

Name	Date started	Target end date

WJEC GCSE Mathematics and Numeracy (Double Award) – Question Pack

Foundation similar shapes and congruence: spotting when two shapes are the same shape (similar) or identical (congruent), using ratios of sides in sim

REVISE

.wales

F3.06 – Similar shapes & congruence – basic

Spec 3.9.1, 3.9.2 – Unit 3 (calculator allowed)

Foundation similar shapes and congruence: spotting when two shapes are the same shape (similar) or identical (congruent), using ratios of sides in similar triangles, and identifying SSS, SAS, ASA and RHS congruence criteria. Sourced from legacy WJEC GCSE Mathematics-Numeracy Foundation papers (3300U10/U20) and accessible content from Intermediate papers (3300U30/U40), organised for revision under the 2025 spec.

2025 SPECIFICATION

Estimated time for entire question pack: ~39 minutes

Derived from the GCSE Higher pace of ~1.5 min/mark (26 marks across 11 questions).

You are advised to **not** attempt to complete all of this in one sitting.

ABOUT THIS QUESTION PACK

This is a **focused single-topic practice pack**, not a single mock paper. Questions are organised against the 2025 specification. Questions are ordered chronologically by sitting, with custom-written and SAM questions at the end.

INSTRUCTIONS

Use black ink or black ball-point pen. Show all working – method marks are awarded for clear setup.

A calculator is allowed on every question in this pack (Unit 3 is the calculator-allowed paper).

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Similar shapes & congruence – basic – what the new spec asks

WJEC GCSE Mathematics (first teaching 2025) · Unit 3: calculator-allowed.

Similarity 3.7.1

- Recognise similar shapes have equal angles.
- Sides in the same ratio.
- Use scale factor to find missing lengths.

Congruence 3.7.2

- Define congruence: same shape and size.
- List the four congruence conditions: SSS, SAS, ASA, RHS.
- Decide whether two triangles are congruent.

Working with ratios 3.7.3

- Compare corresponding lengths to find SF.
- Apply SF to find unknown sides.
- Check SF makes sense (>1 for enlargement, <1 for reduction).

Exam strategy 3.7

- State which sides correspond.
- Show the ratio used.
- Include units when giving a length.

Similar shapes & congruence – basic in one page

Quick-reference notes – revisit before each question. Don't use during the questions.

Similar shapes

Same *shape*, different *size*. Angles equal, sides in the same ratio.

Scale factor k : corresponding sides multiply by k .

Congruent shapes

Identical in shape **and** size. One can be rotated or reflected to land on the other.

Scale factor

$$\text{SF} = \text{new length} \div \text{old length}$$

Apply SF to every pair of corresponding sides.

Finding missing sides

1. Match up corresponding sides.
2. Find the scale factor from one known pair.
3. Multiply (or divide) to get the unknown.

Congruence criteria

SSS, SAS, ASA, RHS – any one of these proves congruence.

SSA does *not* prove congruence.

Common traps

- Mixing up which side corresponds to which.
- Treating 'same angles' alone as congruence (it's only similarity).
- Using SF on the wrong direction (enlarge vs reduce).

Examiner
only

1. (a) Calculate $8 \cdot 2^2 + \sqrt{13}$.
Give your answer correct to 2 significant figures. [2]

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- (b) Find 57% of 83.5.
Give your answer correct to 1 decimal place. [3]

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2. Circle either TRUE or FALSE for each statement given below. [3]

STATEMENT		
All circles are similar.	TRUE	FALSE
All squares are similar.	TRUE	FALSE
All triangles are similar.	TRUE	FALSE
All rectangles are similar.	TRUE	FALSE
All regular hexagons are similar.	TRUE	FALSE

3300U401
03



Examiner
only

5. *In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

18% of £256 is shared in the ratio 2 : 1.
Calculate the value of the larger share.
Give your answer to the nearest 10p.

You must show all your working.

[5 + 2 OCW]

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6. (a) Factorise $7ab + 11a$. [1]

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- (b) Factorise $x^2 - 8x$. [1]

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- (c) Expand $4y(2 - 3y)$. [2]

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3300U401
07



15. 18% of £256 is shared in the ratio 2 : 1.
Calculate the value of the larger share.
Give your answer to the nearest 10p.

