



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate Examination 2017

Mathematics

Paper 2
Ordinary Level

Monday 12 June
Morning 9:30 – 11:30

300 marks

Examination Number		For Examiner						Grade
		Q.	Ex.	Adv. Ex.	Q.	Ex.	Adv. Ex.	
		1			11			
		2						
		3						
		4						
		5						
		6						
		7						
		8						
		9						
Running Total		10			Total			
Centre Stamp								

Instructions

There are 11 questions on this examination paper. Answer **all** questions.

Questions do not necessarily carry equal marks. To help you manage your time during this examination, a maximum time for each question is suggested. If you remain within these times you should have about 10 minutes left to review your work.

Write your answers in the spaces provided in this booklet. You may lose marks if you do not do so. You may ask the superintendent for more paper. Label any extra work clearly with the question number and part.

The superintendent will give you a copy of the *Formulae and Tables* booklet. You must return it at the end of the examination. You are not allowed to bring your own copy into the examination.

You will lose marks if you do not show all necessary work.

You may lose marks if you do not include the appropriate units of measurement, where relevant.

You may lose marks if you do not give your answers in simplest form, where relevant.

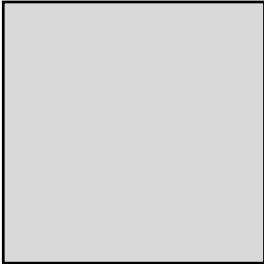
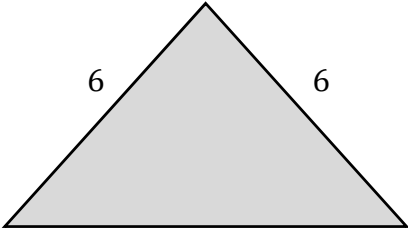

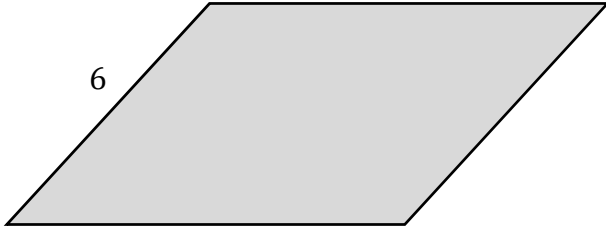
Write the make and model of your calculator(s) here:

Question 1

(Suggested maximum time: 5 minutes)

The table below shows diagrams of a number of shapes.
The lengths of some of the sides are marked.

Fill in the table below to show the number of **axes of symmetry** of each shape.

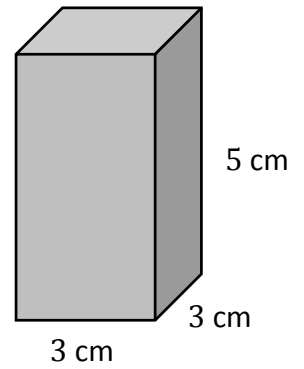
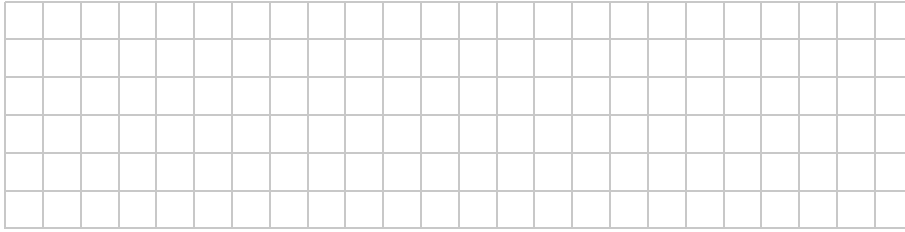
Shape	Diagram	Number of axes of symmetry
Square		Tick (✓) one box only: 0 1 2 4 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Isosceles Triangle		Tick (✓) one box only: 0 1 2 4 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Rectangle		Tick (✓) one box only: 0 1 2 4 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Parallelogram (angles are not 90°)		Tick (✓) one box only: 0 1 2 4 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Question 3

