GCSE

3310U30-1

FRIDAY, 19 MAY 2023 – MORNING

MATHEMATICS – NUMERACY

UNIT 1: NON – CALCULATOR

INTERMEDIATE TIER

1 hour 45 minutes plus your additional time allowance

THE USE OF A CALCULATOR IS NOT PERMITTED IN THIS EXAMINATION

Surname: _____

First name(s): _____

Centre Number: _____

Candidate Number: 0 _____

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	5	
2.	8	
3.	6	
4.	5	
5.	5	
6.	3	
7.	6	
8.	7	
9.	11	
10.	10	
11.	4	
12.	3	
13.	7	
Total	80	

(Turn over)

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.

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 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. Question numbers must be given for the work written on the additional page(s).

Take π as 3·14

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.

In question 1, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

(Turn over)

1. **IN THIS QUESTION, YOU WILL BE ASSESSED ON THE QUALITY OF YOUR ORGANISATION, COMMUNICATION AND ACCURACY IN WRITING.**

Katelyn is buying some medicine.

She has the following information:

Small bottle of medicine **30 ml for £1.20**
Medium bottle of medicine **40 ml for £1.56**
Large bottle of medicine **50 ml for £2.25**

continued on the next page . . .

Question 1 continued

Which size bottle of medicine offers the best value for money?

You must show all your working.

(Turn over)

8

[3 marks + 2 marks OCW]

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

A survey was carried out in the U.S.A.

743 teenagers were interviewed.

They were asked what type of information they posted on social media.

The results were displayed on the internet, as shown in the diagram.

continued on the next page . . .

Question 2 continued

2. (a) How many times bigger is the percentage of the teenagers who posted about their family than the percentage who posted about their religious beliefs?

[1 mark]

continued on the next page . . .

Question 2 continued

2. (b) What fraction of these teenagers posted about their emotions and feelings? Give your answer in its simplest form.

[1 mark]

continued on the next page . . .

Question 2 continued

2. (c) Dewi looks at the type of information posted by these teenagers.

What is the modal type of information?

The modal type of information is

_____

[1 mark]

continued on the next page . . .

Question 2 continued

2. (d) What information would have been needed in the original data so that the following hypothesis could be tested?

In the U.S.A., teenage girls post about family more often than teenage boys.

[1 mark]

Question 2 continued

2. (e) How many of these 743 teenagers posted about their religious beliefs?

You must show all your working.

15

[3 marks]

continued on the next page . . .

Question 2 continued

2. (f) Lottie is confused by the data in the diagram.

She says,

“This diagram can’t be right, as all the bars don’t add up to 100%”

The diagram is correct.
Explain why the bars do not add up to 100%

[1 mark]

3. HydraDwr is a bathroom and plumbing shop.

(a) HydraDwr sells baths and sets of taps.

One day, 80 customers bought:

- one bath and one set of taps, or
- one bath, or
- one set of taps.

continued on the next page . . .

Question 3 (a) continued

Look at the diagram for Question 3 (a) in the separate Diagram Booklet.

The diagram is a Venn diagram.

The Venn diagram shows the number of customers who bought these items.

(i) How many baths did these customers buy?

[1 mark]

Question 3 (a) continued

3. (a) (ii) A bath costs £180

A set of taps cost £60

Calculate the total cost of the baths and sets of taps bought by these 80 customers.

[3 marks]

Question 3 (b) continued

3. (b) HydraDwr also sells pipes and couplings to join the pipes.

(i) Look at the diagram for Question 3 (b) (i) in the separate Diagram Booklet.

3 pipes are joined together using 2 couplings, as shown in the diagram.

How many couplings are needed to join 6 pipes?

_____

_____

[1 mark]

continued on the next page . . .

Question 3 (b) continued

3. (b) (ii) An equation is used to work out the number of couplings needed to join pipes.

P **= the number of pipes**

C **= the number of couplings**

continued on the next page . . .

Question 3 (b) (ii) continued

Which of the following equations can be used to calculate the number of couplings needed?

Circle your answer.

$C = 2P$	$C = P + 1$	$C = P - 1$
$C + P = 1$	$C = P$	

[1 mark]

4. Alice used 400 kWh of electricity.

Electricity was charged at 32p per kWh.

The standing charge was £62

VAT at 5% is payable on ALL the charges.

Calculate Alice's electricity bill.

You must show all your working.

(Turn over)

(Turn over)

[5 marks]

5. Lynette is ordering a T – shirt.

She wants her initial, L, printed on the T – shirt.

Look at the diagram for Question 5 in the separate Diagram Booklet.

The diagram is NOT drawn to scale.

The diagram shows Lynette's design.

Details of Lynette's design are given below.

- The height is twice the width.
- The height is 10 cm.

continued on the next page . . .

Question 5 continued

The cost of printing is 50p for an area of 2 cm^2

How much will it cost Lynette to have her design printed on a T – shirt?

(Turn over)

[5 marks]

6. A survey was carried out to find how often primary school children play board games.

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

This questionnaire was designed for primary school children to answer.

Two questions were asked.

continued on the next page . . .

Question 6 continued

6. (a) For each question, give ONE reason why it is NOT suitable.

Q1. _____

Q2. _____

[2 marks]

continued on the next page . . .

Question 6 continued

6. (b) The survey was carried out by leaving copies of the questionnaire in the local supermarket.

Give ONE criticism of how the survey was carried out.

[1 mark]

7. Mari and Huw share a prize of £2700 in the ratio 4 : 5 respectively.

Mari decides to donate 24% of her share of the prize to charity.

Huw decides to give the same amount of money as Mari to charity.

What fraction of Huw's share of the prize money does he give to charity?

Express your answer in its simplest form.

You must show all your working.

(Turn over)

(Turn over)

[6 marks]

8. Look at the diagram for Question 8 in the separate Diagram Booklet.

The diagram is a scatter diagram.

The scatter diagram shows the length and width of some television remote handsets.

(a) Two of the remotes have the same width.

Write down the width and lengths of these remotes.

Width _____ cm

Lengths are _____ cm

and _____ cm.

[2 marks]

Question 8 continued

8. (b) Consider the remote with a width of 4•5 cm.

Write down the ratio of the width of this remote to its length.

Give your answer in its simplest form.

[2 marks]

Question 8 continued

8. (c) How is it best to describe the correlation seen in this scatter diagram?

[1 mark]

(d) Draw a line of best fit on the scatter diagram.

[1 mark]

continued on the next page . . .

Question 8 continued

8. (e) Is it CERTAIN that another television remote with length 18·5 cm will have a width in the range 3 cm to 4 cm?

