GCSE 3310U30-1

MATHEMATICS – NUMERACY
UNIT 1: NON – CALCULATOR
INTERMEDIATE TIER

TUESDAY, 7 MAY 2019 – MORNING

1 hour 45 minutes (plus your additional time allowance)

THE USE OF A CALCULATOR IS NOT PERMITTED IN THIS EXAMINATION

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	8	
2.	4	
3.	14	
4.	8	
5.	10	
6.	4	
7.	6	
8.	11	
9.	5	
10.	6	
11.	4	
Total	80	

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.

Models for Question 5 (b).

Cut out shapes for Question 7 (b).

(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 continuation pages at the back of the booklet. Question numbers must be given for all work written on the continuation 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, 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.**

Sioned works in a grocery shop. She has made a poster for the window of the shop.

Strawberries	Raspberries
£8.60 per kg	Today's special offer …….. per kg

continued on the next page . . .

Question 1 continued

Sioned has forgotten to write the price of raspberries on the poster.

Mr Thomas buys

$\frac{1}{4}$ kg of strawberries and

$1\frac{1}{2}$ kg of raspberries.

He pays with a £20 note.

He gets £2.55 change.

Calculate the price of

1 kg of raspberries.

You must show all your working.

[6 marks + 2 marks OCW]

(Turn over)

(Turn over)

(Turn over)

(Turn over)

2. Sunflower seeds come in a packet.

Sunflower seeds **Plant in May** **Grow to heights of up to 90 cm (36 inches)**

Dieter planted 8 sunflower seeds in May.
He labelled the sunflowers *A, B, C, D, E, F, G* and *H*.

On 21st August, he measured the heights of all the sunflower plants in cm.

continued on the next page . . .

(Turn over)

Question 2 continued

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

The diagram is a graph.

Dieter drew the graph shown.

2. (a) Use the graph to answer each of the following questions.

continued on the next page . . .

Question 2 (a) continued

2. (a) (i) What fraction of the height of the tallest sunflower is the height of the shortest sunflower?

Circle your answer.

$\frac{3}{10}$	$\frac{3}{7}$	$\frac{3}{5}$	$\frac{3}{8}$	$\frac{3}{80}$

[1 mark]

(Turn over)

Question 2 (a) continued

2. (a) (ii) What is the ratio of the number of sunflowers with heights less than 55 cm to the number of sunflowers with heights greater than 55 cm?

Circle your answer.

5 : 3	3 : 5	1 : 3	3 : 1	1 : 1

[1 mark]

(Turn over)

Question 2 continued

2. (b) Dieter's friend, Glyn, also planted sunflower seeds. Glyn's tallest sunflower grew to a height of 24 inches.

Is this taller or shorter than Dieter's tallest sunflower?

You must show all your working to support your answer.

Taller than Dieter's tallest sunflower ☐

Shorter than Dieter's tallest sunflower ☐

[2 marks]

3. Aled and Gareth went on holiday to France.

(a) The total cost of the holiday was £660

- Aled's mother paid $\frac{1}{3}$ of the total cost.
- Aled and Gareth shared the remaining cost in the ratio 1 : 9

(i) Calculate how much each person paid towards the cost of the holiday.

(Turn over)

Aled's mother paid £ _____

Aled paid £ _____

Gareth paid £ _____

[4 marks]

3. (a) (ii) Explain how you could use your answers to check that they are correct.

_____

_____

_____

[1 mark]

Question 3 continued

3. (b) Gareth's luggage weighed 21•13 kg.

This was over the maximum of 20 kg allowed.

Gareth removed items from his luggage so that its mass was:

- **as close to 20 kg as possible,**
- **NOT GREATER than 20 kg.**

continued on the next page . . .

Question 3 (b) continued

From the following list of items, which TWO items did Gareth remove?

You must show all your working.

Coat	820 g
Headphones	300 g
Jumper	320 g
Book	340 g
Hat	200 g

[3 marks]

continued on the next page . . .

Question 3 continued

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

The diagram is a conversion graph showing pounds (£) and euros.

Before going on holiday, Aled made a conversion graph to help him understand prices in euros.

Use Aled's conversion graph to answer the following questions.

continued on the next page . . .

Question 3 (c) continued

3. (c) (i) A camera costs £90

How much is this in euros?

Camera costs _____ euros

[2 marks]

continued on the next page . . .

Question 3 (c) continued

3. (c) (ii) A meal costs £25

How much is this in euros?

Meal costs _____ euros

[2 marks]

continued on the next page . . .

Question 3 continued

3. (d) Gareth looked at exchange rates for buying euros.

He recorded the exchange rates for the previous 60 days, as shown below.

£1 = *B* euros	Frequency
$1.00 \leq B < 1.04$	2
$1.04 \leq B < 1.08$	8
$1.08 \leq B < 1.12$	16
$1.12 \leq B < 1.16$	33
$1.16 \leq B < 1.20$	1

continued on the next page . . .

Question 3 (d) continued

Gareth started to draw a frequency diagram to show this information.

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

3. (d) (i) Complete the frequency diagram.

[1 mark]

continued on the next page . . .

Question 3 (d) continued

3. (d) (ii) Which is the modal group?

Circle your answer.

60
$1.08 \leq B < 1.12$
33
$1.12 \leq B < 1.16$
16

[1 mark]

4. Look at the diagram for Question 4 in the separate Diagram Booklet. The diagram shows a scatter diagram.

The distance a car will travel using 1 gallon of fuel is called its fuel economy.
The fuel economy of a number of cars with different engine sizes is shown in the diagram.

Use the scatter diagram to answer the following questions.

continued on the next page . . .

Question 4 continued

4. (a) State the fuel economy of the car with the largest engine size.

Fuel economy _____ miles per gallon

[1 mark]

(b) State the engine size of the car with a fuel economy of 40 miles per gallon.

Engine size _____ litres

[1 mark]

continued on the next page . . .

Question 4 continued

4. (c) (i) Calculate the mean fuel economy of the 5 cars with the SMALLEST engine sizes.

Mean fuel economy is

_____ miles per gallon

[3 marks]

continued on the next page . . .

Question 4 continued

4. (c) (ii) Why is this not a suitable average for cars with engine sizes of less than 1•5 litres?

[1 mark]

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

[1 mark]

continued on the next page . . .

Question 4 continued

4. (e) Siân says,

> **The scatter diagram is more reliable to estimate the fuel economy of cars with engine sizes less than 2•5 litres**

Do you think Siân is correct?

Yes ☐ **No** ☐ **Don't know** ☐

You must give a reason for your answer.

_____

_____

[1 mark]

5. RUPERT SHOES sells shoes online.

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

The diagram is NOT drawn to scale.

The designer has drawn a sketch of a new label to stick on the shoeboxes.

She takes the sketch to the printers. The table on the next page shows the costs for printing 100 labels.

continued on the next page . . .

Question 5 (a) continued

Area of label, to the nearest cm^2	Cost to print 100 labels
Up to 80 cm^2	£1.15
81 cm^2 to 85 cm^2	£1.25
86 cm^2 to 89 cm^2	£1.50
90 cm^2 or more	£1.75

How much will it cost to have 500 of the designer's label printed?

You must show all your working.

[4 marks]

(Turn over)

Question 5 continued

5. (b) Ask for model 1 for Question 5 (b).

The model is NOT made to scale.

Pairs of shoes are packed in shoeboxes. The dimensions of the shoebox used are given on the model.

continued on the next page . . .

Question 5 (b) continued

5. (b) (i) What is the area of the smallest face of the shoebox?
Circle your answer.

$40\ cm^2$	$225\ cm^2$	$375\ cm^2$
$800\ cm^2$	$1000\ cm^2$	

[1 mark]

continued on the next page . . .

Question 5 (b) continued

5. (b) (ii) Ask for model 2 for Question 5 (b).

A customer orders 2 pairs of shoes.

The package for sending the shoes to the customer is made by:

- placing one box on top of the other, and
- taping the two boxes together.

This is shown on the model.

continued on the next page . . .

Question 5 (b) (ii) continued

The cost for sending the package is calculated using the formula given in the separate Diagram Booklet. All dimensions are measured in cm.

How much does it cost RUPERT SHOES to send the package? Give your answer in pounds. You must show all your working.

[5 marks]

(Turn over)

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

A builder has drawn a plan for building 3 office blocks on a plot of land.
They are numbered 1, 2 and 3, as shown in the diagram.

The scale of the plan is
1 cm represents 10 metres.

continued on the next page . . .

Question 6 continued

6. (a) The builder is planning to plant a tree so that it is:

- **the same distance from Block 1 as it is from Block 2**
- **80 metres from the top left hand corner of Block 3**

Mark the position for the planting of the tree.

[3 marks]

continued on the next page . . .

Question 6 continued

6. (b) What is the shortest possible distance between Block 2 and Block 3?

_____ **metres**

[1 mark]

7. (a) SAM'S GARDEN CENTRE buys trees to sell.

Sam bought 200 trees.

Each tree cost Sam £25

22% of the trees were not sold.

Sam sold all the other trees for £40 each.

How much profit did Sam make?

You must show all your working.

(Turn over)

[5 marks]

continued on the next page . . .

Question 7 continued

7. (b) Look at the diagram for Question 7 (b) in the separate Diagram Booklet.

The trees are planted in identical pots. They each have a uniform cross – section in the shape of a regular hexagon.

Show that these pots will tessellate.
Cut out shapes are available for this question.

[1 mark]

8. Look at the diagram for Question 8 in the separate Diagram Booklet.
The diagram shows a map of Wales.

A helicopter pilot is planning a route from Milford Haven to Ruabon and then on to Swansea.

(a) To plan the flights, the pilot needs to find the bearings from a map.

continued on the next page . . .

Question 8 (a) continued

8. (a) (i) Find the bearing of Ruabon from Milford Haven.

[1 mark]

continued on the next page . . .

Question 8 (a) continued

8. (a) (ii) Find the bearing of Swansea from Ruabon.

[1 mark]

continued on the next page . . .

Question 8 continued

8. (b) The plan for the flight is shown in the separate Diagram Booklet.

(i) Calculate the total distance of the flight. Give your answer in miles.
You must show all your working.

Total distance is

_____ miles

[4 marks]

continued on the next page . . .

Question 8 (b) continued

8. (b) (ii) On average, the helicopter uses 0•4 gallons of fuel per minute.

Remember: 1 gallon = 4•55 litres

Use this information to calculate how many litres of fuel the helicopter would be expected to use for the flight planned in (b) (i).

You must show all your working.

(Turn over)

(Turn over)

Fuel = _____ litres

[5 marks]

9. You are given that:

1 gigalitre = 1 000 000 m^3

1 megalitre = 1 million litres

Lake Vyrnwy is a reservoir in mid Wales.

(a) Lake Vyrnwy can release between 25 and 45 megalitres of water per day from the dam.

The lake also supplies water through underground pipes to another reservoir at a rate of 230 000 m^3 per day.

continued on the next page . . .

(Turn over)

Question 9 (a) continued

9. (a) (i) How many litres are there in 25 megalitres?

Circle your answer.

25×10^{8}	25×10^{-6}	25×10^{7}
$2{\cdot}5 \times 10^{6}$	$2{\cdot}5 \times 10^{7}$	

[1 mark]

(Turn over)

Question 9 (a) continued

9. (a) (ii) Which is the best estimate for the volume of water passing through the underground pipes PER HOUR?

Circle your answer.

$8500\ m^3$	$9600\ m^3$	$10\,040\ m^3$
$10\,400\ m^3$	$11\,000\ m^3$	

[1 mark]

9. (b) Lake Vyrnwy has a surface area of approximately $4\,540\,000\ m^2$

Lake Vyrnwy contains 59•7 gigalitres of water.

Calculate an estimate of the average depth of the lake.

Give your answer in metres.

(Turn over)

Estimate of average depth is

_____ metres

[3 marks]

10. (a) Look at the three diagrams for Question 10 (a) in the separate Diagram Booklet. The diagrams are box – and – whisker plots.

Maesystrad, Rhewlteg and Glanmawr are three colleges. Each college recorded the times Year 12 students took to travel to college. The results are displayed in the box – and – whisker plots shown.

continued on the next page . . .