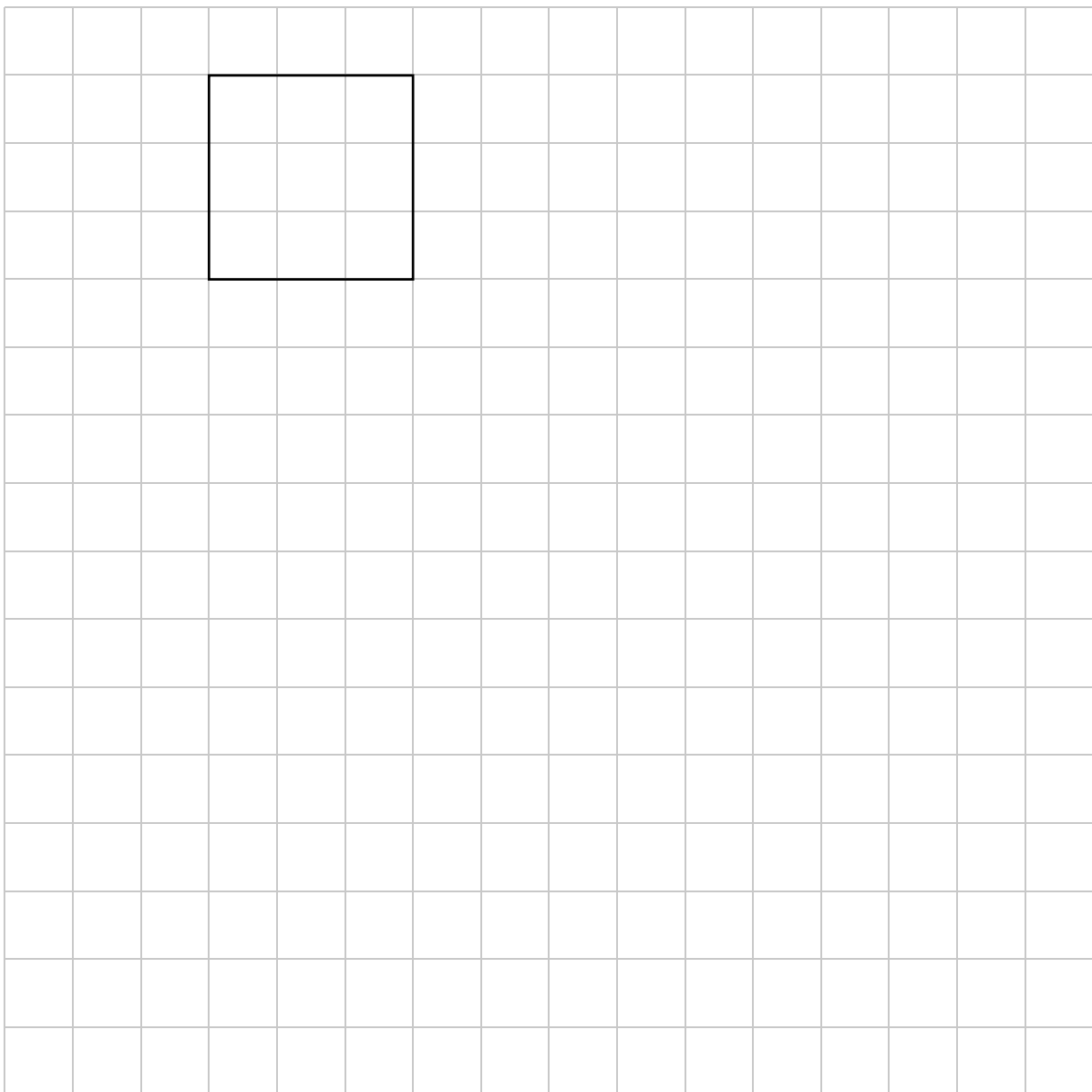
(Suggested maximum time: 15 minutes)

A closed rectangular box has a square base with sides of length 3 cm, and a height of 5 cm.

(a) Find the **volume** of the box.