Yes ☐ **No** ☐

You must give a reason for your answer.

[1 mark]

9. (a) Hesta and Walt hire a canal boat in Llangollen for their holiday.

Look at the diagram for Question 9 (a) in the separate Diagram Booklet.

The diagram is a travel graph.

Hesta records their distance along the canal from Llangollen between 8 a.m. and 4 p.m.

This is shown in the travel graph.

continued on the next page . . .

Question 9 (a) continued

9. (a) (i) During the day, Hesta and Walt made stops by the side of the canal.

At what time did Hesta and Walt first stop at the side of the canal?

[1 mark]

continued on the next page . . .

Question 9 (a) continued

9. (a) (ii) Between which two times were Hesta and Walt travelling the fastest? Circle your answer.

08:00 and 08:30
08:30 and 09:00
10:00 and 11:00
12:30 and 14:00
15:00 and 16:00

[1 mark]

continued on the next page . . .

Question 9 (a) continued

9. (a) (iii) What is the total distance Hesta and Walt travelled in the boat between 8 a.m. and 4 p.m.?

Circle your answer.

3 km	9 km	12 km	15 km	18 km

[1 mark]

continued on the next page . . .

Question 9 continued

9. (b) (i) Look at the diagram for Question 9 (b) (i) in the separate Diagram Booklet.

The diagram shows a map.

Hesta and Walt visit Chirk Castle.

Which is the best estimate for the bearing of Llangollen from Chirk Castle?

Circle your answer.

060°	240°	120°	340°	300°

[1 mark]

continued on the next page . . .

Question 9 (b) continued

9. (b) (ii) Look at the diagram for Question 9 (b) (ii) in the separate Diagram Booklet.

The diagram shows a smaller map of the same area.

The direct straight – line distance between Llangollen and the Pontcysyllte Aqueduct is 5•6 km.

On the map this distance is 5•6 cm.

continued on the next page . . .

Question 9 (b) (ii) continued

What is the scale of the map?

Circle your answer.

1 : 10
1 : 1000
1 : 10 000
1 : 100 000
1 : 1 000 000

[1 mark]

continued on the next page . . .

Question 9 continued

9. (c) The Pontcysyllte Aqueduct was built to carry the Llangollen canal over a valley.

The following facts about the section of the canal over the aqueduct were found on the internet.

- **It has a rectangular uniform cross – section.**
- **It is 300 m in length.**
- **It holds 1 500 000 litres of water.**
- **It takes 2 hours to drain the water.**

continued on the next page . . .

Question 9 (c) continued

9. (c) (i) The section of the canal over the aqueduct is to be drained.

Calculate the number of litres of water that drain from this section of the canal per minute.

You may assume that the water drains from the canal at a constant rate.

You must show all your working.

[3 marks]

Question 9 (c) continued

9. (c) (ii) Calculate the area of the canal's uniform cross – section.

Give your answer in cm^2

[3 marks]

10. (a) A jar contains 300 g of chocolate spread.

In this spread:

- 58% of the mass is pure sugar,
- $\frac{1}{8}$ of the mass is cocoa,
- the mass of the milk powder is $\frac{4}{5}$ of the mass of cocoa,
- the remainder of the 300 g is palm oil.

continued on the next page . . .

Question 10 (a) continued

Calculate the percentage of palm oil in the chocolate spread. You must show all your working.

(Turn over)

[7 marks]

continued on the next page . . .

Question 10 continued

10. (b) A different jar contains 840 g of chocolate spread.

The label on the jar says,

‘Offer: includes 20% extra chocolate spread for free.’

How many grams of chocolate spread did a jar contain before the offer started?

[3 marks]

11. Deva Design Service employs 60 people.

Employees were asked to log on to their computer at 9 a.m. on Thursday.

Look at the diagram for Question 11 in the separate Diagram Booklet. The diagram is a cumulative frequency diagram.

The number of employees logged on was recorded every 10 seconds from 9 a.m. The results are displayed in the cumulative frequency diagram shown.

continued on the next page . . .

Question 11 continued

11. (a) Use the cumulative frequency diagram to estimate the median time taken by the employees to log on.

_____ **seconds**

[1 mark]

continued on the next page . . .

Question 11 continued

11. (b) Deva Design Service has a policy that states the following:

‘90% of employees should be logged on to their computer by 9:01 a.m.’

Show that this policy was met on Thursday.

You must show all your working.

[3 marks]

12. Alan Frames is a company that employs 360 people.

6 of these people are to be selected to discuss changes to the company logo.

The manager has decided to use a systematic sampling method.

He has a numbered list of all 360 people.

continued on the next page . . .

Question 12 continued

12. (a) When using systematic sampling, where in the list SHOULD the manager start his selection of the 6 people?

Tick (✓) ONE from the list below.

The 60th name in the list	
At a randomly chosen name	
First person in the list	
Last person in the list	
A name by any multiple of 60 in the list	

[1 mark]

continued on the next page . . .

Question 12 continued

12. (b) The manager actually starts by selecting the 4th name in his list.

Complete the table provided for Question 12 (b) in the separate Diagram Booklet, to give the position in the list of the 6 people who would be selected using systematic sampling.

[2 marks]

13. Dafydd works in a call centre.

On Monday, he made 200 phone calls. He recorded the length of time he spent on each of these phone calls.

Dafydd noted the following about the times spent on each phone call.

- The greatest time was 2 minutes 10 seconds.
- The range of the times was 2 minutes.
- The median time was 85 seconds.
- The upper quartile was 110 seconds.
- The interquartile range was 70 seconds.

Question 13 continued

13. (a) Using the graph provided for Question 13 (a) in the separate Diagram Booklet, draw a box – and – whisker diagram to represent Dafydd's data.

[4 marks]

continued on the next page . . .

Question 13 continued

13. (b) Dafydd was set a target.

He had to complete half of his phone calls in less than 1 minute 30 seconds each.

By how many seconds did Dafydd beat this target?

Circle your answer.

2 seconds
5 seconds
10 seconds
15 seconds
20 seconds

continued on the next page . . .

[1 mark]

continued on the next page . . .

Question 13 continued

13. (c) On Monday, how many of Dafydd's phone calls lasted less than 110 seconds?