Question 10 (a) continued

10. (a) (i) Which of the three colleges has the greatest range of times?

What is the range of times for this college?

_____

_____

_____

_____

College _____

Range _____ **minutes**

[1 mark]

(Turn over)

Question 10 (a) continued

10. (a) (ii) On average, in which college did Year 12 students have the longest travel times?
You must give a reason for your answer.

College _____

Reason _____

_____

_____

_____

[1 mark]

(Turn over)

Question 10 (a) continued

10. (a) (iii) Which college has the greatest difference between the median and the lower quartile?

What is this difference?

College _____

Difference _____ minutes

[1 mark]

(Turn over)

Question 10 (a) continued

10. (a) (iv) Which of the three colleges has the greatest number of Year 12 students? Give a reason for your answer.

Maesystrad ☐

Rhewlteg ☐

Glanmawr ☐

Don't know ☐

Reason _____

_____

[1 mark]

10. (b) At another college, Wynne College, there are 240 students in Year 12

The interquartile range of the times taken for these students to travel to college is 32 minutes.

continued on the next page . . .

Question 10 (b) continued

10. (b) (i) How many of these students have travel times within this interquartile range?

_____ **students**

[1 mark]

continued on the next page . . .

Question 10 (b) continued

10. (b) (ii) 75% of the Year 12 students at Wynne College take less than 55 minutes to travel to college.

Complete the following statement.

‘25% of the Year 12 students at Wynne College take less than _____ minutes to travel to college.’

[1 mark]

11. Look at the table for Question 11 in the separate Diagram Booklet.

The table shows the approximate land area and population for 5 countries in 2014

(a) Which of the 5 countries had a population density of approximately 100 people per km^2?

Circle your answer.

Argentina	Austria	Canada
Pakistan	United Kingdom	

[1 mark]

continued on the next page . . .

Question 11 continued

11. (b) Which of these countries had the greatest population density? Circle your answer.

Argentina	Austria	Canada
Pakistan	United Kingdom	

[1 mark]

(Turn over)

Question 11 continued

11. (c) Which of these countries had a population density that is approximately 4 times the population density of Canada?

You must show all your working.

(Turn over)

[2 marks]

