



GCSE

3310U30-1

TUESDAY, 8 NOVEMBER 2022 – 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.	11	
2.	4	
3.	5	
4.	15	
5.	18	
6.	13	
7.	8	
8.	6	
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.

(Turn over)

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

(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.

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

(Turn over)

- 1. Look at the pictures for Question 1 in the separate Diagram Booklet. The pictures are NOT drawn to scale.**

Rosie is printing two different rectangular pictures of her dog, a small picture and a large picture. The small picture has a height of 10 cm and a width of 5 cm. The large picture has a height of 40 cm and a width of 15 cm.

continued on the next page . . .

(Turn over)

Question 1 continued

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

The small picture costs £2 to print.

Each 1 cm² of the small picture costs the same to print as each 1 cm² of the large picture.

continued on the next page . . .

(Turn over)

10

[6 marks + 2 marks OCW]

continued on the next page . . .

(Turn over)

Question 1 continued

1. (b) Look at the diagram for Question 1 (b) in the separate Diagram Booklet.

The diagram is NOT drawn to scale. The diagram shows a picture frame.

To make a frame, it costs 40p for each centimetre of the total distance around the outside of the picture.

Calculate the cost of making a frame for the SMALL picture.

(Turn over)

2. Look at the information provided for Question 2 in the separate Diagram Booklet.

The information shows the tram timetable from Kemp Station to Rowe Place.

**(a) At what time does the first tram after 20:30 leave Kemp Station?
Circle your answer.**

20:50	20:40	21:00	20:36	20:42
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[1 mark]

(Turn over)

Question 2 continued

2. (b) Nesta looks at the information shown. She decides to take the latest possible tram from Kemp Station to be at Rowe Place by 10:15 a.m.

At what time will Nesta's tram arrive at Rowe Place?

You must show all your working.

(Turn over)

3. (a) Martina is going to buy some milk to make pancakes.

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

The information is about the prices of different cartons of milk.

Which size carton of milk offers the best value for money?

You must show all your working.

(Turn over)

Question 3 continued

3. (b) Martina's pancake recipe is as follows.

PANCAKE RECIPE –

Makes 12 pancakes

100 g flour

2 eggs

300 ml milk

Calculate the quantity of milk needed to make 30 pancakes.

(Turn over)

Milk: _____ **ml**

[2 marks]

(Turn over)

4. (a) Look at the diagram for Question 4 (a) in the separate Diagram Booklet. The diagram is NOT drawn to scale.

Jenny is planning to sow grass seed in her garden.

The plan for her garden is shown, labelled *ABCD*.

continued on the next page . . .

(Turn over)

Question 4 (a) continued

In the diagram,

$$**AB = 13\text{ m}**$$

$$**BC = 12\text{ m}**$$

$$**CD = 3\text{ m}**$$

$$**DA = 4\text{ m}**$$

$$**AC = 5\text{ m}**$$

**Angle ADC and angle ACB
are right angles.**

**Grass seed to cover 1 m^2
costs 30p.**

**Calculate how much it will
cost Jenny to buy the grass
seed she needs.**

(Turn over)

Question 4 continued

- 4. (b) (i) Jenny's neighbour, Hubert, has a quote from a gardener to landscape his garden. The gardener will charge a total of £175, excluding VAT. This total charge includes £55 for plants. The remainder of the charge is for labour.**
- The gardener says it will take 8 hours to landscape Hubert's garden.**

continued on the next page . . .

(Turn over)

[2 marks]

continued on the next page . . .

(Turn over)

Question 4 (b) continued

**4. (b) (ii) VAT at 20% is payable on
the charge of £175**

**Calculate the total charge
of the landscaping,
including the VAT.**

[3 marks]
(Turn over)

Question 4 continued

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

The following summer, Hubert picked 10 different flowers from his garden.

He measured the height of each flower.

He also counted the number of leaves on each flower.

His results are shown on the scatter diagram.

continued on the next page . . .

(Turn over)

Question 4 (c) continued

4. (c) (i) Is it possible to estimate the number of leaves on a flower of height 6 cm?

Yes **No**

You must give a reason for your answer.

[1 mark]

continued on the next page . . .

(Turn over)

Question 4 (c) continued

4. (c) (ii) How tall is the flower with the greatest number of leaves?

Circle your answer.

26 cm	2.5 cm	7.5 cm	5 cm	17.5 cm
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[1 mark]

continued on the next page . . .

