

C4.1 Geometrical terms

Name: _____ Class: _____ Date: _____

Total: 20 marks**KEY WORDS** parallel 平行 • perpendicular 垂直 • right angle 直角 • square 正方形 • arc 弧

Objective

Use geometrical terms to solve Core IGCSE Mathematics problems.

You must be able to:

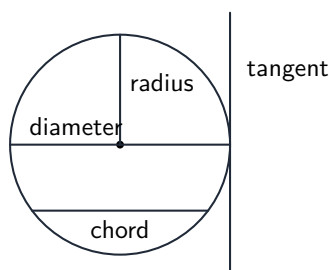
- Use precise names for plane shapes and solids
- Distinguish sides, vertices, edges and faces
- Justify classification from geometrical properties

1 Key knowledge and worked examples

■ Key knowledge: Geometrical terms

Parallel lines never meet; perpendicular lines meet at 90° . Acute angles are below 90° , obtuse angles between 90° and 180° , and reflex angles between 180° and 360° . An equilateral triangle has three equal sides; isosceles has two; scalene has none. A regular polygon has equal sides and angles. Similar shapes have the same shape; congruent shapes have the same shape and size.

■ Worked example: Geometrical terms



A circle's radius joins centre to circumference; a diameter passes through the centre and has length $d = 2r$. A chord joins two circumference points. A tangent touches at one point; an arc is part of the circumference. A sector is bounded by two radii and an arc; a segment by a chord and an arc.

- A rectangle has four right angles; a rhombus has four equal sides; a square has both. A parallelogram has two pairs of parallel sides; a trapezium has one pair.
- A cube has 6 square faces, 12 edges and 8 vertices. A prism has a uniform cross-section; a pyramid's side faces meet at an apex. Cylinders, cones and spheres have

curved surfaces.

- An angle such as ABC is at the middle letter, B. A hexagon has six sides; an octagon eight; a decagon ten.
- A kite has two pairs of adjacent equal sides. A pentagon has 5 sides and an octagon 8. An interior angle is inside a polygon; its adjacent exterior angle is outside, on an extended side.

■ Method check

Use the full defining property. A rectangle has four right angles; a parallelogram needs opposite sides parallel and need not have right angles.

2 Practice

2.1 Classify 38° , 127° , 230° as acute, obtuse or reflex. [2]

2.2 A triangle has sides 5 cm, 5 cm and 8 cm. Name its type. Name a four-equal-sided quadrilateral with no right angles. [2]

2.3 State the number of faces and edges of a cube. [2]

2.4 Name the circle region bounded by two radii and an arc, and the line touching at one point. [2]

3 Exam-style questions

3.1 Apply the geometrical terms methods below. Show working and include units where appropriate.

(a) A circle has radius 7 cm. Find its diameter and name a line through its centre joining two circumference points. [2]

(b) Name the region between a chord and its shorter arc. Explain how it differs from a sector. [2]

(c) Two rectangles measure 3×5 cm and 6×10 cm. State whether they are similar or congruent, and give the length scale factor. [2]

3.2 Shape A is a quadrilateral with two pairs of parallel opposite sides and no right angles. Solid B is a triangular prism.

(a) Give the most specific name guaranteed for A. State two properties of its opposite sides or angles. [3]

(b) State the numbers of faces, edges and vertices of B, and explain why it is a prism rather than a pyramid. [3]

Solutions

Award method and answer marks as indicated; accept equivalent correct methods.

2.1

- Compare with 90 and 180 degrees: **acute**, **obtuse**, **reflex**, respectively.

2.2

- Two equal sides make it **isosceles**. The quadrilateral is a **rhombus**.

2.3

- Six square faces meet along **12 edges**; there are **6 faces**.

2.4

- The region is a **sector**; the touching line is a **tangent**.

3.1

(a)

- $d = 2r = 2(7) = \mathbf{14}$ cm; the line segment is a **diameter**.

(b)

- A **segment** has a chord boundary; a **sector** has two radius boundaries.

(c)

- Both lengths double, so **similar with scale factor 2**, but **not congruent** because their sizes differ.

3.2

(a)

- A is a **parallelogram**.
- Its opposite sides are **equal in length** and its opposite angles are **equal**.
- No given information guarantees a rhombus.

(b)

- B has **5 faces and 9 edges**, and **6 vertices**.
- It has two congruent parallel triangular ends with a constant cross-section, unlike a pyramid with one base and an apex.