Unit I5: Geometry – angles and 2D shapes

Lesson I: Identifying angles

➜ pages 93–95

1. a) Ticked: 3rd and 5th angle
b) Ticked: 4th and 5th angles
c) Ticked: 2nd angle

2. Size and orientation of angles will vary but must be a right angle, an acute angle and an obtuse angle.

3. The trapezium (top right corner) is in the wrong place since it has 2 acute angles and 2 obtuse angles so belongs in the top left cell in the diagram.

4. Angles a) and d). Angle a) is a right angle and so will fit exactly. Angle d) is acute and so will also fit.

5. Tree or pond.

Reflect

Descriptions may vary; for example:

An acute angle is an angle that is less than a right angle (or quarter turn).
An obtuse angle is an angle greater than a right angle (or quarter turn) but less than a straight line (or half turn).
A right angle is a quarter turn or 90°.

Lesson 2: Comparing and ordering angles

➜ pages 96–98

1. a) d b c a
b) b c a d
c) d b c a

2 a) A B D C E
b) The more sides a regular shape has, the bigger the interior angles.

3. Answers will vary, but ensure that angles are in ascending order and ideally include an acute angle, a right angle and an obtuse angle.

4. Sometimes true; if the angles are less than 45°, then adding them together will be less than 90° and will thus make an acute angle. However, combining 2 acute angles which are both more than 45° will make an obtuse angle.

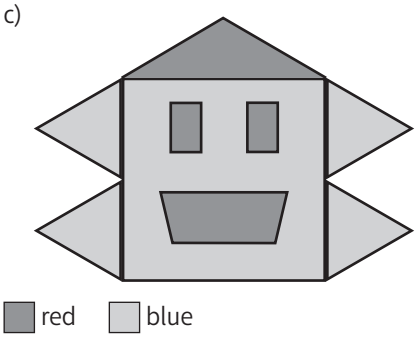
Reflect

Acute angles are smaller than a right angle (a quarter turn) and obtuse angles are greater than a right angles (a quarter turn) but smaller than a straight line (half turn).

Lesson 3: Identifying regular and irregular shapes

➜ pages 99–101

1. a) Circled: square and equilateral triangle
b) Circled: all shapes except the equilateral triangle
c)



2. Children should have drawn two different squares.

3. Children should have drawn one regular and one irregular hexagon.

4. A

5. Different solutions are possible:
Shape on top left can be joined to the shape at top right; the trapezium in the middle of the bottom row can be joined to another copy of itself to make a hexagon. Also, 6 equilateral triangles (in the middle of the top row) can be joined together to make a hexagon.

Reflect

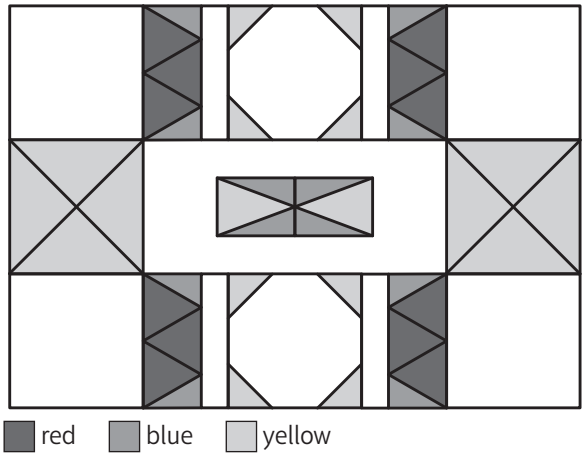
A regular shape has sides which are all the same length and angles which are all the same size.

Lesson 4: Classifying triangles

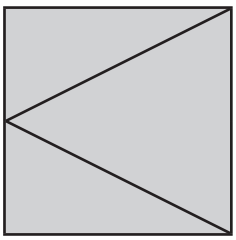
➜ pages 102–104

1. a) Circled: 1st and 3rd triangles
b) Circled: 2nd triangle
c) Circled: 1st and 4th triangles

2.



3.



4.