END OF PAPER

TOTAL 80 MARKS

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

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3310U30-1

MATHEMATICS – NUMERACY

UNIT 1: NON – CALCULATOR

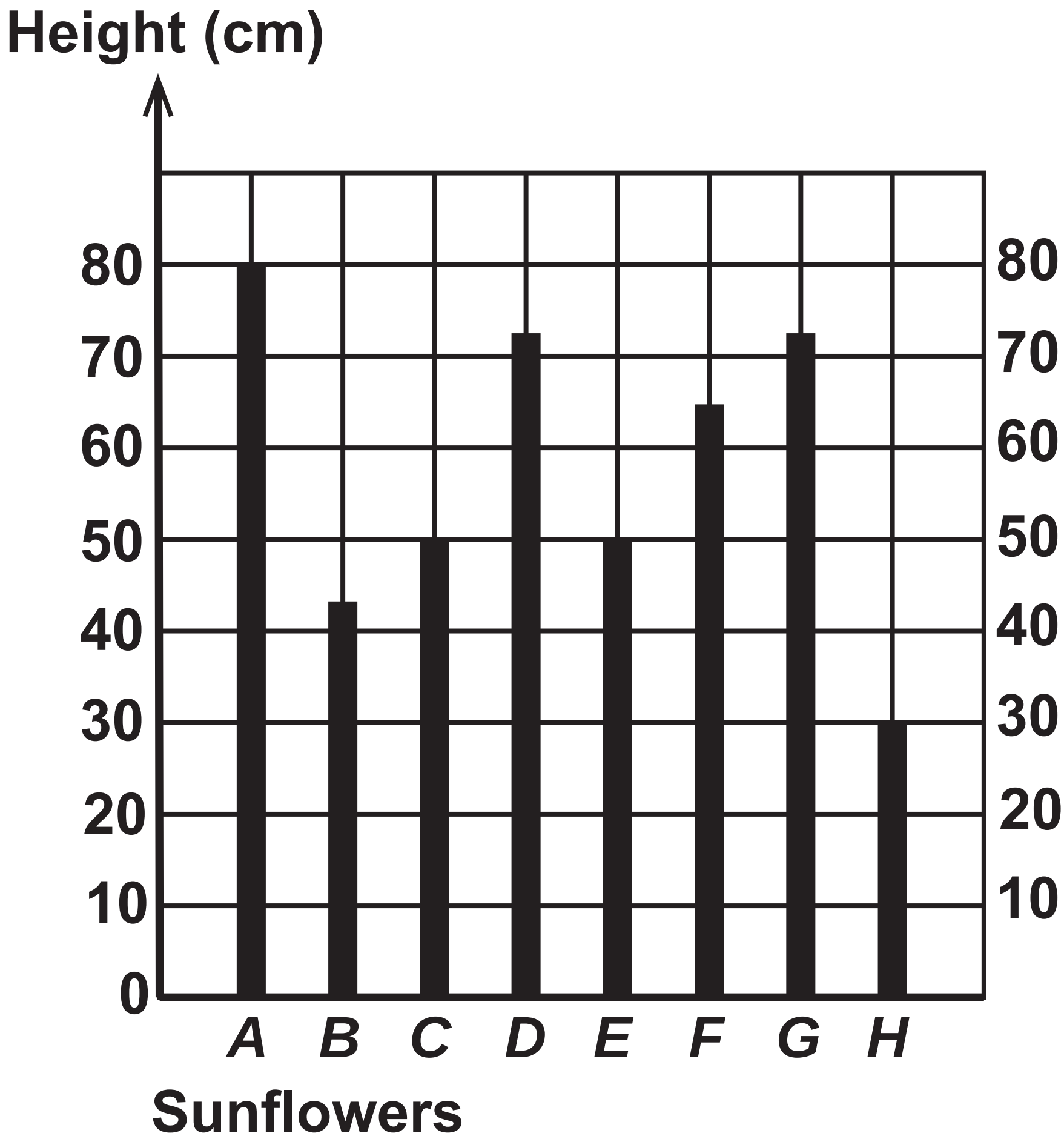
INTERMEDIATE TIER

TUESDAY, 7 MAY 2019 – MORNING

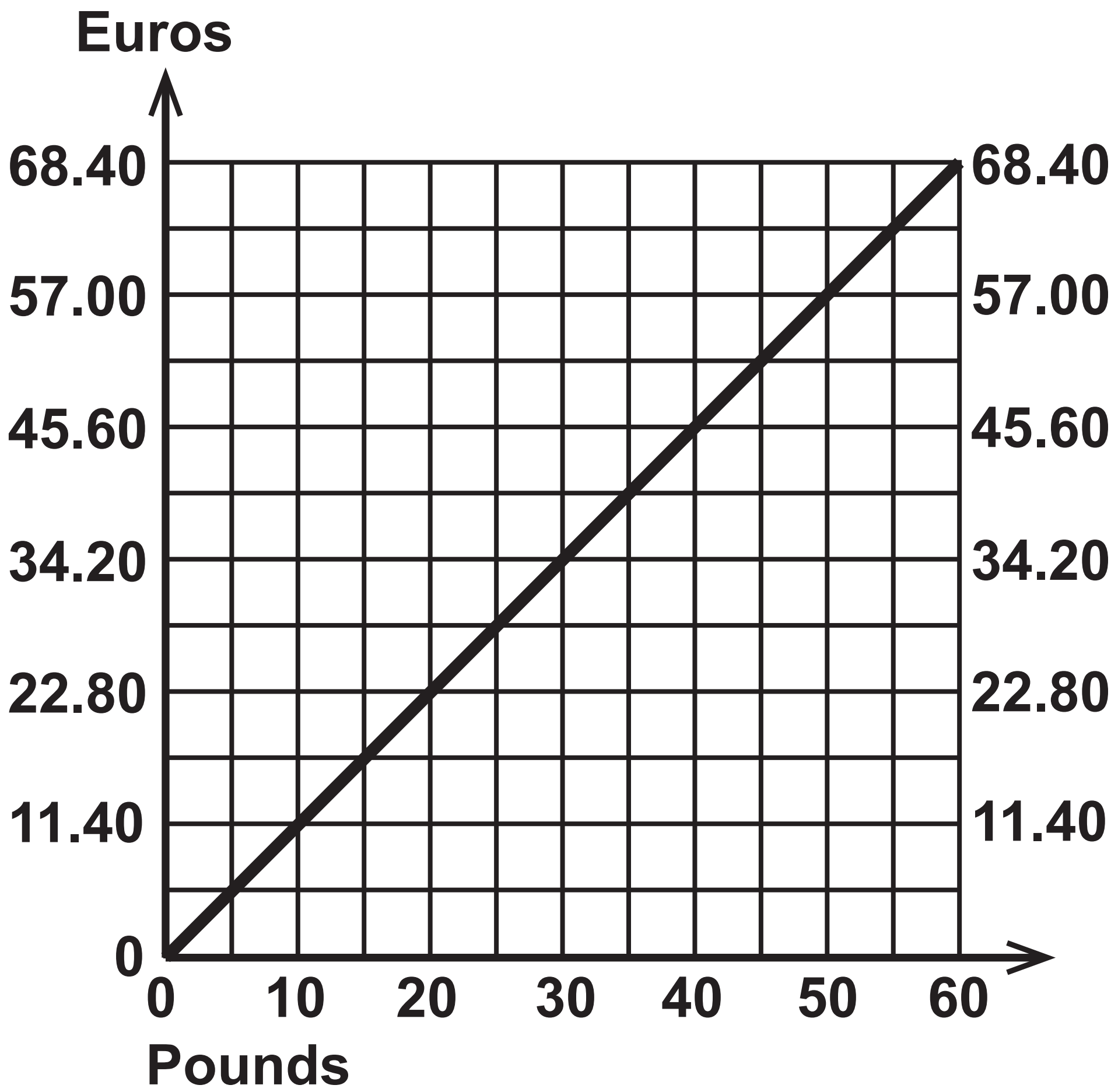
Diagram Booklet

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

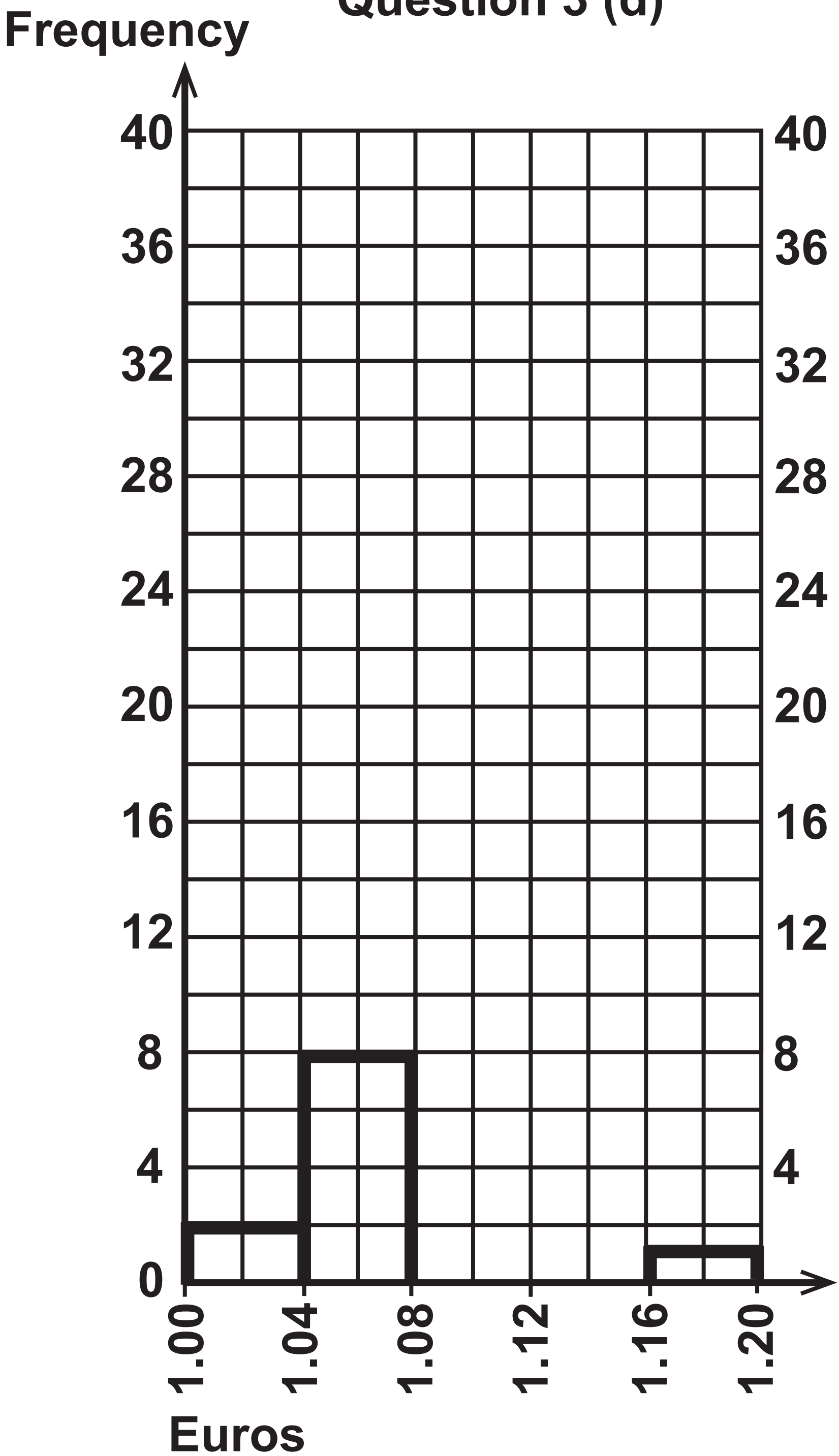
Question 2



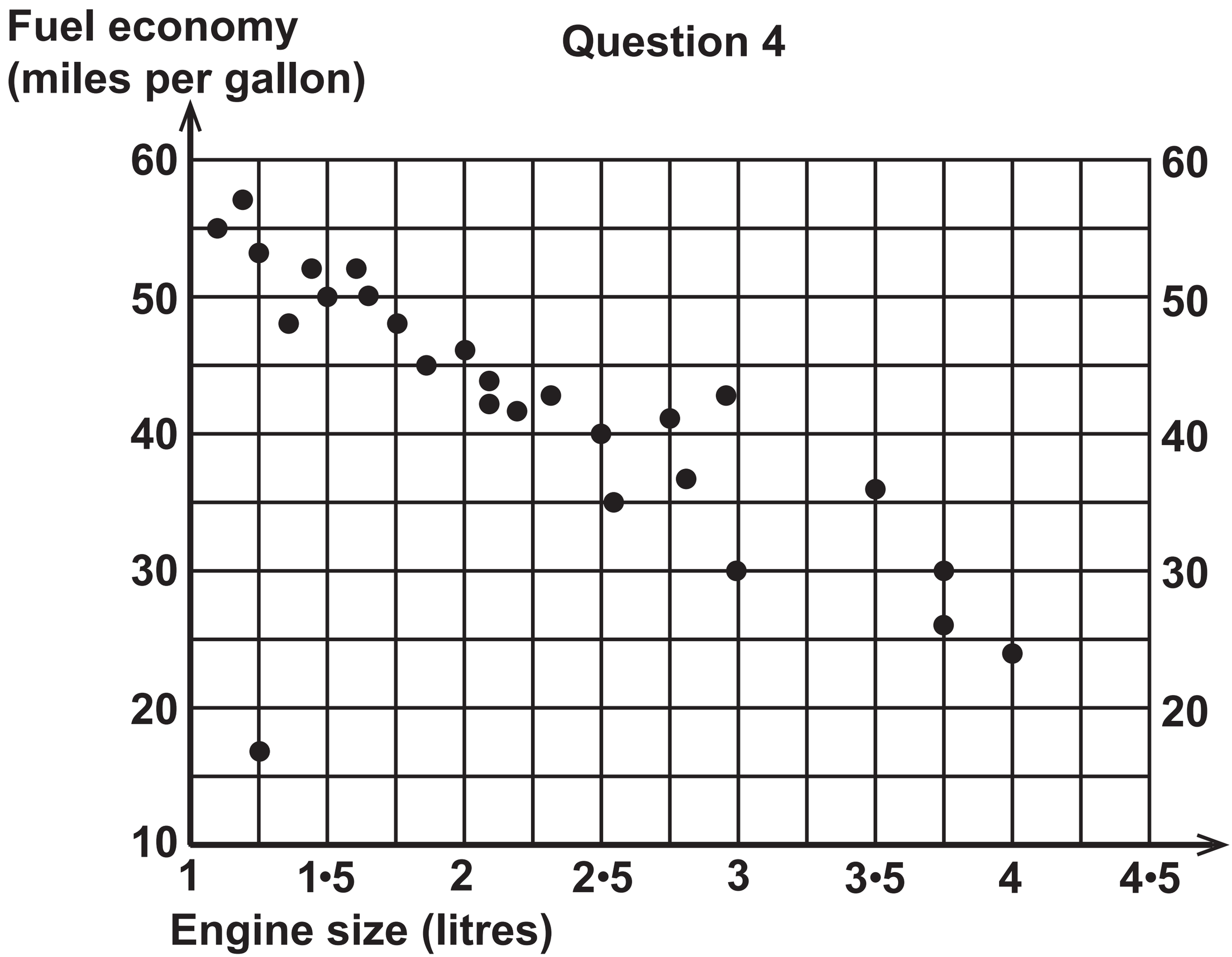
Question 3 (c)


Euros
68.40
57.00
45.60
34.20
22.80
11.40
0
68.40
57.00
45.60
34.20
22.80
11.40
0
10
20
30
40
50
60
Pounds

Question 3 (d)

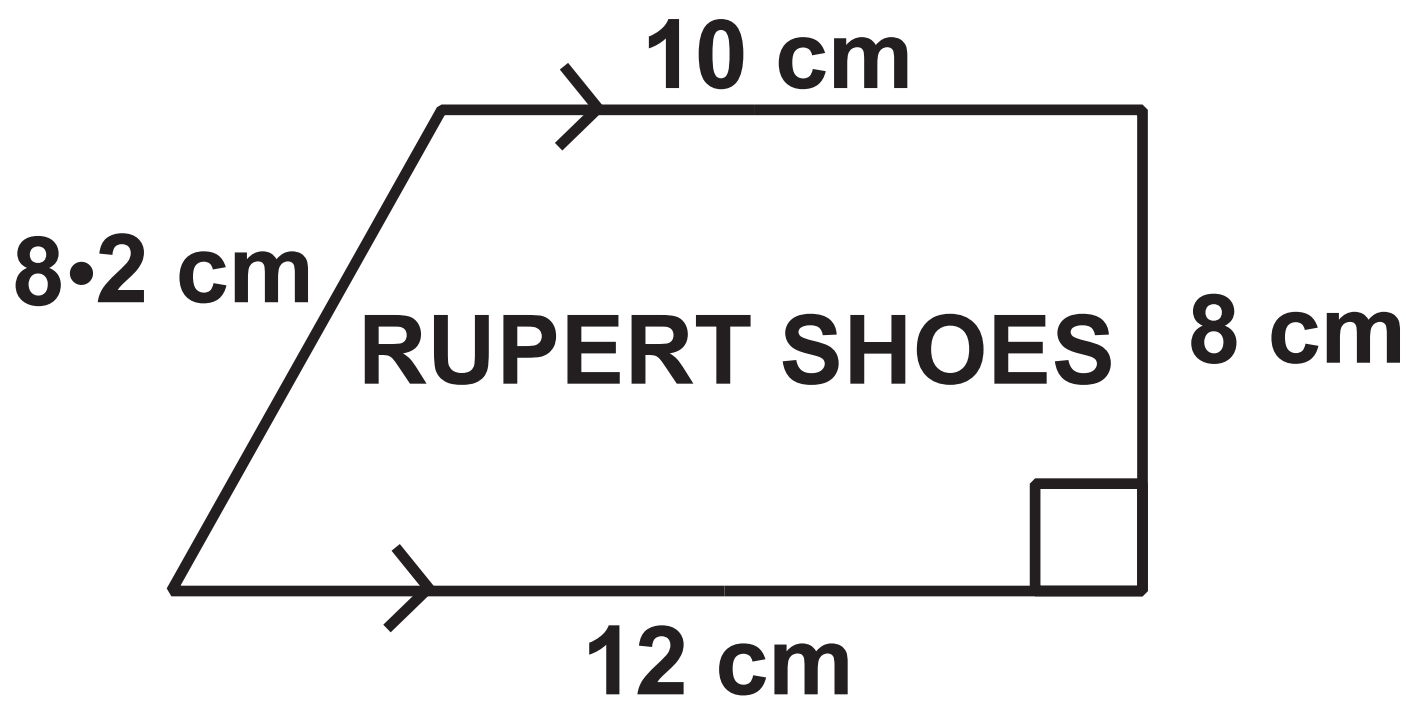

Frequency
40
36
32
28
24
20
16
12
8
4
0
1.00
1.04
1.08
1.12
1.16
1.20
Euros

Question 4


Fuel economy
(miles per gallon)
60
50
40
30
20
10
1
1•5
2
2•5
3
3•5
4
4•5
Engine size (litres)

Question 5 (a)

Diagram NOT drawn to scale



Question 5 (b) (ii)

Formula

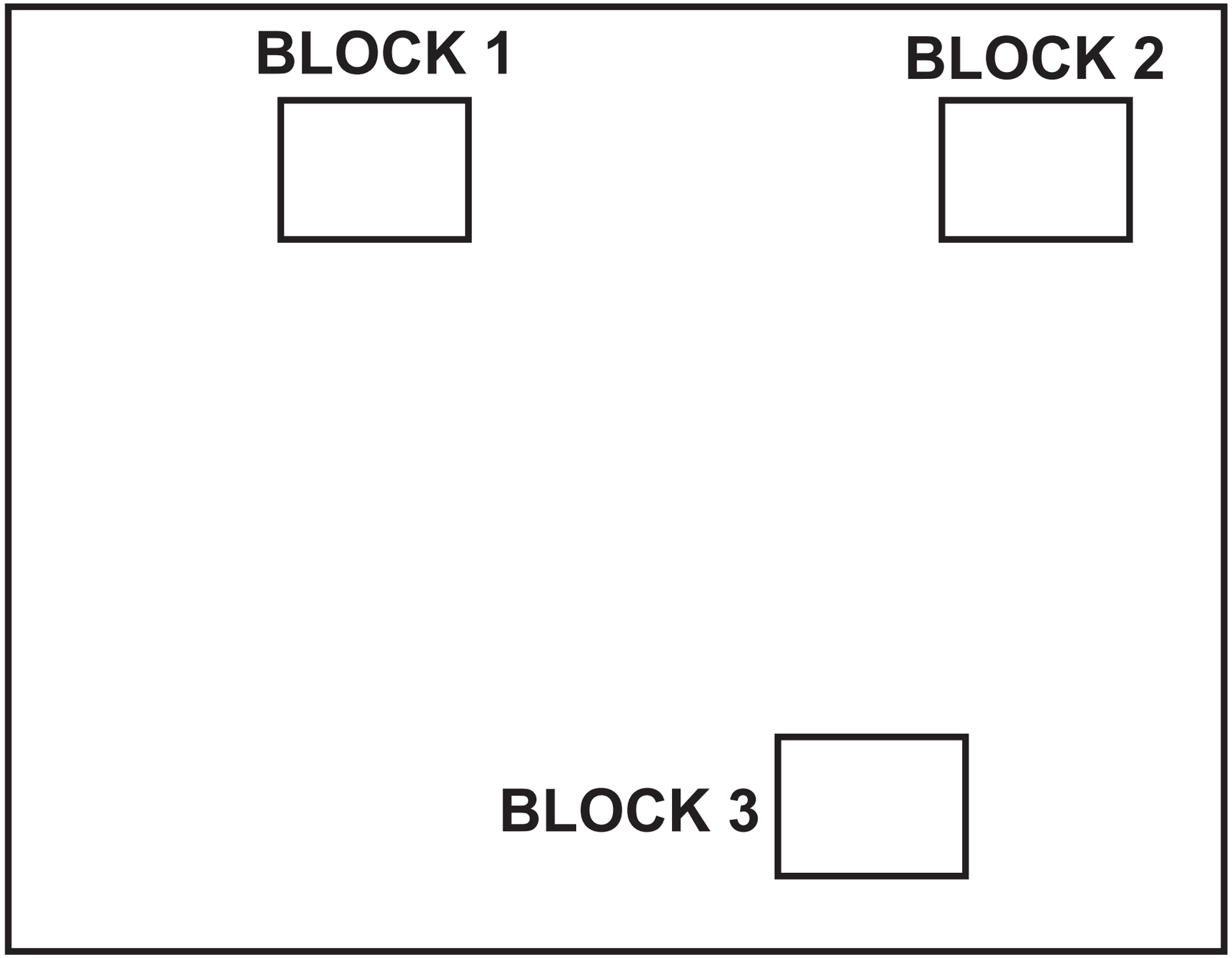
$$\text{Cost in £} = \frac{1}{5} \times (S + F) \times 0{\cdot}02$$