You must show all your working.

[5]

Examiner
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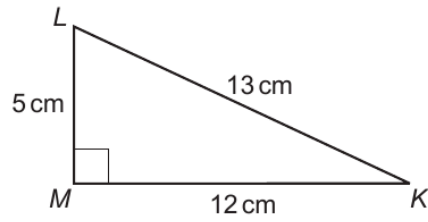
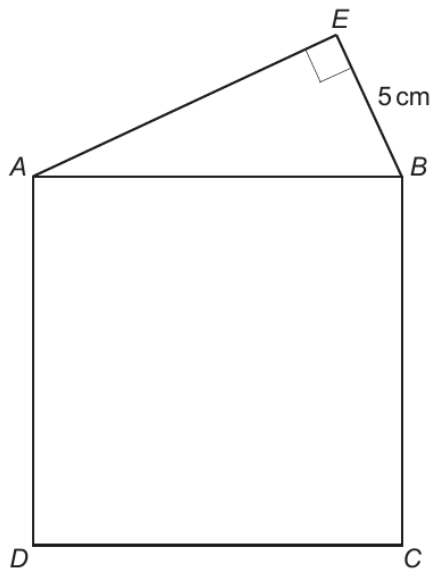
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Examiner only

7. In the diagrams below, $ABCD$ is a square. Triangles ABE and KLM are congruent.



Diagrams not drawn to scale

Calculate the area of the square $ABCD$.

[3]

