The vocabulary of geometry

Labelling and referring to lines, shapes and angles, and learning the special names of different types of lines and angles.

Check that you can:

- recognise and name simple 2-D shapes
- understand the terms 'alphabetical order', 'clockwise' and 'anticlockwise'
- understand how the sizes of angles are measured using degrees (°).

Labelling and referring to lines and shapes

In order to be able to identify the line or lines in a diagram, we need to have a way of referring to each of the lines.

We do this by labelling the ends of each line with a capital letter.

Where two lines meet at a point, a corner is formed. We call these points **vertices**. One of these points is called a **vertex**.

The vertices in the diagram below are labelled *M*, *N* and *P* and the remaining ends of the lines are labelled *L* and *Q*.

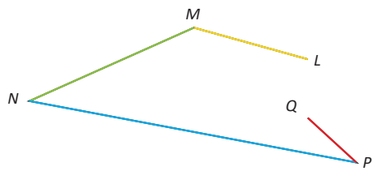
We refer to a line by the two letters at each end of the line. It does not strictly matter in which order we write these two letters, but it is recommended that we choose the order of the alphabet.

The red line is referred to as *PQ* (or *QP*).

The blue line is referred to as *NP* (or *PN*).

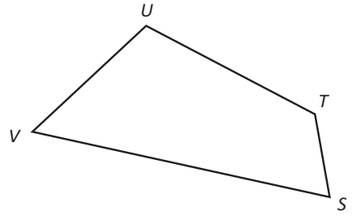
The green line is referred to as *MN* (or *NM*).

The yellow line is referred to as *LM* (or *ML*).



The shape below is a quadrilateral (a four-sided shape).

Usually, we refer to the shape using the four labelled vertices. We would start with the letter that comes first in the alphabet and work our way either clockwise or anticlockwise around the shape.



We would usually refer to the quadrilateral opposite as *STUV*. It would also be correct to start at a different vertex and/or go in a different direction around the shape. An example of an incorrect way of referring to this quadrilateral is *STVU* because here *V* comes after *T*, but the shape does not have a line joining *V* to *T*.

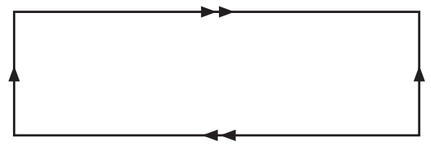
Types of lines

Parallel lines

Lines that go in the same direction are called **parallel lines**.

Parallel lines...

- never meet (even if you extended them further than on the diagram)
- are always the same distance apart
- do not have to be the same length
- are identified by placing similar arrows on the lines, pointing in the same direction.

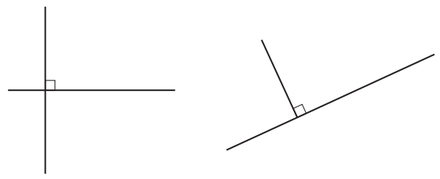


If a diagram has more than one set of parallel lines, we use the same number of arrows to show which lines are parallel to each other.

Perpendicular lines

Lines that cross each other (intersect) at right angles are called **perpendicular lines**.

A right-angle symbol is usually placed where perpendicular lines meet to show that lines are perpendicular.

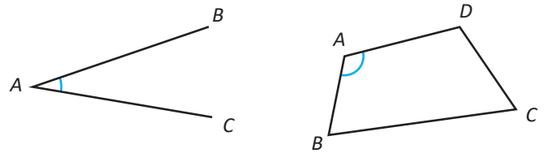


Labelling and referring to angles

When only two lines meet at a vertex in a diagram, we can refer to an angle just by giving the letter at the vertex, with an angle symbol either given before the letter or on top of it.

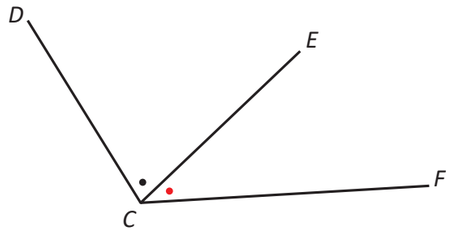
In both diagrams, the marked angle could be referred to as:

$\angle A$ or $\hat{A}$



But, when more than two lines meet at a vertex, referring to an angle using one letter is not enough. It could also cause confusion.

