GEOMETRY ...

@whisto_maths

Properties of shape

What do I need to be able to do?

By the end of this unit you should be able to:

- Measure with a protractor
- Classify and calculate angles
- Know and calculate angles in a triangle
- Know properties of angles in special quadrilaterals
- Know properties of angles in regular polygons
- Draw shapes and nets of 3D shapes

Keywords

Protractor: mathematical equipment used to measure angles
Angle: the amount of turn between two lines around their common point
Adjacent: lying next to each other
Sum: addition
Quadrilateral: a four-sided polygon
Polygon: an enclosed 2D shape made up of straight lines
Scalene triangle: a triangle with all different sides and different angles
Regular Polygon: a polygon with equal angles and all sides the same size

Measuring angles

Acute Angles
0° < angle < 90°

Right Angles
90°

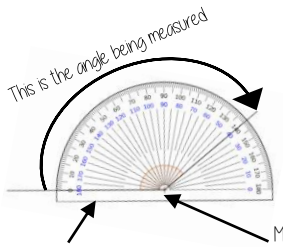
Right angle notation

Obtuse
90° < angle < 180°

Reflex
180° < angle < 360°

Straight Line
180°

Measure angles to 180°



The base line follows the line segment

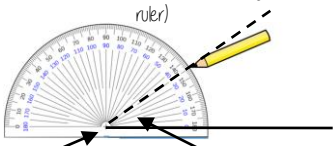
Make sure the cross is at the point the two lines meet

Read from 0° on the base line. Remember to use estimation. This is an obtuse angle so between 90° and 180°

Draw angles up to 180°

Draw a 35° angle

Make a mark at 35° with a pencil and join to the angle point (use a ruler)



Make sure the cross is at the end of the line (where you want the angle)

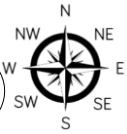
The angle

Angles as measures of turn

Clockwise

Anti-Clockwise

East to South is a quarter turn clockwise



Quarter Turn
90°
Clockwise

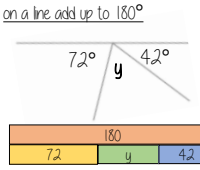
Half Turn
180°

Three-quarter Turn
270°
Anti-Clockwise

Full Turn
360°

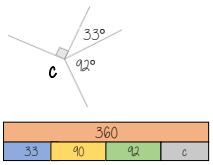
Calculating missing angles

Adjacent angles that share a common point on a line add up to 180°



72 + y + 42 = 180
180 − 72 − 42 = y
66 = y

The sum of angles around a point is 360°



33 + 90 + 92 + c = 360
360 − 90 − 92 − 33 = c
c = 155

Vertically opposite angles are equal

Opposite angles made from straight lines connecting are equal size

Triangles

All interior angles in a triangle add up to 180°

Isosceles Triangles

Two sides the same length
Base angles the same size

Equilateral Triangles

All sides the same length
All angles the same size

Look for combinations of angle rules in triangles. Dash notation indicates equal length sides.

Quadrilaterals

All interior angles in a quadrilateral add up to 360°

Rhombus
All sides equal size
Opposite angles are equal

Kite
No parallel lines
Equal lengths on top sides
Equal lengths on bottom sides
One pair of equal angles

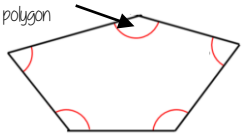
Trapezium
One pair of parallel lines

Polygons

(number of sides − 2) x 180

Interior Angles

The angles enclosed by the polygon

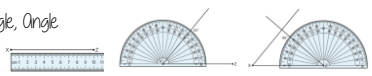


This is an **irregular** polygon – the sides and angles are different sizes

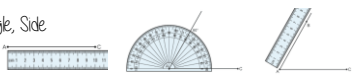
Remember this is **all** of the interior angles added together

Drawing Triangles

Side, Angle, Angle



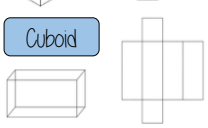
Side, Angle, Side



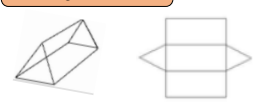
3D shapes and nets

Cube

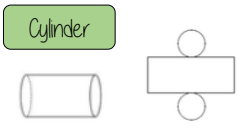
Cuboid



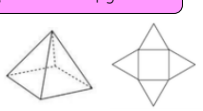
Triangular Prism



Cylinder



Square based pyramid



Vertex: a point where two or more line segments meet
Face: any of the flat surfaces of a solid object
Edge: a line segment on the boundary joining one vertex to another