
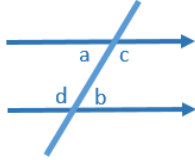
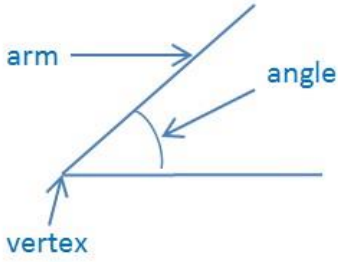
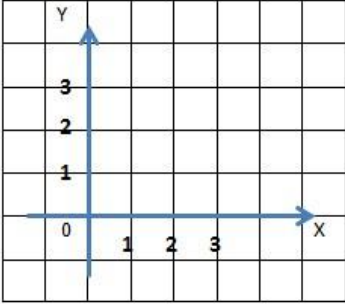
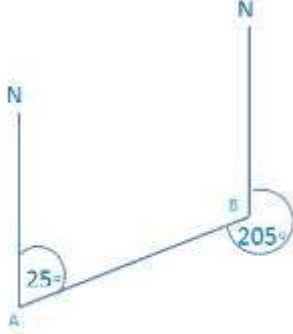





## Angle, symmetry and transformation

Term	Definition	Illustrations
<b>Acute angle</b>	An angle greater than $0^\circ$ and less than $90^\circ$ .	
<b>Alternate angles</b>	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.	
<b>Angle</b>	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 ( $^\circ$ ) using a protractor.	

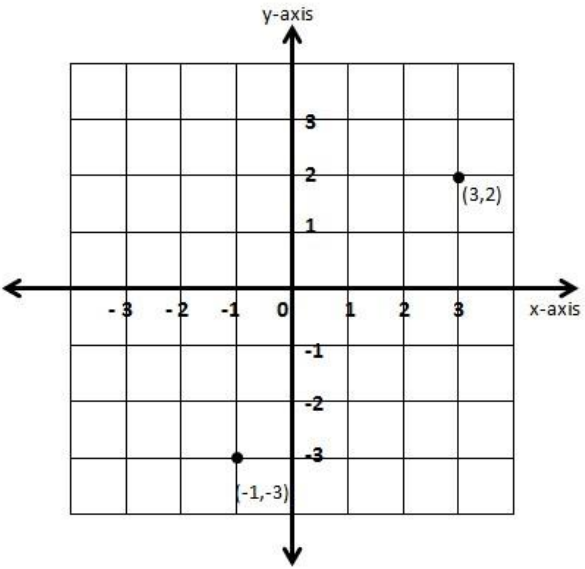
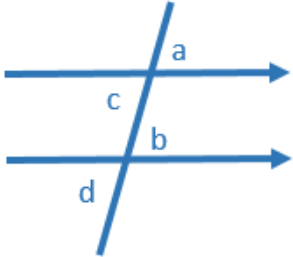
## Angle, symmetry and transformation

<b>Axis</b>	A fixed, reference line from which locations, distances or angles are taken. Usually grids have an x axis and y axis.	
<b>Bearings</b>	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 $205^\circ$ . Bearings are commonly used in navigation.	
<b>Compass (in directions)</b>	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.	

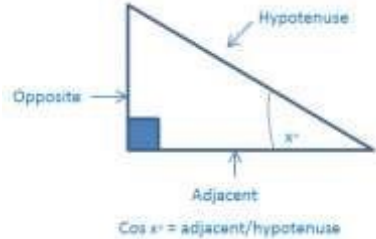
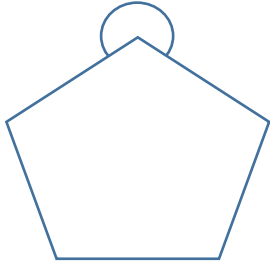
## Angle, symmetry and transformation

<b>Compass points</b>	<p>Used to help with finding location and directions.</p> <p>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</p> <ul style="list-style-type: none"><li>• NNE (north-north-east)</li><li>• ENE (east-north-east)</li><li>• ESE (east-south-east)</li><li>• SSE (south-south-east)</li><li>• SSW (south-south-west)</li><li>• WSW (west-south-west)</li><li>• WNW (west-north-west)</li><li>• NNW (north-north-west)</li></ul>	
<b>Complementary angles</b>	<p>Two angles which add together to <math>90^\circ</math>. Each is the 'complement' of the other.</p>	


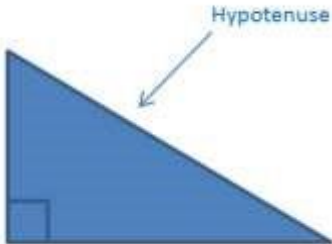
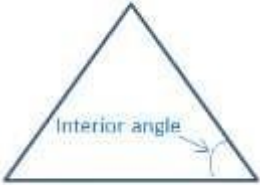

## Angle, symmetry and transformation

<b>Coordinate system</b>	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.	
<b>Corresponding angles</b>	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.	