_____ **phone calls**

[2 marks]

END OF PAPER

TOTAL 80 MARKS

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

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

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

GCSE

3310U30-1

FRIDAY, 19 MAY 2023 – MORNING

MATHEMATICS – NUMERACY

UNIT 1: NON – CALCULATOR INTERMEDIATE TIER

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

Diagram Booklet

Surname: _____

First name(s): _____

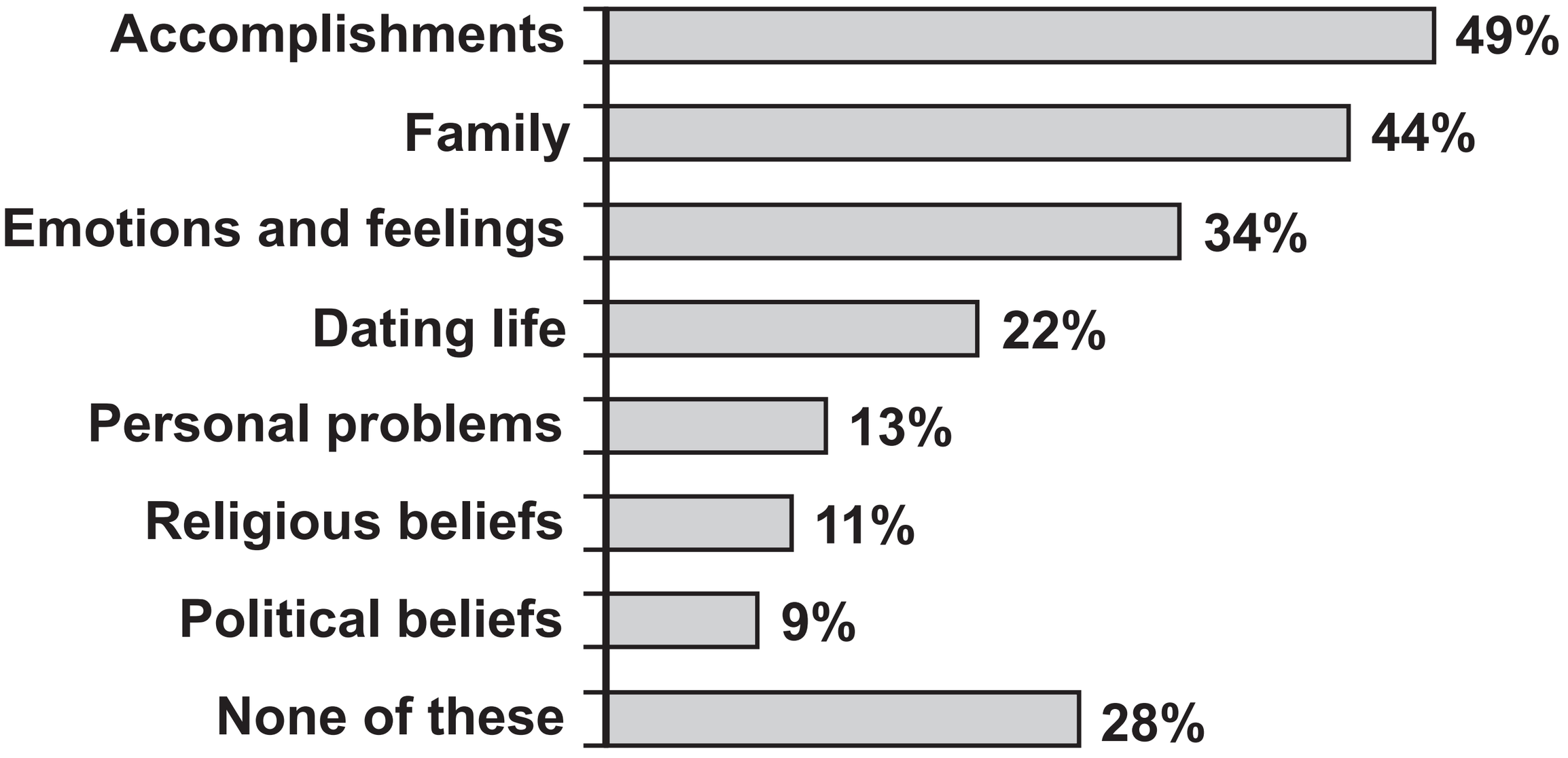