S = value of the sum of the 3 dimensions of the package

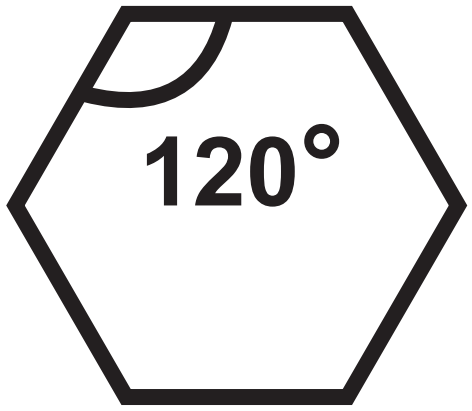
F = value of the area of one of the LARGEST faces of the package

Question 6

The scale of the plan is 1 cm represents 10 metres

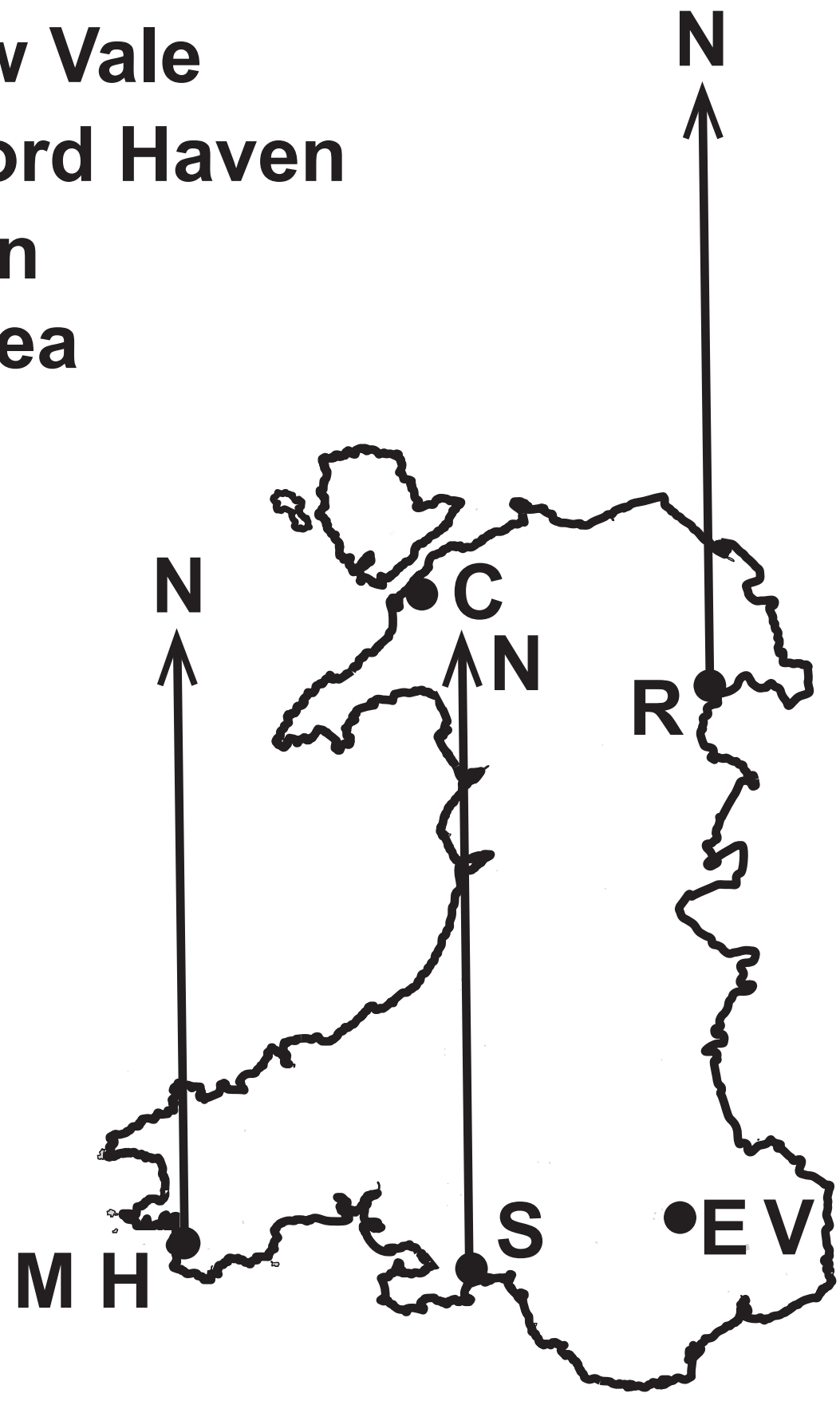


Question 7 (b)



Question 8

KEY:
C - Caernarfon
E V - Ebbw Vale
M H - Milford Haven
R - Ruabon
S - Swansea



Question 8 (b)

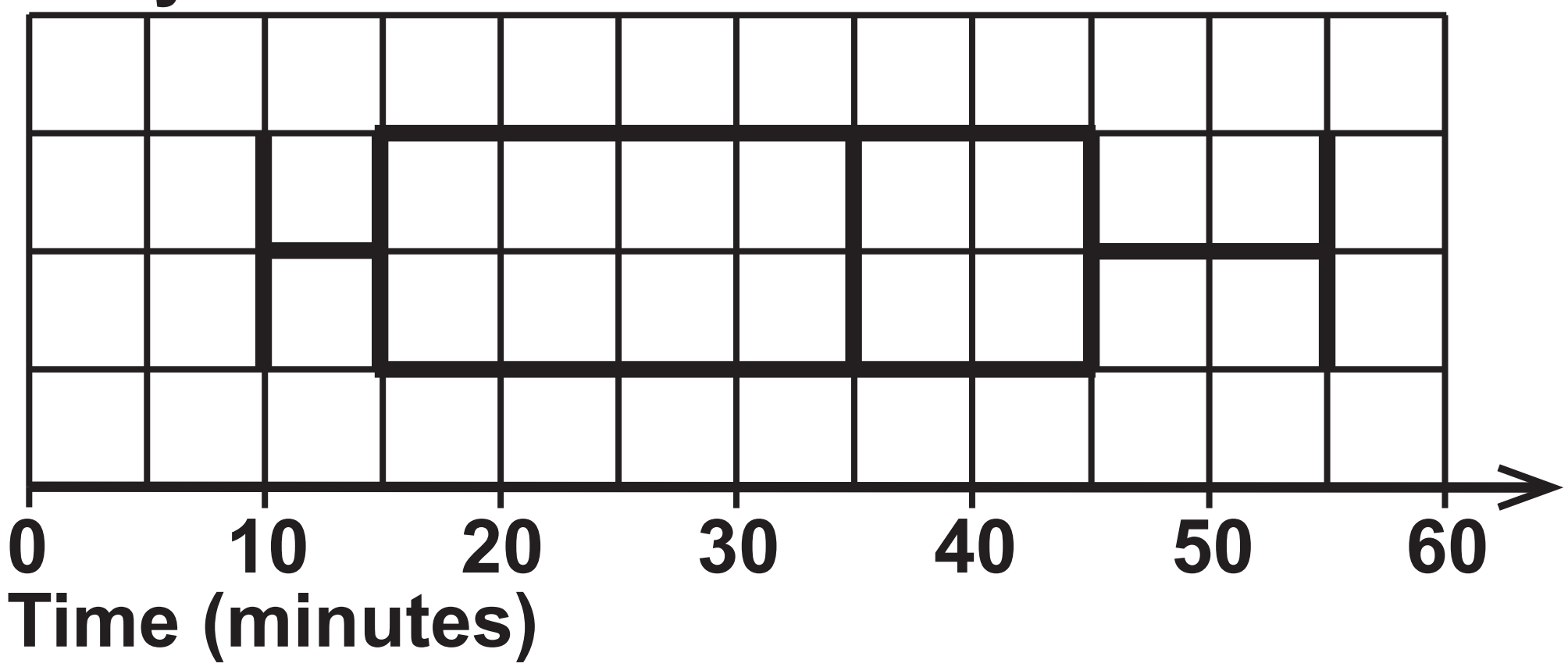
Information

Plan for the flight

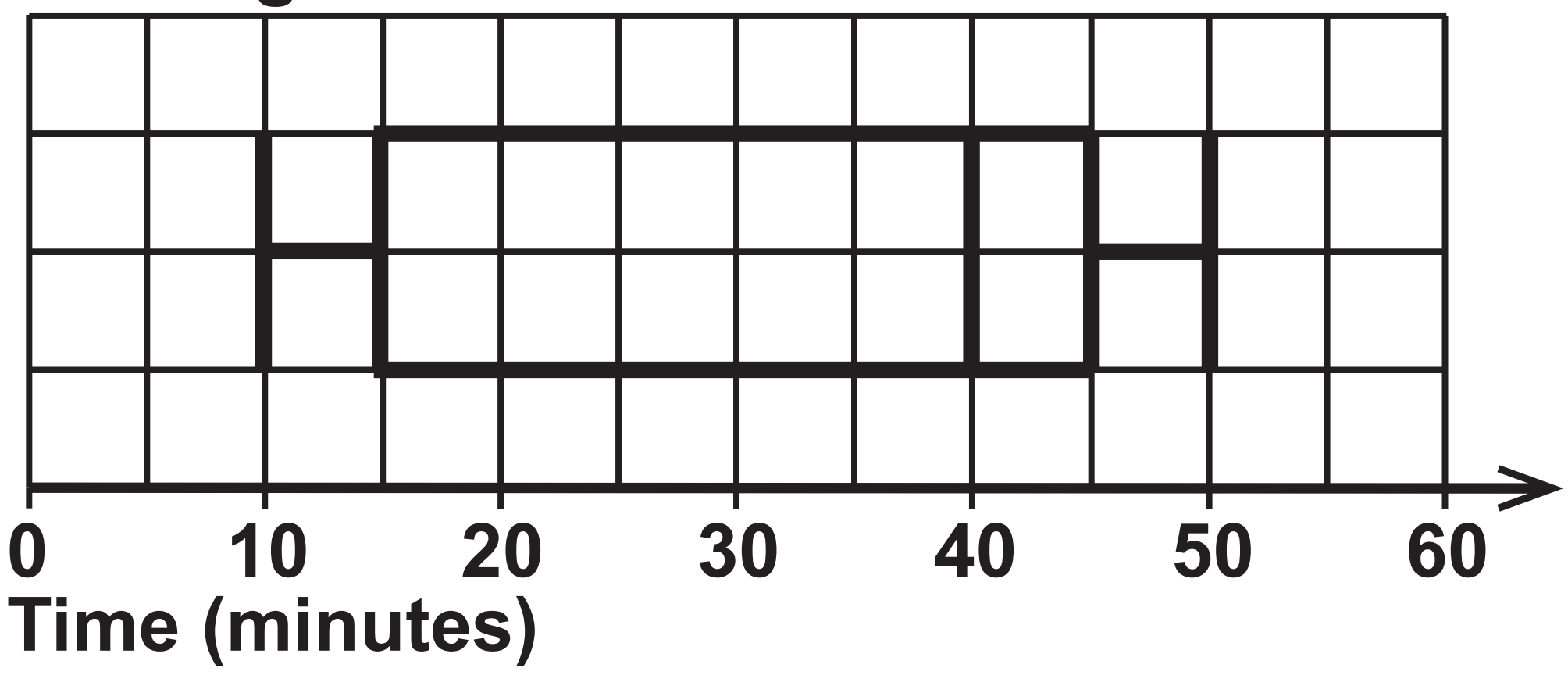
Journey	Average speed	Time
Milford Haven to Ruabon	90 mph	1 hour 20 minutes
Ruabon to Swansea	80 mph	1 hour 15 minutes

