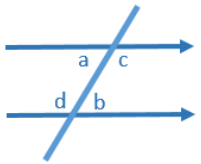
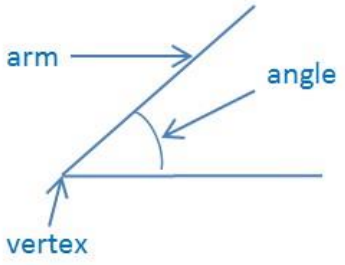
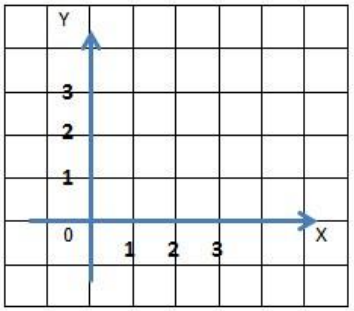
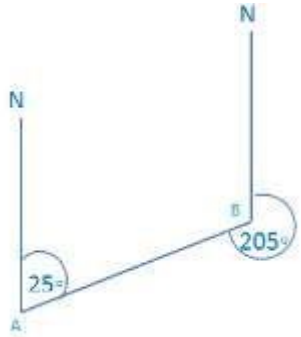
Angle, symmetry and transformation

Term	Definition	Illustrations
Acute angle	An angle greater than 0° and less than 90°.	
Alternate angles	Where two straight lines are cut by a third line (called the transversal), as in the diagram, the angles a and b (also c and d) are alternate. If the two straight lines are parallel, then the alternate angles are equal in size.	
Angle	An angle measures the amount of 'turning' between two straight lines that meet at a vertex (point). Angles can be classified by their size e.g. obtuse, acute, reflex, right angle etc. They are usually measured in degrees (°) using a protractor.	

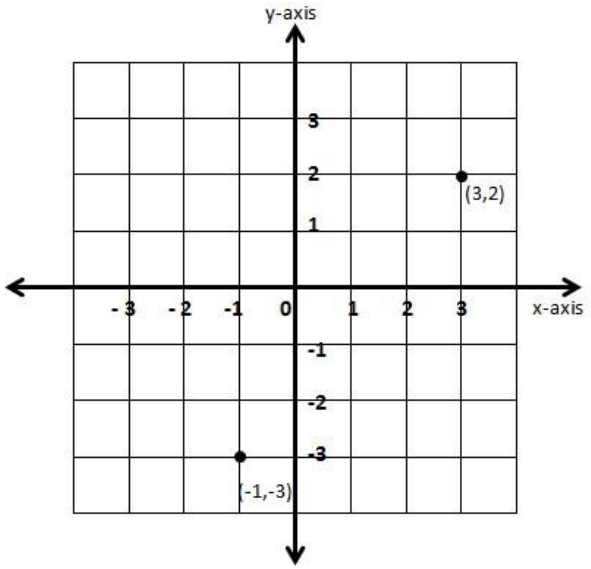
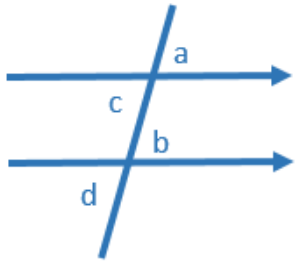
Angle, symmetry and transformation

Axis	A fixed, reference line from which locations, distances or angles are taken. Usually grids have an x axis and y axis.	
Bearings	A bearing is used to represent the direction of one point relative to another point. It is the number of degrees in the angle measured in a clockwise direction from the north line. In this example, the bearing of A *from* B is 205°. Bearings are commonly used in navigation.	
Compass (in directions)	An instrument containing a magnetised pointer which shows the direction of magnetic north and bearings from it. Used to help with finding location and directions.	