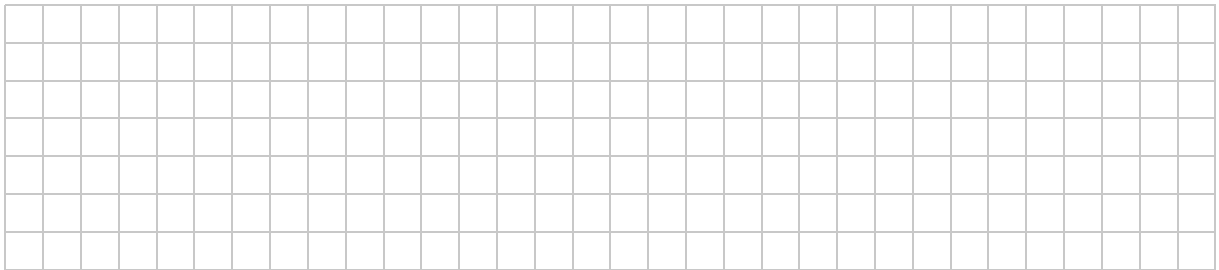
(b) The diagram below shows part of a **net** of the box. **Complete** the net, as accurately as you can.



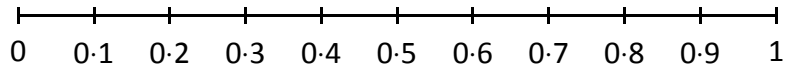
(b) The table below shows the probability of four events, **A**, **B**, **C**, and **D**.

(i) Fill in the 4 missing values in the table below, to show the probability of each event as a fraction, a percentage, and a decimal. Write the fraction in its simplest form.

Event	Probability		
	Fraction	Percentage	Decimal
A	$\frac{1}{4}$	25%	0.25
B	$\frac{1}{2}$		0.5
C	$\frac{2}{5}$	40%	
D		2%	



(ii) **Mark and label** the probability of each of the events **A**, **B**, **C**, and **D** on the scale below.



Question 5

(Suggested maximum time: 15 minutes)

There are 15 boxers in a boxing club. The weight of each boxer (in kg) is shown in the table below.

47	49	49	50	56
57	58	65	67	68
69	69	69	75	79

(a) (i) Complete the stem and leaf diagram below to show this data.

4							
5							
6							
7							

Key: $\begin{array}{|c} 5 \\ \hline \end{array}$ $\begin{array}{|c} 6 \\ \hline \end{array}$ =

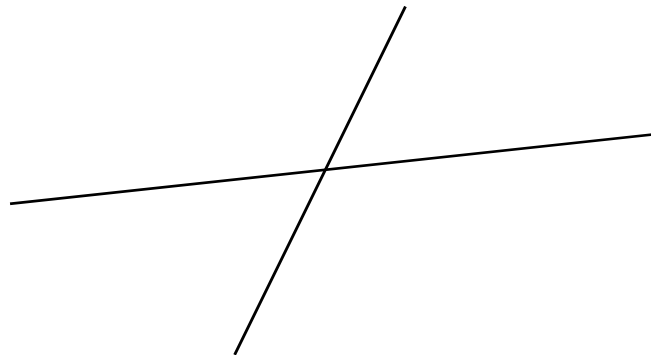
(ii) Find the **median** weight of the boxers.

(iii) Find the **range** of the boxers' weights.

Question 7

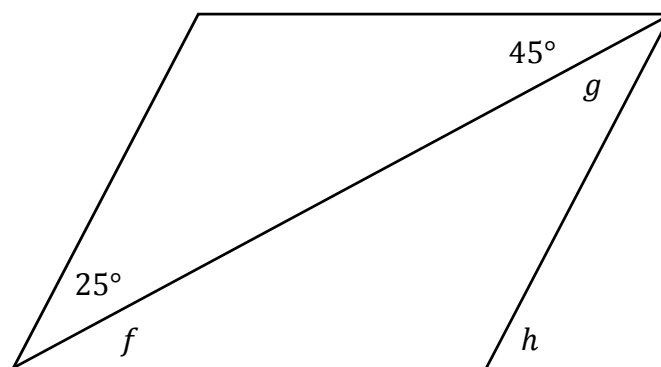
(Suggested maximum time: 5 minutes)

(a) The diagram below shows two line segments.



- (i)** On the diagram above, write the letter **A** in an **acute** angle.
- (ii)** On the diagram above, write the letter **O** in an **obtuse** angle.

(b) The diagram below shows a parallelogram. One of the sides has been extended. The sizes of some of the angles are marked.

