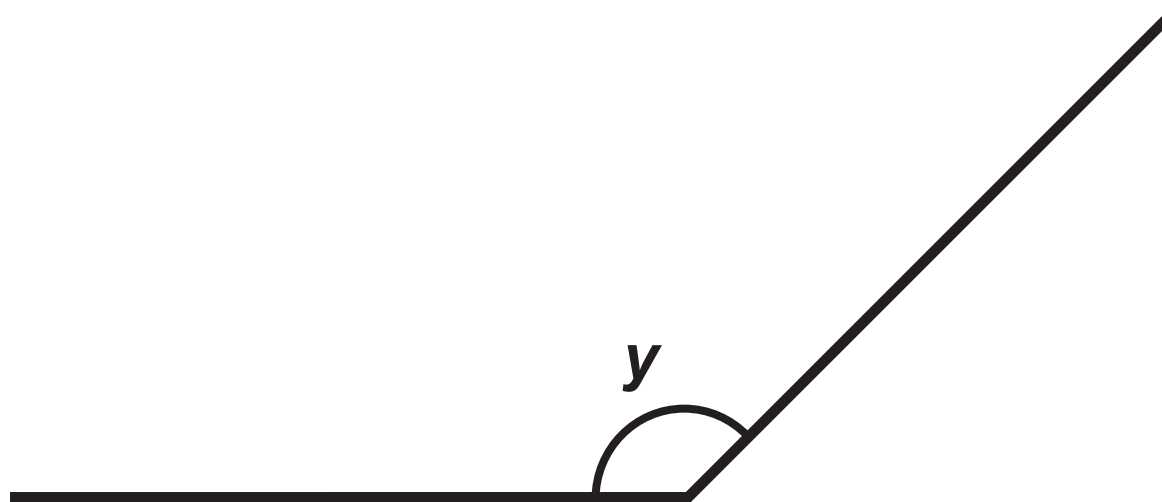
Question 2 (a)



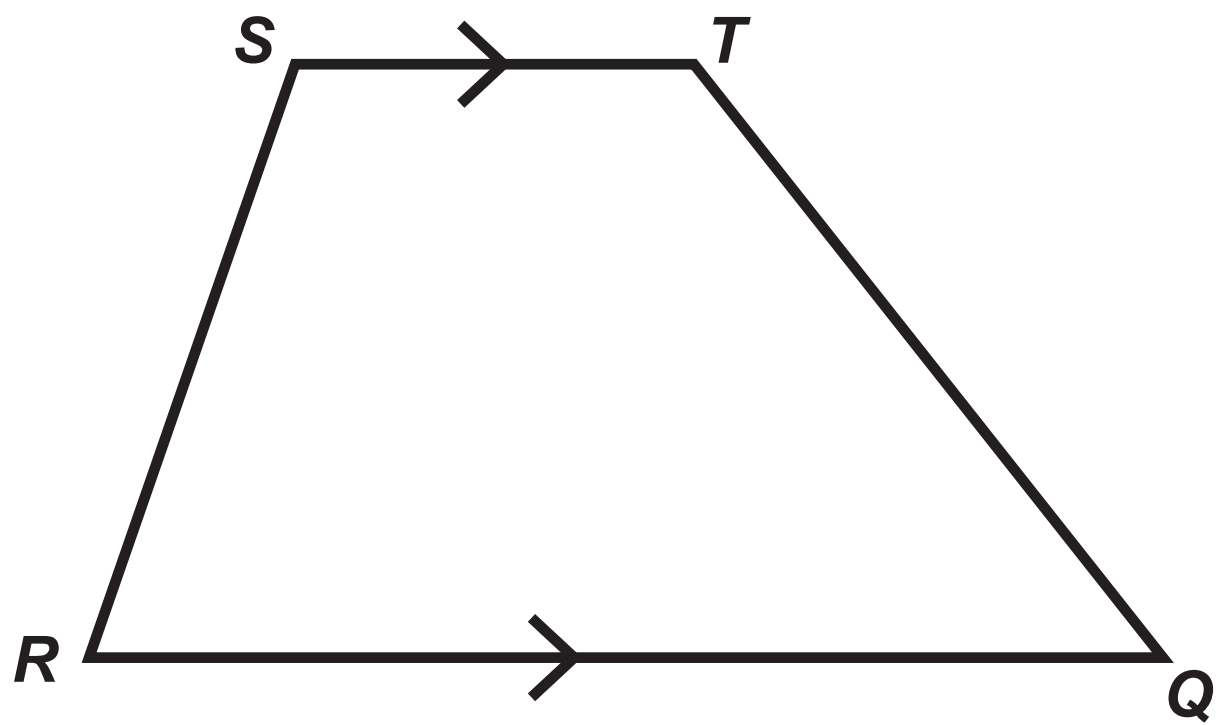
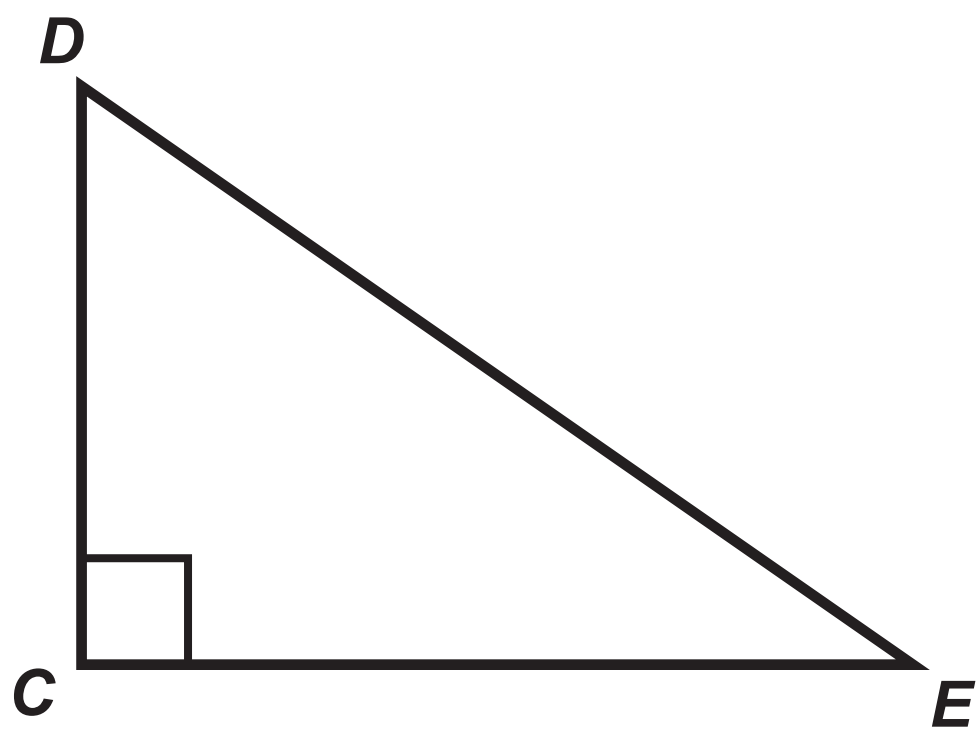
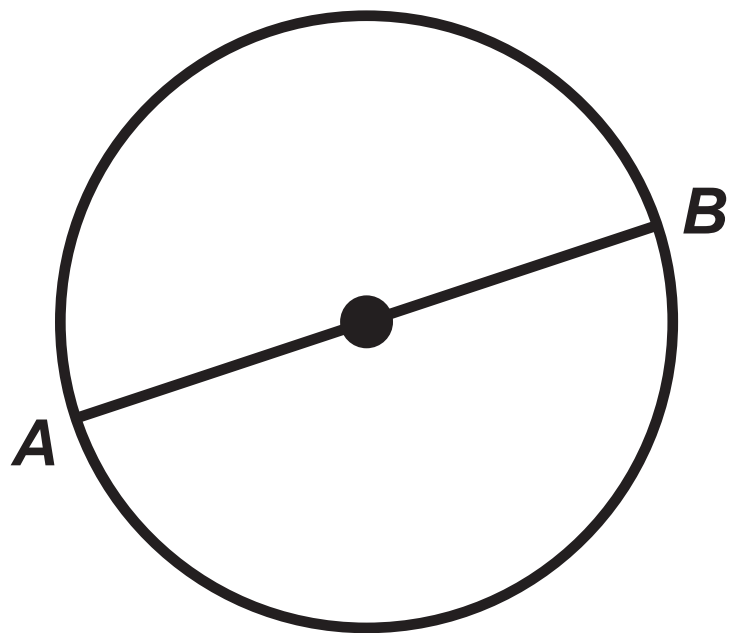
Question 2 (b)

