Content Geometry and measures

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4.1 Symmetry

I can

- identify reflection symmetry in 2D shapes
- identify rotation symmetry in 2D shapes

Example

- **a i** How many lines of symmetry does this shape have?
 - ii Colour two squares so that it has four lines of symmetry.
- **b** i What is the order of rotational symmetry of this shape?
 - ii Colour two squares so that it has rotational symmetry of order four.

Solution

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- **a** i It has two lines of symmetry. They pass through opposite corners.
 - **ii** Colour the other two corners. This will make the shape symmetrical horizontally and vertically as well as diagonally.



The four lines of symmetry have been drawn on the shape.

- **b** i It has rotational symmetry of order two.
 - ii Colour the two squares as shown.



The shape now has rotational symmetry of order four. If you rotate the shape about the centre it will come back on itself four times in one complete revolution. You can check this with tracing paper.

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i.	<i>c</i>	
k	b	



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Practice questions



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a Shade in squares to turn the dashed line into a line of symmetry.

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b Shade in squares to turn both the dashed lines into lines of symmetry.

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Work out the order of rotation symmetry of each shape.



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Put a 1 inside shapes that do **not** have rotation symmetry.

Write the order of rotation symmetry inside the other shapes.



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Complete these shapes so they have rotation symmetry of the given order about the centre shown.



4.1 Symmetry

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4.2 3D shapes

I can

• identify properties of 3D shapes

Example

This is a square-based pyramid.

Work out the number of

a faces b edges c vertices

Solution

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- **a** There is a square base and four triangular faces. There are five faces all together.
- **b** Two faces meet at an edge. There are four edges round the base and four sloping edges. There are eight edges all together.

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c There is a vertex at each end of an edge. There are four vertices round the base and one more at the top. There are five vertices all together.

Practice questions

1	This is a cube.	
	Write down the number of	
	a faces b edges c vertices	
2	The shape of this wooden block is a triangular prism. Work out the number of	
	a faces b edges c vertices	
3	 This shape is an octahedron. It has eight triangular faces. a How many vertices does it have? b How many edges does it have? 	
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4.3 Measuring angles

I can

• use a protractor to measure angles of any size

Example

- a Draw this triangle.
- **b** Measure angle *C*.
- **c** Measure the length of BC.

Solution

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- a Start by drawing AB.Draw the angles at A and B.The lines cross at C.
- **b** Angle C is 51° .
- **c** The length of BC is 3.5 or 3.6 cm.

Practice questions

Use a ruler and a protractor to make an accurate drawing of each of the following triangles. Measure and label the third angle.

26°

6.3 cm

103°

В

В

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52

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3

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Use a ruler and a protractor to make an accurate drawing of each of the following triangles. Measure and label the other angles on your drawing.

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Construct each of the following triangles accurately on squared paper. Remember to label all of the lines and angles. Measure the lines shown.



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4.4 Calculating angles

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I can

- work out angles of a triangle
- work out angles round a point

Example

Work out the sizes of angles *a* and *b*.

Solution

115 and *a* are angles on a straight line. They add up to 180°.

 $a = 180^{\circ} - 115^{\circ} = 65^{\circ}$

The three angles of a triangle add up to 180°.

$$41 + 65 + b = 180$$

106 + b = 180

b = 180 - 106 = 74

Practice questions



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Find the missing angles.



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 b°

a° 115°

41°



Find the missing angles.



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Find the missing angles.



96° d

0

d = _



е

72°

0





e = ____



Find the missing angles.



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Find the size of the angle marked by a letter in each triangle.





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Find the size of the unknown angles in each isosceles triangle.



100° 40° b 0 *b* = _ c =

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4.5 Area and perimeter

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I can

- use the formula for the area of a rectangle
- distinguish between area and perimeter

Example

This is the plan of the floor of a room.



- **a** Work out the area of the floor.
- **b** Work out the perimeter of the floor.

Solution

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a There are two rectangles.

The area of the top rectangle is $3 \times 11 = 33$ m².

The area of the bottom rectangle is $4 \times 5 = 20 \text{ m}^2$.

The total area is $33 + 20 = 53 \text{ m}^2$.

The sides are in metres (m) so the area is in square metres (m²).

b There are two missing lengths.

The right-hand side is 3 + 4 = 7 m.

The other missing length is 11 - 5 = 6 m.

The perimeter is the total length round the edge of the room.

The perimeter is 11 + 7 + 5 + 4 + 6 + 3 = 36 m.

The sides are in metres so the perimeter is in metres.

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Practice questions



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The table shows the length and width of five rectangles.

Work out the area of each rectangle.

Length	Width	Area
7 cm	11 cm	
4 m	15 m	
10 cm	25 cm	
13 km	4 km	
12 cm	32 cm	

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Comments, next steps, misconceptions	