Consider the diagram on the right. If we are asked to measure the angle at *C*, it is not clear if we are meant to measure the angle with the black dot, the angle with the red dot, or the angle with the black and red dots combined.



This is when we should use three letters to refer to an angle.

The angle with the black dot is referred to as $D\hat{C}E$.

We could change the order of the three letters, but *C* needs to be the middle letter.

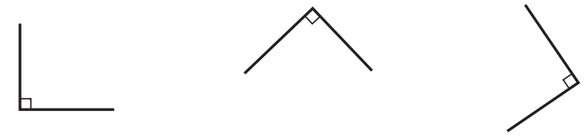
So, the angle could also be referred to as $E\hat{C}D$.

Similarly, the angle with the red dot would be referred to as $E\hat{C}F$ or $F\hat{C}E$.

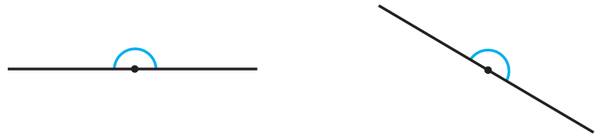
The largest angle (black and red dots combined) would be referred to as $D\hat{C}F$ or $F\hat{C}D$.

The special names of angles

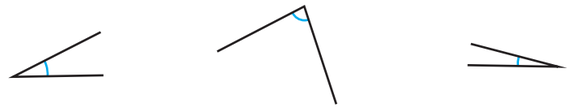
You should have already come across **right angles**. These are 90° angles.



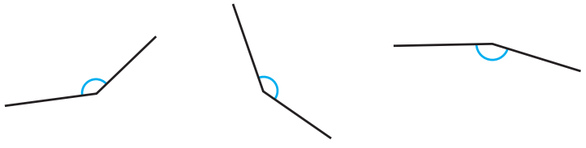
An angle that is double the size of a right angle forms a **straight angle**, also called a straight line. Straight angles are 180°.



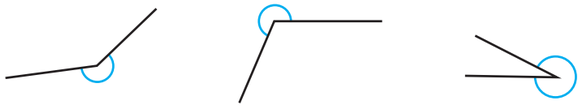
Acute angles are greater than 0°, but less than 90°.



Obtuse angles are greater than 90°, but less than 180°.



Reflex angles are greater than 180°, but less than 360°.



Remember!

When referring to angles using their three-letter description, the middle letter of the three must be where the vertex or angle is formed (or where the two lines meet), and we place an angle symbol on top of this letter too, e.g. $D\hat{C}E$.

When referring to a shape using its labelled vertices, the order of the letters used must follow the order of the lines that form the shape.

The vocabulary of geometry

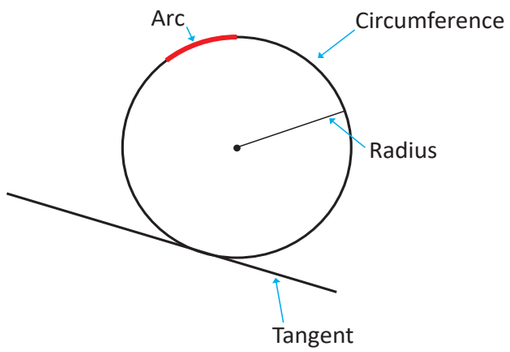
Learning the vocabulary of circles, and the special names and properties of the five simple 3-D shapes.