(Turn over)

Question 4 (c) continued

4. (c) (iii) There are two flowers that each have 19 leaves.

Calculate the difference in the heights of these two flowers.

You must show all your working.

Difference in the heights is

_____ cm

[2 marks]

continued on the next page . . .

(Turn over)

Question 4 (c) continued

4. (c) (iv) Calculate the percentage of the flowers that have FEWER THAN 23 LEAVES.

_____ % of the flowers
have FEWER THAN 23 LEAVES.

[2 marks]

(Turn over)

5. (a) Malik has two orchards.

He has apple trees and pear trees in his north orchard.

He has pear trees and cherry trees in his west orchard.

Look at the information provided for Question 5 (a) in the separate Diagram Booklet.

The information is about Malik's two orchards.

How many CHERRY trees does Malik have?

You must show all your working.

(Turn over)

[5 marks]

continued on the next page . . .

(Turn over)

Question 5 continued

5. (b) Malik's crop of apples this year has a total mass of 5280 pounds.

He makes apple juice from $\frac{1}{6}$ of the mass of his apple crop.

Malik makes 2 litres of apple juice from every 5 kg of apples.

Calculate the number of litres of apple juice Malik makes.

(Turn over)

[6 marks]

continued on the next page . . .

(Turn over)

Question 5 continued

5. (c) Malik makes cherry jam using some of the fruit from his trees.

He makes and sells 200 jars of cherry jam.

It costs him £94 for all the ingredients to make the jam.

Malik pays 23p for each jam jar he uses.

He sells each jar of jam for £1.60

Calculate the profit Malik makes from selling his 200 jars of jam.

(Turn over)

[5 marks]

continued on the next page . . .

(Turn over)

Question 5 (c) continued

5. (c) (ii) Look at the diagrams for Question 5 (c) (ii) in the separate Diagram Booklet. The diagrams are NOT drawn to scale.

Malik makes a poster to advertise his jam.

He also makes labels for the jars.

The poster and the labels are mathematically similar.

continued on the next page . . .

(Turn over)

6. Look at the diagram for Question 6 in the separate Diagram Booklet. The diagram is a map.

Whales are sometimes spotted in the Irish Sea, off the west coast of Wales.

A minke whale was spotted on a bearing of:

- **010° from Aberporth**
- **280° from Aberystwyth.**

continued on the next page . . .

(Turn over)

Question 6 continued

6. (a) Scientists decide to search for other whales in the Irish Sea. The search area is the region within 20 km of the position where the minke whale was spotted.

Using the scale given, show this search area on the map.

[4 marks]

(Turn over)

Question 6 continued

6. (b) This minke whale has a length of 20 feet.

Remember:

1 inch \approx 2.5 cm,

1 foot = 12 inches

Use these facts to complete the following statement.

The minke whale has a length of _____ metres.

(Turn over)

Question 6 continued

- 6. (c) The brain of a minke whale has 12.8 billion neocortical neurons. A female human brain has 19 billion neocortical neurons.**

Remember:

1 billion = 1000 million

continued on the next page . . .

(Turn over)

Question 6 (c) continued

6. (c) (i) Calculate an ESTIMATE for the number of neurons in a minke whale brain expressed as a percentage of the number of neurons in a female human brain. You must show all your working.

(Turn over)

Approximately _____ %

[2 marks]

continued on the next page . . .

(Turn over)

Question 6 (c) continued

6. (c) (ii) 10% of all neocortical neurons are lost over a human lifespan.

Calculate the number of neocortical neurons in a female human brain at the end of a lifespan.

Give your answer in standard form.

51

[4 marks]

(Turn over)

7. (a) Look at Diagram 1 for Question 7 (a) in the separate Diagram Booklet.

Diagram 1 is a cumulative frequency diagram.

The lengths of the 60 yachts in Eog Marina were measured. The results are shown in Diagram 1.

The shortest yacht has a length of 3 m.

The longest yacht has a length of 22 m.

continued on the next page . . .

(Turn over)

Question 7 (a) continued

**Look at Diagram 2 for
Question 7 (a) in the separate
Diagram Booklet.**

**Use the information on the
previous page and in
Diagram 1 to complete a
box – and – whisker diagram
on Diagram 2.**

[3 marks]

(Turn over)

Question 7 continued

7. (b) The lengths of the 68 yachts in Clwyd Marina were measured.

For these yachts:

- **the lower quartile of their lengths is 10 m**
- **25% have lengths greater than 18 m**
- **the median length is 11.6 m.**

continued on the next page . . .