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3300U301
09



9. Giovanni has a takeaway pizza van. He sells whole pizzas and slices of pizza from his van.



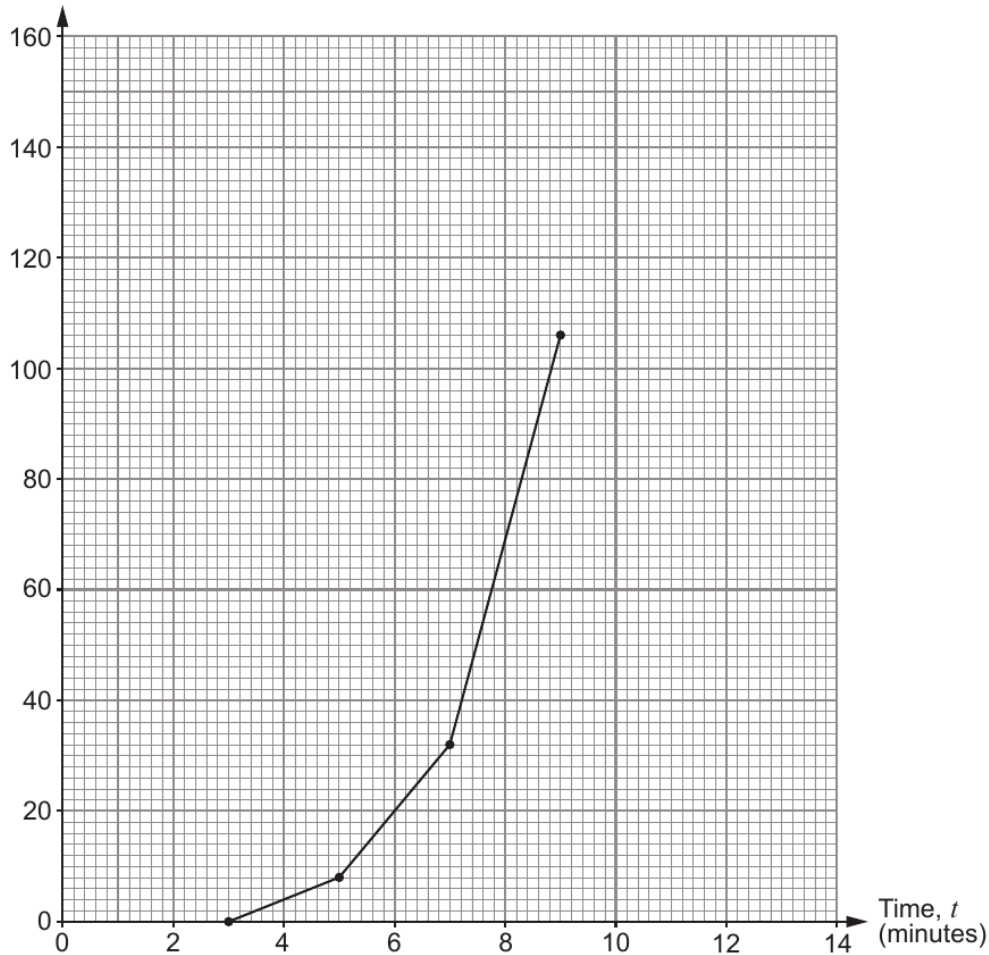
Examiner only

(a) For the last 3 days, he has timed how long it takes to complete the food order for each of his customers. Giovanni recorded his results in the table below.

(i) Complete the cumulative frequency table **and** the cumulative frequency diagram. [2]

Time, t (minutes)	Frequency	Cumulative frequency
$3 < t \leq 5$	8	8
$5 < t \leq 7$	24	32
$7 < t \leq 9$	74	106
$9 < t \leq 11$	40
$11 < t \leq 13$	14

Cumulative frequency



Examiner only

Use your cumulative frequency diagram to give the best estimates for the answers to each of the following questions.

- (ii) Find the median time taken to complete a food order. [1]

The median time is minutes.

- (iii) Giovanni is concerned that food orders are taking too long to complete. He says,

"Only 25% of the food orders are completed in under minutes."

Use **one** of the five values below to complete Giovanni's statement. [1]

6.4 6.6 7.2 8 9.6

- (iv) Calculate the percentage of orders that were completed in less than 6 minutes. [2]

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- (b) For the last 3 days:
 - Giovanni spent £180 on ingredients
 - he spent £220 on the running costs for the pizza van
 - he received a total of £700 from the food orders.

Calculate Giovanni's percentage profit. [3]

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- (c) Next year Giovanni intends to charge £8.40 for a basic pizza. This is an increase of 20% from the current charge.

Calculate how much Giovanni currently charges for a basic pizza. [2]



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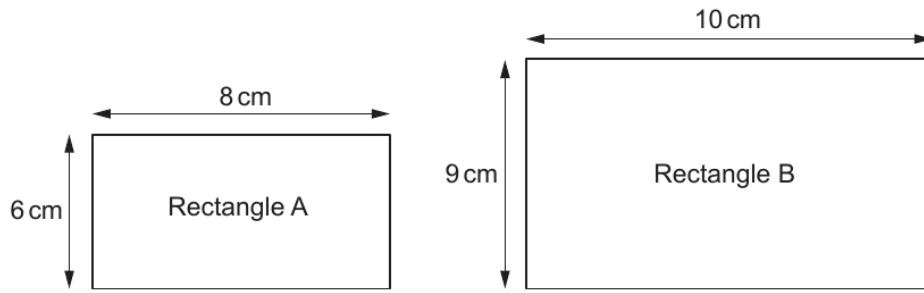
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Examiner
only

15.



Diagrams not drawn to scale

- (a) Explain why Rectangle A is **not** mathematically similar to Rectangle B. [2]

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- (b) Alun changes **only one** of the measurements of **Rectangle B** to make the two rectangles mathematically similar.

Write down a possible length and width of Alun's new rectangle.
You must show all your working. [2]

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Length = cm

Width = cm



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18. The diagram below shows a shape made by joining two congruent rectangles together. The length of each rectangle is $(5x + 3)$ cm. The width of each rectangle is $(2x - 1)$ cm.