[illegible]

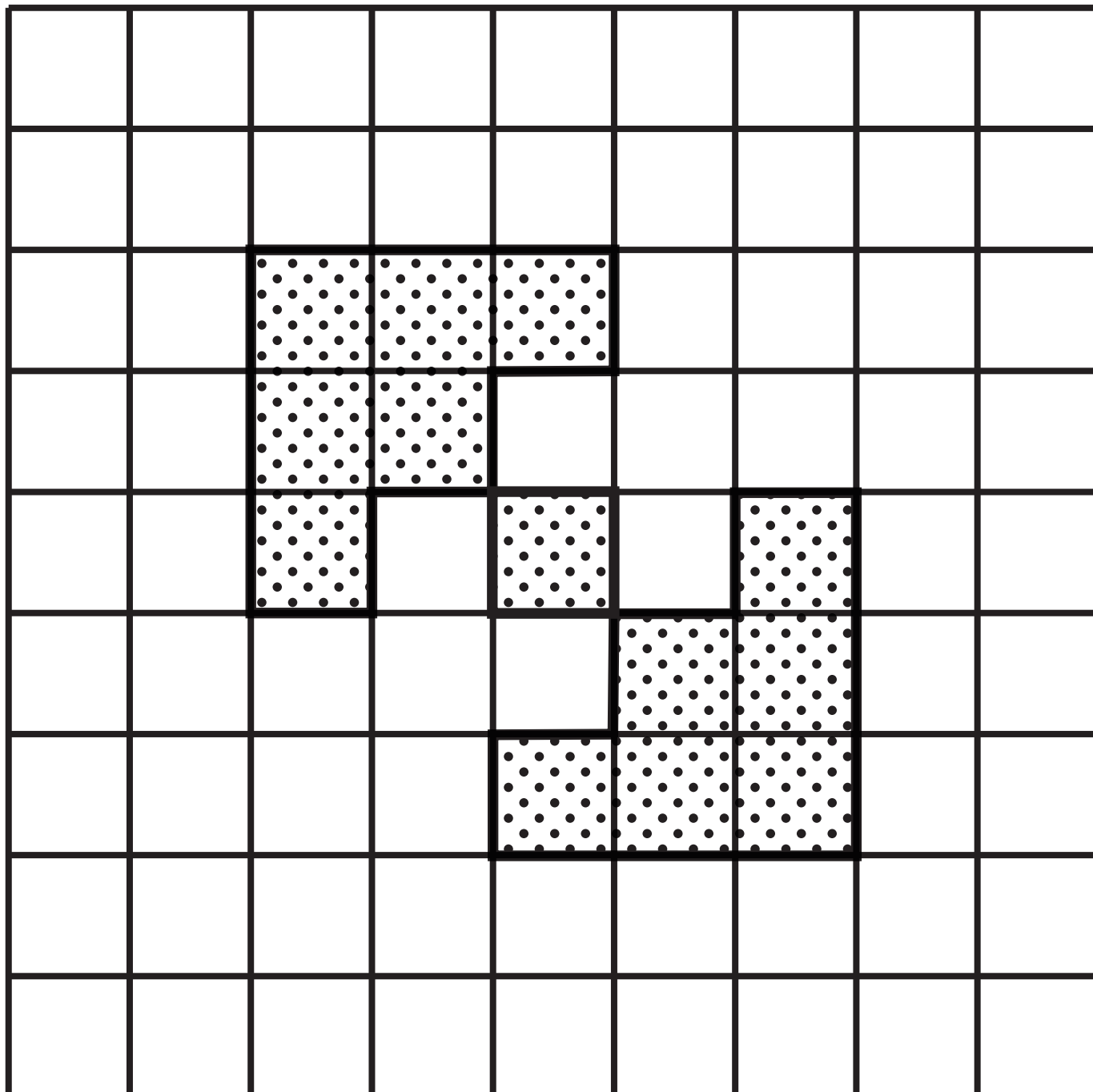
Question 4 (a)



