

## Guidance

### Symmetry

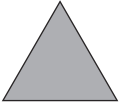

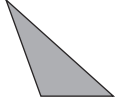
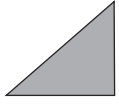
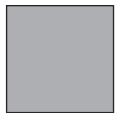

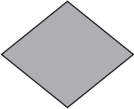
Children are expected to be able to recognise symmetry and draw symmetrical shapes, usually by being given a shape to complete across a mirror line. Sometime, children find tracing paper helpful. However children should also be encouraged to hold symmetrical drawings up in front of them with the mirror line vertical in order to see the symmetry. Sometimes this will mean rotating the drawing, as with Q1 above.

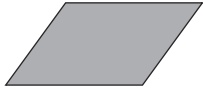

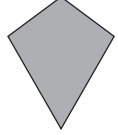
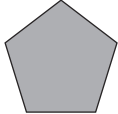
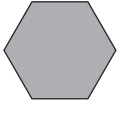
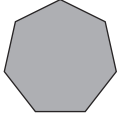
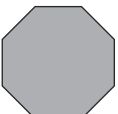
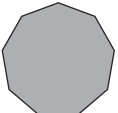
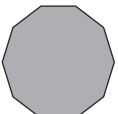
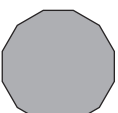
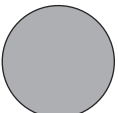
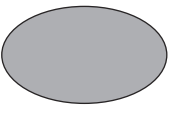
### Properties of Shape

Children are expected to recognise and name 2D and 3D shapes, describe their properties and sort shapes according to these properties.

There is no definitive list of shapes, although it can reasonably be expected that children need to know the following:

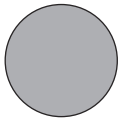
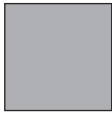



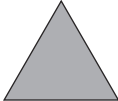


#### 2D Shapes

Number of sides	Shape type*	Shape name		Main feature
3	triangle	equilateral triangle		all sides and angles equal
		isosceles triangle		two sides and angles equal
		scalene triangle		no sides and angles equal
		right-angled triangle		one angle is a right angle
4	quadrilateral	square		all sides equal and all angles right angles
		rectangle		opposite sides equal and all angles right angles
		rhombus		all sides equal

	quadrilateral	parallelogram		opposite sides equal
		trapezium		one pair of opposite sides parallel
		kite		two pairs of adjacent sides equal
5	regular and irregular polygons (regular polygons have equal sides and angles)	pentagon		five sides
6		hexagon		six sides
7		heptagon		seven sides
8		octagon		eight sides
9		nonagon		nine sides
10		decagon		ten sides
12		dodecagon		twelve sides
1	one curved side	circle		all points of the line are the same distance from the centre
		ellipse		

\*The shape type is a helpful category. In fact all 2D shapes are polygons.

## 3D shapes

Shapes	2D image	Brief description
sphere		The shape of a ball. Has one curved surface.
cube		6 square faces, similar to a dice.
cuboid		6 rectangular faces.
cone		One flat circular face and a curved surface ending in a point, similar to an ice cream cone.
cylinder		2 flat circular faces and one curved surface, similar to a tin can.
tetrahedron		4 triangular faces, similar to pyramid with a triangular base.
square-based pyramid		Square base with 4 triangular faces, similar to the Egyptian pyramids.
prisms		The same shape at either end, joined by a number of rectangles equal to the number of sides of the end shapes. The shape at each end defines the name of the shape, e.g. hexagonal prism.

Children will also be expected to accurately draw some of these shapes according to certain criteria. They also need to know the language of perpendicular, parallel, horizontal and vertical.

## Coordinates

Children need to use coordinates in all 4 quadrants, which means using negative numbers as well as positive numbers. The quadrants are the 4 areas divided up by the axes, the lines, in Q4. Most questions ask children to calculate the coordinates of a given shape or shapes using some given coordinates. Often the shape has been translated (moved and kept the same size) or reflected. The numbers are not usually large.

In Q4, the triangle is moved left 6 and down 8. This translation is repeated using the same measurement. Calculating the coordinates means using the 6 to the left and 8 down for all the coordinates.