Centre Number: _____

Candidate Number: 0 _____

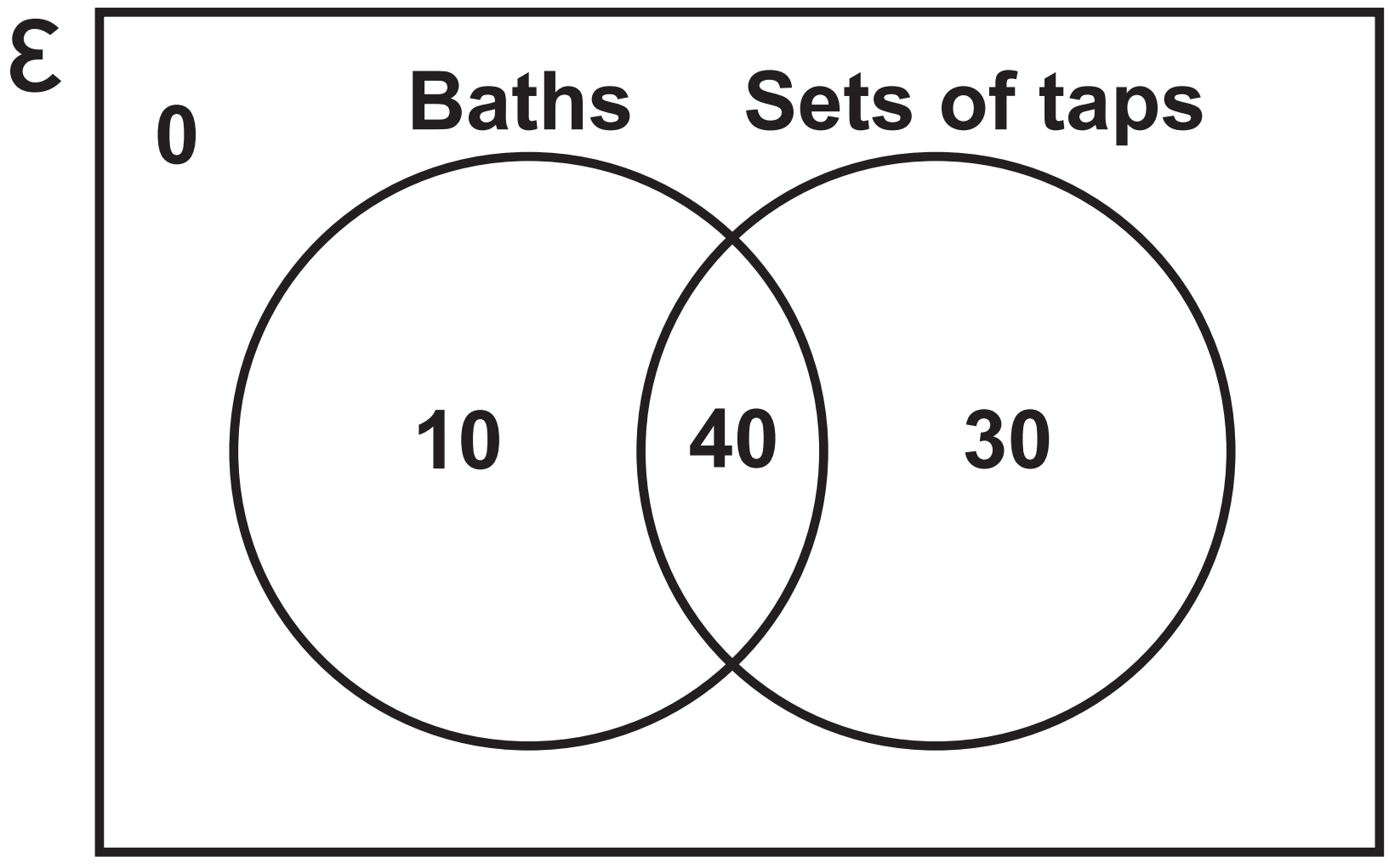
Question 2

POSTS ON SOCIAL MEDIA

Percentage of American teenagers who say they have posted about the following:

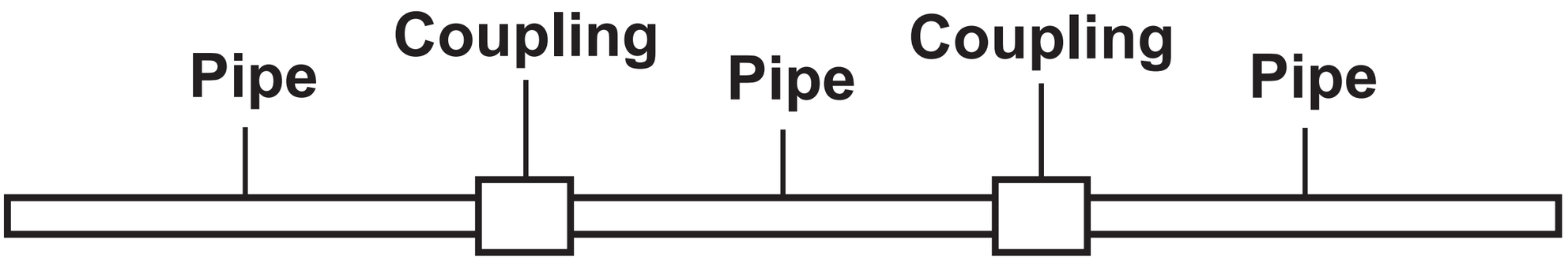


Question 3 (a)



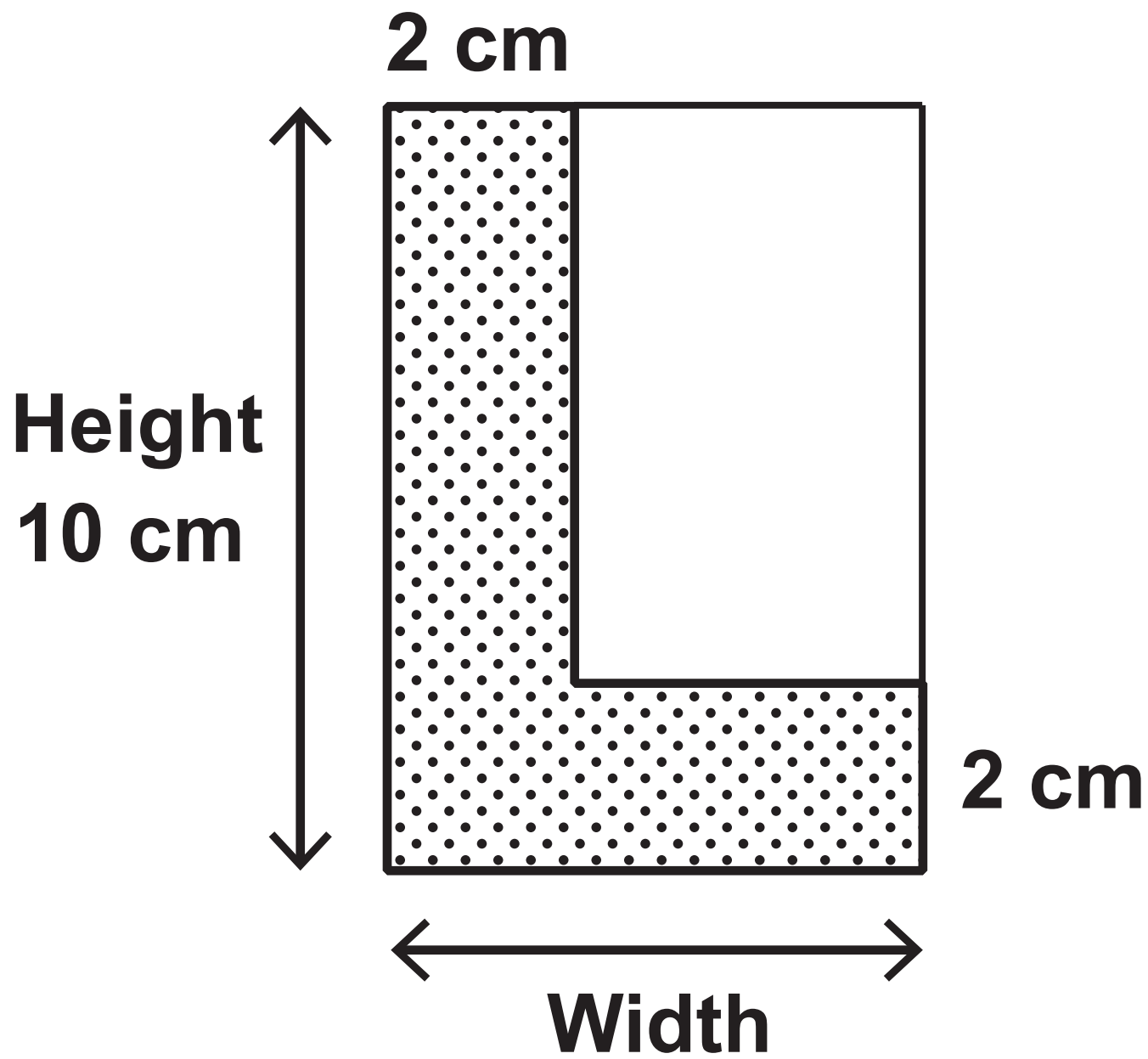
Question 3 (b) (i)

Diagram NOT drawn to scale



Question 5

Diagram NOT drawn to scale



Question 6

Questionnaire

Q1. Do you live within 5 minutes' walking distance of school?