Question 10 (a)

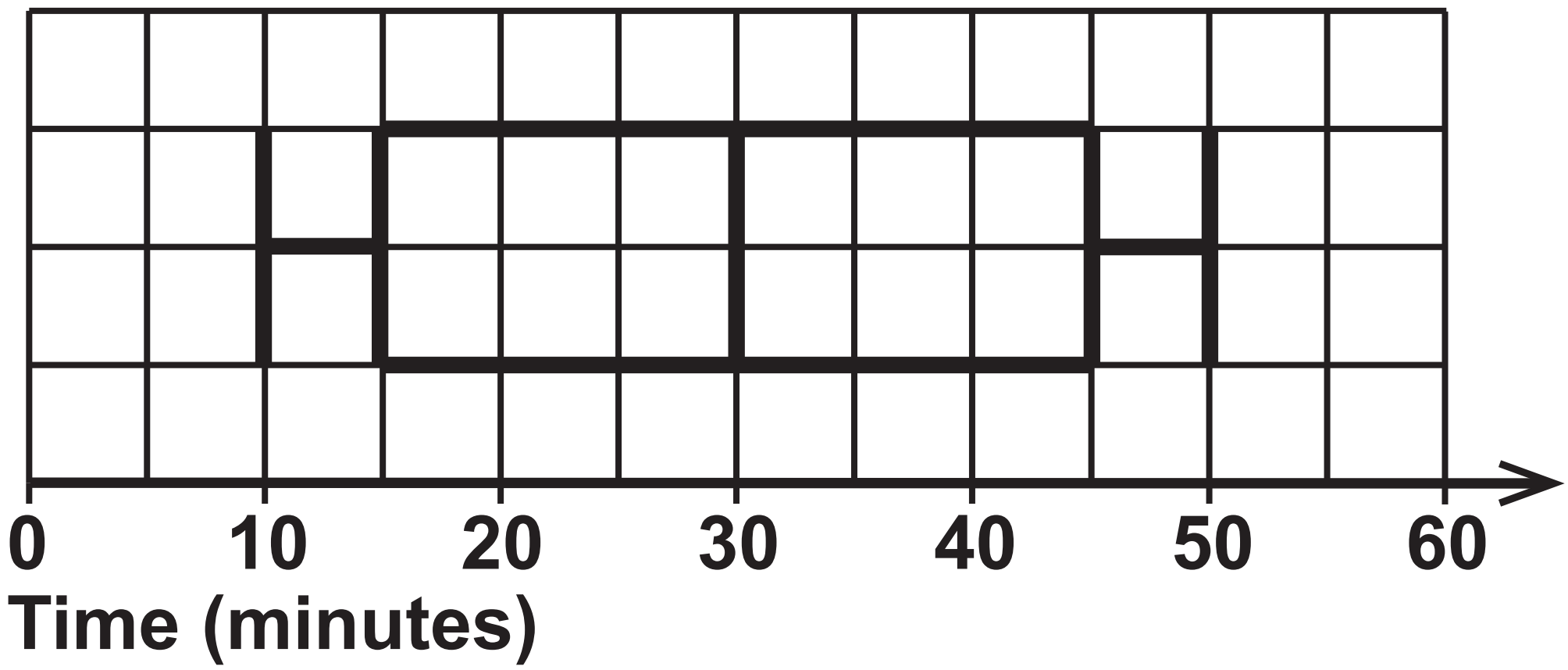
Maesystrad



Rhewlteg



Glanmawr



Question 11

Table

COUNTRY	APPROXIMATE LAND AREA, km^2	APPROXIMATE POPULATION
Argentina	2 800 000	40 000 000
Austria	84 000	8 400 000
Canada	10 000 000	34 000 000
Pakistan	800 000	170 000 000
United Kingdom	240 000	62 000 000

GCSE

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MATHEMATICS – NUMERACY

UNIT 1: NON – CALCULATOR

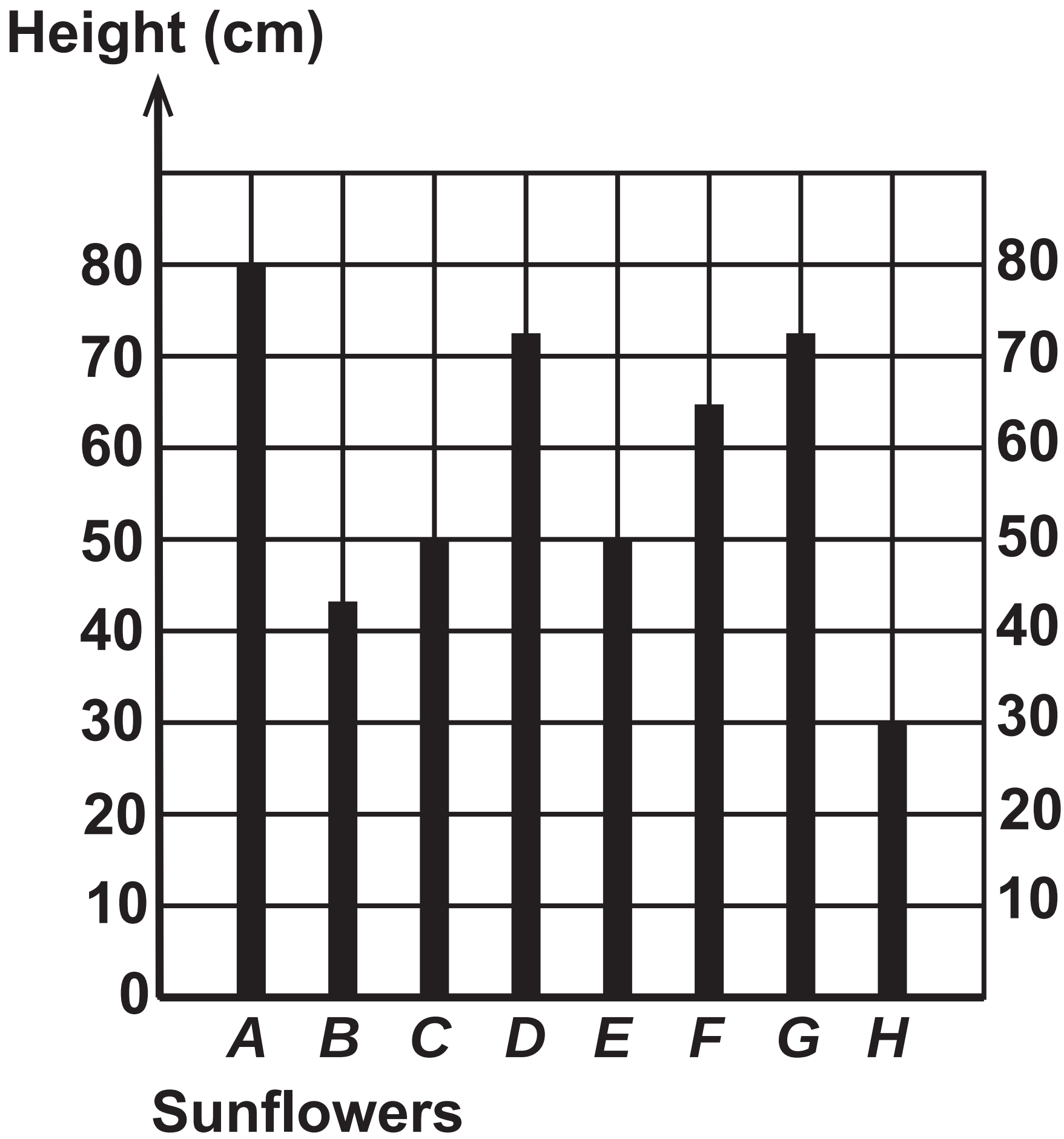
INTERMEDIATE TIER

TUESDAY, 7 MAY 2019 – MORNING

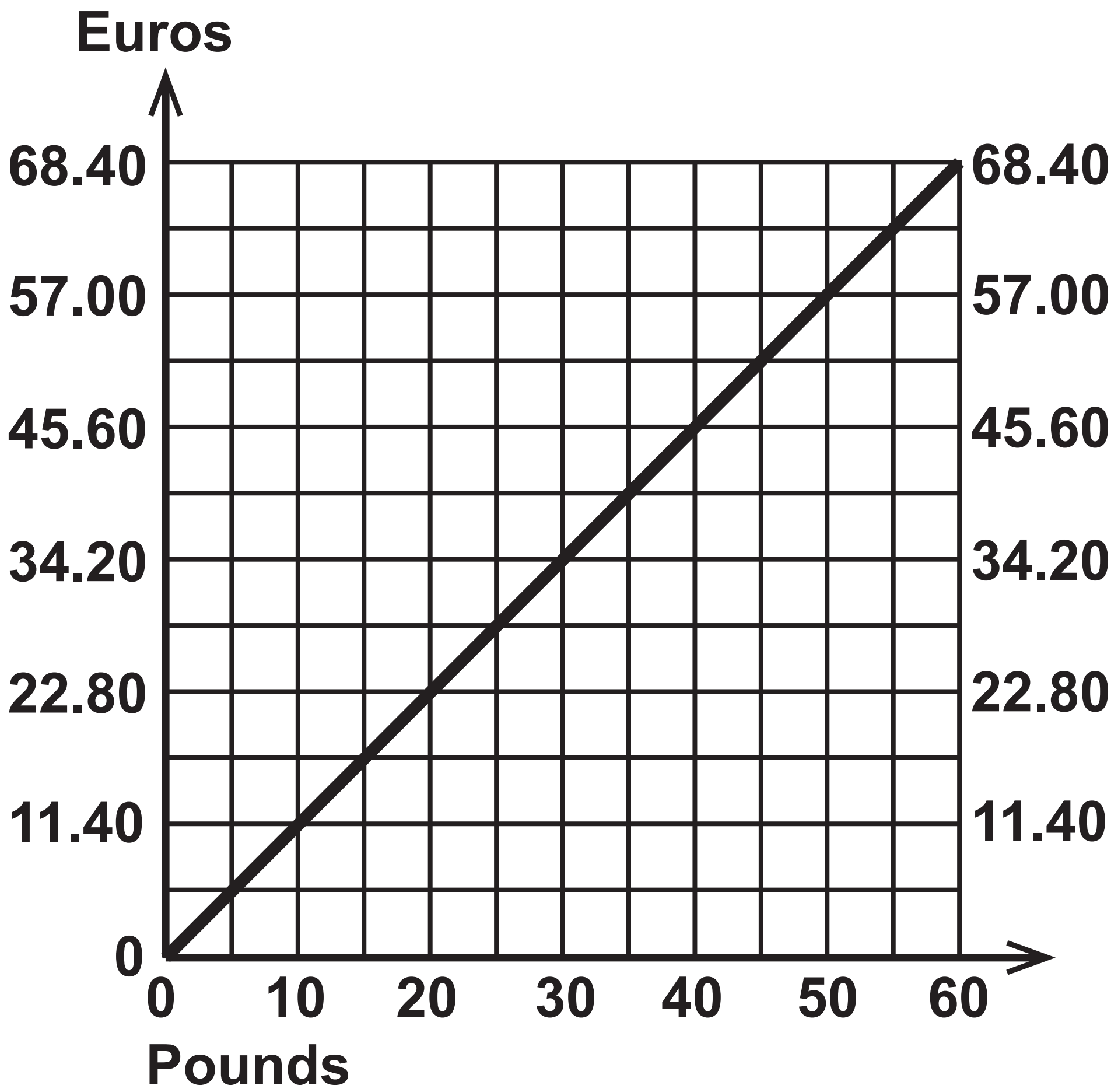
Spare Diagram Booklet

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

Question 2



Question 3 (c)