(Turn over)

Question 7 (b) continued

7. (b) (i) Calculate how many of the yachts in Clwyd Marina have lengths greater than 10 m.

_____ **yachts**

[2 marks]

continued on the next page . . .

(Turn over)

Question 7 (b) continued

7. (b) (ii) In which marina, Eog or Clwyd, is the interquartile range of the lengths of the yachts greater?

Eog Marina

Clwyd Marina

You must show all your working.

(Turn over)

[2 marks]

continued on the next page . . .

(Turn over)

Question 7 (b) continued

7. (b) (iii) In which marina is the longest yacht?

Eog Marina

Clwyd Marina

Can't tell

You must give a reason for your answer.

(Turn over)

[1 mark]

(Turn over)

8. Melin is a company that packages flour for sale in supermarkets.

It packages the flour in cylindrical bags.

The area of the cross – section of each of these bags is 25 cm^2

(a) Write down an expression, in terms of π , for THE RADIUS OF THE BASE of each of these bags.

(Turn over)

[2 marks]

continued on the next page . . .

(Turn over)

Question 8 continued

8. (b) Each bag has a volume of 500 cm^3

(i) Currently the bags are filled with flour at a rate of $\frac{1}{4}$ of a bag per second.

Complete the following statement.

Melin packages bags of flour at a rate of _____ cm^3 per minute.

(Turn over)

[2 marks]

continued on the next page . . .

(Turn over)

Question 8 (b) continued

8. (b) (ii) A new cylindrical bag is designed to have the same capacity and to be more stable.

Melin decides to increase the area of the cross – section of its original bags by 100%. Calculate the height of this new bag.

(Turn over)



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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 1

Pictures NOT drawn to scale

Small picture

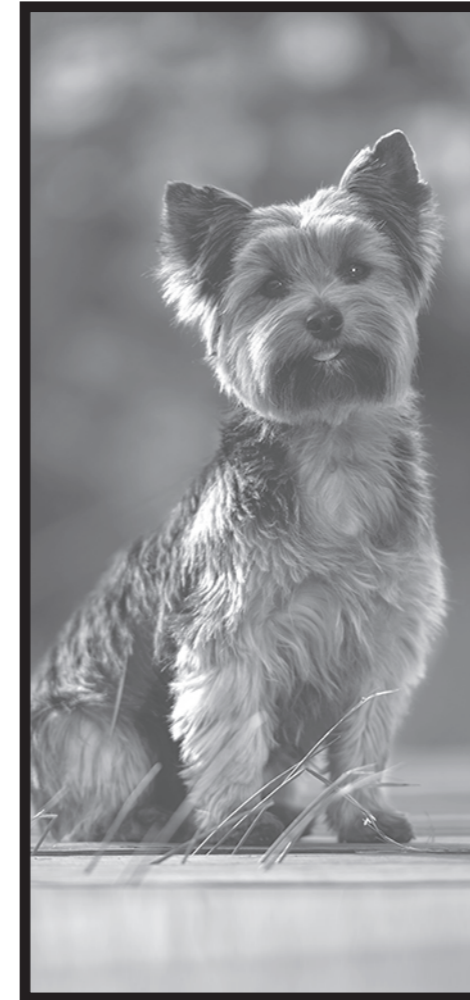
5 cm



10 cm

Large picture

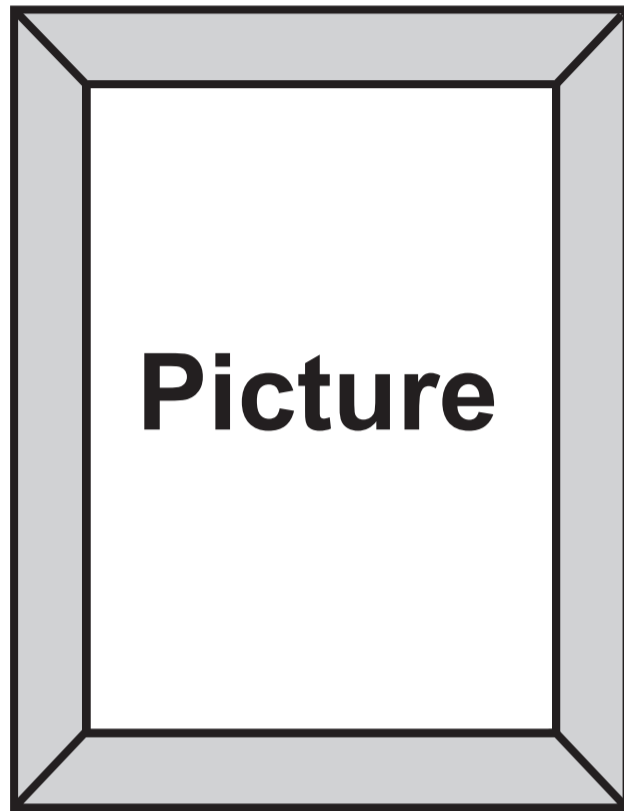
15 cm



40 cm

Question 1 (b)

