GM1 Properties of 2D Shapes

Knowledge Organiser

Keywords

Congruent - the same shape and size
Polygon - two-dimensional shape with *many* straight sides.
Regular polygon - when all angles are equal and all sides are equal
Tangent – a line that just touches a curve at a point
Chord - a line connecting two points on a curve, creating a **segment**
Radius - the distance from the centre to the circumference of a circle
Cyclic quadrilateral - every vertex (corner) is on a circle's circumference

Formulae – Angles in Polygons

Exterior angles all add up to 360°

Exterior angles in regular polygons = 360° ÷ number of sides

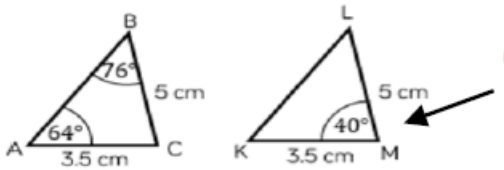
Sum of interior angles: (number of sides – 2) x 180

Interior angles in regular polygons = $\frac{\text{(number of sides} - 2) \times 180}{\text{number of sides}}$

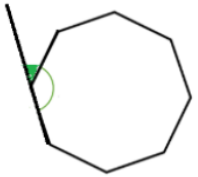
Interior angle + Exterior angle = straight line = 180°

Examples

Congruent shapes are identical – all corresponding sides and angles are the same size



$A\hat{C}B = K\hat{M}L$

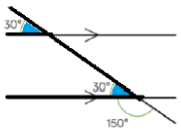


Exterior angle = 360 ÷ 8 = 45°

Interior angle = $\frac{(8-2) \times 180}{8} = \frac{6 \times 180}{8} = 135°$

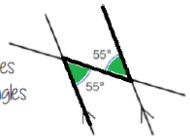
Parallel Line Angles

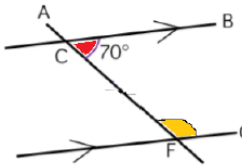
Alternate/ Corresponding angles



Because alternate angles are equal the highlighted angles are the same size

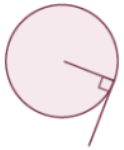
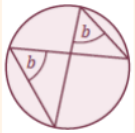
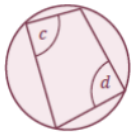
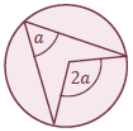
Because corresponding angles are equal the highlighted angles are the same size





Because co-interior angles have a sum of 180° the highlighted angle is 110°

Circle Theorems

Angle in a semicircle is 90°		Angle between radius and tangent is 90°	
Angles in the same segment are equal		Opposite angles in a cyclic quadrilateral add to 180°	
Angle at the centre is twice the angle at the circumference		Alternate segment theorem	

Congruency

Congruent triangles

Side-side-side
All three sides on the triangle are the same size

Angle-side-angle
Two angles and the side connecting them are equal in two triangles

Side-angle-side
Two sides and the angle in-between them are equal in two triangles (it will also mean the third side is the same size on both shapes)

Right angle-hypotenuse-side
The triangles both have a right angle, the hypotenuse and one side are the same