Euros
68.40
57.00
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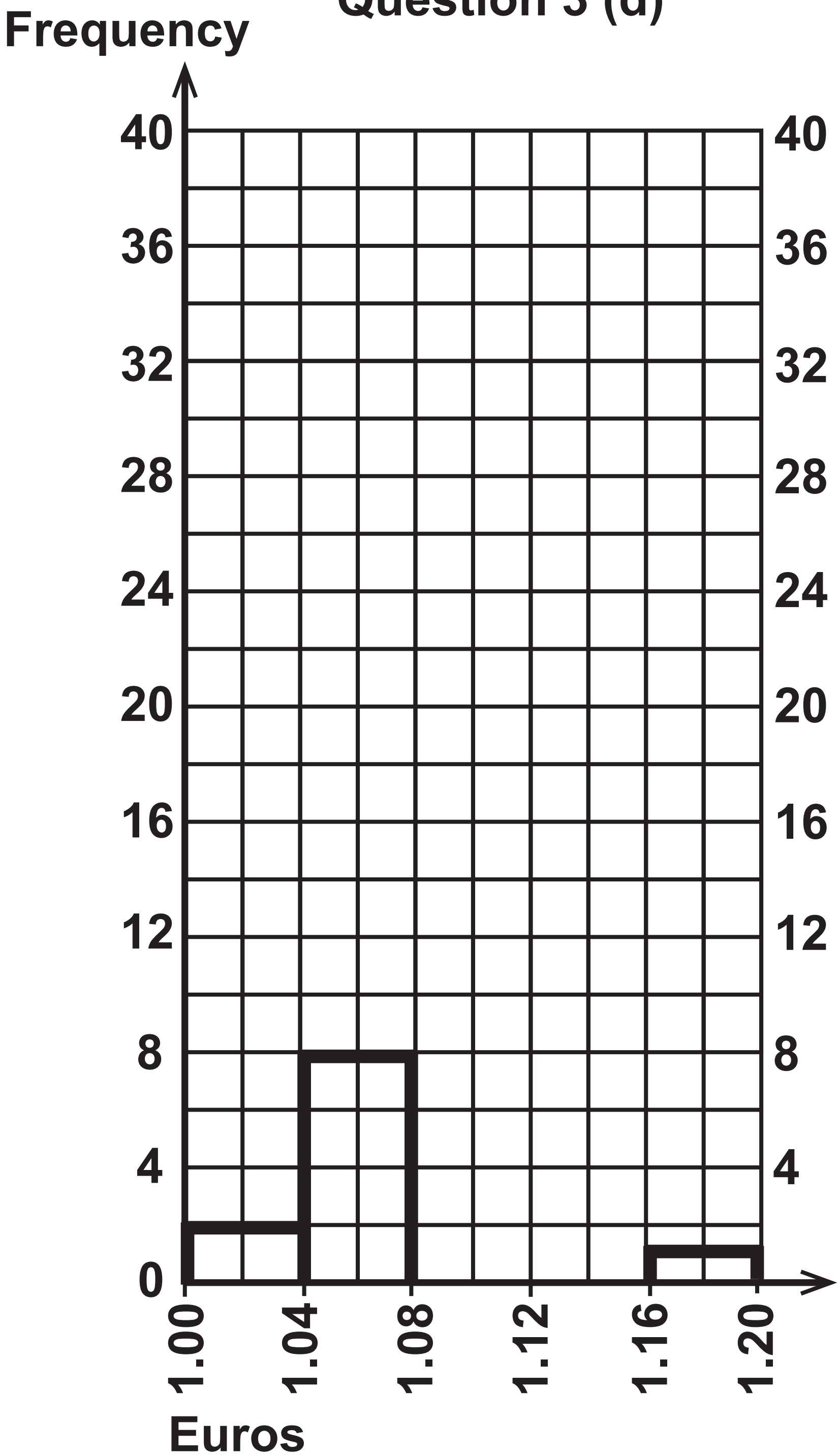
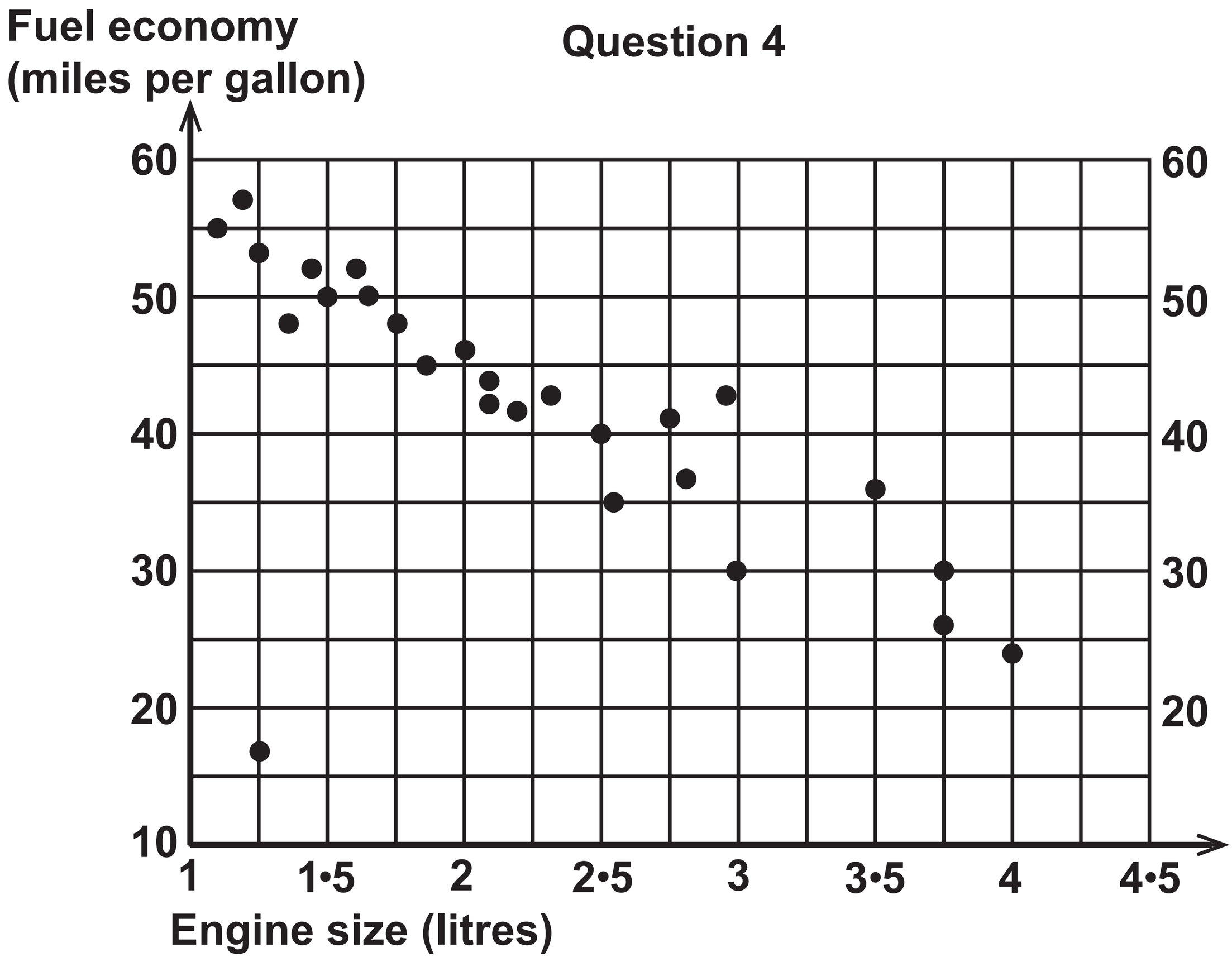
11.40
0
68.40
57.00
45.60
34.20
22.80
11.40
0
10
20
30
40
50
60
Pounds

Question 3 (d)

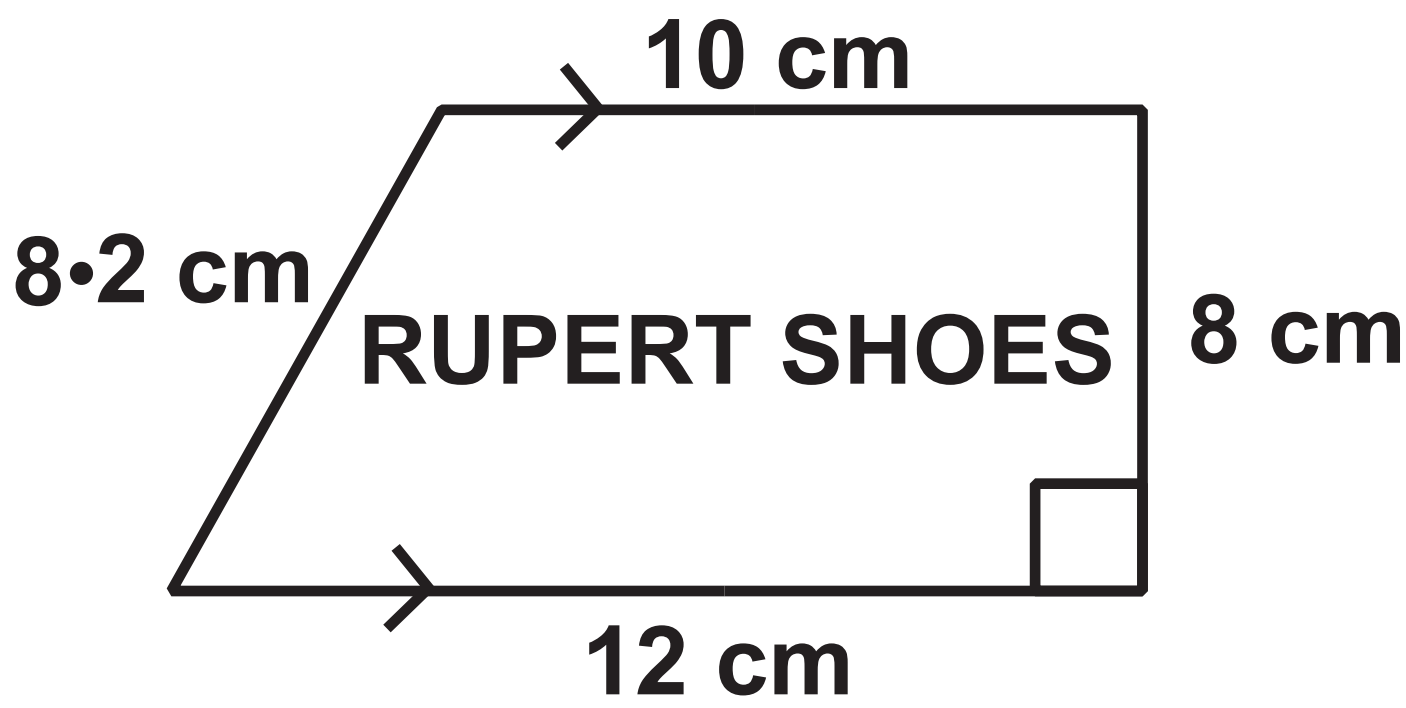

Frequency
40
36
32
28
24
20
16
12
8
4
0
1.00
1.04
1.08
1.12
1.16
1.20
Euros

Question 4


Fuel economy
(miles per gallon)
60
50
40
30
20
10
1
1•5
2
2•5
3
3•5
4
4•5
Engine size (litres)

Question 5 (a)

Diagram NOT drawn to scale



Question 5 (b) (ii)

