Name	Date started	Target end date

REVISE
.wales

F2.16 — Polygons — interior & exterior angles

Spec 3.4.3 — Unit 2 (no calculator)

Foundation work on polygons: the sum of the interior angles of an n-gon is 180(n−2)°, the exterior angles of any polygon sum to 360°, and for a regular polygon the interior angle is (n−2)×180°/n. 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: ~34 minutes

*Derived from the GCSE Higher pace of **~1.5 min/mark** (23 marks across 10 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 **not** permitted on any question in this pack (Unit 2 is the non-calculator paper).*

Polygons — interior & exterior angles — what the new spec asks

WJEC GCSE Mathematics (first teaching 2025) · Unit 2: non-calculator.

Interior angles 3.4.3

- Recall the interior angle sum 180(n−2).
- Apply to find a missing angle in an irregular polygon.

Exterior angles 3.4.3

- Recall that exterior angles of any polygon sum to 360°.
- Find the exterior angle of a regular polygon as 360°/n.

Regular polygons 3.4.3

- Find each interior angle of a regular polygon.
- Work backwards from an interior or exterior angle to find n.

Exam strategy 3.4

- Non-calculator — quote 180(n−2) and 360° cleanly.
- Decide first whether the polygon is regular or irregular.
- Sketch and label exterior angles when the question is about a regular shape.

Crib sheet »

Polygons — interior & exterior angles in one page

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

Polygon names

3 triangle · 4 quadrilateral · 5 pentagon · 6 hexagon · 7 heptagon · 8 octagon · 10 decagon.

Interior sum

Sum of interior angles of an n-sided polygon: **$180°(n - 2)$**.

Pentagon: 540° · Hexagon: 720° · Octagon: 1080°.

Exterior sum

The exterior angles of *any* polygon add to **360°**.

Regular polygon: each exterior angle = $360°/n$.

Regular polygon interior

Each interior angle of a regular n-gon = **$(n-2)\times180°/n$**.

Or: 180° − exterior angle.

Interior + exterior

At each vertex, interior + exterior angle = **180°** (they sit on a straight line).

Common traps

- Using $360°/n$ as the interior angle — that's the *exterior*.
- Forgetting "regular" means all sides *and* angles equal.
- Adding instead of subtracting in $180(n-2)$.

Examiner only

8. *ABCDE* is a regular pentagon with centre *O*.

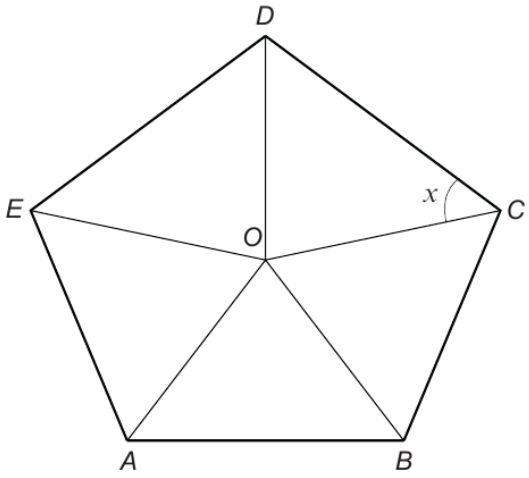
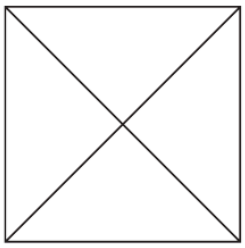


Diagram not drawn to scale

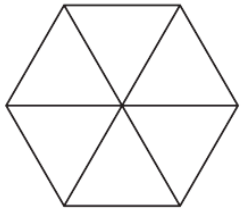
Calculate the size of angle x.
You must show all your working. [4]

Examiner only

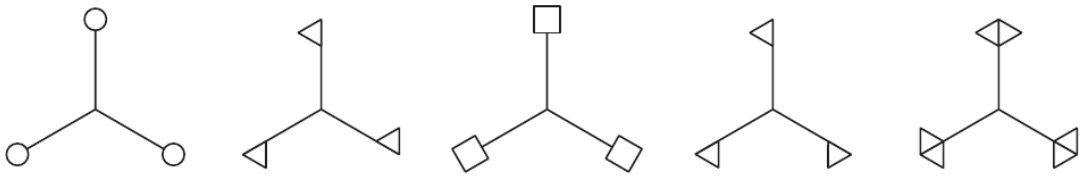
2. *(a)* The square drawn below has rotational symmetry of order 4.
Place **two** identical dots (●) on the square so that it will have rotational symmetry of order 2. [1]