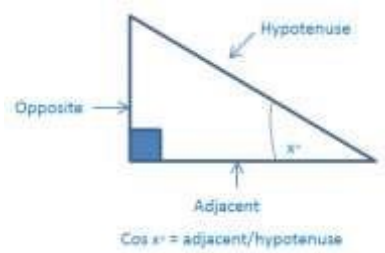
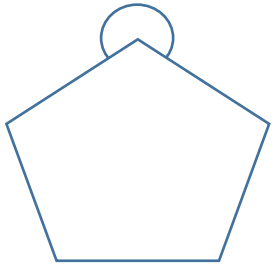
Angle, symmetry and transformation

Compass points	Used to help with finding location and directions. Common points include North, East, South, West, (N, E, S, W), North East (NE), South East (SE), South West (SW) and North West (NW) as well as • NNE (north-north-east) • ENE (east-north-east) • ESE (east-south-east) • SSE (south-south-east) • SSW (south-south-west) • WSW (west-south-west) • WNW (west-north-west) • NNW (north-north-west)	
Complementary angles	Two angles which add together to 90°. Each is the 'complement' of the other.	

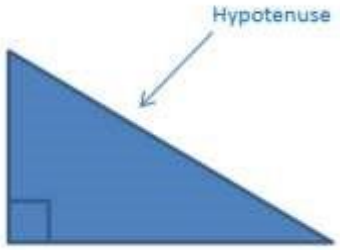
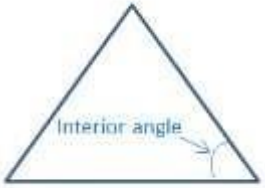
Angle, symmetry and transformation

Coordinate system	A system which usually uses numbers as coordinates to determine the position of a point in space e.g. (4,8) on a grid with horizontal (x) and vertical (y) axes.	
Corresponding angles	Where two straight lines are cut by a third line (called the transversal), as in the diagram, the angles a and b (also c and d), for example, are corresponding. If the two straight lines are parallel, then the corresponding angles are equal in size.	

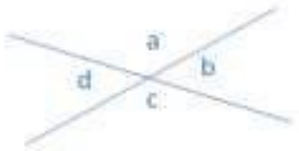
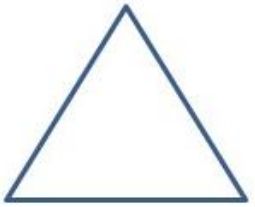
Angle, symmetry and transformation

Cosine function in trigonometry	$\cos(\theta) = \frac{Adjacent}{Hypotenuse}$	
Degrees	The most common unit of measurement for angles. One full turn is equal to 360 degrees, written as 360^{o}	
Directional language	The use of a variety of words to help with directions such as left, right, up, down, forwards, backwards, sideways, across, close, far, along, to, from, over, under, near, through, towards, away from, underneath, quarter turn, half turn, three quarter turn, whole turn, journey, route, clockwise, anti-clockwise, North, East, South, West, horizontal, vertical , diagonal.	
Exterior angle	In a polygon, exterior angles are formed outside the shape between one side and the adjacent side. The angle that has to be turned at the vertex if you are travelling around a shape.	

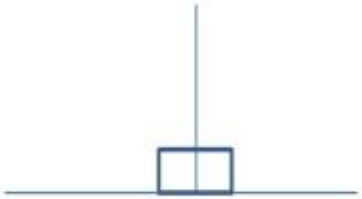
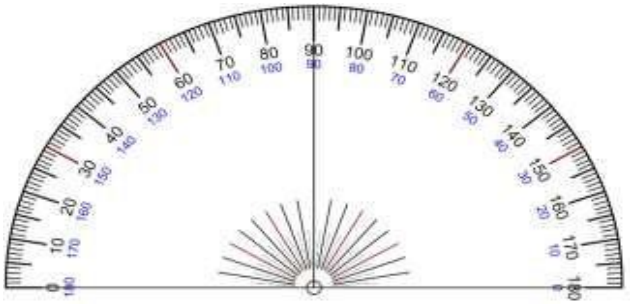
Angle, symmetry and transformation

Half turn	Rotation through 180º	
Hypotenuse	The longest side of a right-angled triangle. It is the side opposite the right angle.	
Interior angle	At a vertex of a shape, the angles that lie within it.	
Obtuse angle	An angle greater than 90° but less than 180°.	