Diagram NOT drawn to scale



Question 2

Information

TRAM TIMETABLE FROM KEMP STATION TO ROWE PLACE

Trams leave the station:

- every 12 minutes from 8 a.m. until 10 a.m.**
- every 20 minutes from 10 a.m. until late.**

It takes 22 minutes from Kemp Station to Rowe Place.

Question 3 (a)

Information

SMALL carton of milk

500 ml for 40p

MEDIUM carton of milk

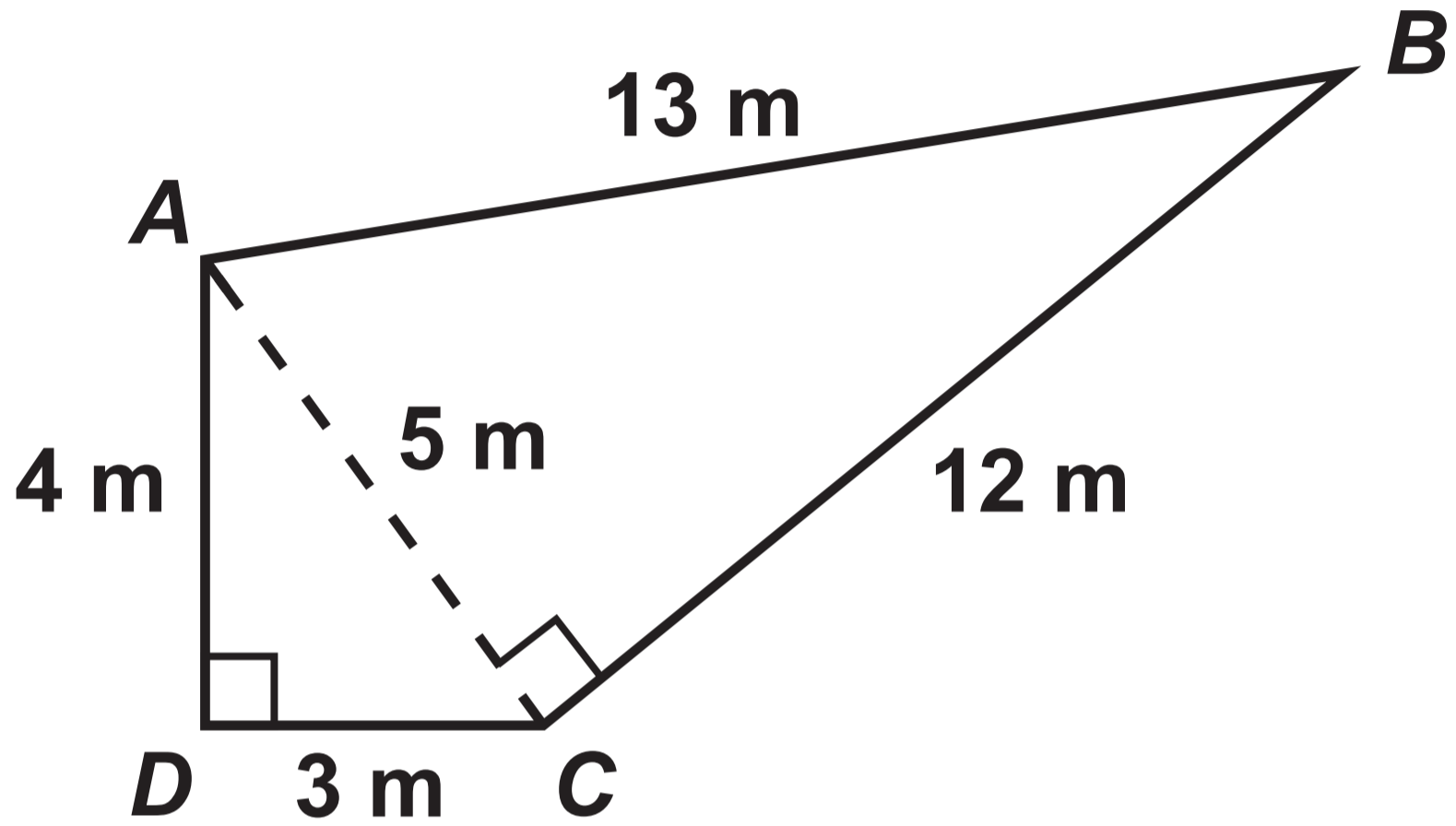
1200 ml for £1.20

LARGE carton of milk

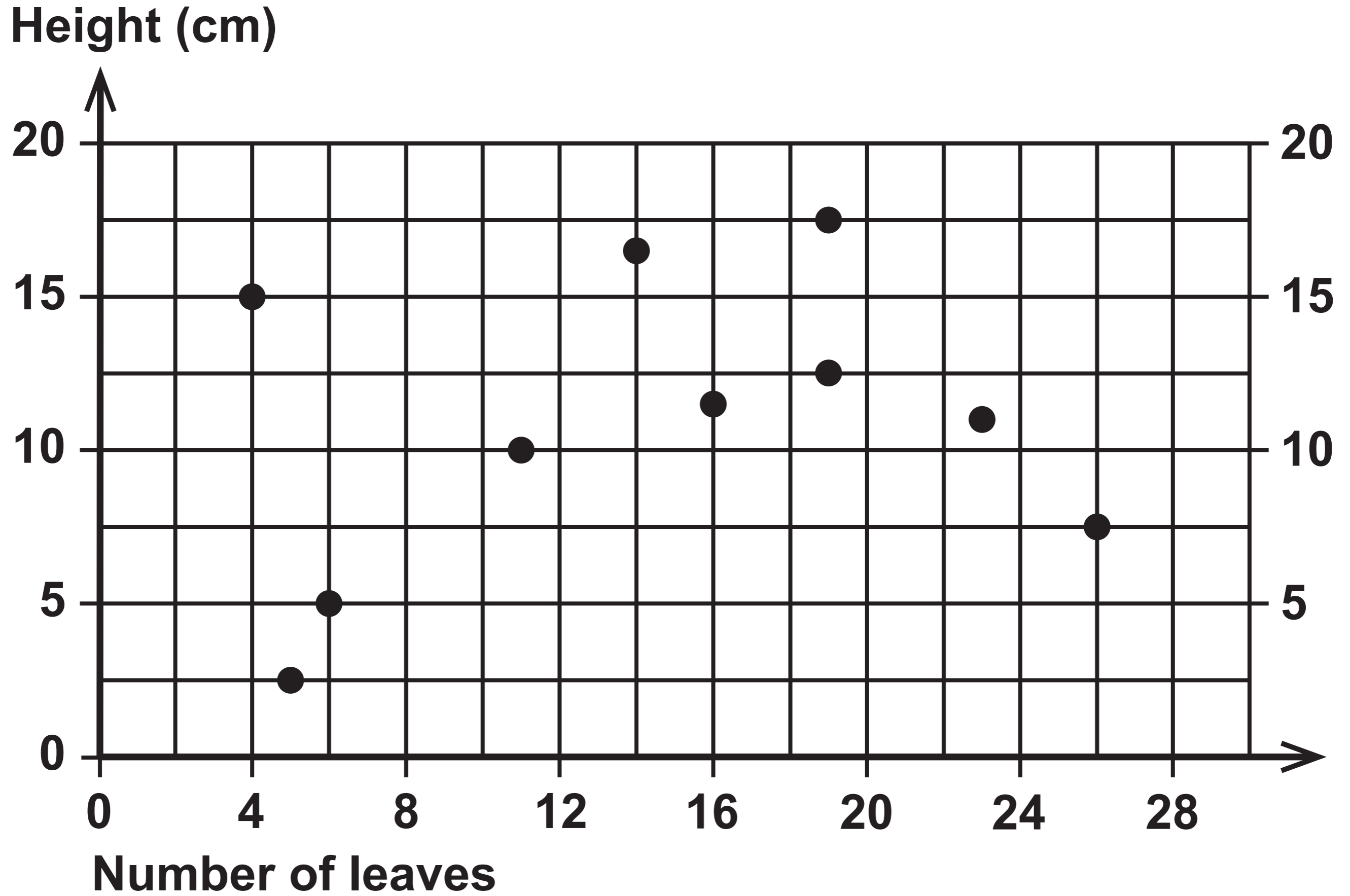
2000 ml for £2.50

Question 4 (a)