(b) The regular hexagon drawn below has rotational symmetry of order 6.
Place **three** identical dots (●) on the regular hexagon so that it will have rotational symmetry of order 3. [1]



(c) Which of the following shapes has rotational symmetry of order 3, but has **no** line symmetry?
Circle the correct shape. [1]



Examiner only

11. Rhys wrote down four whole numbers.

The mode of the four numbers is 7.
The median of the four numbers is 6.
The range of the four numbers is 5.

What are the four numbers that Rhys wrote down?
You must show all your working. [3]

Rhys's numbers are ..... , ... , ... and .....

Examiner only

11. *(a)* Calculate $\frac{145{\cdot}3}{(12{\cdot}4 - 9{\cdot}8)^3}$, giving your answer correct to 3 significant figures. [2]

(b) Calculate the reciprocal of 47, giving your answer correct to 4 decimal places. [2]

12. Circle the correct answer in each of the following.

(a) Which of the following values **cannot** be an external angle of a regular polygon? [1]

10° 18° 30° 48° 72°

(b) An arrow on a spinner is facing north.
It is turned clockwise through an angle of 1530°.
In which direction will the arrow now be facing? [1]

North East South West None of these

(c) Point *A* is on a bearing of 100° from point *B*.
What is the bearing of point *B* from point *A*? [1]

260° 100° 280° 180° 80°

Examiner only

12. A **regular** octagon with centre *O* is shown below.

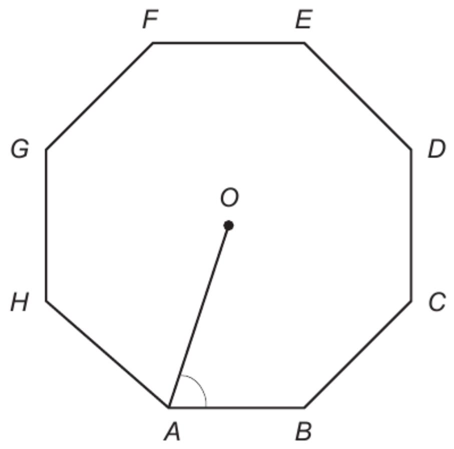


Diagram not drawn to scale

Calculate the exact size of $O\hat{A}B$.
You may choose to draw additional lines on the diagram to help you.
You must show all your working. [4]

Examiner only

13. The exterior angle of a regular polygon is 36°.

(a) How many sides does the polygon have? [2]

(b) Calculate the sum of all the interior angles of this regular polygon. [2]

14. *(a)* Write down the first three terms of the sequence whose nth term is given by $n^2 - 6$. [2]

1st term = ... 2nd term = ... 3rd term = ...

(b) Write down an expression for the nth term of the following sequence. [2]

5, 11, 17, 23, …

Examiner only

15. In the diagram below, *AB*, *BC* and *CD* are three sides of a **regular polygon**.
The polygon has 15 sides.
The length of each side is 8 cm.

The exterior angle of the polygon is $x°$.
BRC is a right-angled triangle.

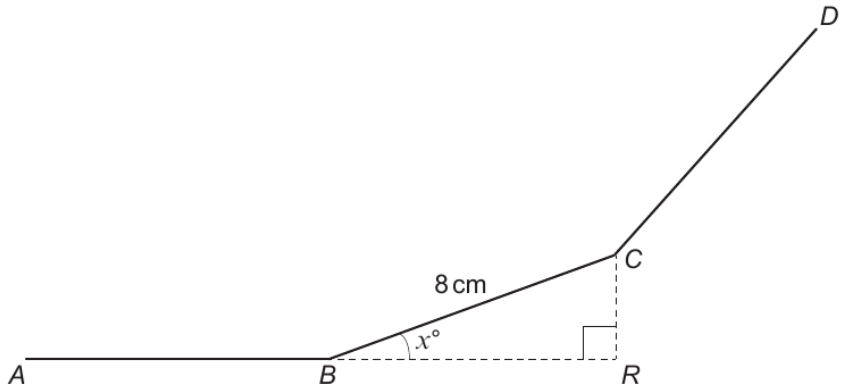


Diagram not drawn to scale

Calculate the length of *BR*. [5]