	2 or 3 equal sides	No equal sides
2 or 3 equal angles	A, C	
No equal angles		B, D

5. There are 25 isosceles triangles altogether.

Reflect

An equilateral triangle has sides of equal length and all angles of equal size (60°). An isosceles triangle has 2 sides the same length and 2 angles equal in size. A scalene triangle has all sides different lengths and all angles different sizes. A right-angled triangle has 1 angle which is a right angle (90°). Right-angled triangles can be isosceles or scalene.

Lesson 5: Classifying and comparing quadrilaterals

➜ pages 105–107

1. a) Circled: rectangle (top left), rhombus (top right), square (bottom left), trapezium (bottom right)
b) Circled: both squares (bottom left, bottom right)
c) Circled: all shapes except the square

2. Answers will vary but must include 2 squares and 4 non-square quadrilaterals (orientation will vary).

3. Shapes matched:
Trapezium ➜ bottom shape
Rhombus ➜ 3rd shape from top (a square is a special sort of rhombus)
Parallelogram ➜ top shape and 3rd shape from top (a square is a special sort of parallelogram)
Rectangle ➜ 2nd shape from top and 3rd shape from top (a square is a special sort of rectangle)

4. Check children have drawn four different parallelograms.

Reflect

A rhombus has 4 equal sides but can have different sized angles. A square is a type of rhombus but with angles of equal size (right angles or 90°).

Lesson 6: Deducing facts about shapes

➜ pages 108–110

1. a) Circled: rectangle (3rd shape), triangle (4th shape)
b) Circled: parallelogram (2nd shape), rectangle (3rd shape), trapezium (4th shape)
c) Circled: parallelogram (1st shape), right-angled triangle (2nd shape), right-angled triangle (5th shape)
d) Circled: trapezium (3rd shape), triangle (4th shape), parallelogram (5th shape)

2. Different answers are possible including irregular pentagons, irregular octagons, irregular dodecagons (12-sides).

3. It could be an equilateral triangle (all angles 60°) or a scalene triangle.

4. It could be a parallelogram, a rhombus, a trapezium, a kite, an arrow-head or a quadrilateral with all sides and angles different. It cannot be a square or a rectangle since these shapes only have right angles.

5. Headings in top row left to right:
Quadrilateral Not quadrilateral
Headings in left-hand column top to bottom:
Angles not all equal Angles all equal

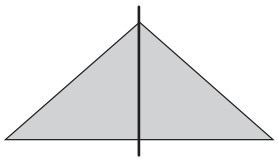
Reflect

Answers will vary. Children should recognise that they need to consider the properties of its sides, i.e. how many sides and whether they are equal in length and parallel. They should also consider the properties of its angles, i.e. whether they are equal in size, acute/obtuse or right angles.

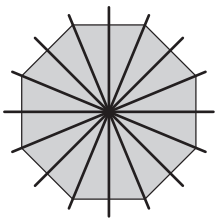
Lesson 7: Lines of symmetry inside a shape

➜ pages 111–113

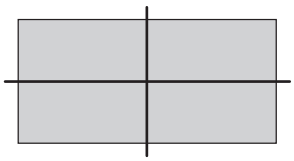
1. a)



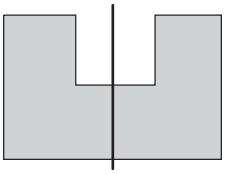
c)



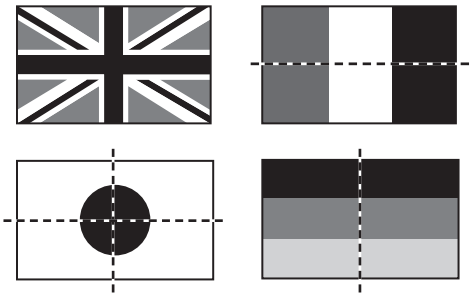
b)



d)



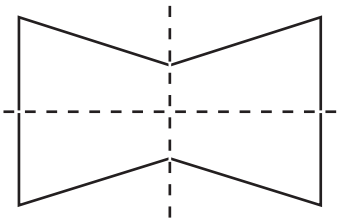
2. (No line of symmetry)



3. Shapes drawn into table:

	Regular	Irregular
4 or more lines of symmetry	Square Regular hexagon Regular octagon	
Fewer than 4 lines of symmetry	Equilateral triangle	Parallelogram Rectangle

4. Answers will vary; for example:



5. Answers will vary; for example:
a) Isosceles trapezium
b) Rhombus
c) Equilateral triangle

Reflect

Answers may vary but should include that there are infinite lines of symmetry; for example:

If you fold a circle along any line which goes through its centre, the 2 halves match exactly. There are an infinite number of such lines so a circle has infinite lines of symmetry.