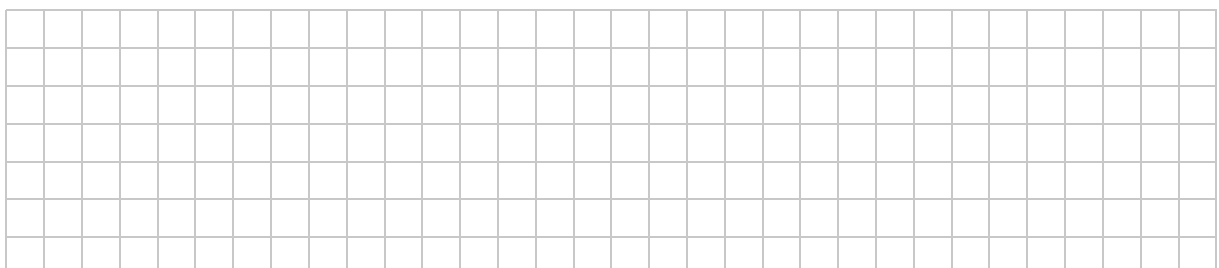


Find the size of the angle f , the angle g , and the angle h , without measuring.

$|\angle f| =$

$|\angle g| =$

$|\angle h| =$



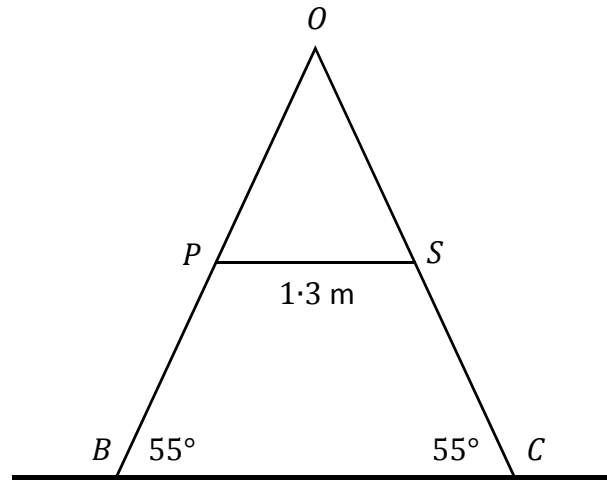
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Question 8**(Suggested maximum time: 10 minutes)**

The diagram below shows part of a climbing frame.

The points B and C are on the ground.

The legs $[OB]$ and $[OC]$ are joined by the horizontal bar $[PS]$.



Ava measures the angle that each of the legs makes with the ground. She finds that they are both 55° .

- (a)** What type of triangle is OBC ? Give a reason for your answer.

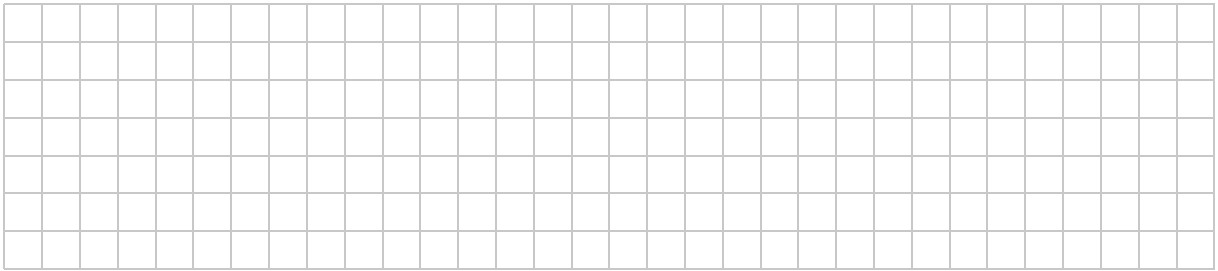
Type of triangle: Equilateral Isosceles Scalene
 (Tick (✓) **one** box only)

Reason: _____

- (b)** Work out the size of the angle at O , the top of the frame.