Examiner only

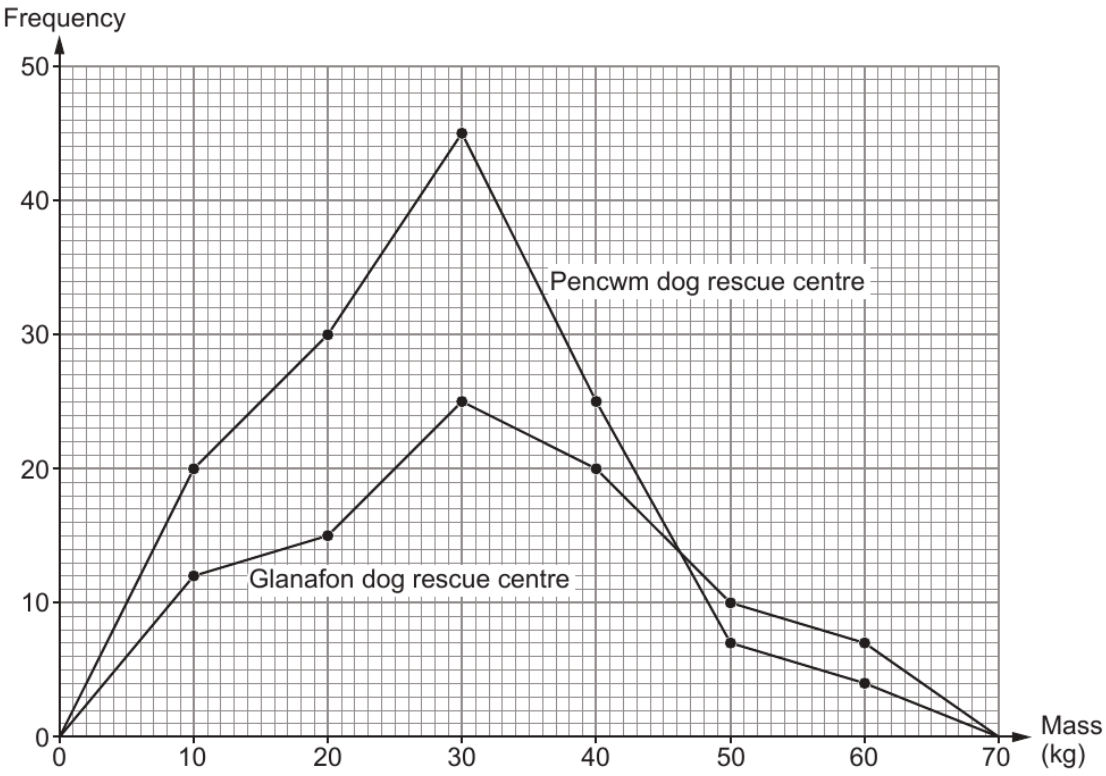
6. Glanafon and Pencwm dog rescue centres take in unwanted dogs.

The mass of each dog in the two dog rescue centres was recorded.

Groups of width 10 kg were used:

$5\,\text{kg} \leqslant \text{mass} < 15\,\text{kg}, \quad 15\,\text{kg} \leqslant \text{mass} < 25\,\text{kg}, \quad \ldots, \quad 55\,\text{kg} \leqslant \text{mass} < 65\,\text{kg}$

The results are shown in the frequency polygons below.



(a) Doreen, Rory and Muzhir look at these frequency polygons.

(i) Doreen says,

"The modal group of the masses of dogs in each dog rescue centre is the same."

Is Doreen correct?

Yes ☐ No ☐ Can't tell ☐

You must give a reason for your answer. [1]

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Examiner only

(ii) Rory says,

"28 of the dogs in Pencwm each have a mass of 18 kg."