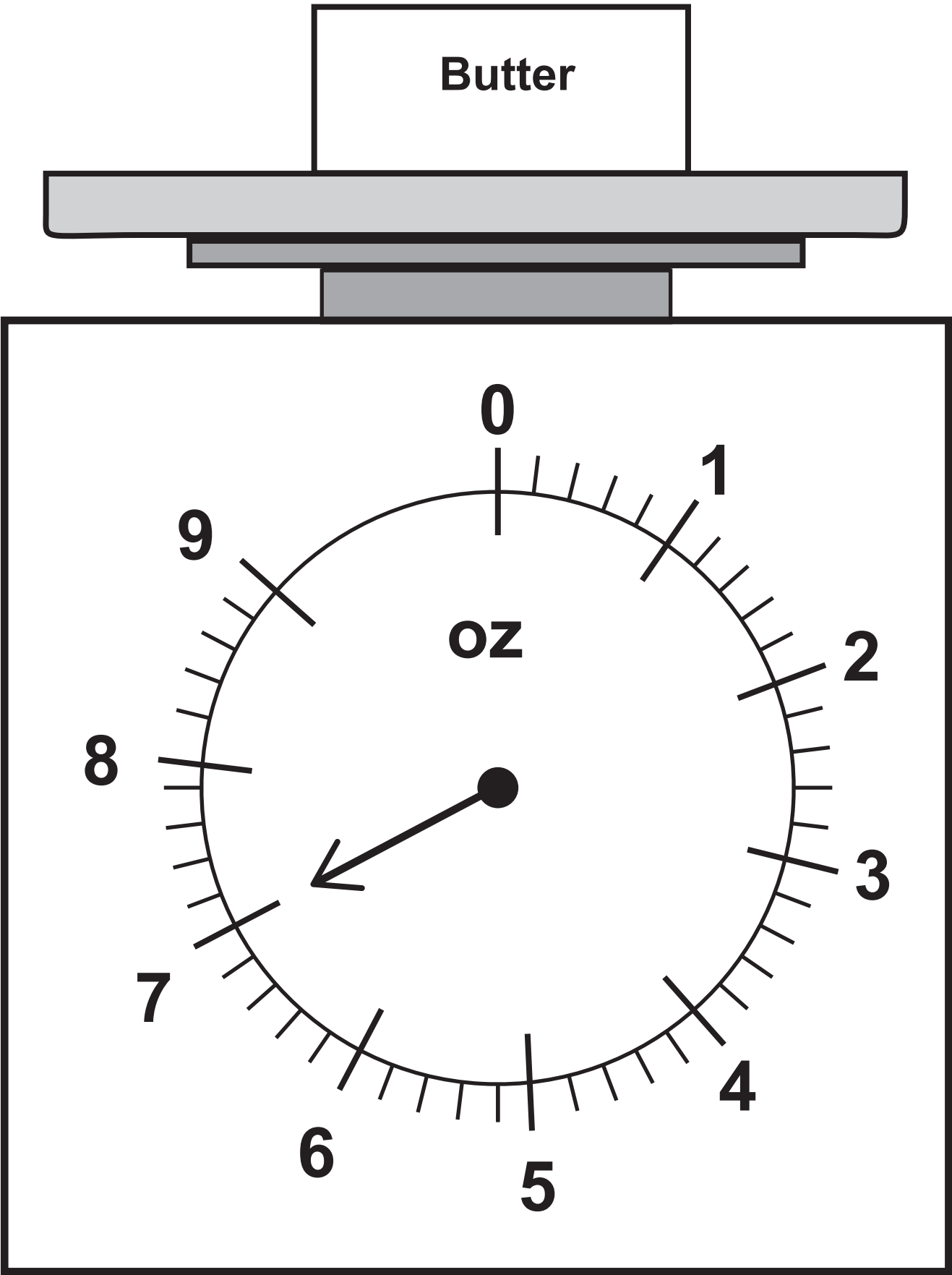
Question 4 (b)



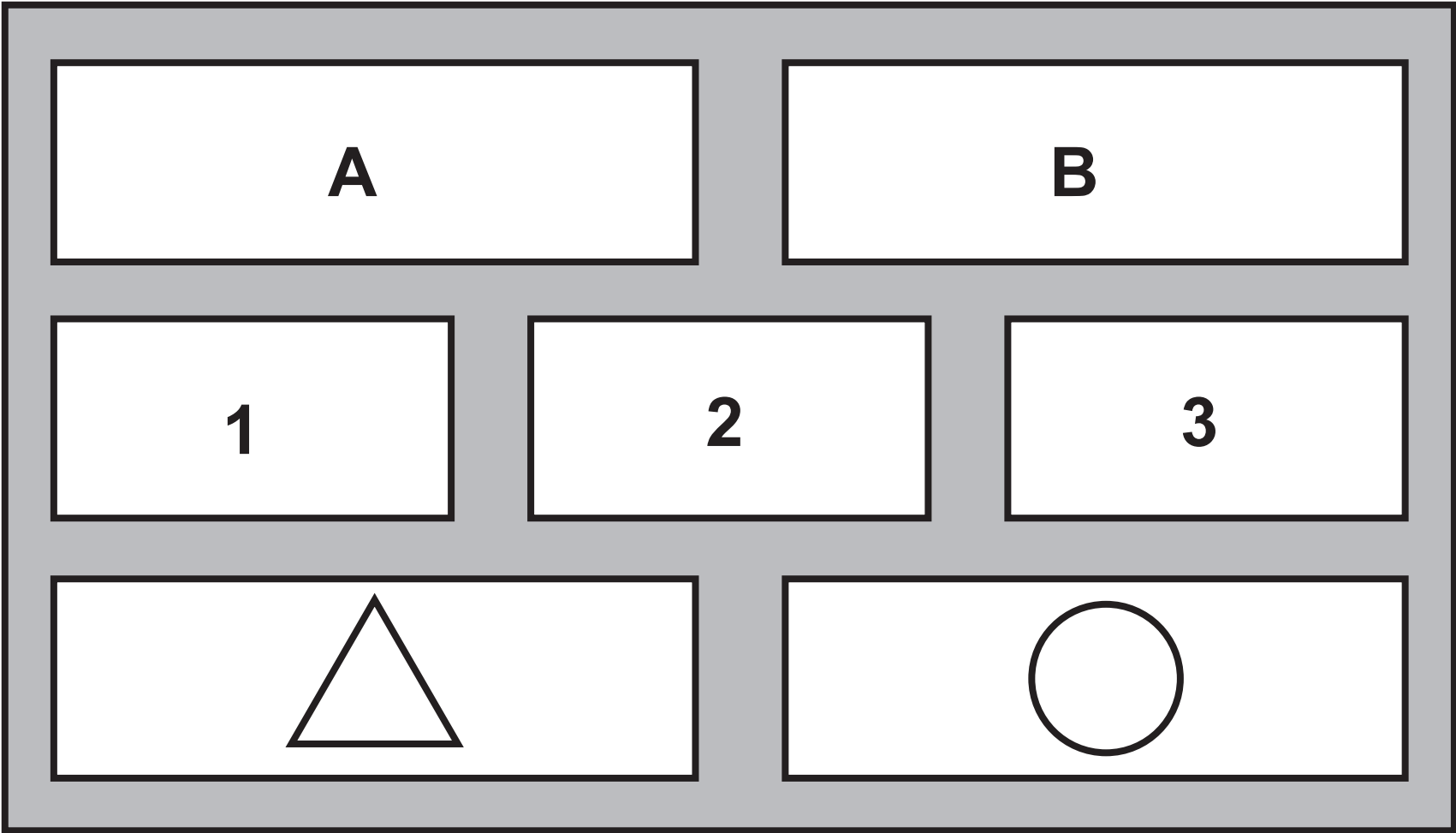
Question 4 (d)



Question 5 (c) (i)



Question 6



Question 7

Table

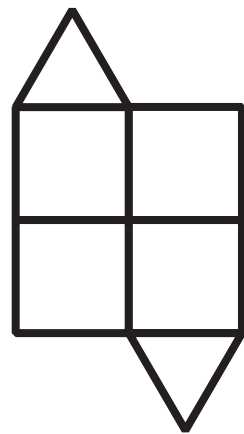
Food Group	Proportion of diet
Whole grains and pasta	36%
Vegetables and fruit	30%
Fish, meat, and dairy products	20%
Olive oil	9%
Sugar	5%