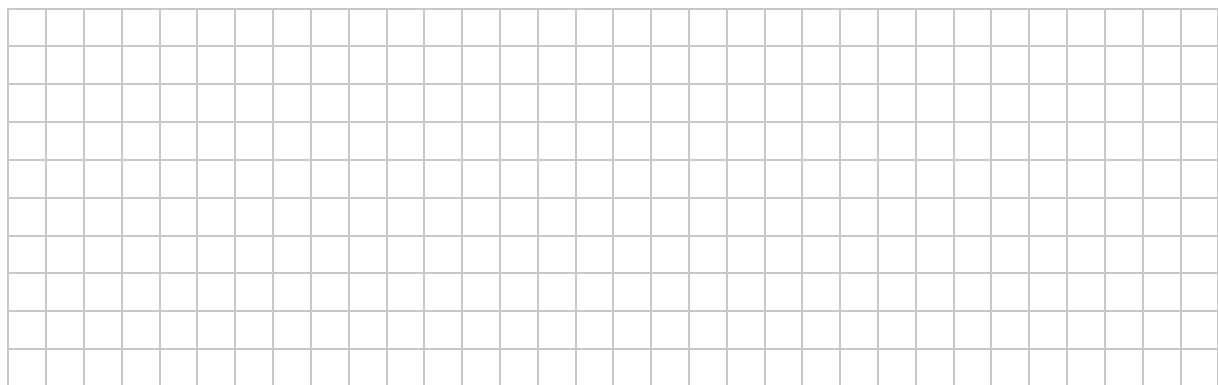
OBC and OPS are **similar** triangles.

(c) **Explain** what this means.



$|PS| = 1.3$ m, as shown in the diagram.
The point P is **half way** between B and O .

(d) Find the length $|BC|$.

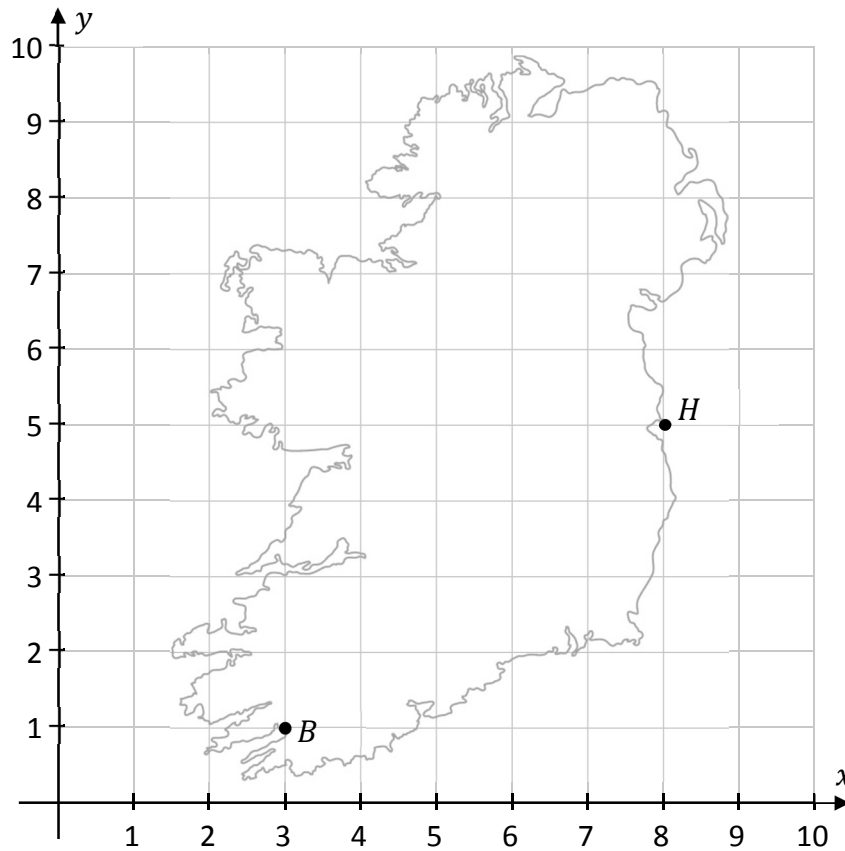


Question 9

(Suggested maximum time: 15 minutes)

The diagram below shows a map of Ireland on a co-ordinate grid.

Each unit on the grid is 1 cm. The point B represents Bantry and the point H represents Howth.