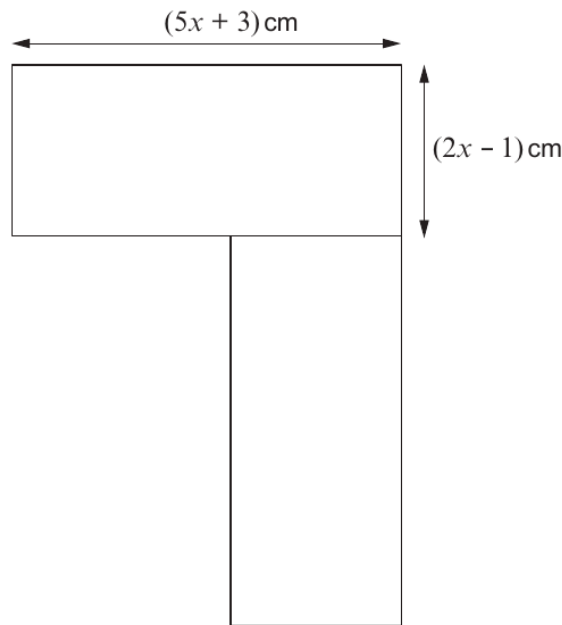


Diagram not drawn to scale

Write an expression for the total area of the shape in the form $ax^2 + bx + c$, where a , b and c are whole numbers. [3]

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Examiner only

9. (a) The area of Wales is $20\,735\text{ km}^2$.

The table below gives the population of Wales in 1977, 1998 and 2015.



Year	1977	1998	2015
Population	2.8 million	2.9 million	3.1 million

(i) What was the increase in the population of Wales between 1977 and 1998?
Circle your answer.

[1]

- 1×10^3
- 1×10^4
- 1×10^5
- 1×10^6
- 1×10^7

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(ii) Estimate the population density of Wales in 2015.

[3]

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Population density of Wales in 2015 was people/ km^2

(b) Cardiff is the largest city in Wales.
In 2018, the population of Cardiff was approximately 360 000.
The population of Cardiff increased by 20% from 1991 to 2018.
Calculate the population of Cardiff in 1991.

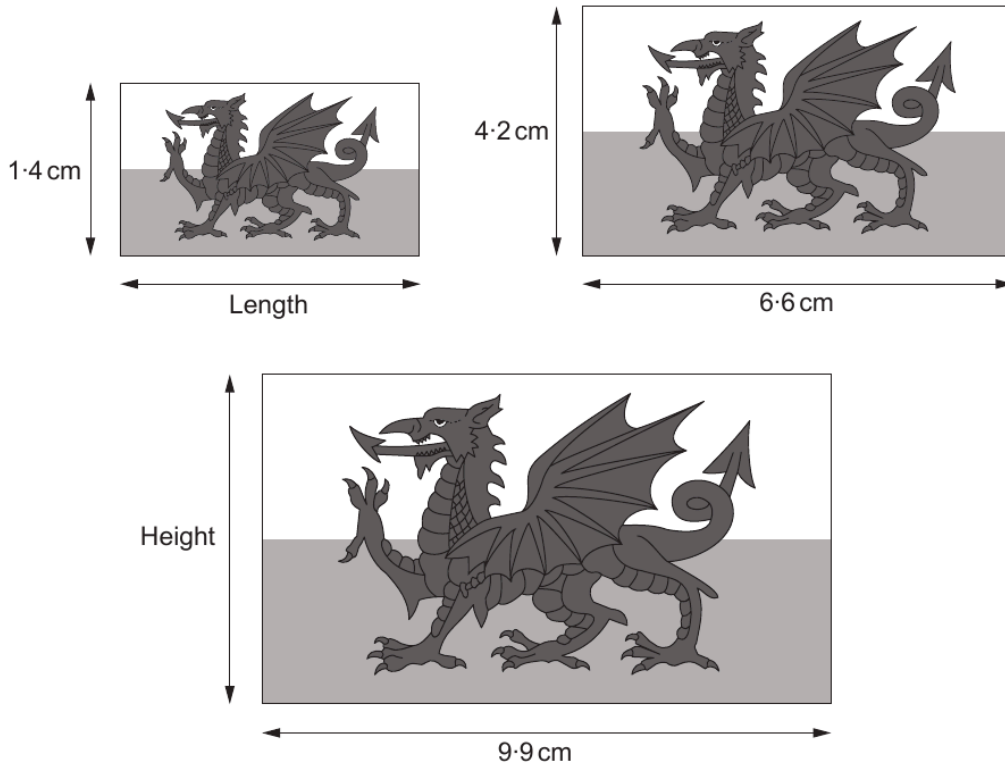
[3]

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Examiner only

(c) DraigYma prints Welsh flags onto stickers. Three of their mathematically similar Welsh flag stickers are shown below.



