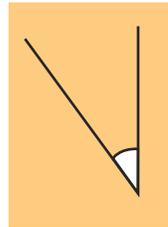


## Key Vocabulary

angle  
 right angle  
 acute  
 obtuse  
 reflex  
 protractor  
 horizontal  
 vertical  
 parallel  
 perpendicular  
 polygon  
 regular  
 irregular  
 two-dimensional  
 three-dimensional  
 flat face  
 curved surface  
 edge  
 curved edge  
 vertex  
 vertices  
 apex  
 radius  
 diameter  
 circumference

## Angle Types



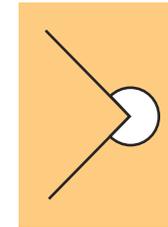
### Acute Angles

Any angle that measures less than  $90^\circ$  is called an **acute** angle.



### Obtuse Angles

Any angle that measures greater than  $90^\circ$  and less than  $180^\circ$  is called an **obtuse** angle.



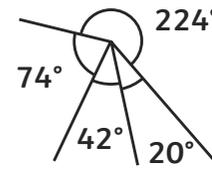
### Reflex Angles

Any angle that measures greater than  $180^\circ$  is called a **reflex** angle.

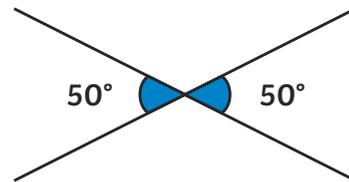
## Calculating Angles



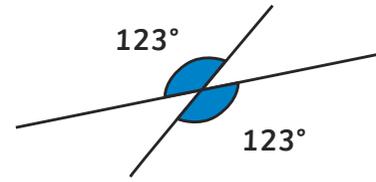
Angles on a straight line always total  $180^\circ$ .



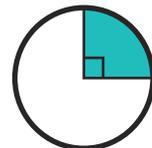
Angles around a point always total  $360^\circ$ .



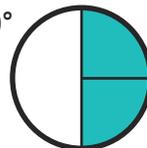
Opposite angles that share a vertex are equal.



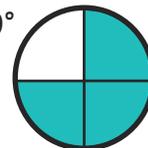
$\frac{1}{4}$  turn  
 $90^\circ$



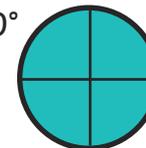
$\frac{1}{2}$  turn  
 $180^\circ$



$\frac{3}{4}$  turn  
 $270^\circ$

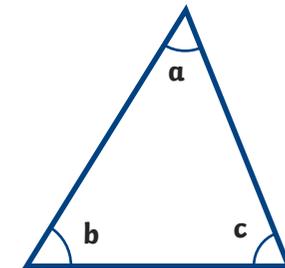


1 turn  
 $360^\circ$



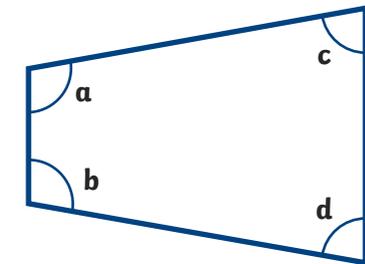
Multiples of  $90^\circ$  can be used as descriptions of a turn.

## Angles in a Triangle



$$a + b + c = 180^\circ$$

## Angles in a Quadrilateral



$$a + b + c + d = 360^\circ$$

# Properties of Shapes

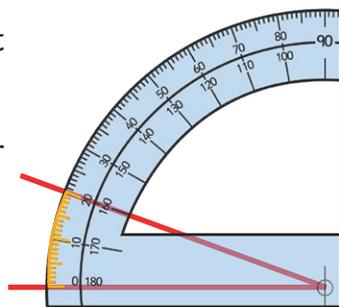
# Knowledge Organiser

## Using a Protractor

Place the cross or circle at the point of the angle you are measuring.

Read from the zero on the outer scale of your protractor.

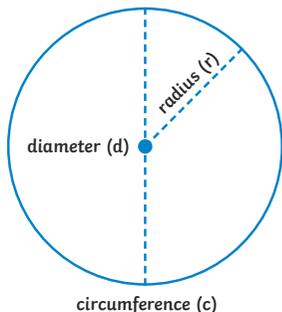
Count the degree lines carefully.



## Parts of Circles

A circle is a 2D shape. The perimeter of a circle is called the **circumference** (c). The distance across the circle, passing through the centre, is called the **diameter** (d).

The distance from the centre of the circle to the circumference is called the **radius** (r).



$$r \times 2 = d$$

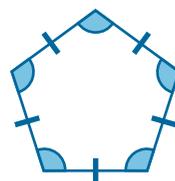
$$\frac{d}{2} = r$$

## Angles in Regular Polygons

As the number of sides of a polygon increases by one, the total of the interior angles increases by  $180^\circ$ . When  $n$  = number of sides, this formula can be used to find the size of each angle in a **regular polygon**:

$$\text{Sum of Interior Angles} = (n - 2) \times 180^\circ$$

$$\text{Each Angle} = \frac{(n - 2) \times 180^\circ}{n}$$

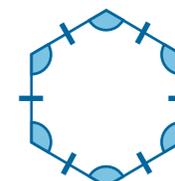


**Pentagon**

$$n = 5$$

$$(5 - 2) \times 180^\circ = 540^\circ$$

$$540^\circ \div 5 = 108^\circ$$



**Hexagon**

$$n = 6$$

$$(6 - 2) \times 180^\circ = 720^\circ$$

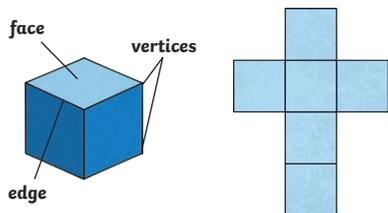
$$720^\circ \div 6 = 120^\circ$$

## Properties of 3D Shapes

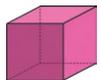
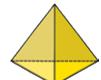
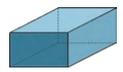
3D shapes have three dimensions – **length, width and depth**.

A **polyhedron** is a 3D shape with flat faces. Spheres, cylinders and cones are not polyhedrons as they have curved surfaces.

## Nets of 3D Shapes



A shape net shows which 2D shapes can be folded and joined to make a 3D shape. When you are drawing a net, or solving a problem involving a shape net, think carefully about where the edges of the faces meet.

<p><b>Cube</b></p>  <p>6 square faces 12 edges 8 vertices</p>	<p><b>Tetrahedron</b></p>  <p>4 triangular faces 6 edges 4 vertices</p>	<p><b>Sphere</b></p>  <p>1 curved surface 0 edges 0 vertices</p>
<p><b>Cuboid</b></p>  <p>6 faces 12 edges 8 vertices</p>	<p><b>Octahedron</b></p>  <p>8 faces 12 edges 6 vertices</p>	<p><b>Triangular prism</b></p>  <p>5 faces 9 edges 6 vertices</p>
<p><b>Square-based pyramid</b></p>  <p>5 faces 8 edges 5 vertices</p>	<p><b>Cone</b></p>  <p>1 circular face 1 curved surface 1 curved edge 1 apex</p>	<p><b>Cylinder</b></p>  <p>2 circular faces 1 curved surface 2 curved edges 0 vertices</p>