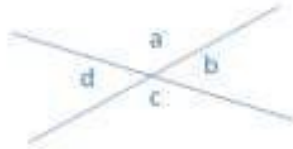


## Angle, symmetry and transformation

<p><b>Cosine function in trigonometry</b></p>	$\cos(\theta) = \frac{\textit{Adjacent}}{\textit{Hypotenuse}}$	
<p><b>Degrees</b></p>	<p>The most common unit of measurement for angles.</p> <p>One full turn is equal to 360 degrees, written as 360°</p>	
<p><b>Directional language</b></p>	<p>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.</p>	
<p><b>Exterior angle</b></p>	<p>In a polygon, exterior angles are formed outside the shape between one side and the adjacent side.</p> <p>The angle that has to be turned at the vertex if you are travelling around a shape.</p>	

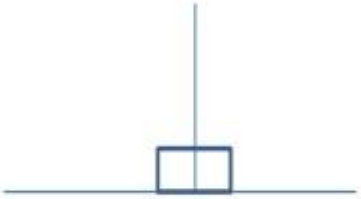
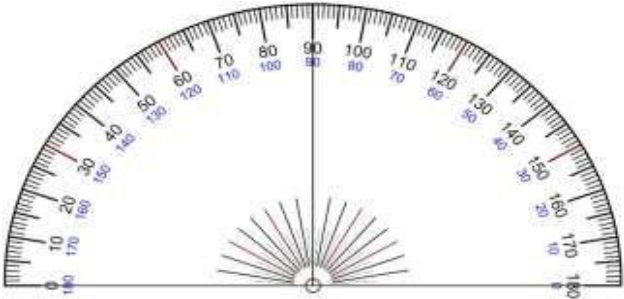
## Angle, symmetry and transformation

<b>Half turn</b>	Rotation through $180^\circ$	
<b>Hypotenuse</b>	The longest side of a right-angled triangle. It is the side opposite the right angle.	
<b>Interior angle</b>	At a vertex of a shape, the angles that lie within it.	
<b>Obtuse angle</b>	An angle greater than $90^\circ$ but less than $180^\circ$ .	

## Angle, symmetry and transformation

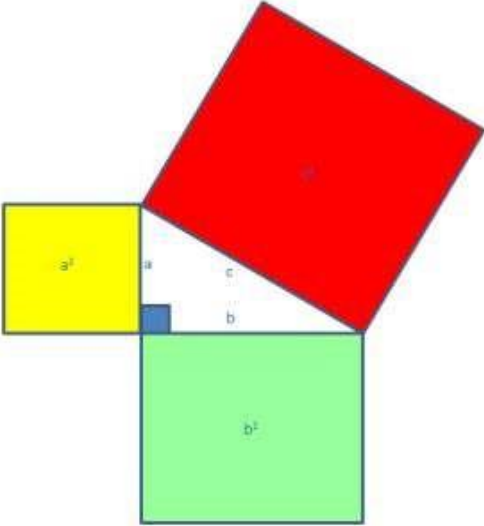
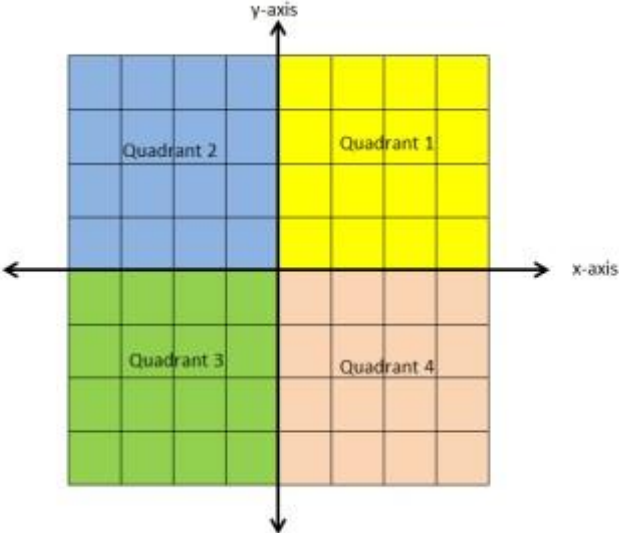
<b>Opposite angles</b>	<p>Angles formed where two lines intersect.</p> <p>In the diagram 'a' is opposite 'c' and 'b' is opposite 'd'.</p> <p>Also known as vertically opposite angles.</p>	
<b>Order (in symmetry)</b>	<p>The number of times a shape can be rotated and fit exactly on top of its original position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

## Angle, symmetry and transformation



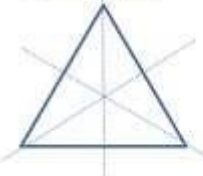

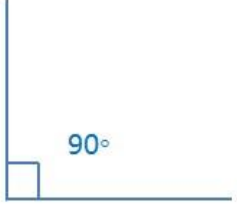
<b>Perpendicular lines</b>	Lines that are at right angles ( $90^\circ$ ) to each other.	 A diagram showing two lines intersecting at a right angle. A vertical line is perpendicular to a horizontal line. A small square is drawn at the intersection point to indicate the right angle.
<b>Positional language</b>	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.	
<b>Protractor</b>	An instrument for measuring or drawing angles, usually in the form of a semi-circle marked with degrees along the curved edge.	 A diagram of a semi-circular protractor. The curved edge is marked with degrees from 0 to 180. The 0-degree mark is on the left, and the 180-degree mark is on the right. The 90-degree mark is at the top. A vertical line is drawn from the center of the protractor to the 90-degree mark.