Check that you can:

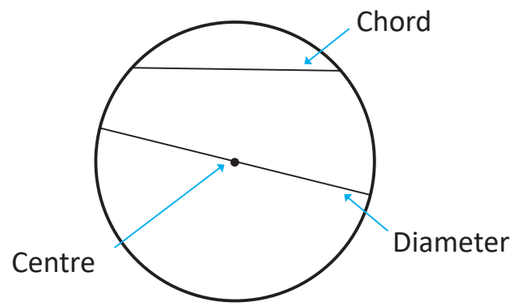
- recognise and name simple 2-D shapes, including circles
- recognise when a shape is 2-D (flat) or 3-D (a shape that has a length, width and a depth).

Vocabulary of circles

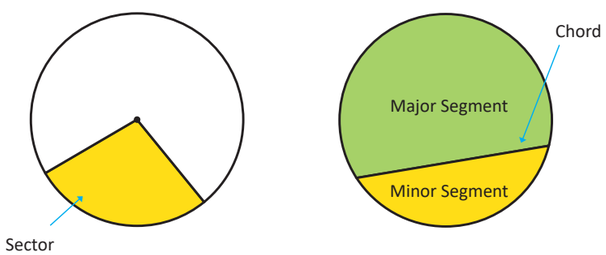
There are several words associated with circles that you need to know.



Word	Meaning
Circumference	The outside of a circle. It also means the length of this circular line.
Arc	A part of the circumference.
Radius	A straight line that goes from the centre of a circle to the circumference. It also means the length of this line shown in the diagram.
Tangent	Any straight line outside the circle that touches the circle at one point only.



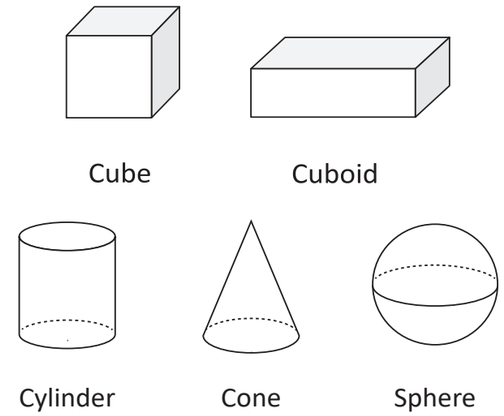
Word	Meaning
Centre	The point at the middle of a circle.
Diameter	A straight line that goes from one point on the circumference to another point on the circumference, going through the centre. It also means the length of this line.
Chord	A straight line that does not go through the centre of a circle but has both ends on the circumference.



Word	Meaning
Sector	A sector is the part of a circle between two radiuses and a part of the circumference, namely an arc. It can be compared to a piece of cake.
Segment	A segment is formed when a chord divides a circle into two parts. The name of the segment with the smallest area is the smallest segment, and the name of the segment with the largest area is the largest segment. These segments are also referred to as the minor segment and major segment.

The special names of simple 3-D shapes

There are five simple 3-D shapes that you need to be able to name.



Properties of the five simple 3-D shapes

3-D shape	Description
Cube	A cube is a three-dimensional prism with eight vertices, 12 edges and six square faces. The six square faces are congruent. Each pair of adjacent faces meet at a right angle. The length, width, and height of a cube are equal.
Cuboid	A cuboid is a three-dimensional prism with eight vertices, 12 edges and six faces. There are two types of cuboids. In the first type, two of the faces are square and four of the faces are rectangular. In the second type, all six faces are rectangular. The opposite faces of a cuboid are congruent, but not all the faces are congruent. Each pair of adjacent faces meet at a right angle.
Cylinder	A cylinder is a three-dimensional prism with a circular cross-section. A cylinder can be open (one curved face only) or closed (one curved face and two circular faces). A cylinder has no vertices, but it does have two edges.
Cone	A cone is a three-dimensional shape. It is a specific type of pyramid with a circular base. The apex of the cone is usually directly above the centre of the circle. A closed cone has two faces (one curved face and one circular face), one vertex and one edge.
Sphere	A sphere is a three-dimensional shape with a circular face. It has only one face, and no vertices or edges. Every point on the surface of a sphere is equidistant from the centre of the sphere.

Remember!

2-D shapes are ‘flat’ shapes, they only have a length and a width. 3-D shapes have a length, a width and a depth.