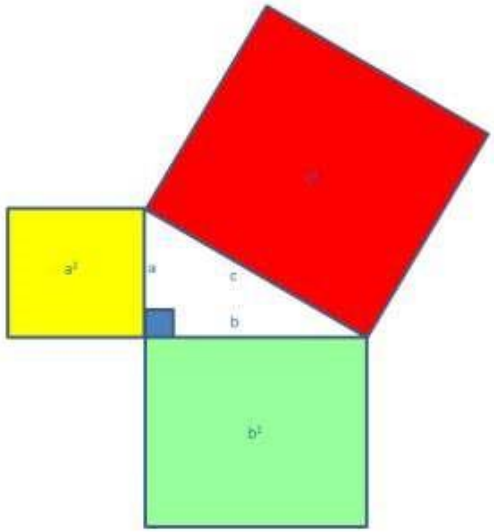
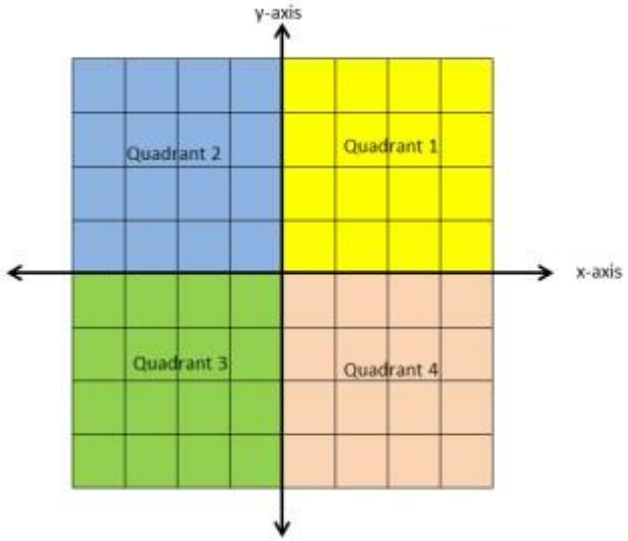
Angle, symmetry and transformation

Opposite angles	Angles formed where two lines intersect. In the diagram ‘a’ is opposite ‘c’ and ‘b’ is opposite ‘d’. Also known as vertically opposite angles.	
Order (in symmetry)	The number of times a shape can be rotated and fit exactly on top of its original position within a complete turn.	 No rotational symmetry  Order 3 symmetry
Parallel lines	Lines are parallel if they are always the same distance apart (called "equidistant" and travel in the same direction. They will never meet.	

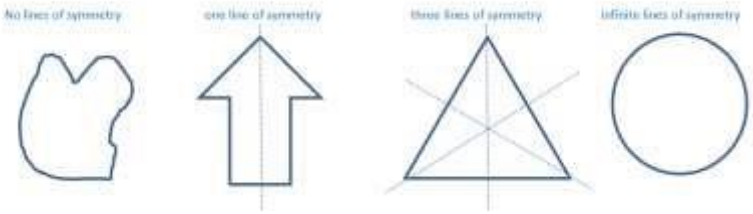
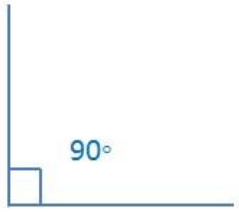
Angle, symmetry and transformation

Perpendicular lines	Lines that are at right angles (90°) to each other.	
Positional language	The use of a variety of words to help with describe position such as over, under, above, below, top, bottom, side on, inside, outside, in front of, behind, front, back, before, after, beside, next to, in the middle of, opposite, apart, between.	
Protractor	An instrument for measuring or drawing angles, usually in the form of a semi-circle marked with degrees along the curved edge.	

Angle, symmetry and transformation

Pythagoras' Theorem	In a right angled triangle, the square of the long side (**hypotenuse)** is equal to the sum of the squares of the other two sides. It is stated in this formula: $a^2 + b^2 = c^2$ Pythagoras' Theorem is named after Pythagoras of Samos, a Greek philosopher and mathematician.	
Quadrant	Any of the 4 areas made when we divide up a graph by an x and y axis.	