Q2. How often do you play board games?

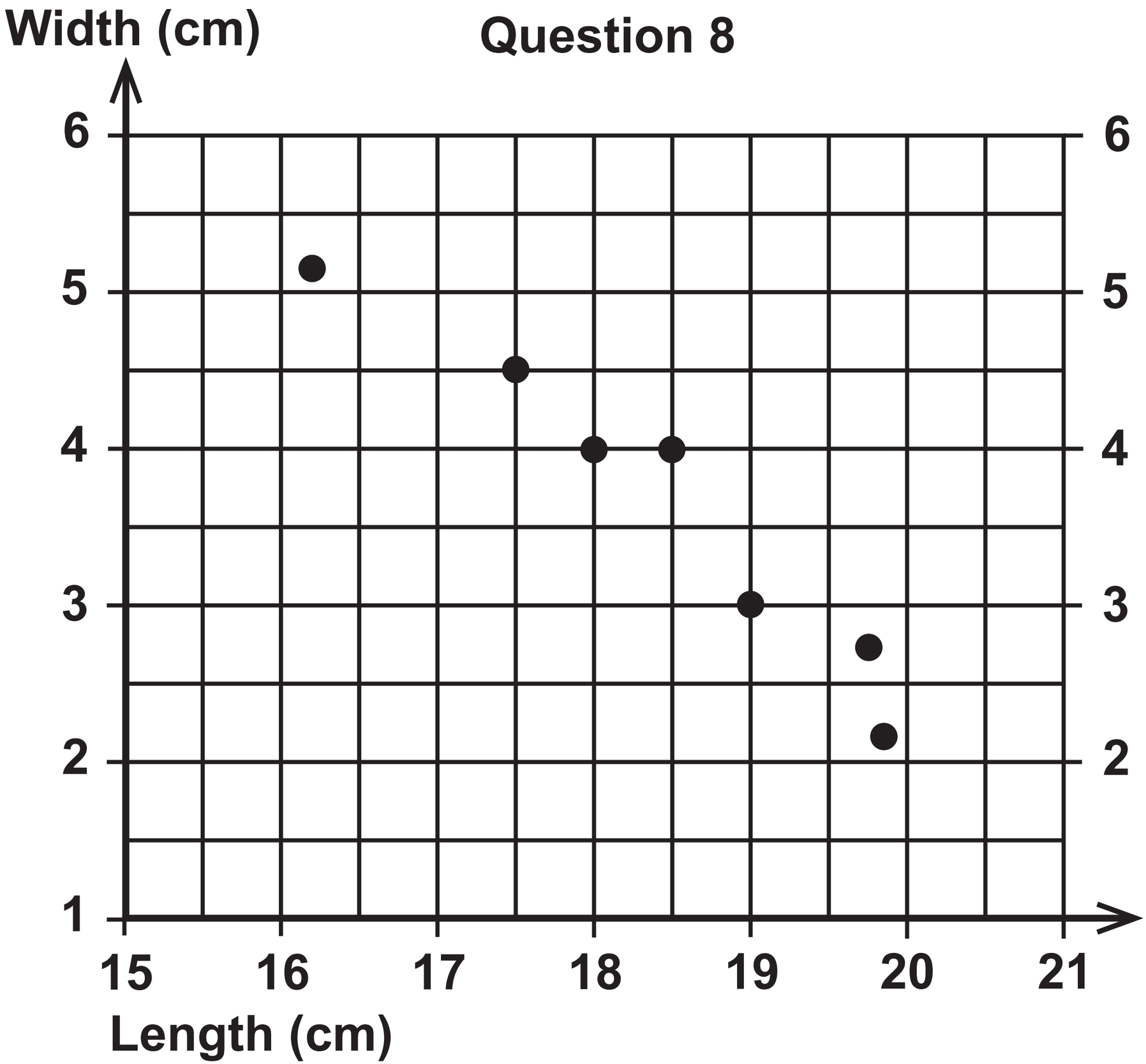
Never ☐

1 – 5 times ☐

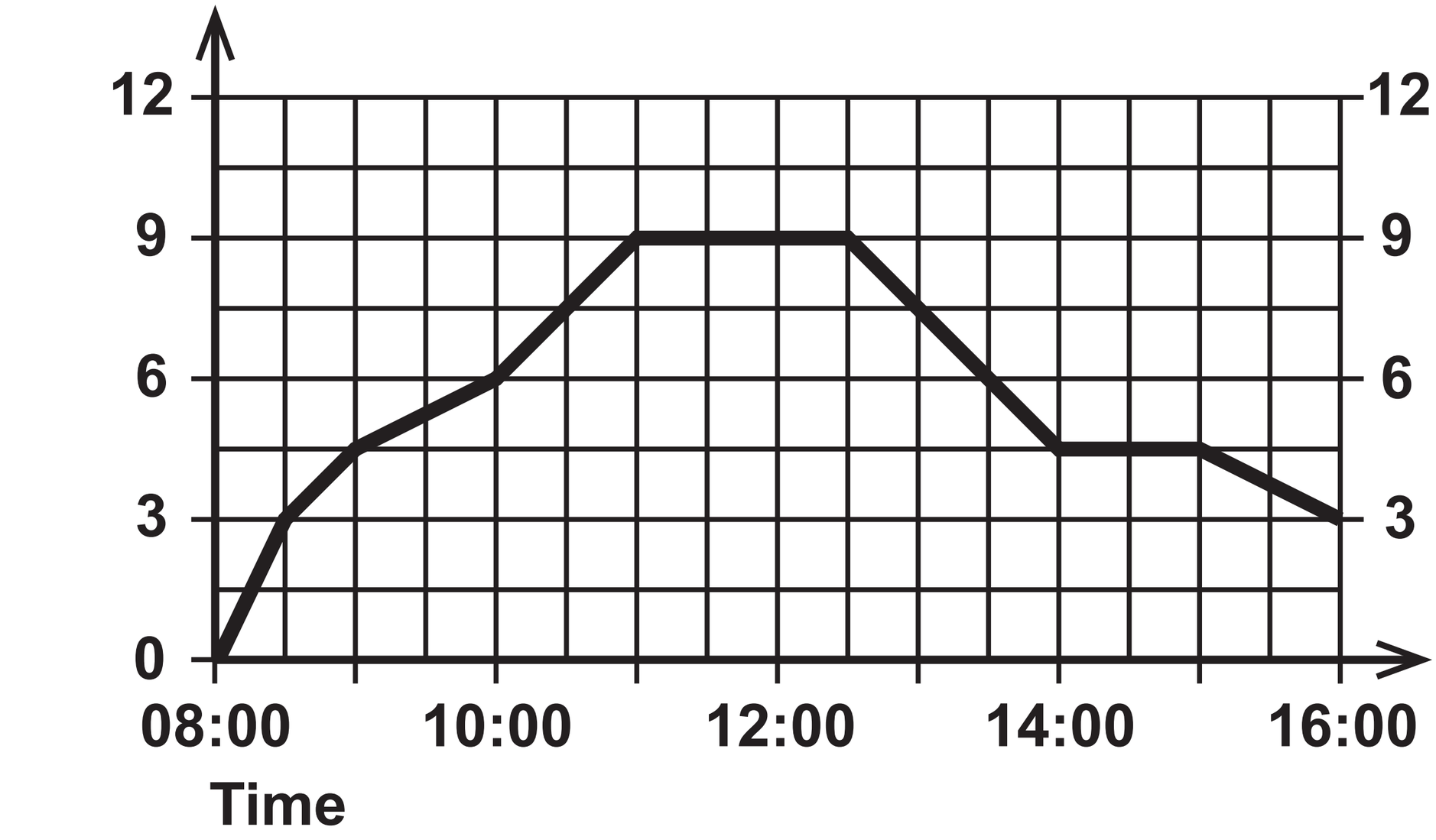
5 – 10 times ☐

More than 10 times ☐