Question 9

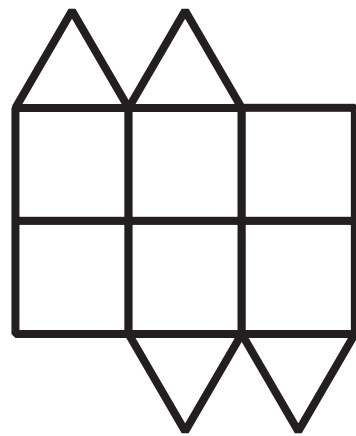
New Plymouth	357	797			
Rotorua	234	670	290		
Thames	114	550	414	349	
Wellington	658	1094	718	323	380
Whakatane	298	737	205	308	165
	Auckland	Cape Reinga	Hicks Bay	Napier	Taupo

Question 10 (a)

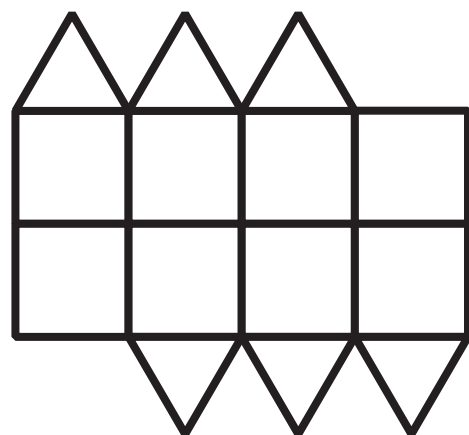
Pattern 1



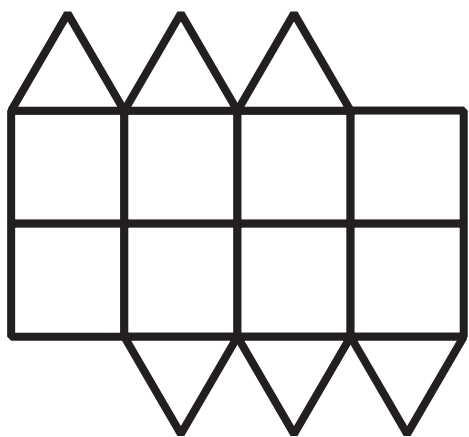
Pattern 2



Pattern 3

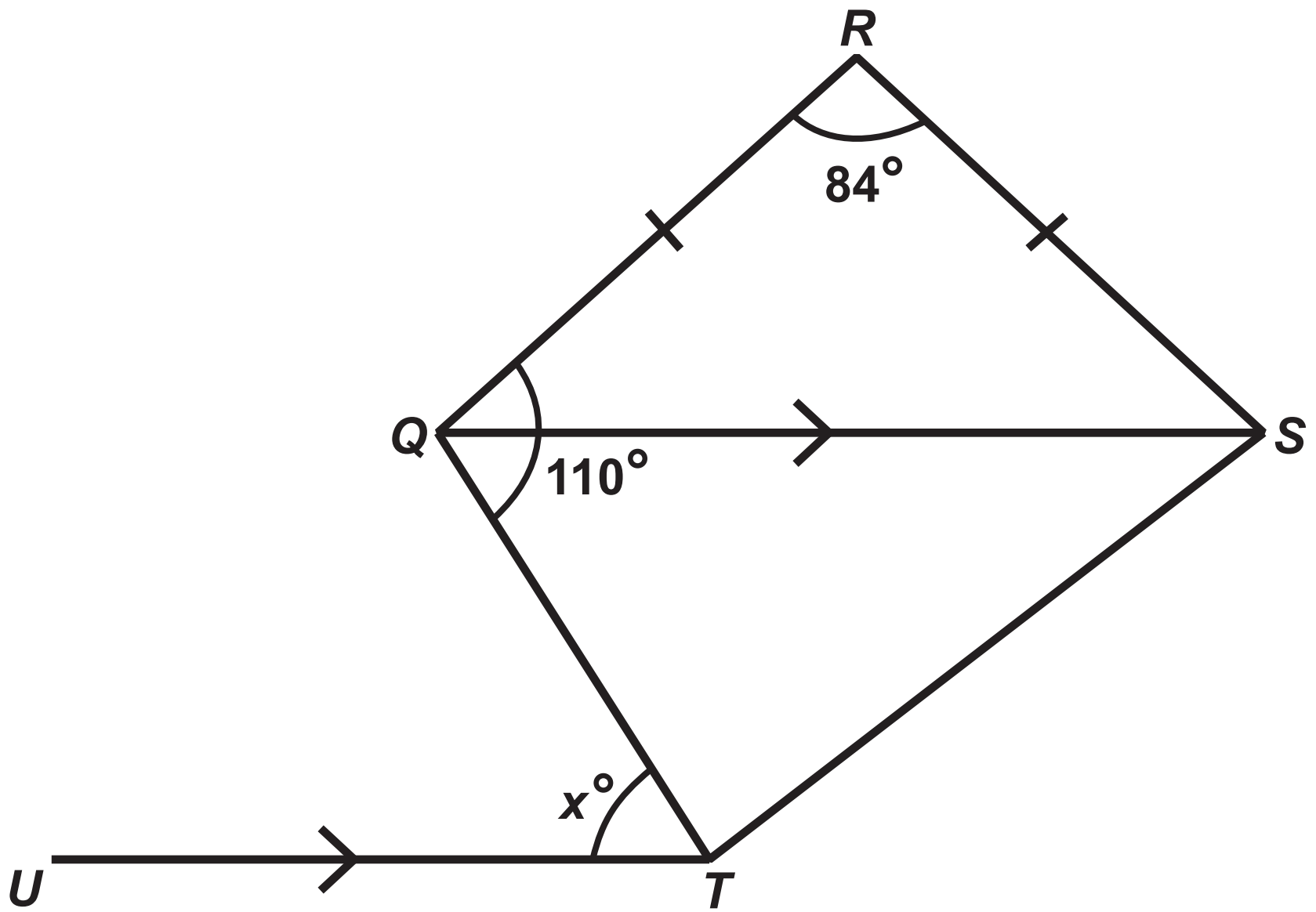


Incomplete
Pattern 5



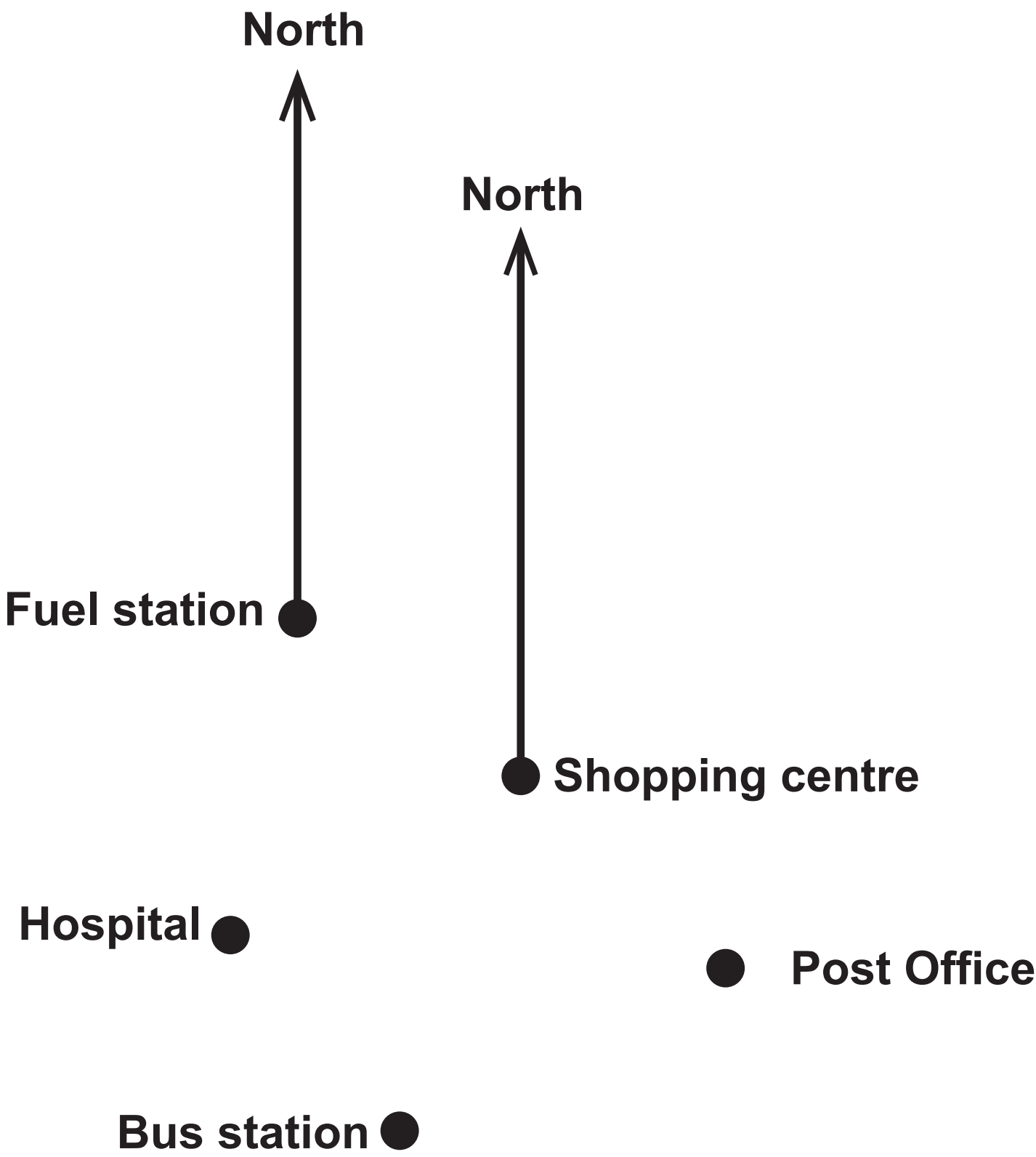
Question 12 (b)

