Templars Primary School Knowledge Organiser — Year 6 Properties of Shape

Key Vocabulary

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

Angles

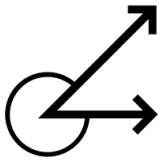
Acute angles

An angle that measures less than 90° is called an **acute** angle.

Obtuse angles

An angle that measures greater than 90° but less than 180° is called an **obtuse** angle.

Reflex angles

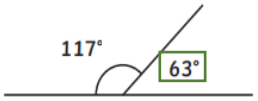


An angle that measures greater than 180° is called a **reflex** angle.

Calculating angles

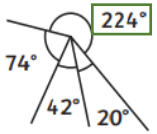
Angles on a straight line always total 180°

Calculate a missing angle:
180° – 117° = 63°



Angles around a point always total 360°

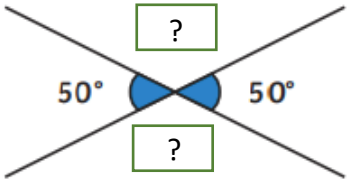
Calculate a missing angle: Add the known angles then subtract from 360.
74 + 42 + 20 =136.
360° – 136° = 224°



Angle	Fraction of a full turn	Degrees
Right angle	¼	90°
Straight line	½	180°
Three right angles	¾	270°
Full turn	4/4 or 1 whole	360°

Vertically opposite angles

Opposite angles that share a vertex are equal

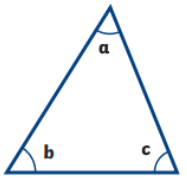


We can calculate our missing angles in two ways:

1. **Angles on a straight line always total 180°**
180 – 50 = 130°

2. **Angles around a point always total 360°**
50 + 50 = 100
360 – 100 = 260
260 ÷ 2 = 130°

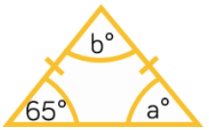
Angles in a triangle



Interior angles in a triangle always total 180°
a + b + c = 180°

To calculate a missing angle:
Add together the known angles and subtract from 180°

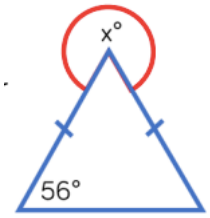
If a triangle is an equilateral triangle, all of its sides will be the same length so all of its angles will be equal too.



An isosceles triangle has two equal sides. Equal sides are marked with a hatch. If two sides are equal lengths, their angles will be equal too.
Angle *a* must equal 65°

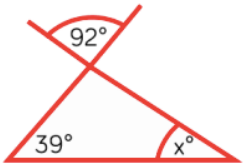
Angles in a triangle – problem solving

We can use our knowledge of interior angles in a triangle to help us solve missing angle problems.



The opposite angle must be 56° as the lengths are equal.
56 + 56 = 112°
180 – 112 = 68°

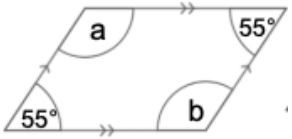
Angles around a point total 360°
So 360 - 68 = 292° ***x* = 292°**



I know that opposite angles are equal so the top angle of the triangle must be 92°
92 + 39 = 131°
Interior angles of a triangle total 180°
180 – 131 = 49° ***x* = 49°**

Angles in quadrilaterals

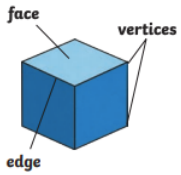
Interior angles in a quadrilateral always total 360°

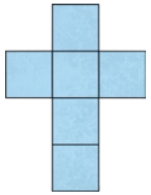


Interior angles in a quadrilateral always total 360°
Angles on a line always total 180°
180 – 55 = 125°
Opposite angles are equal in size so if
a = 125° then b = 125°

We can measure the interior angles using a protractor. We can check our measuring skills by checking that all 4 angles add up to 360°

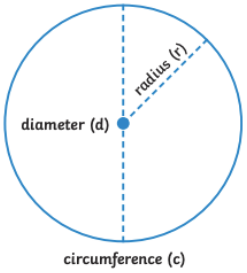
Nets of 3D shapes





A shape net shows which 2D shapes can be folded and joined to make a 3D shape.

Circles

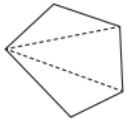


The perimeter of a circle is called the **circumference** (c). The distance across the circle, passing through the centre, is called the **diameter** (d). The distance from the centre of the circle to the circumference is called the **radius** (r).

If we know the radius, we can calculate the diameter
r x 2 = d
If we know the diameter, we can calculate the radius
r = d / 2

Angles in regular polygons

We can use the sum of interior angles of a triangle to help us work out the interior angles of polygons. Any polygon can be split into triangles and then we multiply the number of triangles by 180°.



number of sides = 5
number of triangles = 3
3 x 180 = 540
The sum of the interior angles of a pentagon is 540°

Shape	Number of sides	Number of triangles	Sum of interior angles
quadrilateral	4	2	360
pentagon	5	3	540
hexagon	6	4	720

In other words, where
n = number of sides

Sum of interior angles = (*n* – 2) x 180°

Each angle = $\frac{(n-2) \times 180°}{n}$