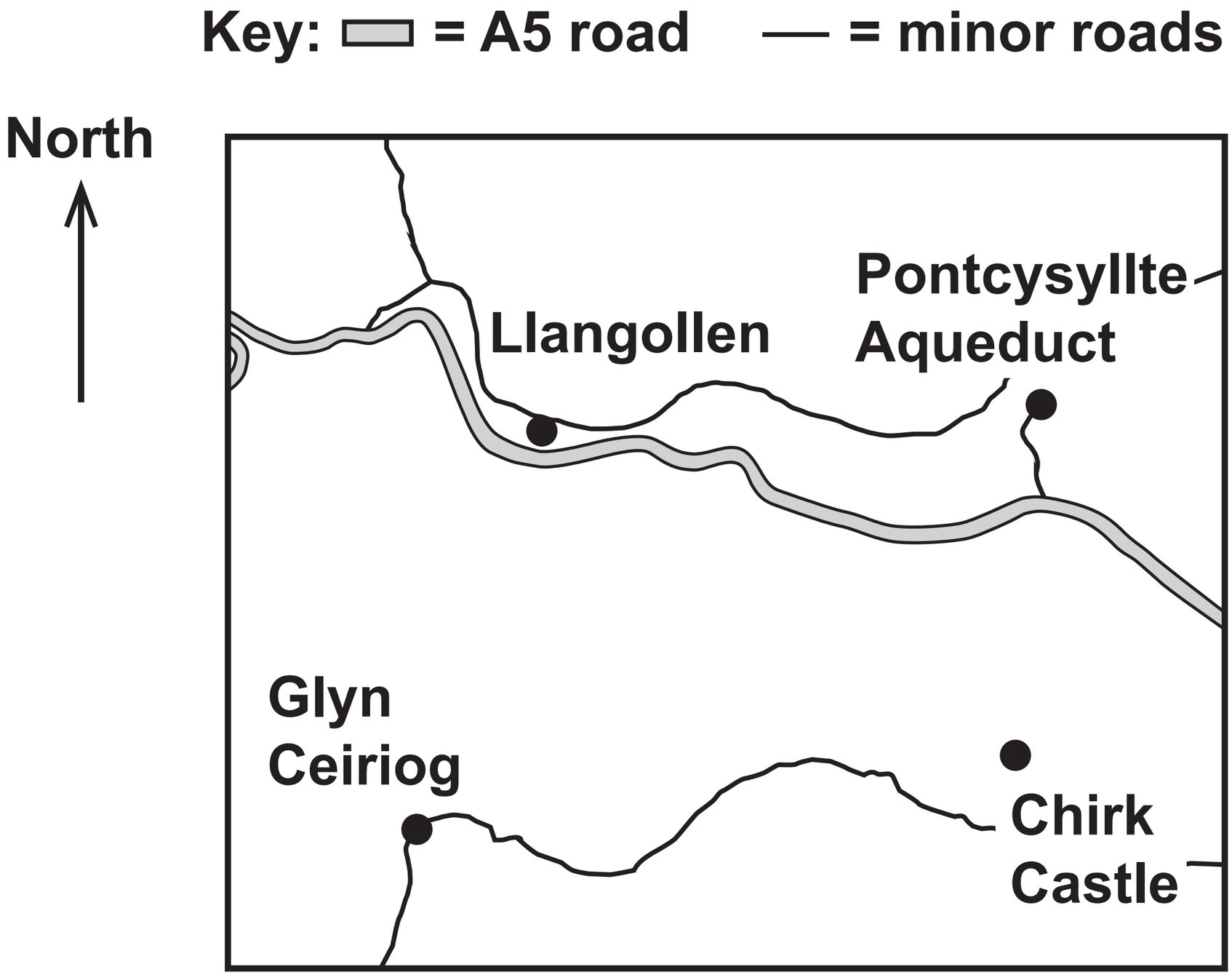
Question 8



Question 9 (a)


Distance along the canal from Llangollen (km)
12
9
6
3
0
12
9
6
3
08:00
10:00
12:00
14:00
16:00
Time

Question 9 (b) (i)



Question 9 (b) (ii)

