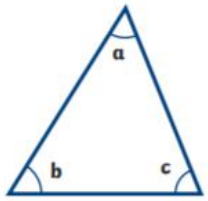
Learning Objectives

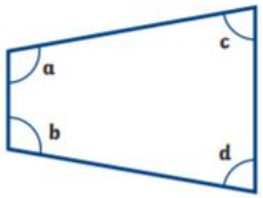
- To draw 2-D shapes using given dimensions and angles
- To recognise, describe and build simple 3-D shapes, including making nets
- To compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
- To illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
- To recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.
- To describe positions on the full coordinate grid (all four quadrants)
- To draw and translate simple shapes on the coordinate plane, and reflect them in the axes.

Angles in a Triangle



a + b + c = 180°

Angles in a Quadrilateral



a + b + c + d = 360°

Properties of 3D Shapes

3D shapes have three dimensions – **length**, **width** and **depth**.

A **polyhedron** is a 3D shape with flat faces. Spheres, cylinders and cones are not polyhedrons as they have curved surfaces.

Cube 6 square faces 12 edges 8 vertices	**Tetrahedron** 4 triangular faces 6 edges 4 vertices	**Sphere** 1 curved surface 0 edges 0 vertices
Cuboid 6 faces 12 edges 8 vertices	**Octahedron** 8 faces 12 edges 6 vertices	**Triangular prism** 5 faces 9 edges 6 vertices
Square-based pyramid 5 faces 8 edges 5 vertices	**Cone** 1 circular face 1 curved surface 1 curved edge 1 apex	**Cylinder** 2 circular faces 1 curved surface 2 curved edges 0 vertices

Angles in Regular Polygons

As the number of sides of a polygon increases by one, the total of the interior angles increases by 180°. When n = number of sides, this formula can be used to find the size of each angle in a **regular polygon**:

Sum of Interior Angles = (n − 2) × 180°

Each Angle = $\frac{(n-2) \times 180^\circ}{n}$

Pentagon
n = 5
(5 - 2) × 180° = 540°
540° ÷ 5 = 108°

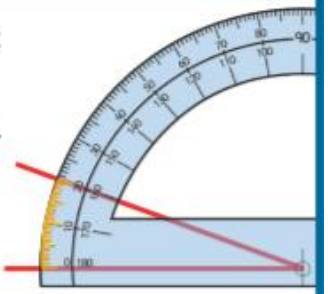
Hexagon
n = 6
(6 - 2) × 180° = 720°
720° ÷ 6 = 120°

Using a Protractor

Place the cross or circle at the point of the angle you are measuring.

Read from the zero on the outer scale of your protractor.

Count the degree lines carefully.



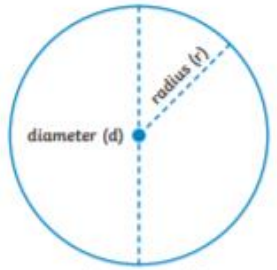
Parts of Circles

A circle is a 2D shape. The perimeter of a circle is called the **circumference** (c). The distance across the circle, passing through the centre, is called the **diameter** (d).

The distance from the centre of the circle to the circumference is called the **radius** (r).

r × 2 = d

$\frac{d}{2}$ = r

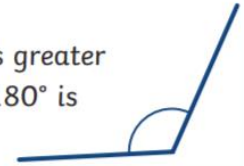


Key Vocabulary
Quarter turn
Half turn
Three-quarter turn
Angle
Right-angle
Acute
Obtuse
Horizontal
Vertical
Diagonal
Parallel
Perpendicular
Polygon
Two-dimensional
Three-dimensional
Flat face
Curved surface
Edge
Curved edge
Vertex
Vertices
Apex
Reflex
Protractor
Radius
Diameter
Circumference

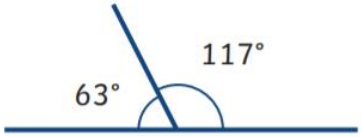
Identifying Angles

Acute Angles
Any angle that measures less than 90° is called an **acute** angle.

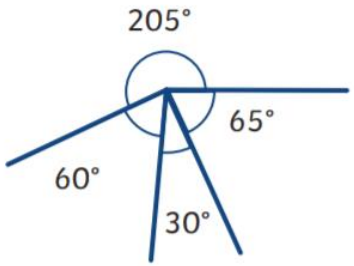
Obtuse Angles
Any angle that measures greater than 90° and less than 180° is called an **obtuse** angle.



Reflex Angles
Any angle that measures greater than 180° is called a **reflex** angle.

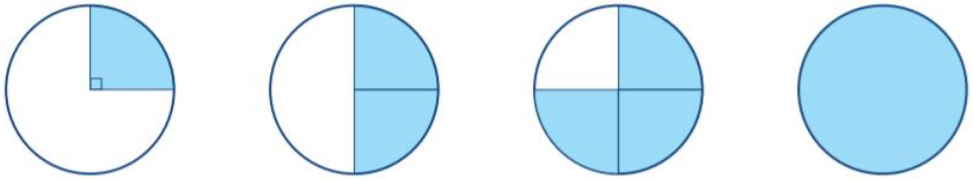


Angles on a straight line always total 180°.



Angles around a point always total 360°.

Multiples of 90° can be used as descriptions of a turn.



$\frac{1}{4}$ turn - 90° | $\frac{1}{2}$ turn - 180° | $\frac{3}{4}$ turn - 270° | 1 turn - 360°

Opposite angles that share a vertex are equal.

What I Should Already Know:

- How to identify 3-D shapes, including cubes and other cuboids, from 2-D representations
- That angles are measured in degrees: estimate and compare acute, obtuse and reflex angles
- How to draw given angles, and measure them in degrees
- How to identify: angles at a point and one whole turn (total 360), angles at a point on a straight line and 1/2 a turn (total 180) and other multiples of 90
- How to use the properties of rectangles to deduce related facts and find missing lengths and angles
- How to distinguish between regular and irregular polygons based on reasoning about equal sides and angles.
- How to identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.