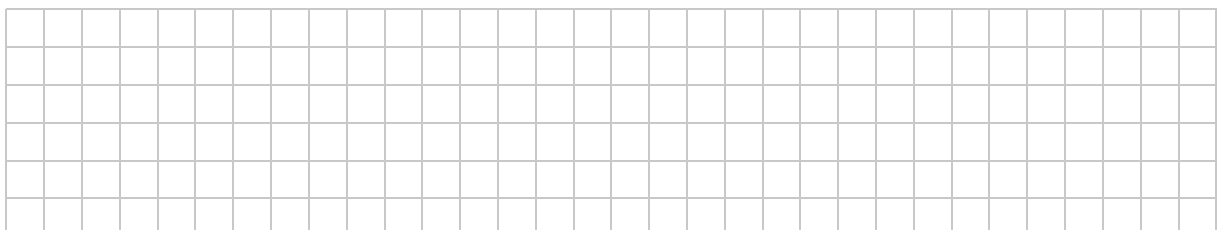
- (a) (i) Write down the co-ordinates of the point B and the point H .

$B =$

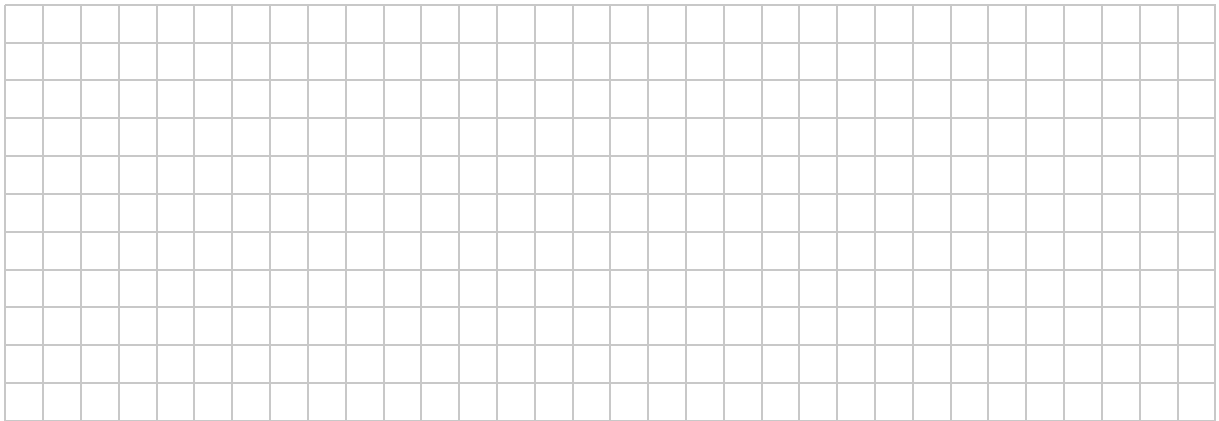
$H =$

- (ii) **Draw** the line segment $[BH]$ on the diagram above.
- (iii) **Construct** the **perpendicular bisector** of $[BH]$ on the diagram, using only a compass and straight edge. Show all of your construction lines clearly.
- (iv) Hence, or otherwise, find the co-ordinates of the **midpoint** of $[BH]$.