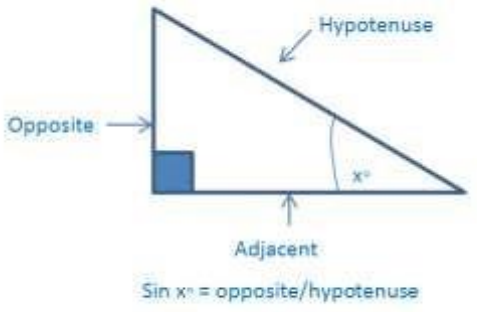
Angle, symmetry and transformation

Quarter Turn	A rotation through 90 °.	
Ratio	The relative sizes of two or more values. In the context of shape, a ratio can be used to describe the link between actual lengths and those on a scale model or diagram.	
Reflective Symmetry or Line Symmetry	When an image or object has a 'mirror image', each side is equal. Symmetry goes beyond simple shapes to explore real images and other forms of symmetry.	
Right angle	An angle of 90°.	

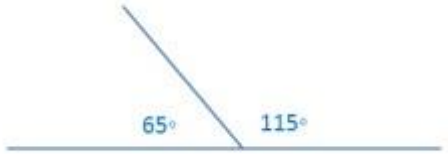
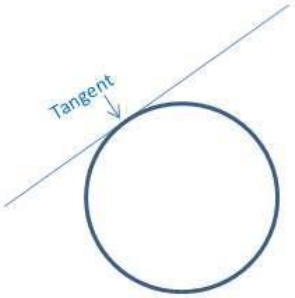
Angle, symmetry and transformation

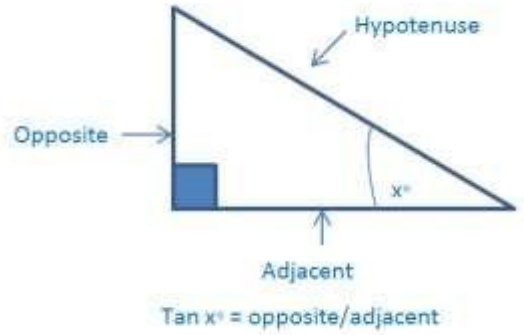
Rotational Symmetry	A shape has rotational symmetry when it fits into its own outline after a rotation. How many times this happens in a full rotation is called the order of rotational symmetry. This star shape has 'Order 5 symmetry'.	
Scale	The ratio of the length in a drawing (or model) to the length of the real thing. Ratios are used to enlarge or reduce an image, drawing or model. This model car is built in the ratio 1:43 meaning the real car is 43 times bigger.	

Angle, symmetry and transformation

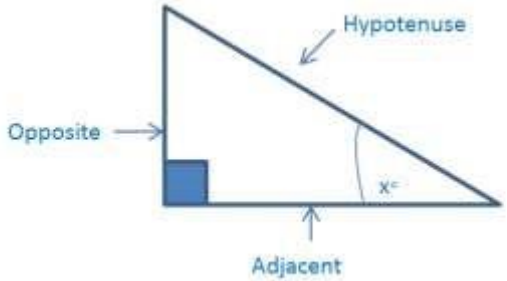
Scale drawings	A drawing that shows a real object with accurate sizes reduced or enlarged in a certain ratio. This floorplan for a house indicates the actual measurements as well as the correct proportions for the house.	
Similarity	Similar shapes and figures are those whose dimensions are linked using a scale factor.	
Sine function	$\sin(\theta) = \frac{Opposite}{Hypotenuse}$	

Angle, symmetry and transformation

Straight angle	An angle of 180 degrees. A straight angle lies on a straight line.	
Supplementary angles	Angles which add up to 180°.	
Tangent line	A tangent is a straight line that touches a circle at one point only.	

Tangent function	tan(θ) = $\frac{Opposite}{Adjacent}$	
Tessellation or tiling	A pattern made of identical shapes where the shapes fit together without any gaps and the shapes do not overlap.	
Three quarter turn	A rotation through 270 ° This is the same as three right angles (3 x 90 °).	
Transformation	Changing a shape using rotation (turns), reflection (flips), translation (slides) or resizing it.	

Angle, symmetry and transformation

Translation	‘Sliding’ a shape by moving it without rotating or flipping it. The shape still looks exactly the same, just in a different place.	
Trigonometry	Trigonometry is the study of the relationships between the sides and angles in triangles. The common functions of angles in trigonometry are sine, cosine, and tangent.	
Vertex (singular) or vertices (plural)	A ‘corner’ or corners on a 3D object. A point(s) where two or more straight lines meet.	
Whole turn	A rotation through 360 degrees. Also known as a full turn.	