Diagram NOT drawn to scale



Question 4 (c)



Question 5 (a)

Information

In the north orchard,

- **Malik has a total of 35 trees**
- **number of apple trees : number of pear trees = 4 : 3**

In the west orchard,

- **Malik has twice as many PEAR trees as he has
PEAR trees in the north orchard**
- **number of pear trees : number of cherry trees = 5 : 11**

Question 5 (c) (ii)

Diagrams NOT drawn to scale

POSTER

48 cm



JAM JAR LABEL

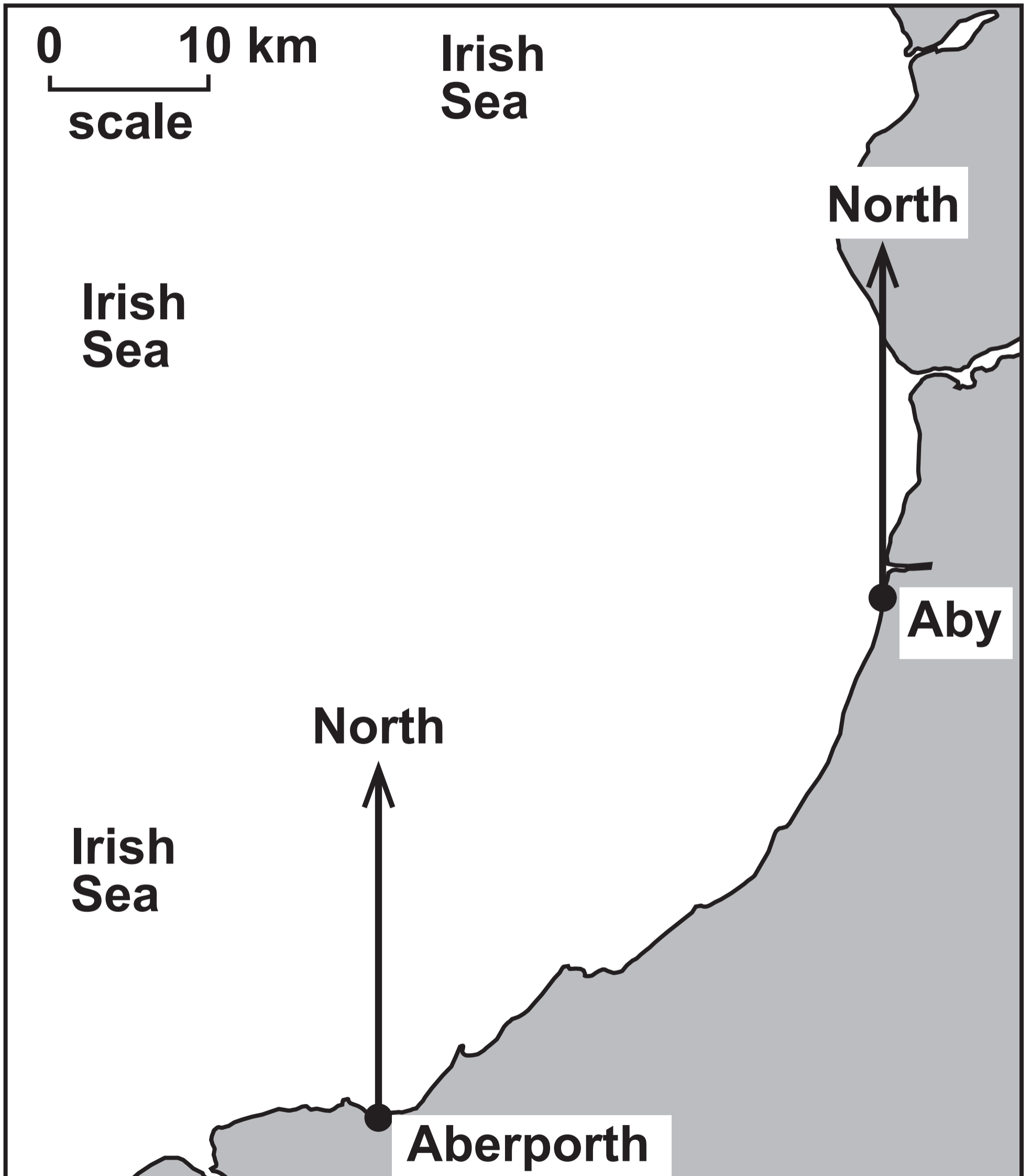
8 cm



Question 6

Key:

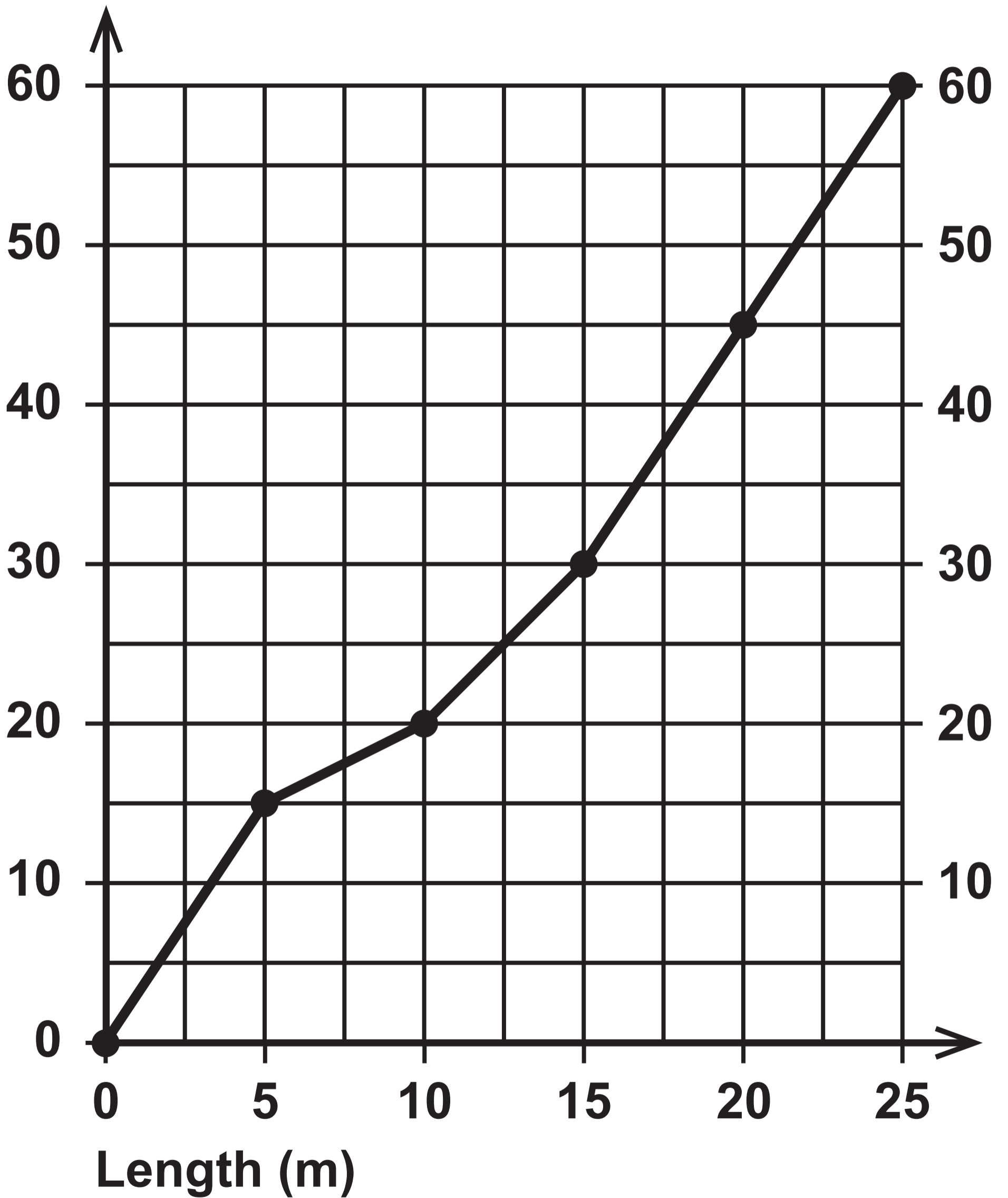
Aby = Aberystwyth



Question 7 (a)