Midpoint =

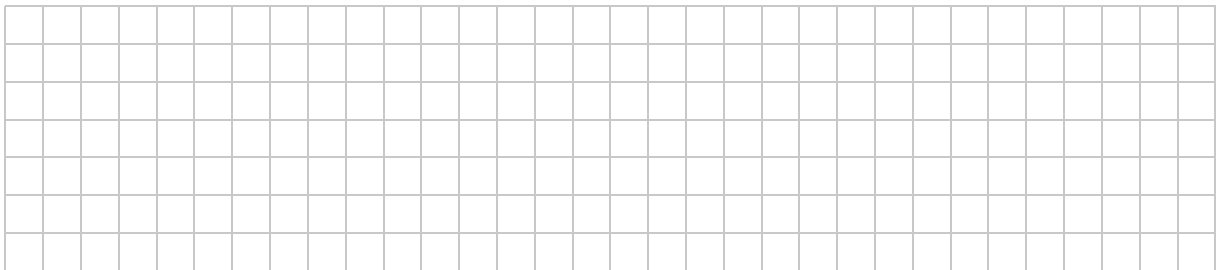


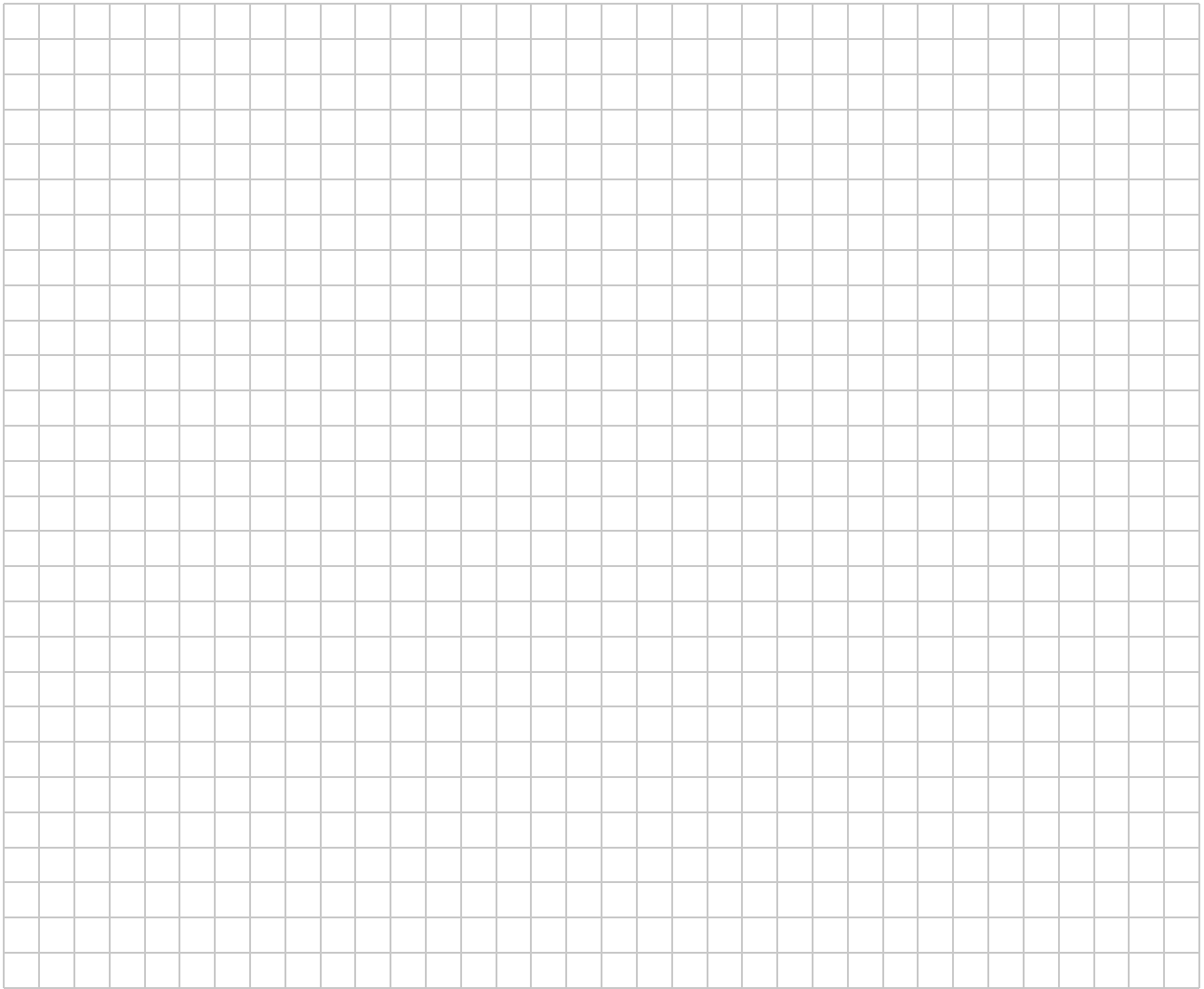
- (b) Work out the distance on the diagram from Wicklow (8, 4) to Westport (3, 6).
Give your answer in centimetres in the form \sqrt{n} , where $n \in \mathbb{N}$.



- (c) The distance from Dublin to Galway **on the diagram** is 4 cm.
The **actual** distance from Dublin to Galway is 180 km.

Work out how many kilometres each centimetre on the grid represents.





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