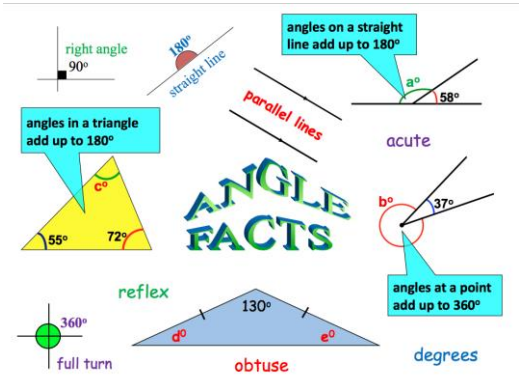
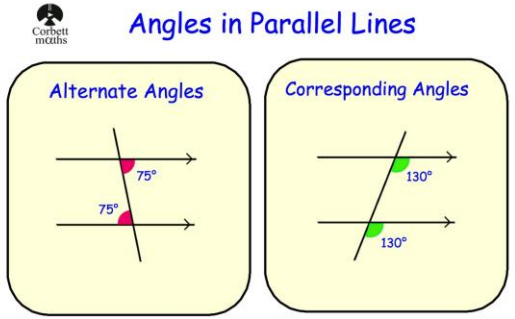
Angles and trigonometry

Congruent – shapes are exactly the same size and shape
Similar – one shape is an enlargement of the other
Regular polygon – a shape with equal sides and equal angles
Tessellate – when shapes fit together with no gaps, the angles where the shapes meet must add up to 360°
Hypotenuse – the longest side in a right angled triangle

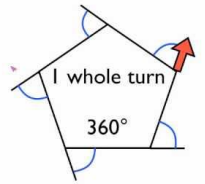




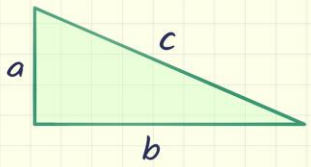
Angles in regular polygons

Shape	Sides	Sum of Interior Angles	Shape	Each Angle
Triangle	3	180°	△	60°
Quadrilateral	4	360°	□	90°
Pentagon	5	540°	⬠	108°
Hexagon	6	720°	⬡	120°
Heptagon (or Septagon)	7	900°	◯	128.57...°
Octagon	8	1080°	◯	135°
Nonagon	9	1260°	◯	140°
...	...	..	...	...
Any Polygon	n	(n-2) × 180°	ⓝ	(n-2) × 180° / n

Exterior angles

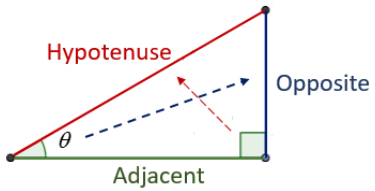


Pythagoras Theorem



$$a^2 + b^2 = c^2$$

SOHCAHTOA



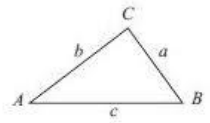
SOH $\text{Sin}\,\theta = \frac{\text{Opposite}}{\text{Hypotenuse}}$

CAH $\text{Cos}\,\theta = \frac{\text{Adjacent}}{\text{Hypotenuse}}$

TOA $\text{Tan}\,\theta = \frac{\text{Opposite}}{\text{Adjacent}}$

Higher GCSE only, advanced trigonometry and trigonometric graphs

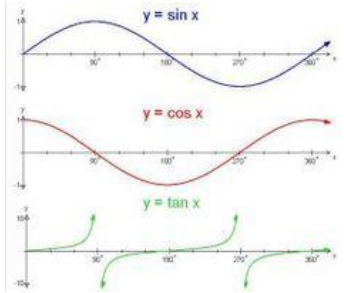
In any triangle ABC



Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc\cos A$

Area of triangle $= \frac{1}{2}ab\sin C$



Transformation Rules for Functions		
Function Notation	Type of Transformation	Change to Coordinate Point
f(x) + d	Vertical translation up d units	(x, y) → (x, y + d)
f(x) − d	Vertical translation down d units	(x, y) → (x, y − d)
f(x + c)	Horizontal translation left c units	(x, y) → (x − c, y)
f(x − c)	Horizontal translation right c units	(x, y) → (x + c, y)
−f(x)	Reflection over x-axis	(x, y) → (x, −y)
f(−x)	Reflection over y-axis	(x, y) → (−x, y)
af(x)	Vertical stretch for |a| > 1	(x, y) → (x, ay)
	Vertical compression for 0 < |a| < 1	
f(bx)	Horizontal compression for |b| > 1	$(x, y) \to \left(\frac{x}{b}, y\right)$
	Horizontal stretch for 0 < |b| < 1	