More questions can be found in this resource: <http://www.twinkl.co.uk/resource/t2-m-1659-ks2-reasoning-test-practice-coordinates-resource-pack>

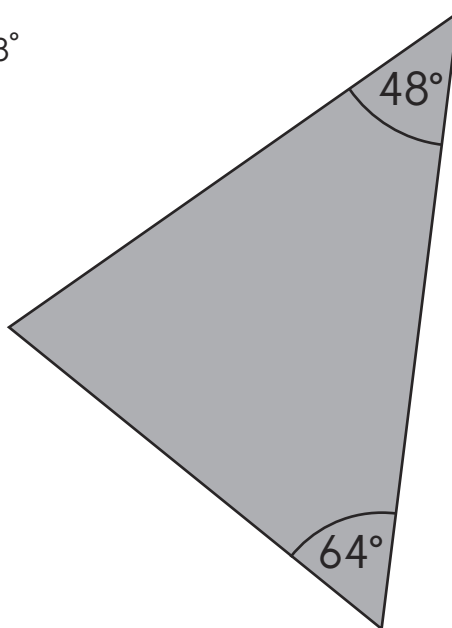
## Angles

Children are expected to estimate, measure, draw and calculate angles. Estimation is important in giving children an understanding of the approximate size of angles. It is very helpful to estimate angles to the nearest  $10^\circ - 20^\circ$ .

Children will measure and draw using a protractor or angle measurer. The most important aspects of doing this is getting the centre of the protractor or angle measurer on the angle and measuring the correct angle as most protractors and angle measurer's have two set of numbers, one for each direction.

Calculating angles relies upon knowing that there are  $180^\circ$  in a straight line and a triangle, and  $360^\circ$  in a circle.

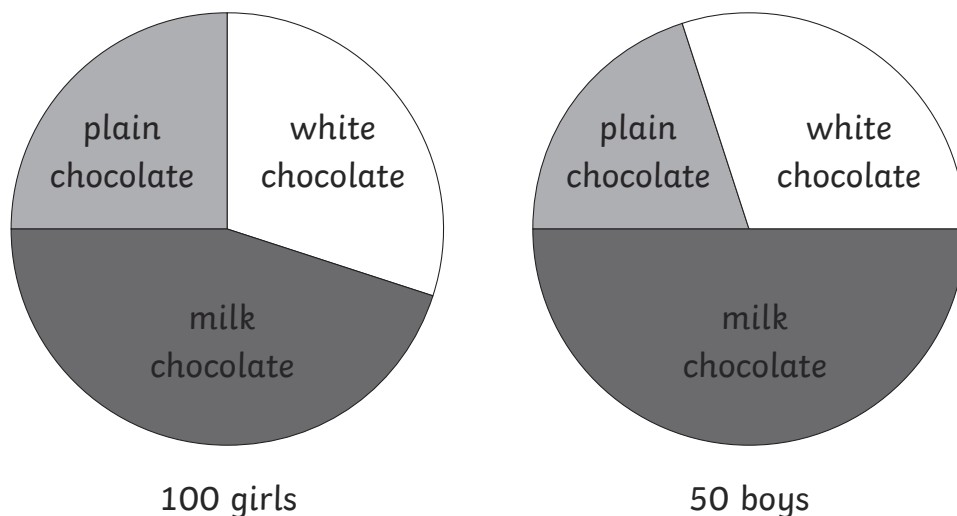
$$\text{Missing angle} = 180^\circ - 48^\circ + 64^\circ = 180^\circ - 112^\circ = 68^\circ$$



## Pie Charts

Pie charts are circles divided up into pieces of pie, which represent different values of data.

In the example question, there are 2 pies. One represents twice as many children as the other.



$\frac{1}{4}$  or 25% of the pie chart representing 100 girls represents 25 girls who like plain chocolate.

$\frac{1}{2}$  or 50% of the pie chart representing 50 boys represents 25 boys who like milk chocolate.

Children need to calculate and compare these pie charts. It can be helpful to estimate the numbers of boys and girls who liked the other chocolates best. Do the totals add up to 100 girls and 50 boys?

## Bar Charts

Bar charts for Year 6 may take a different form to the traditional bar chart used by younger children, which has one bar for each set of data. The bar chart in Q9 is one horizontal bar divided into different sections to represent the data. Children have to calculate how much each section of the bar represents using the measurement at the beginning and end of each section.

## Mean Average

The average mean is calculated by adding all the values of a set of data and dividing by the number of values. It is the mathematical process of sharing data equally.