Is Rory correct?

Yes ☐ No ☐ Can't tell ☐

You must give a reason for your answer. [1]

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(iii) Muzhir says,

"There is a higher proportion of dogs that are heavier than 35 kg in Glanafon than in Pencwm."

Without doing any calculations, decide if Muzhir is correct.

Correct ☐ Incorrect ☐ Can't tell ☐

You must give a reason for your answer. [1]

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(b) The estimate of the mean mass of the dogs in Glanafon was 32·5 kg.
How much less was the estimate of the mean mass of the dogs in Pencwm?
You must show all your working. [5]

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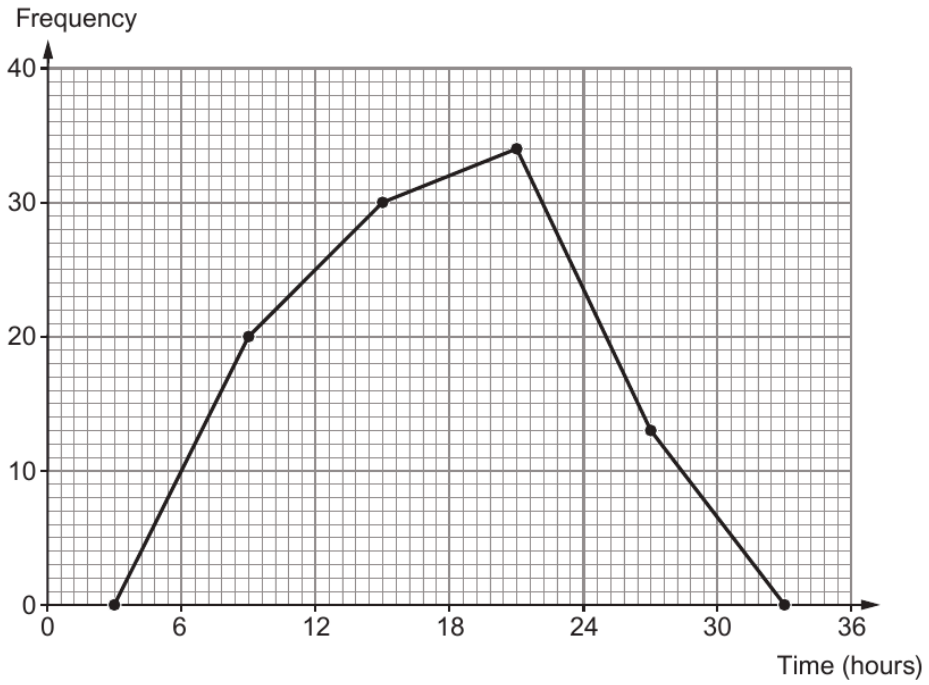
Estimate of the mean mass of the dogs in Pencwm is ..... kg less than in Glanafon.

Examiner only

6. (a) A survey was carried out to find the total time people took to read the book 'Wales is a Celtic Country'.
The results are shown in the frequency polygon below.



(i) Which is the modal group?
Circle your answer. [1]

18 to 24 hours 21 hours 12 to 18 hours 34 hours 30 to 36 hours

(ii) How many people took part in the survey?
Circle your answer. [1]

34 30 33 97 108

.....

.....

Examiner only

(iii) How many of the people in the survey took 24 hours or more to read this book? Circle your answer. [1]

13 34 47 24 84

(iv) Did any of the people in the survey take less than 6 hours to read this book?

Yes ☐ No ☐ Can't tell ☐

You must give a reason for your answer. [1]

(b) Four books are placed in a stack.

The thickness of each of the books is as follows:

22 mm 25 mm 29 mm 31 mm

The thickness of each book is measured **correct to the nearest mm**.

Show that the total height of the stack of these four books cannot be more than 109 mm. [3]

Examiner only

12. Find five numbers so that:

- their mean is 4·5
- their mode is 3·5.

Write your five numbers in the boxes below. [3]

The five numbers are ☐ ☐ ☐ ☐ ☐

13. The interior angle of a regular polygon is 171°.

How many sides does the polygon have? [3]