



# Year 7 Knowledge Organiser - Measures, area and perimeter

## Objectives

- Use conventional vocabulary and notation to describe 2D shapes
- Use standard convention for labelling and referring to sides and angles
- Draw diagrams from written descriptions
- Apply the properties and definitions of quadrilaterals and triangles
- Use standard units of measure and related concepts. (length, area, volume/capacity, mass, time, money, etc.)
- Calculate perimeters of 2D shapes
- Know and apply formulae to calculate area of triangles, parallelograms, trapezia

## Key Vocabulary

- Edge** - a line segment joining one vertex to another
- Vertex** - where 2 or more edges meet
- Plane** - a flat, two-dimensional surface
- Parallel** - lines which are equidistant (will never meet)
- Perpendicular** - lines which intersect at right angles
- Polygon** - a 2D shape with straight edges
- Symmetry** - a shape is symmetrical when it is identical on both sides about a mirror line
- Quadrilateral** - a four sided shape
- Capacity** - the maximum volume something can hold
- Perimeter** - the distance around the outside of the shape

## Polygons

3	- Triangle	5	- Pentagon	8	- Octagon
4	- Quadrilateral	6	- Hexagon	9	- Nonagon
		7	- Heptagon	10	- Decagon

If all the sides and angles are the same, it is a **regular** polygon

## Properties of Quadrilaterals



**Square**  
All sides equal size  
All angles  $90^\circ$   
Opposite sides are parallel



**Rectangle**  
All angles  $90^\circ$   
Opposite sides are parallel



**Rhombus**  
All sides equal size  
Opposite angles are equal



**Parallelogram**  
Opposite sides are parallel  
Opposite angles are equal  
Co-interior angles



**Trapezium**  
One pair of parallel lines



**Kite**  
No parallel lines  
Equal lengths on top sides  
Equal lengths on bottom sides  
One pair of equal angles

## Units of measure

- 10mm = 1cm
- 100cm = 1m
- 1000m = 1km
- 1000ml = 1l
- 100cl = 1l
- 1000g = 1kg
- 1000kg = 1 tonne
- 60 seconds = 1 minute
- 60 minutes = 1 hour
- 24 hours = 1 day
- 7 days = 1 week
- 52 weeks / 365 1/4 days = 1 year

## Types of Triangles

<p><b>Equilateral triangle</b> All sides the same length All internal angles the same</p>	<p><b>Isosceles triangle</b> 2 sides the same length 2 internal angles the same</p>
<p><b>Right-Angled triangle</b> 1 internal angle that is <math>90^\circ</math> Can be either scalene or isosceles as well</p>	<p><b>Scalene triangle</b> All the different length All internal angles different</p>

## Letter and labelling convention

The letter in the middle is the angle  
The arc represents the angle



**Angle Notation:** three letters ABC

This is the angle at B -  $113^\circ$

**Line Notation:** two letters EC

The line that joins E to C

Area of a rectangle = length x width

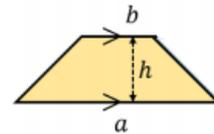
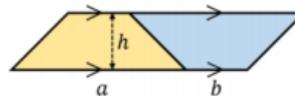
Area of a triangle =  $\frac{1}{2}$  base x perpendicular height

Area of parallelogram = base x perpendicular height

## Area of a trapezium

$$\text{Area of a trapezium} = \frac{(a+b) \times h}{2}$$

Why?



- Two congruent trapeziums make a parallelogram
- New length  $(a+b) \times$  height
- Divide by 2 to find area of one

## Classify angles

<p><b>Acute Angles</b> <math>0^\circ &lt; \text{angle} &lt; 90^\circ</math></p>	<p><b>Right Angles</b> <math>90^\circ</math></p>
<p><b>Obtuse</b> <math>90^\circ &lt; \text{angle} &lt; 180^\circ</math></p>	<p><b>Right angle notation</b></p>
<p><b>Reflex</b> <math>180^\circ &lt; \text{angle} &lt; 360^\circ</math></p>	<p><b>Straight Line</b> <math>180^\circ</math></p>

## Measure angles to $180^\circ$



The base line follows the line segment

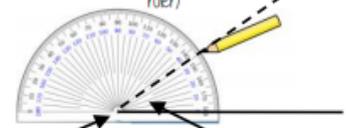
Make sure the cross is at the point the two lines meet

Read from  $0^\circ$  on the base line.  
Remember to use estimation.  
This is an obtuse angle so between  $90^\circ$  and  $180^\circ$

## Draw angles up to $180^\circ$

Draw a  $35^\circ$  angle

Make a mark at  $35^\circ$  with a pencil. And join to the angle point (use a ruler)



Make sure the cross is at the end of the line (where you want the angle)

The angle

## Parallel and Perpendicular lines

### Parallel lines

Straight lines that never meet (Have the same gradient)

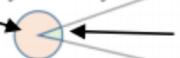
### Perpendicular lines

Straight lines that meet at  $90^\circ$

## Angles over $180^\circ$

Use your knowledge of straight lines  $180^\circ$  and angles around a point  $360^\circ$

$360^\circ$  - smaller angle = reflex angle



Measure the smaller angle first (less than  $180^\circ$ )