Diagram NOT drawn to scale

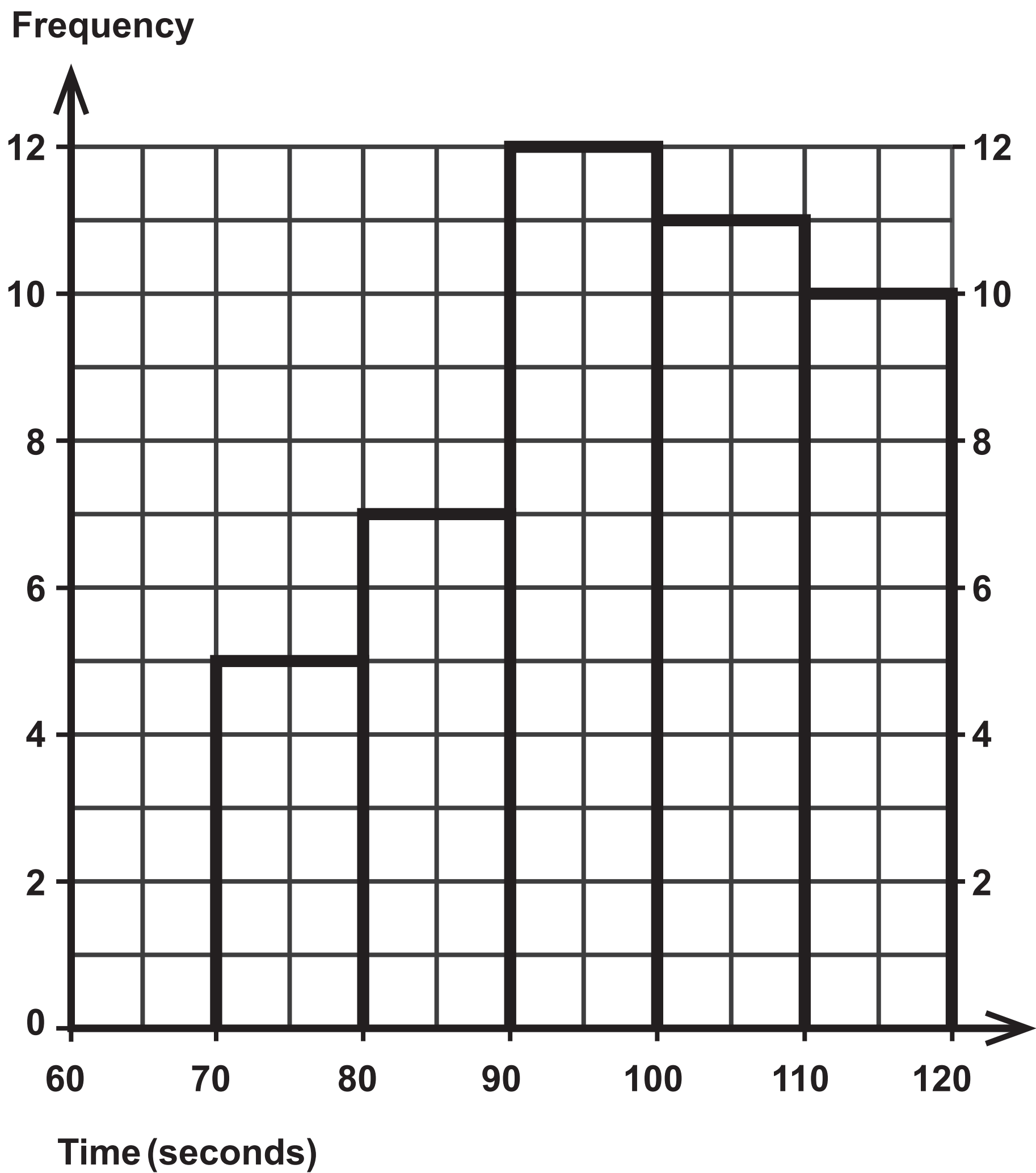


Question 14

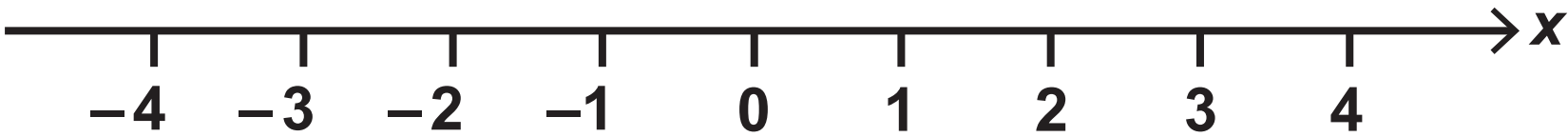
Scale 1 : 24 000



Question 16

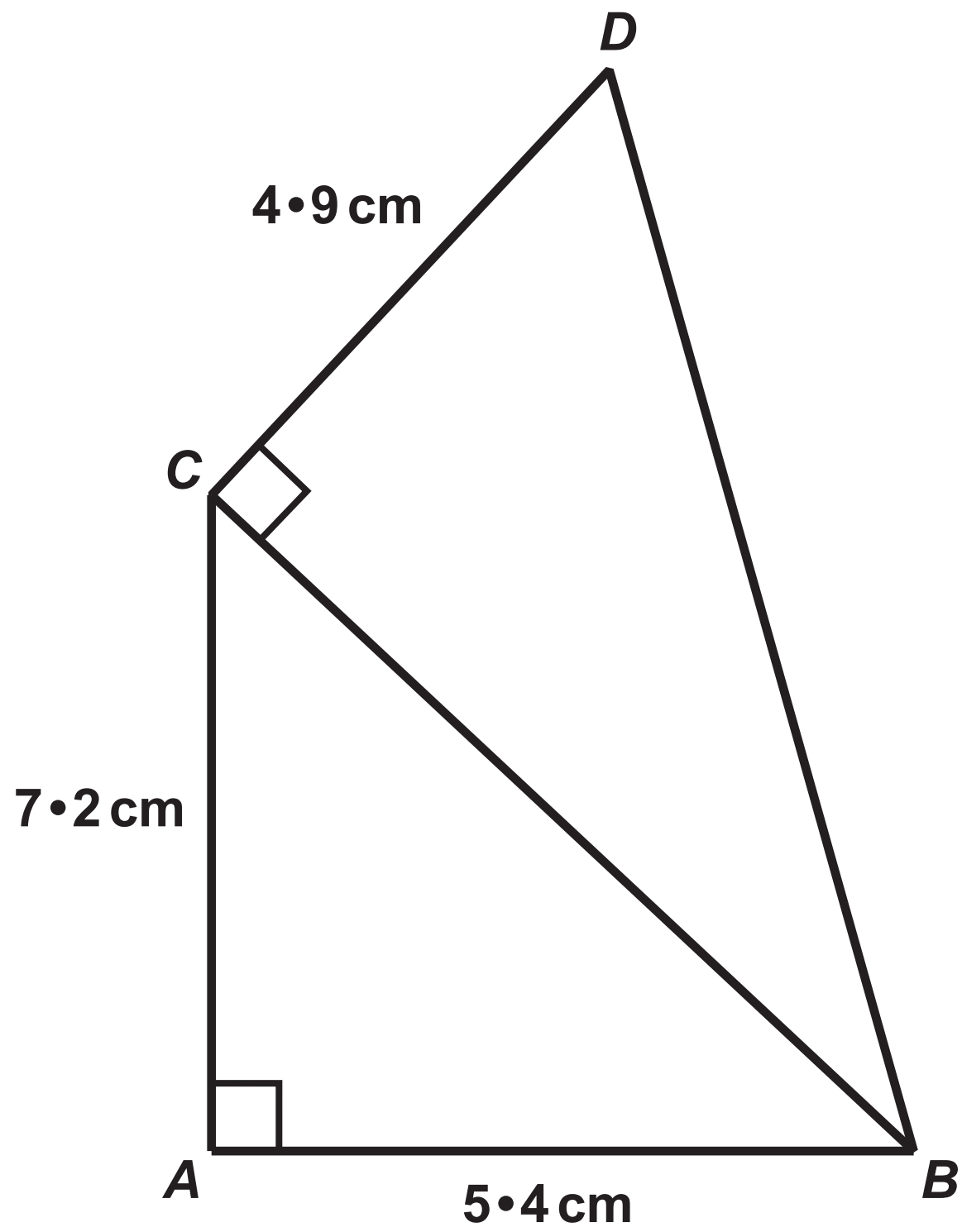


Question 17 (c)

