

## Key Vocabulary

angle

right angle

acute

obtuse

reflex

protractor

horizontal

vertical

parallel

perpendicular

two-dimensional

three-dimensional

polygon

regular

irregular

flat face

curved surface

edge

curved edge

vertex

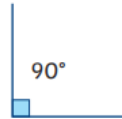
apex

## Measuring angles

An angle is created when two straight lines meet at a point or intersect.

### Right angle

The intersection of perpendicular lines creates a right angle. A right angle is 90 degrees.



### Acute angle

Any angle measuring more than – degrees and less than 90 degrees is acute. Acute angles are smaller than a right angle.



### Obtuse angle

Any angle measuring more than 90 degrees but less than 180 degrees is obtuse. Obtuse angles are larger than a right angle.



### Reflex angle

Any angle that measures greater than 180 degrees is called a reflex angle.



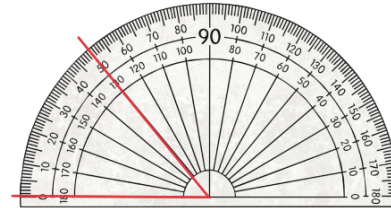
## Measuring and drawing angles with a protractor

To measure and draw angles, we use a protractor. The numbers on the scale count from 0 degrees to 180 degrees in both directions.

Place the protractor on the angle so the centre mark is over the point of the angle you're measuring.

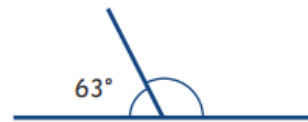
Then make sure the zero edge lines up with one of the edges of the angle.

Look carefully when measuring an angle and make sure you start counting from 0.



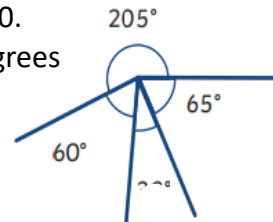
## Angles on a straight line

Angles on a straight line add up to 180 degrees. We can use this fact to calculate missing angles on straight lines by subtracting.  $180 - 63 = 117$  degrees.



## Angles around a point

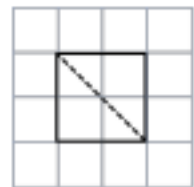
There are 360 degrees in a full turn. We can use this fact to calculate missing angles around a point by subtracting.  $205 + 60 + 65 = 330$ .  $360 - 330 = 30$  degrees



## Lengths and angles in shapes

Half a right angle measures 45 degrees.

If I fold a square in half diagonally to make a triangle. The size of the angles in a triangle will be  $90 + 45 + 45$  because 2 of the right angles from the square have been halved.

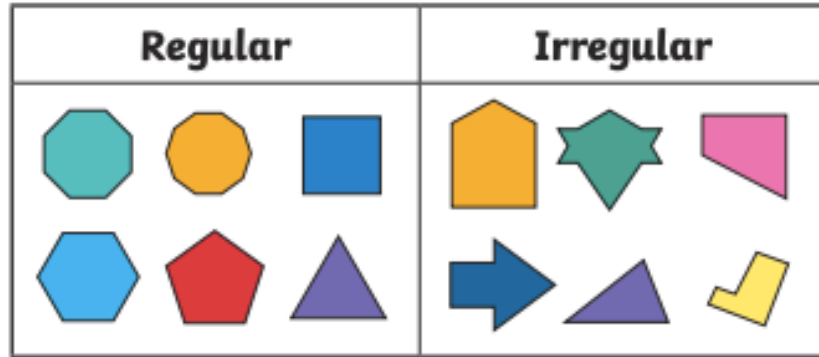


## Regular and irregular polygons

A **polygon** is any two-dimensional (2D) shape formed with straight lines.

In a **regular polygon**, all the sides and angles are equal.

In an **irregular polygon**, the sides and angles are not equal.

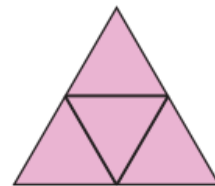


## Reasoning about 3D shapes

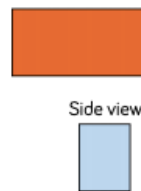
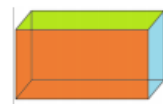
We can identify 3D shapes from 2D shapes.

A **shape net** is a 2D drawing of an unfolded 3D shape.

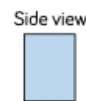
When you are drawing or reasoning about shape nets, think carefully about where the edges of the faces meet.



Shape net of a tetrahedron.



Front view



Side view



Plan view

We can also represent 3D shapes from **different views** by drawing the shape of their faces from different angles.

Some shapes may look similar from different views e.g. a prism could always look like a cuboid due to its rectilinear faces.

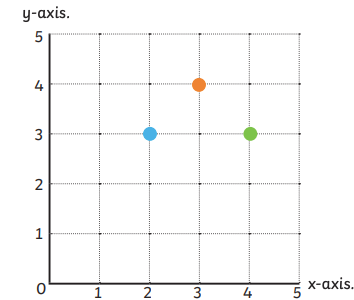
## Position and Direction

### Position in the First Quadrant

Coordinates are a useful way to locate a position on a map or grid.

The numbers across the horizontal line are on the x-axis.

The numbers on the vertical line are on the y-axis.

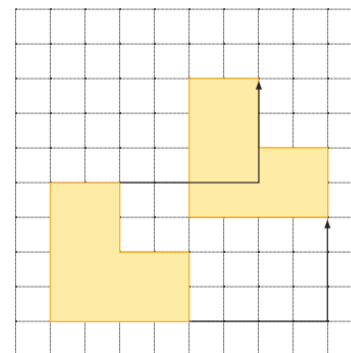


We always read or write the number on the x-axis before the y axis. To help us remember which point to read or write first, we can say '**along the corridor and up the stairs**'.

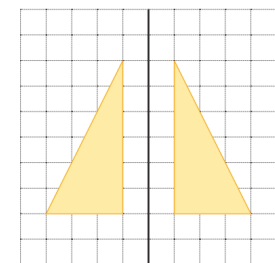
The x and y position are written in brackets with a comma. The coordinate of the blue spot is (2, 3).

### Translation

Translation means moving an object on a grid. The object is moved without changing in size, turning or reflecting. The object can move up, down, left or right.



### Reflection



A shape is reflected when it is flipped over a mirror line. The reflected image is congruent to the original. This means that the measurements of the sides and angles have not changed. Each point of the reflected shape is the same distance from the mirror line as the original shape.