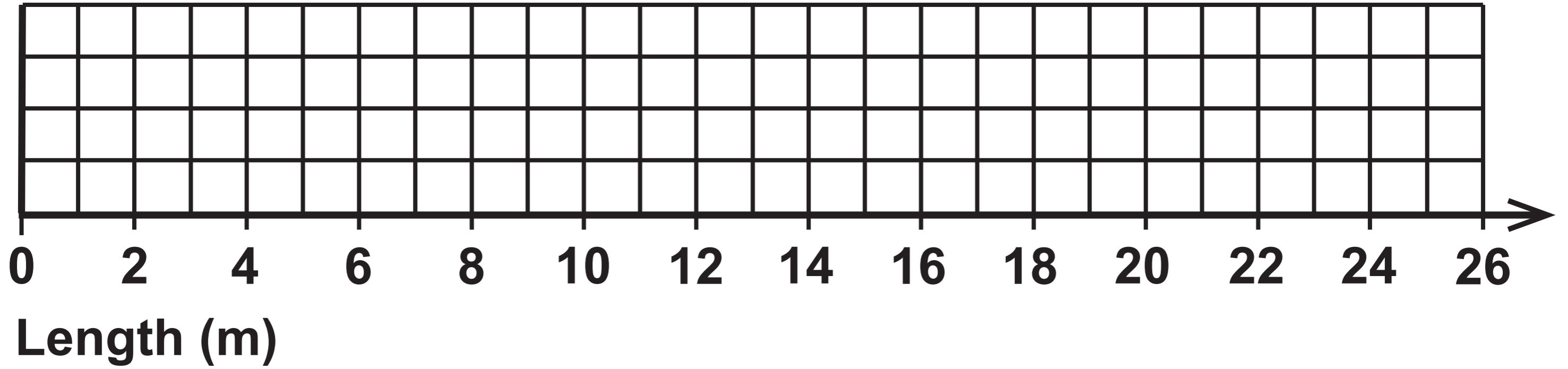
Cumulative
frequency

Diagram 1



Question 7 (a)

Diagram 2



**GCSE
MATHEMATICS
and
NUMERACY**



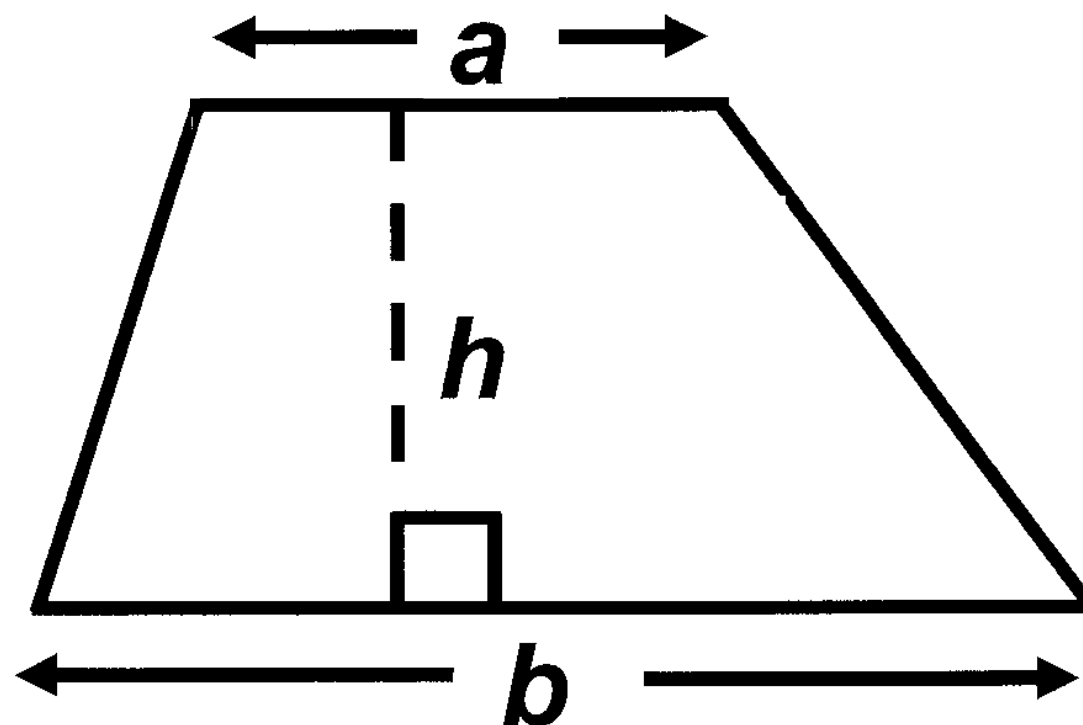
**FORMULA LIST
INTERMEDIATE TIER
GCSE**

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 \times length