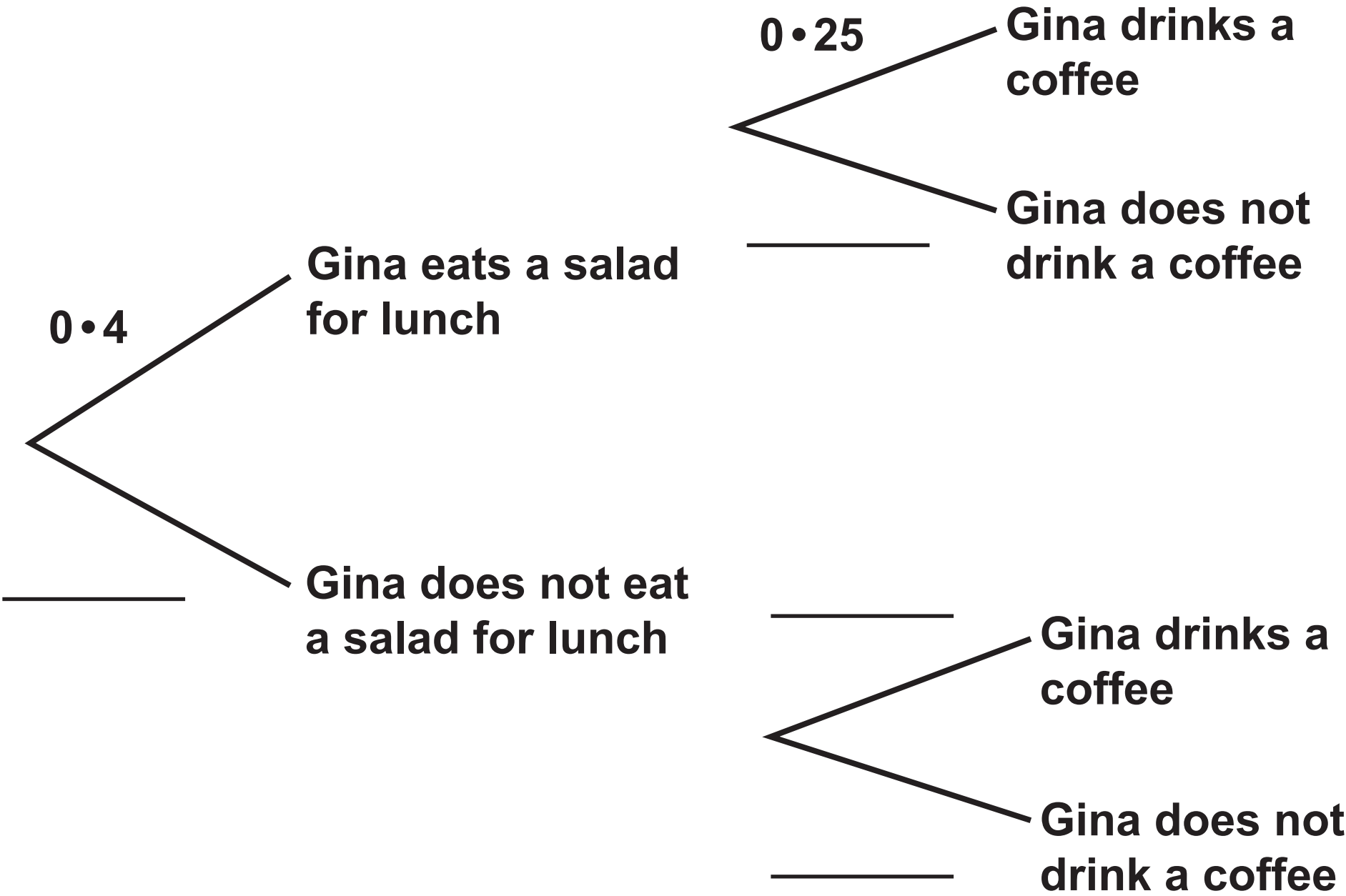


Question 18

Diagram NOT drawn to scale

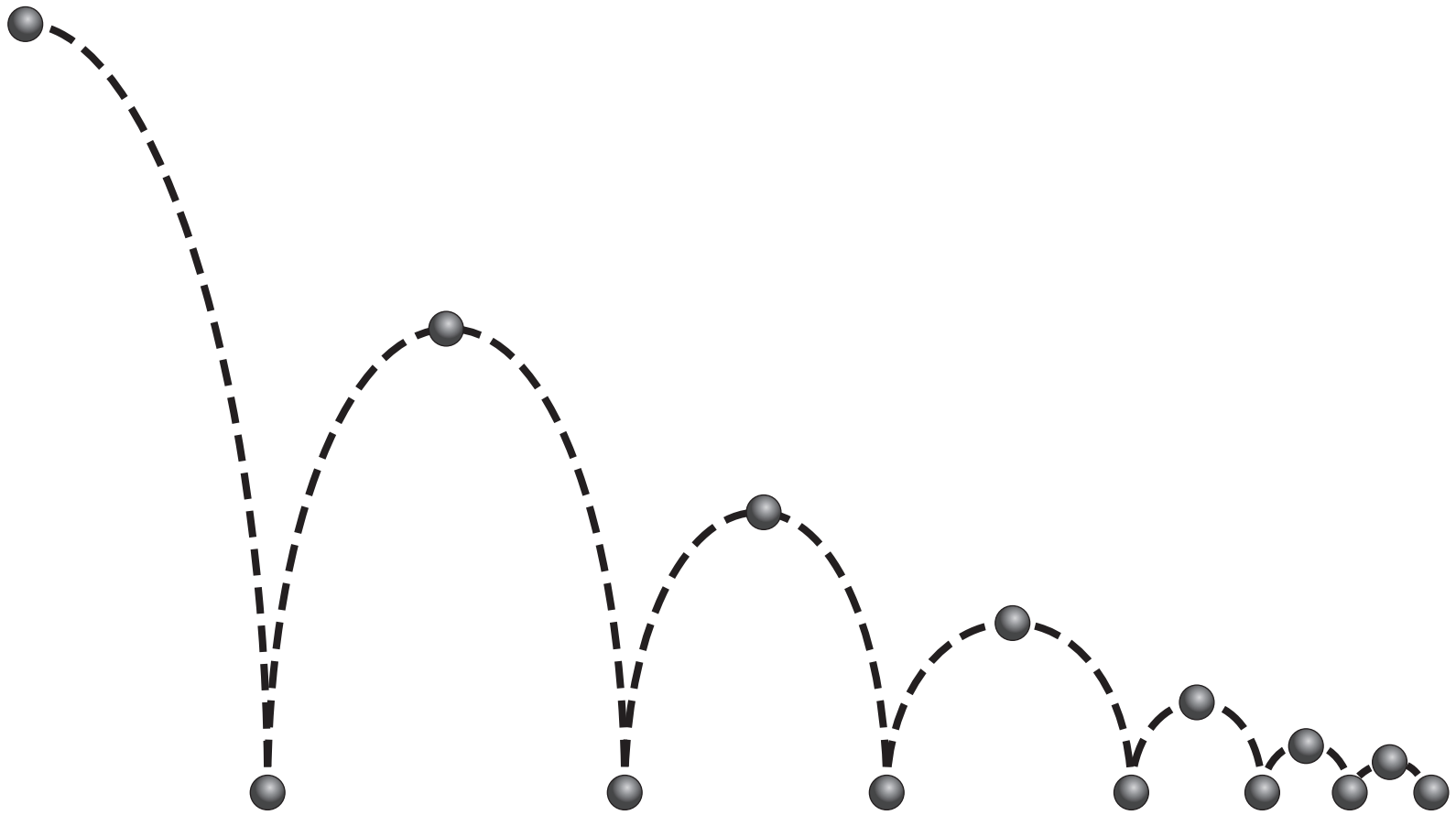


Question 19 (a)

