Name	Date started	Target end date

REVISE
.wales

2.13 — 3D solid shapes & properties

Spec 3.1.1, 3.1.2, 3.1.3 — Unit 2 (no calculator)

Vocabulary and essential properties of 3D solid shapes — cubes, cuboids, cylinders, prisms, pyramids, cones, spheres, tetrahedra — including faces, edges, vertices and identifying prism cross-sections. Sourced from legacy WJEC GCSE Mathematics / Mathematics–Numeracy Higher non-calculator papers, organised for revision under the 2025 spec.

2025 SPECIFICATION

Estimated time for entire question pack: ~0 minutes

*Derived from the GCSE Higher pace of **~1.5 min/mark** (0 marks across 0 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).*

3D solid shapes & properties — what the new spec asks

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

2-D vocabulary 3.1.2

- Triangles: scalene, isosceles, equilateral, right-angled.
- Quadrilaterals: square, rectangle, parallelogram, rhombus, kite, trapezium.
- Circle parts: radius, diameter, tangent, chord, arc, sector, segment.

3-D vocabulary 3.1.3

- Cube, cuboid, cylinder, prism, pyramid, cone, sphere, tetrahedron.
- A prism has a uniform cross-section along its length.
- Identify shapes from their features, not just from looks.

Faces, edges, vertices 3.1.3

- Face: flat surface. Edge: line where two faces meet. Vertex: corner.
- Cube: 6 / 12 / 8. Square-based pyramid: 5 / 8 / 5.
- Use Euler's formula $F + V - E = 2$ as a sanity check.

Cross-sections of prisms 3.1.1

- Slice perpendicular to length to find the cross-section.
- Triangular prism: triangular cross-section, rectangular sides.
- Cylinder is a prism with a circular cross-section.

Crib sheet »

3D solid shapes & properties in one page

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

Faces, edges, vertices

A *face* is a flat surface, an *edge* joins two faces, a *vertex* is a corner.

Cube: 6 faces, 12 edges, 8 vertices.

Square-based pyramid: 5, 8, 5.

Cube & cuboid

Cube: all six faces are congruent squares.

Cuboid: six rectangular faces, opposite faces equal.

Both have 8 vertices, 12 edges.

Cylinder, cone, sphere

Cylinder: two circular ends joined by a curved surface (a prism with a circular cross-section).

Cone: one circular base tapering to a point.

Sphere: every point on the surface equidistant from the centre.

Prism

A *prism* has the same cross-section along its full length.

Triangular prism: 5 faces, 9 edges, 6 vertices.

Volume of a prism = area of cross-section × length.

Pyramid

A *pyramid* has a polygonal base and triangular faces meeting at an apex.

Square-based pyramid: 5 faces (1 square + 4 triangles), 8 edges, 5 vertices.

Tetrahedron: a pyramid with a triangular base (all 4 faces are triangles).

Identifying solids

Match each solid to its name by counting faces / edges / vertices.

Look for cross-sections to decide if it's a prism.

Check for an apex to spot a pyramid or cone.

Euler's formula

$$F + V - E = 2$$

For any convex polyhedron the number of faces plus vertices minus edges is 2.

Use it to sanity-check your counts.

Common traps

- Confusing 'face', 'edge' and 'vertex' in counts.
- Forgetting that a cylinder has 3 surfaces (2 circles + 1 curved).
- Calling any 3-D shape with a point an 'edge' — an edge is a line, not a corner.