Key: ▭ = A5 road

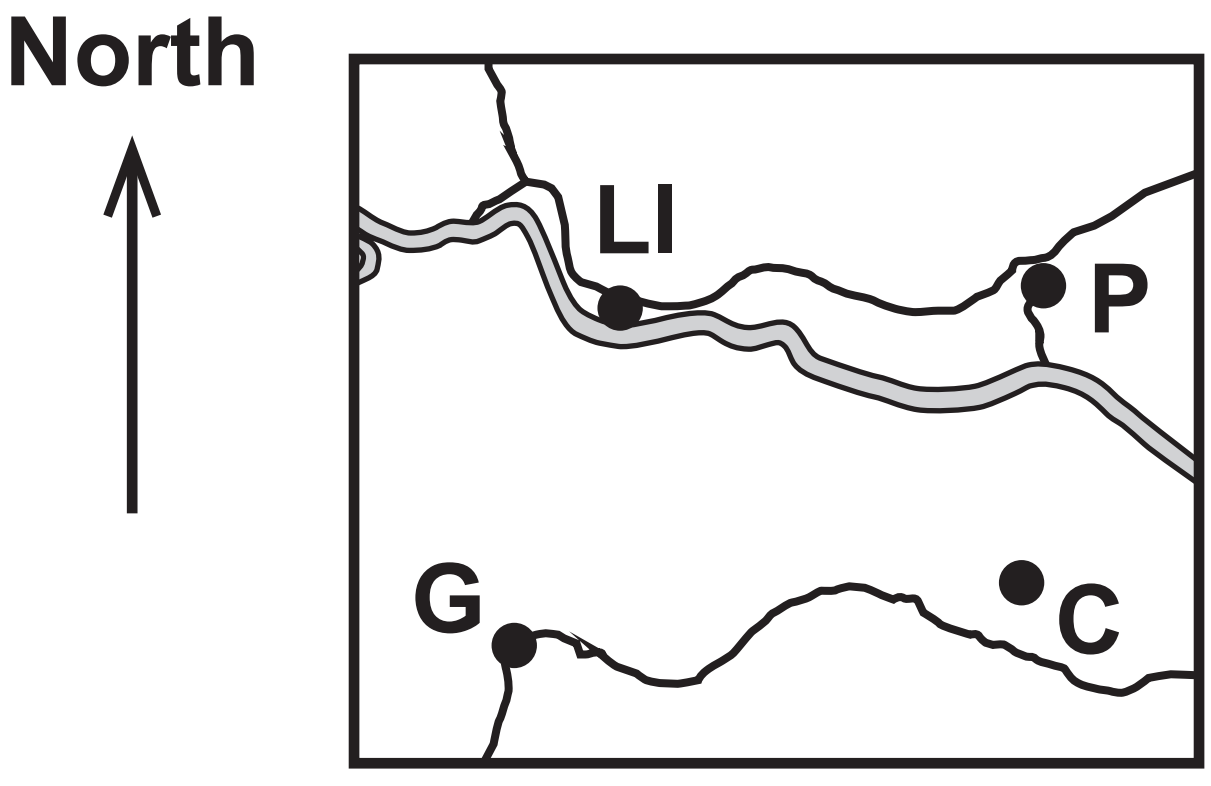
— = minor roads

LI = Llangollen

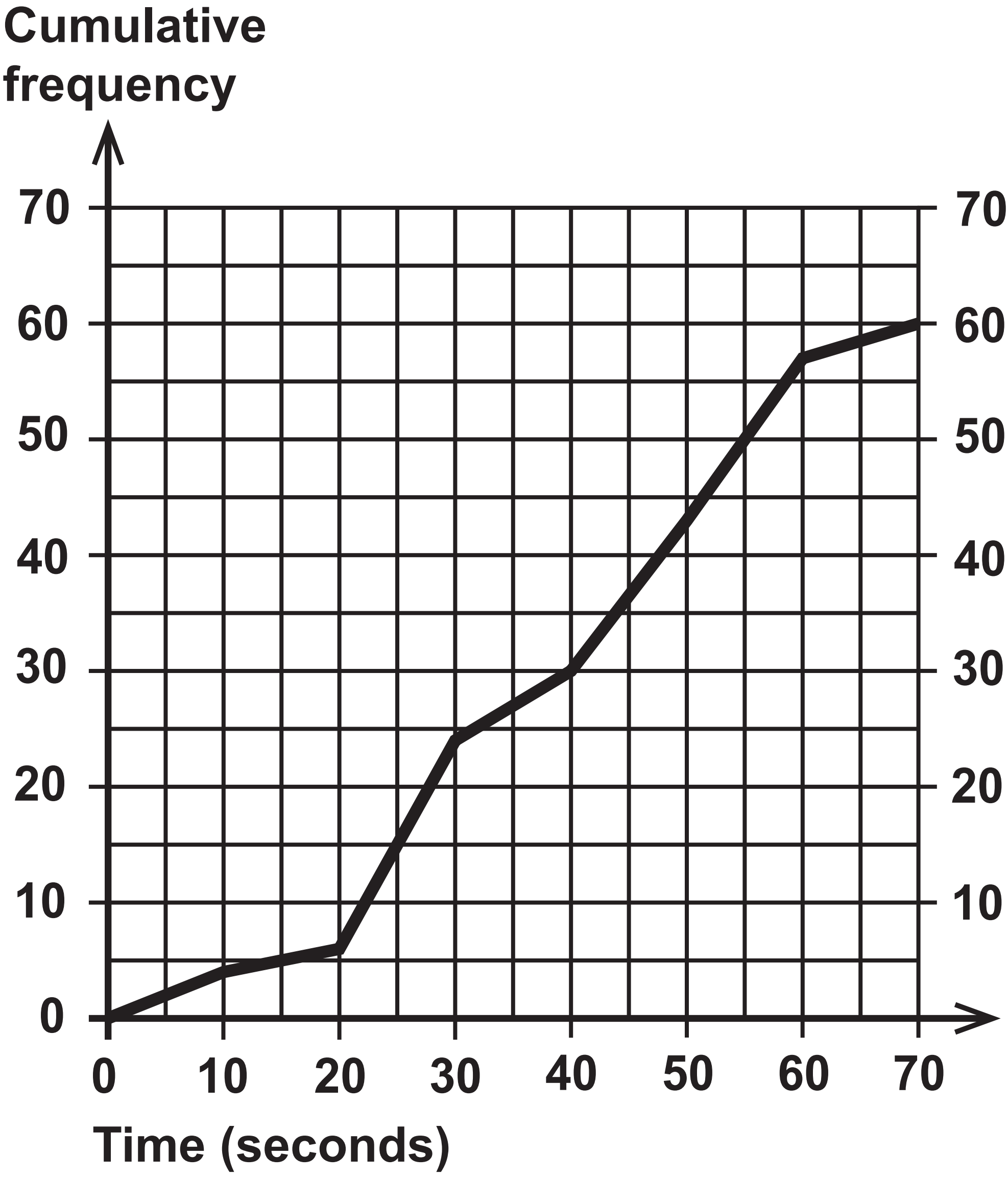
P = Pontcysyllte Aqueduct

C = Chirk Castle

G = Glyn Ceiriog



Question 11


Cumulative frequency
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
Time (seconds)