Formula

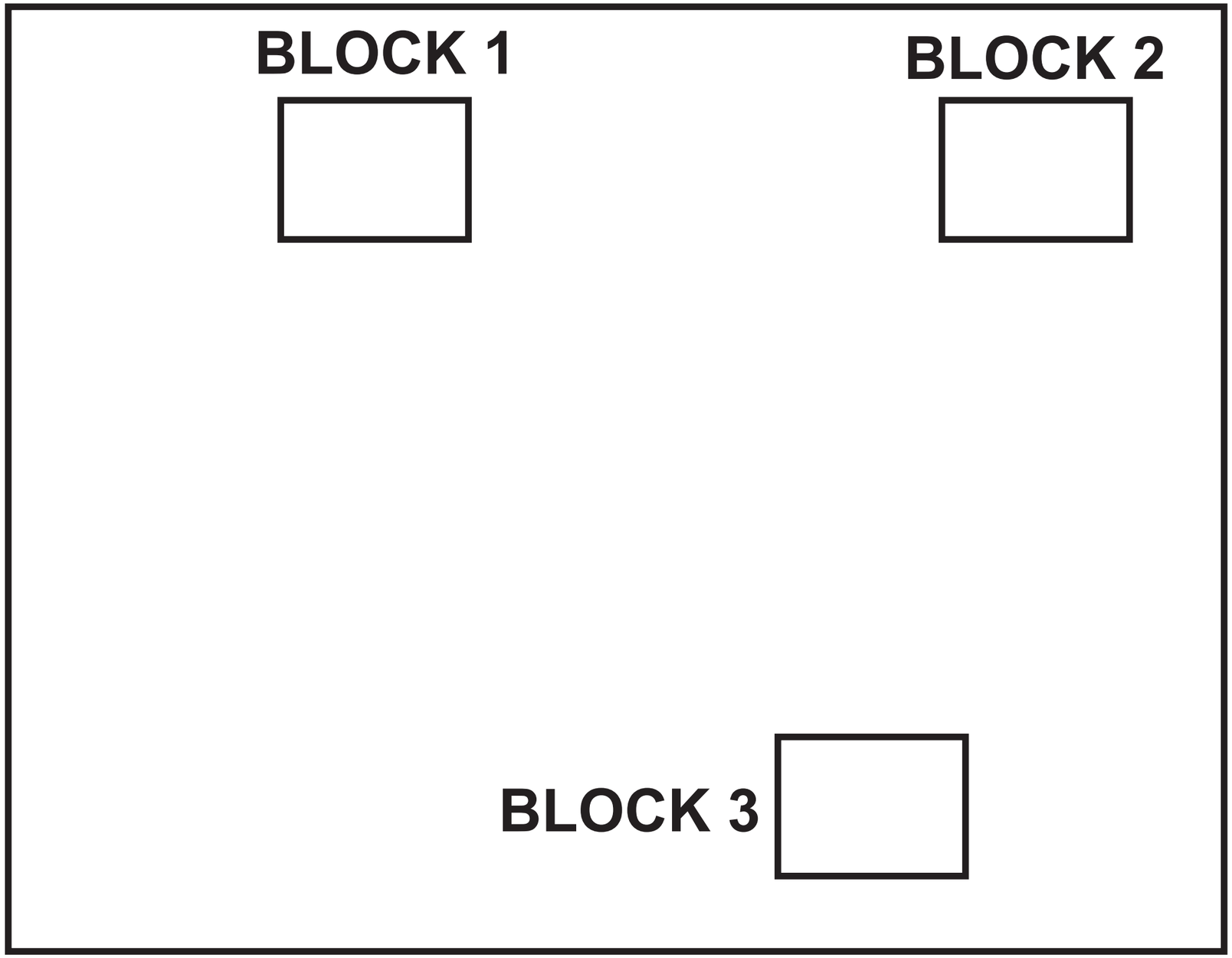
$$\text{Cost in £} = \frac{1}{5} \times (S + F) \times 0{\cdot}02$$

S = value of the sum of the 3 dimensions of the package

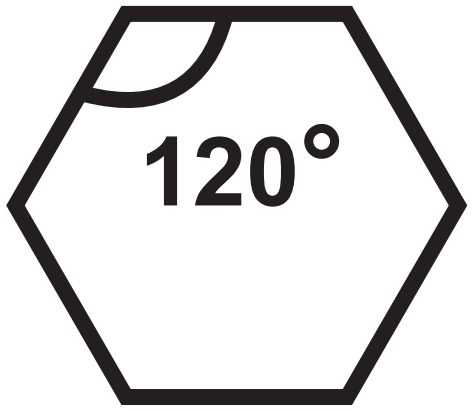
F = value of the area of one of the LARGEST faces of the package

Question 6

The scale of the plan is 1 cm represents 10 metres

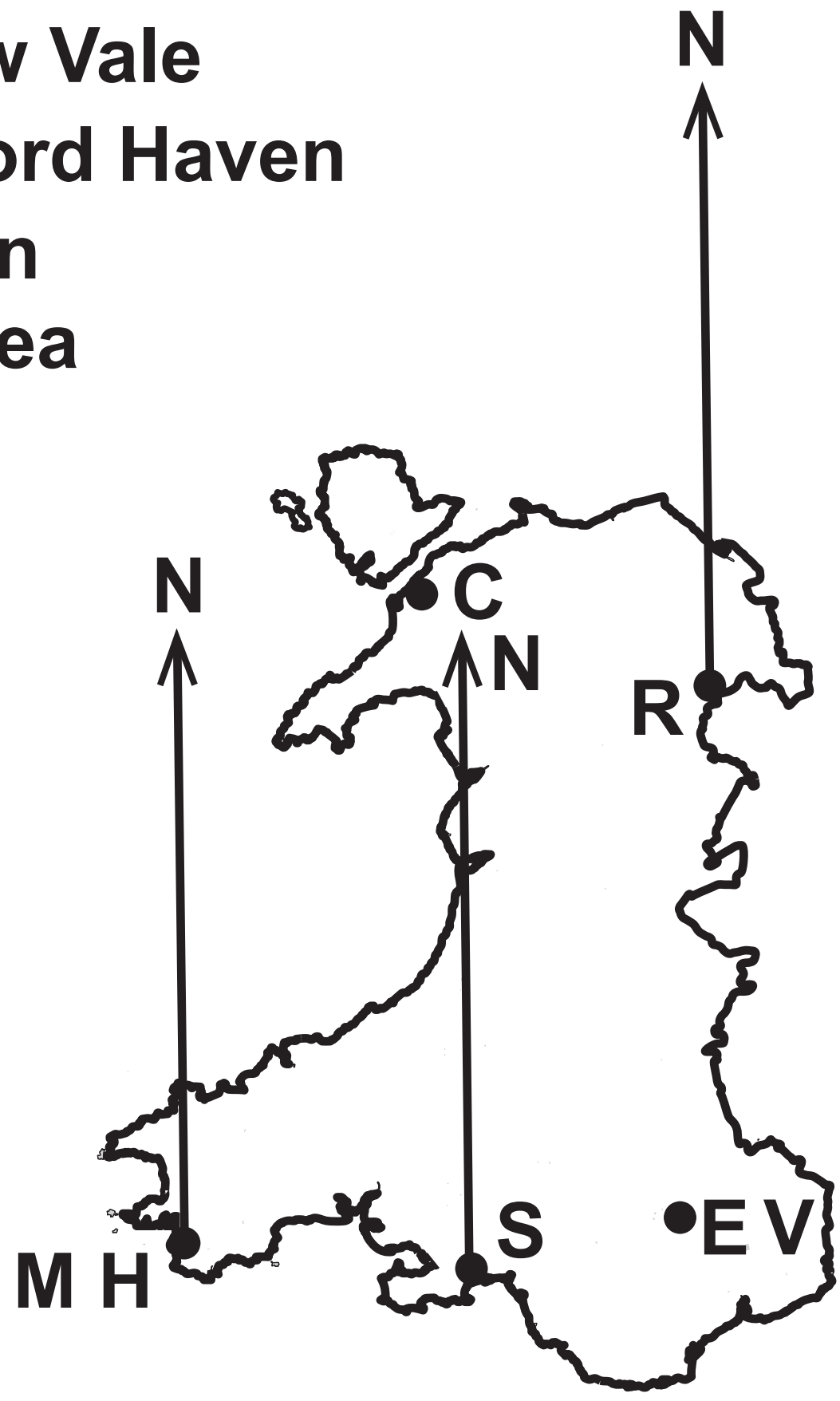


Question 7 (b)



Question 8

KEY:
C - Caernarfon
E V - Ebbw Vale
M H - Milford Haven
R - Ruabon
S - Swansea



Question 8 (b)