Diagrams not drawn to scale

Calculate the missing length and height in the diagrams.

[4]

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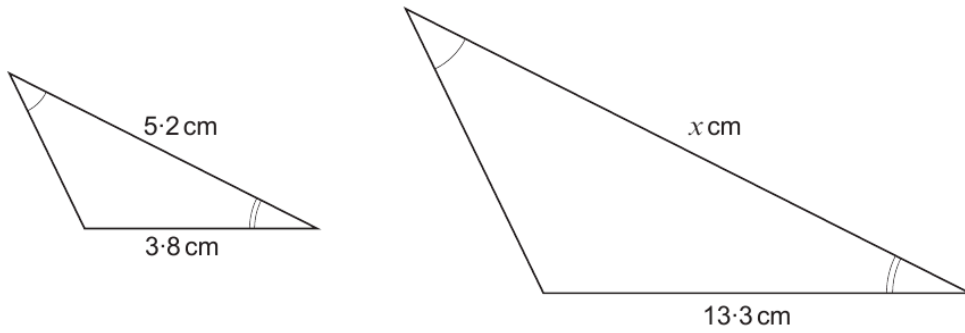
Length is cm Height is cm

END OF PAPER



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19. (a) The triangles shown below are similar.



Diagrams not drawn to scale

Calculate the value of x .

[2]

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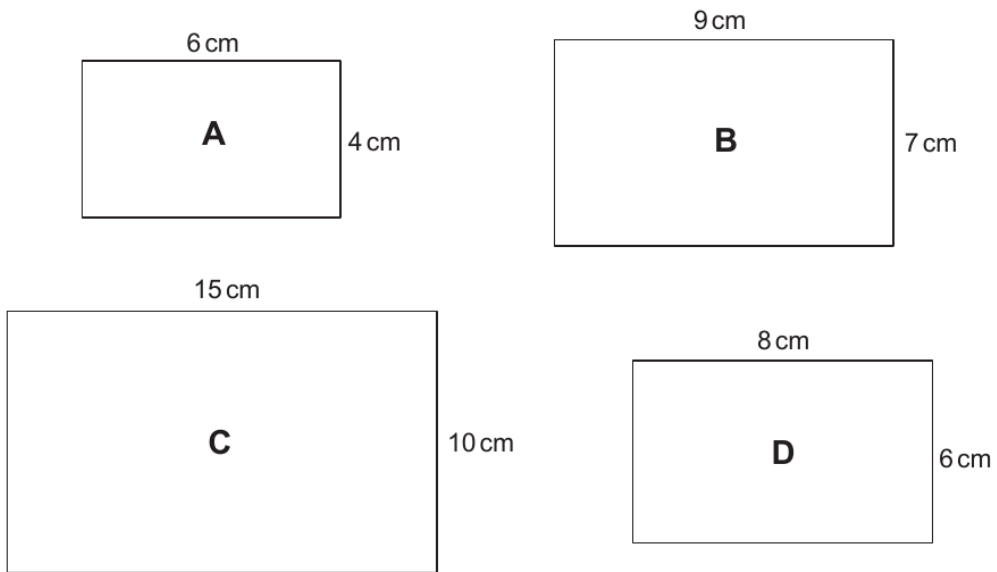
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Examiner
only

(b) Four rectangles labelled **A**, **B**, **C** and **D** are shown below.



Diagrams not drawn to scale

Which two rectangles are similar?
Give a reason for your choice.

[2]

The two rectangles which are similar are rectangles and

Reason:

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Examiner only

9. (a) The base of a flagpole is fixed to horizontal ground. It is held vertically by a straight rod of length 3.8 m. The rod is fixed to the ground and to a point 1.5 m from the top of the flagpole. The flagpole and the rod are shown in the diagram below.