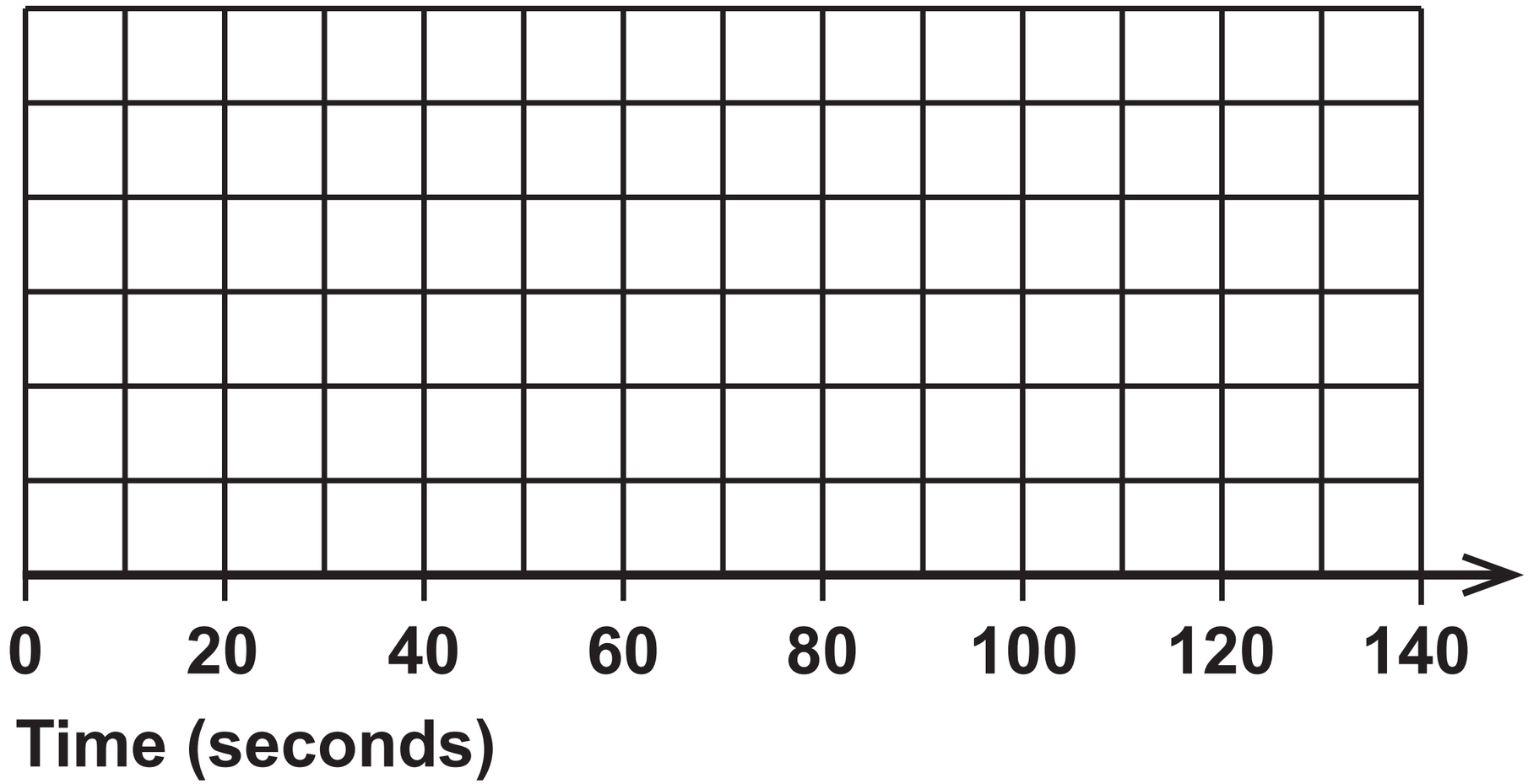
Question 12 (b)

Table

Person selected	Position in the list
1st	4th
2nd	
3rd	
4th	
5th	
6th	

Question 13 (a)

LENGTH OF TIME ON EACH OF 200 PHONE CALLS



GCSE
MATHEMATICS
and
NUMERACY

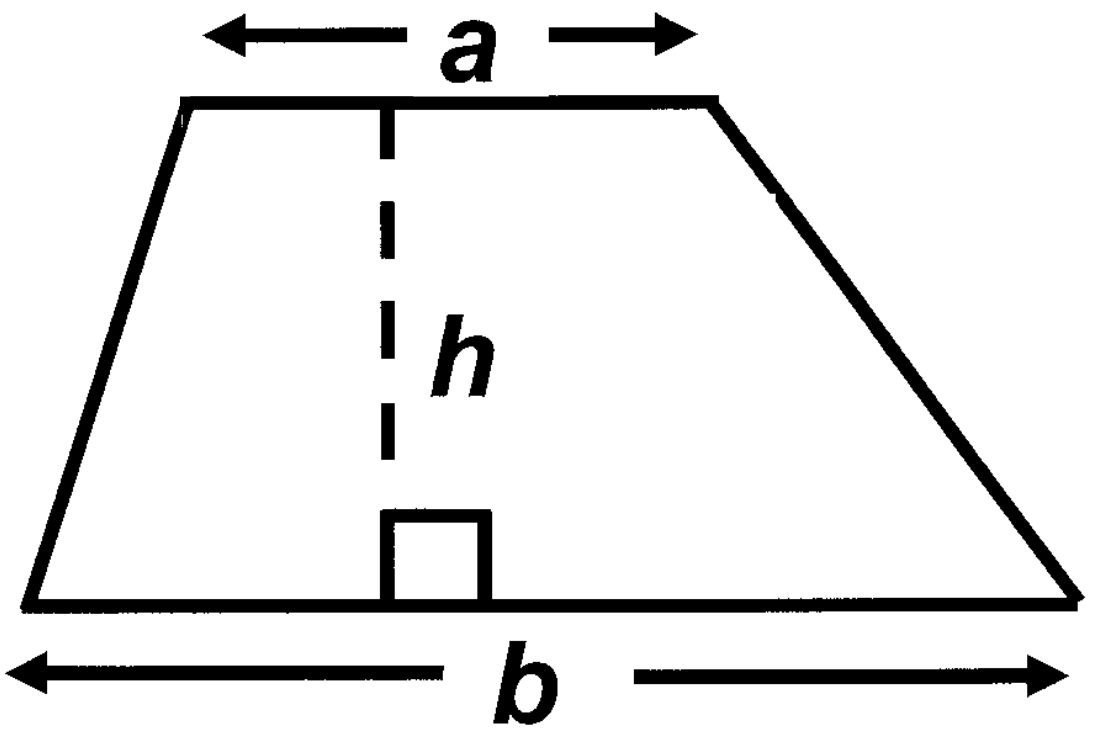
FORMULA LIST
INTERMEDIATE TIER
GCSE

You must not write on these formula pages.

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

Formula List – Intermediate Tier

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



Volume of prism =

area of cross – section × length