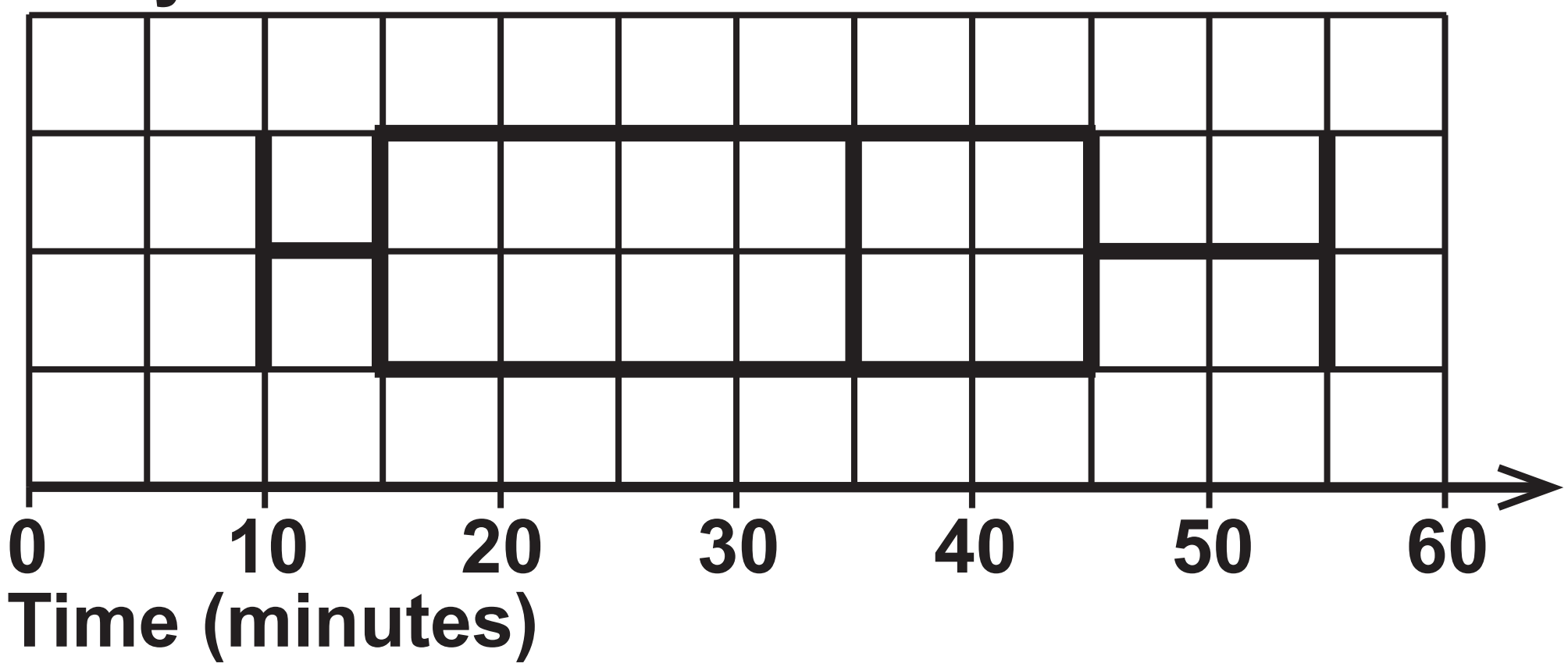
Information

Plan for the flight

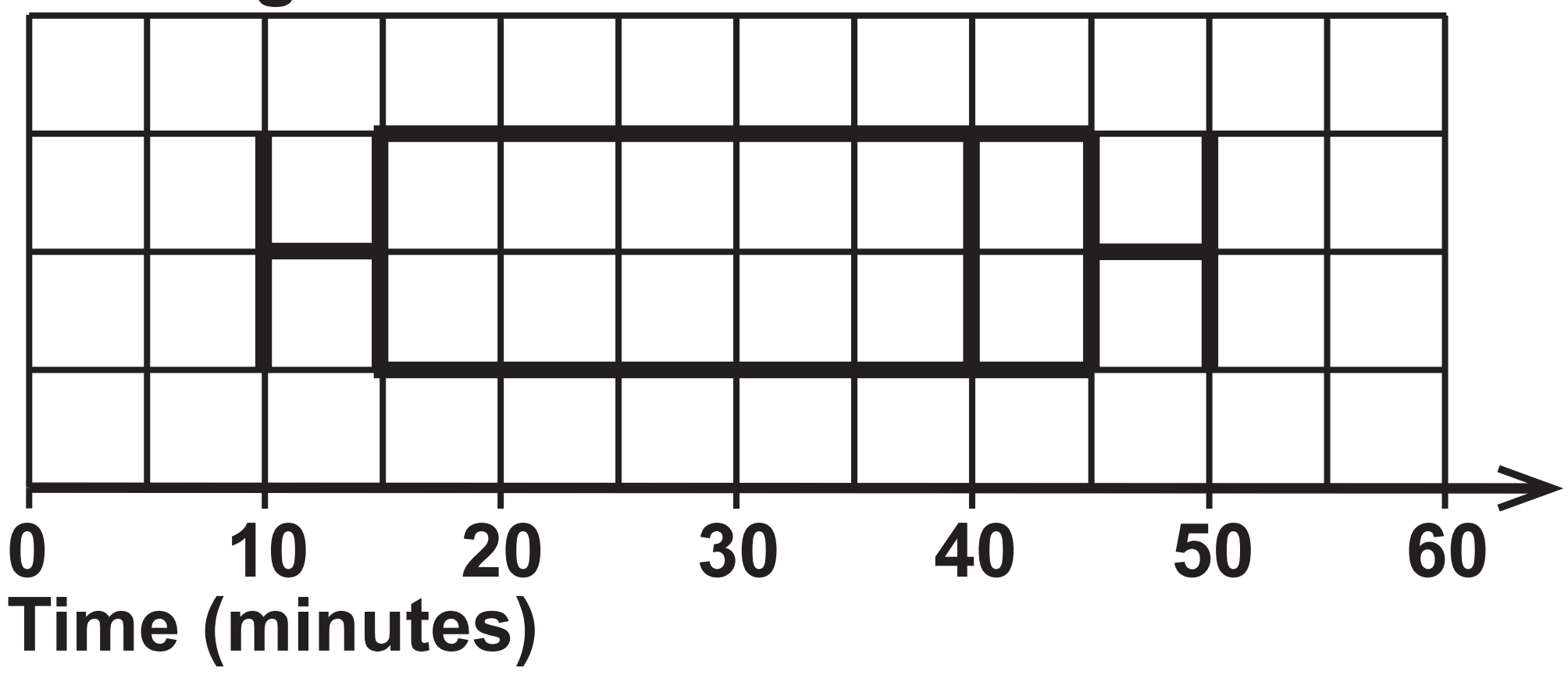
Journey	Average speed	Time
Milford Haven to Ruabon	90 mph	1 hour 20 minutes
Ruabon to Swansea	80 mph	1 hour 15 minutes

Question 10 (a)

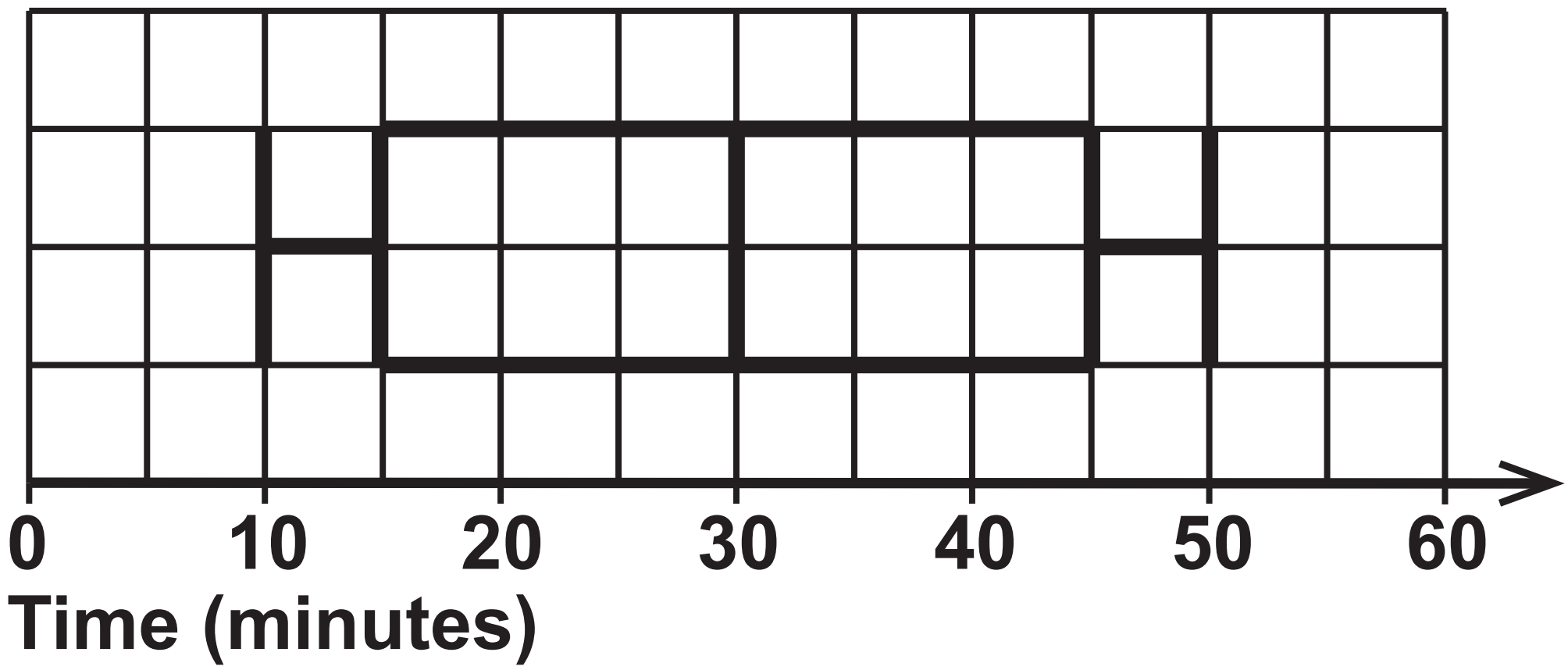
Maesystrad



Rhewlteg



Glanmawr



Question 11

Table

COUNTRY	APPROXIMATE LAND AREA, km^2	APPROXIMATE POPULATION
Argentina	2 800 000	40 000 000
Austria	84 000	8 400 000
Canada	10 000 000	34 000 000
Pakistan	800 000	170 000 000
United Kingdom	240 000	62 000 000

GCSE
MATHEMATICS
and
NUMERACY

FORMULA LIST

INTERMEDIATE TIER

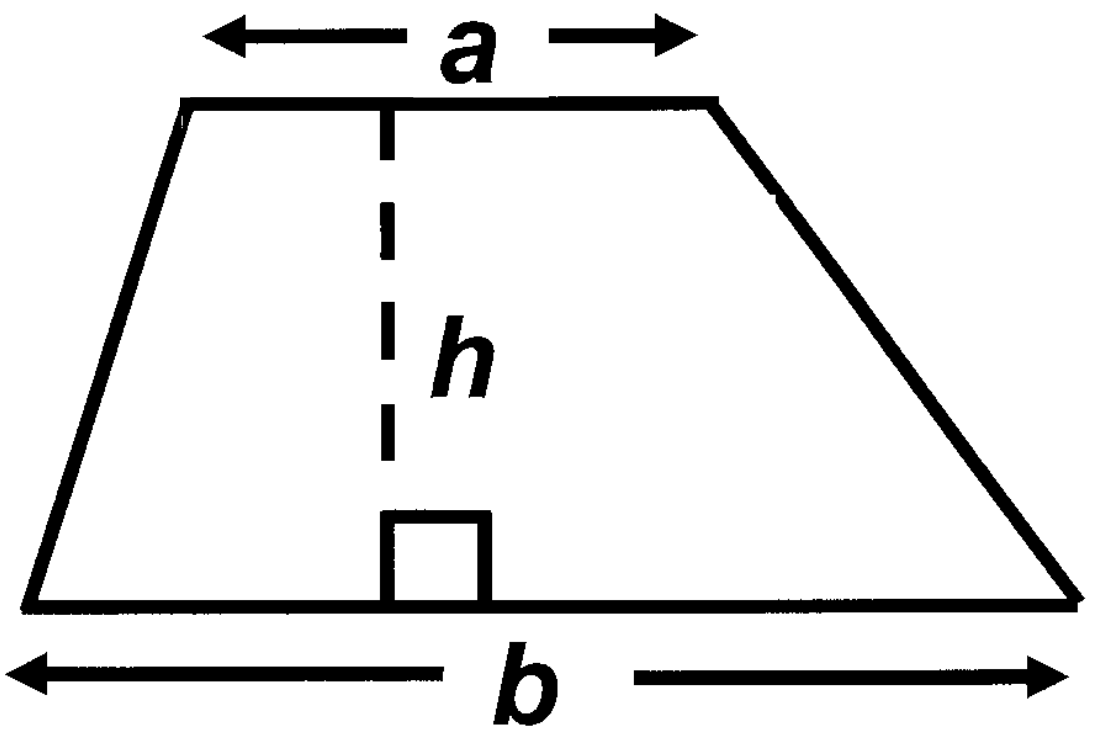
GCSE

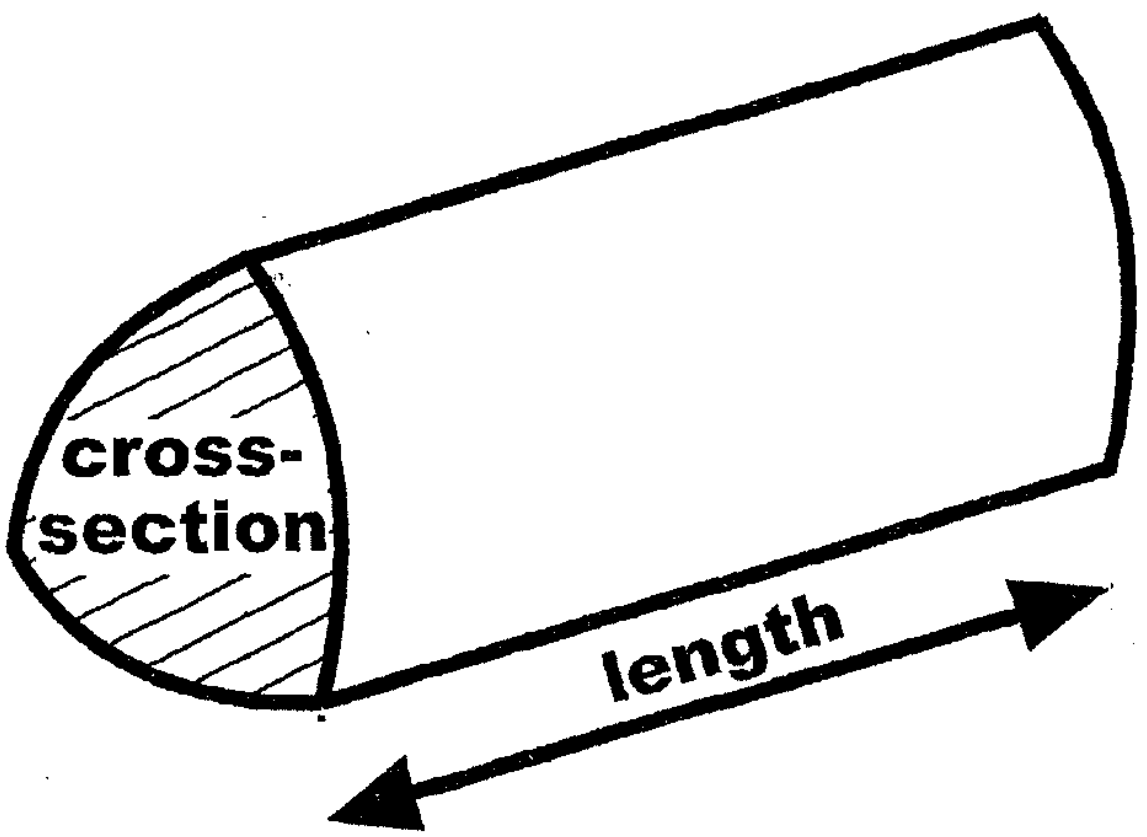
You must not write on these formula pages.

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