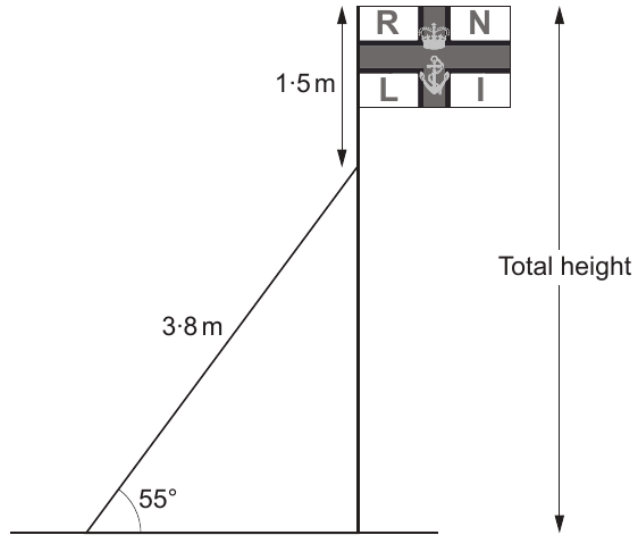


Diagram not drawn to scale

Calculate the **total** height of the flagpole.
Give your answer correct to the nearest centimetre.

[4]

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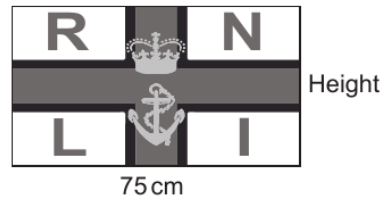
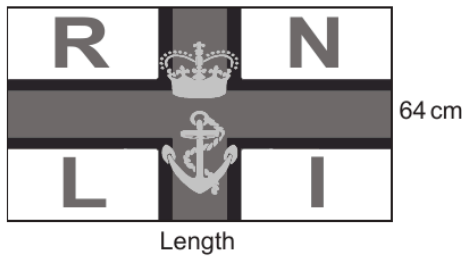
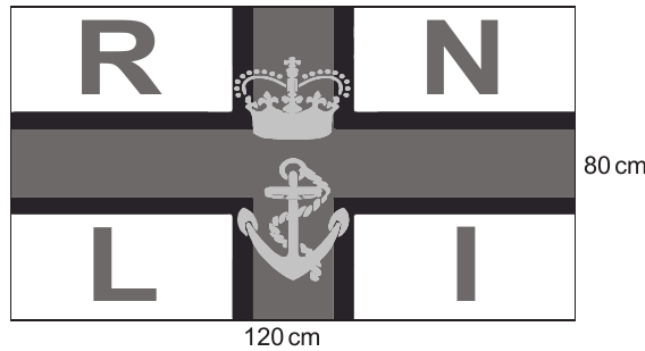
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Examiner only

(b) Mathematically similar large, medium and small flags are made.



Diagrams not drawn to scale

(i) Calculate the length of the medium flag. [2]

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Length of the medium flag is cm

(ii) Calculate the height of the small flag. [2]

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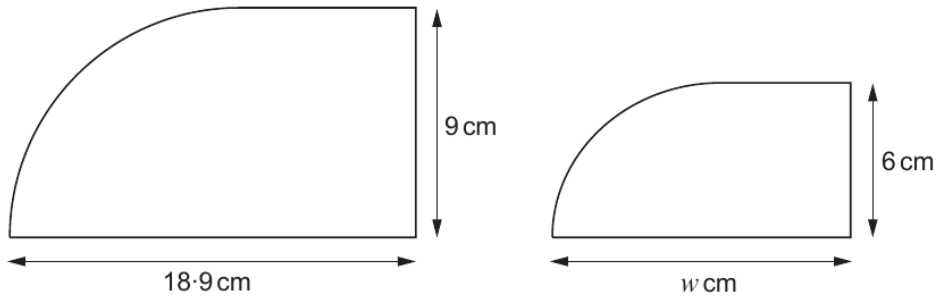
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Height of the small flag is cm



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only

14. The two shapes below are mathematically similar.



Diagrams not drawn to scale

Calculate the value of w .

[2]

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