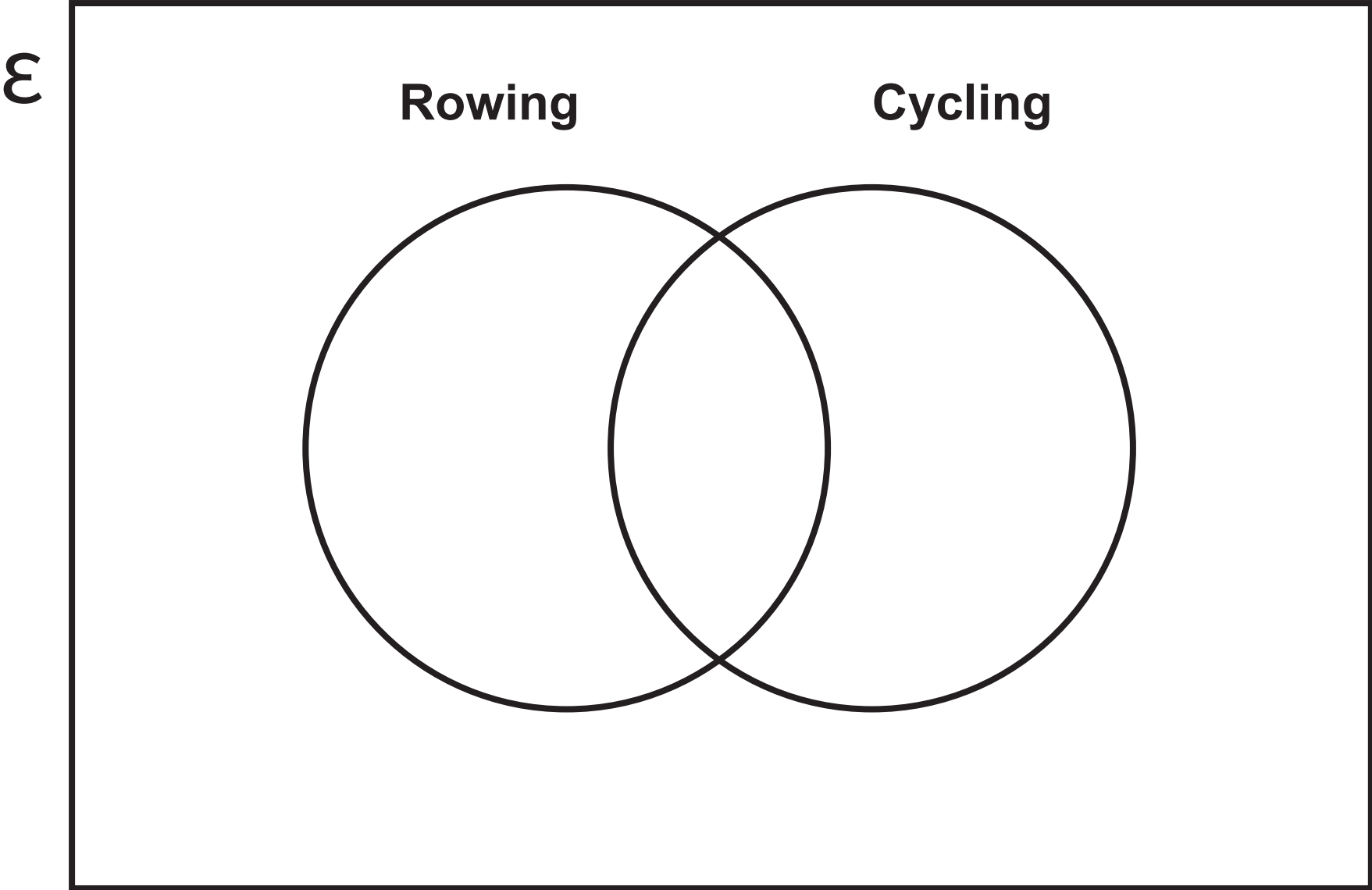


Question 20

Diagram NOT drawn to scale



Question 21 (a)



C300U20-1A

MONDAY, 3 JUNE 2024 – MORNING

MATHEMATICS

FOUNDATION TIER

Additional Formulae

PERIMETER, AREA AND VOLUME

Where a and b are the lengths of the parallel sides and h is their perpendicular separation:

$$\text{Area of a trapezium} = \frac{1}{2} (a + b)h$$

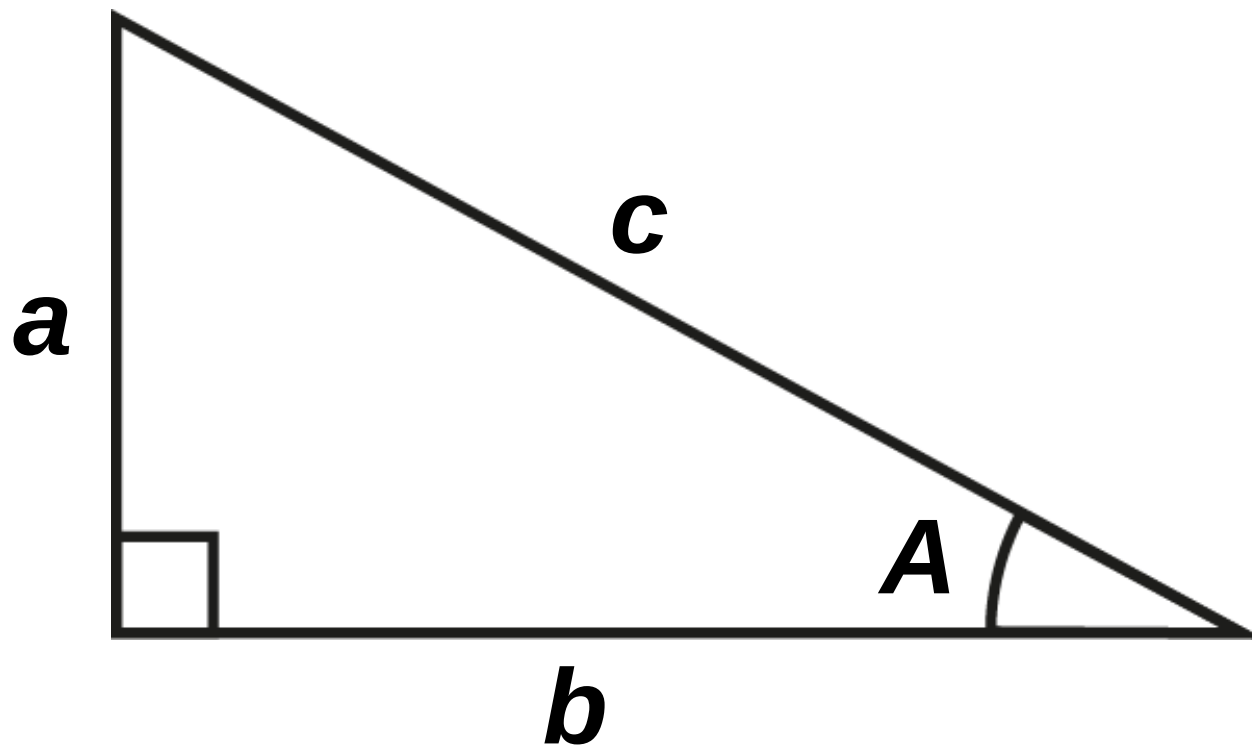
Volume of a prism =
area of cross section $\times$ length

Where r is the radius and
 d is the diameter:

$$\text{Circumference of a circle} = 2\pi r = \pi d$$

$$\text{Area of a circle} = \pi r^2$$

PYTHAGORAS' THEOREM AND TRIGONOMETRY



In any right – angled triangle where a , b and c are the length of the sides and c is the hypotenuse:

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

In any right – angled triangle ABC where a , b and c are the length of the sides and c is the hypotenuse:

$$\sin A = \frac{a}{c} \quad \cos A = \frac{b}{c} \quad \tan A = \frac{a}{b}$$

COMPOUND INTEREST

Where P is the principal amount,
 r is the interest rate over a given period
and n is number of times that the
interest is compounded:

$$\text{Total accrued} = P \left(1 + \frac{r}{100} \right)^n$$

PROBABILITY

Where $P(A)$ is the probability of
outcome A and $P(B)$ is the probability
of outcome B :

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

MATHEMATICS

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

You must not write on these formulae 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 constant acceleration,
 u is initial velocity, v is final velocity,
 s is displacement from the position
when $t = 0$ and t is time taken:

$$v = u + at$$

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

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