## Angle, symmetry and transformation

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


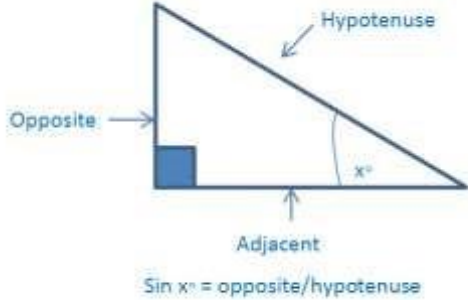
## Angle, symmetry and transformation

<b>Quarter Turn</b>	<p>A rotation through <math>90^\circ</math>.</p>	
<b>Ratio</b>	<p>The relative sizes of two or more values.</p> <p>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.</p>	
<b>Reflective Symmetry or Line Symmetry</b>	<p>When an image or object has a 'mirror image', each side is equal.</p> <p>Symmetry goes beyond simple shapes to explore real images and other forms of symmetry.</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>No lines of symmetry</p>  </div> <div style="text-align: center;"> <p>one line of symmetry</p>  </div> <div style="text-align: center;"> <p>three lines of symmetry</p>  </div> <div style="text-align: center;"> <p>Infinite lines of symmetry</p>  </div> </div>
<b>Right angle</b>	<p>An angle of <math>90^\circ</math>.</p>	


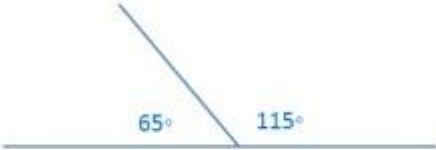
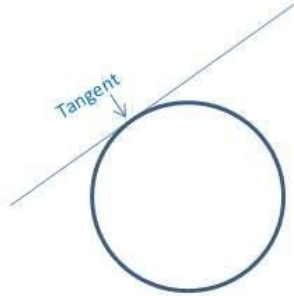
## Angle, symmetry and transformation

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

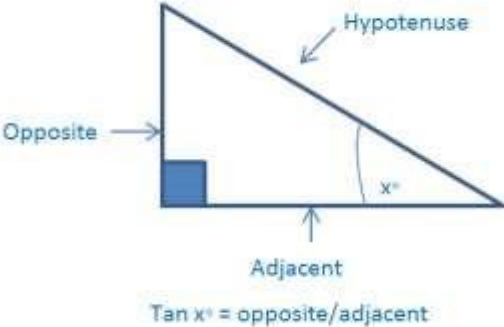


## Angle, symmetry and transformation

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

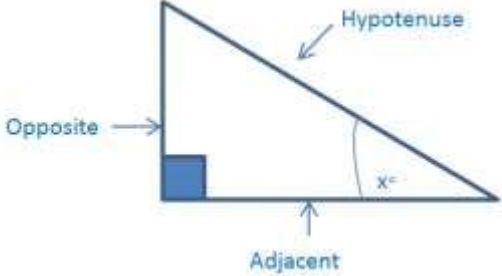
## Angle, symmetry and transformation

<b>Straight angle</b>	An angle of 180 degrees. A straight angle lies on a straight line.	
<b>Supplementary angles</b>	Angles which add up to $180^\circ$ .	
<b>Tangent line</b>	A tangent is a straight line that touches a circle at one point only.	

## Angle, symmetry and transformation

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

## Angle, symmetry and transformation

<b>Translation</b>	'Sliding' a shape by moving it without rotating or flipping it. The shape still looks exactly the same, just in a different place.	
<b>Trigonometry</b>	<p>Trigonometry is the study of the relationships between the sides and angles in triangles.</p> <p>The common functions of angles in trigonometry are sine, cosine, and tangent.</p>	 <p>The diagram shows a right-angled triangle with a right angle symbol at the bottom-left corner. The vertical side is labeled 'Opposite' with an arrow pointing to it. The horizontal side is labeled 'Adjacent' with an arrow pointing to it. The hypotenuse is labeled 'Hypotenuse' with an arrow pointing to it. An angle 'x' is marked at the bottom-right vertex.</p>
<b>Vertex (singular) or vertices (plural)</b>	<p>A 'corner' or corners on a 3D object.</p> <p>A point(s) where two or more straight lines meet.</p>	
<b>Whole turn</b>	A rotation through 360 degrees. Also known as a full turn.	