Lesson 8: Lines of symmetry outside a shape

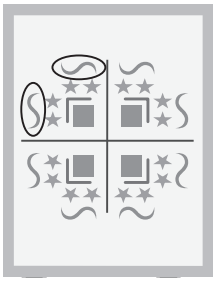
→ pages 114–116

1. Table completed to show:
a) Symmetric
b) Not symmetric
c) Symmetric

2. 2 lines of symmetry drawn: horizontal and vertical lines through centre of pattern

3. 4 lines of symmetry drawn: horizontal, vertical and diagonal lines of symmetry through the centre of pattern

4. 'S' shapes in top left corner of the pattern are the wrong way around.



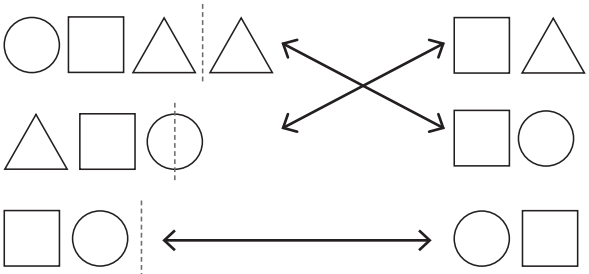
Reflect

Answers will vary; check that patterns are symmetrical.

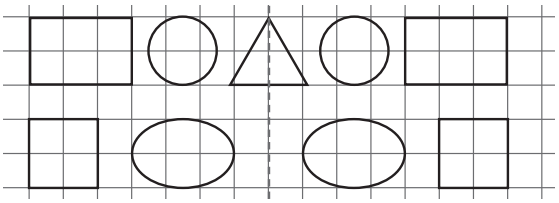
Lesson 9: Completing a symmetric figure

→ pages 117–119

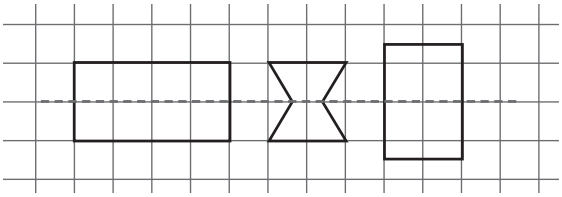
1.



2. a)



b)



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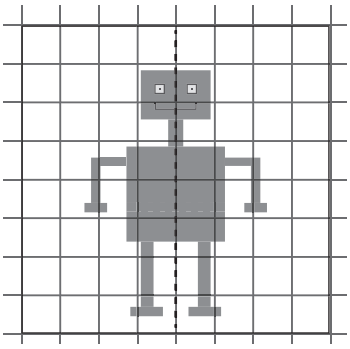

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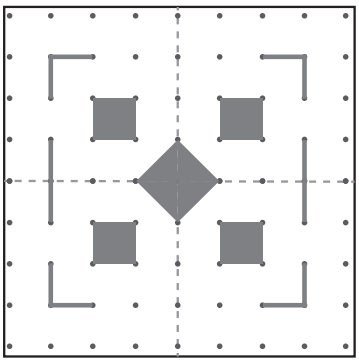
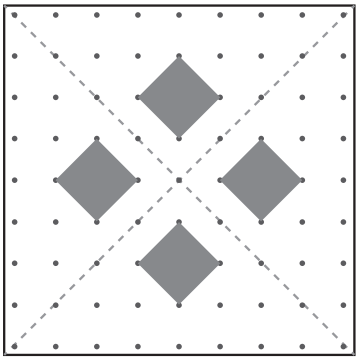
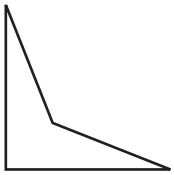


5.



6. Answers will be a kite (or arrow-head); for example:



7. Answers will vary. Check children's pattern is symmetrical in both diagonal lines of symmetry.

Reflect

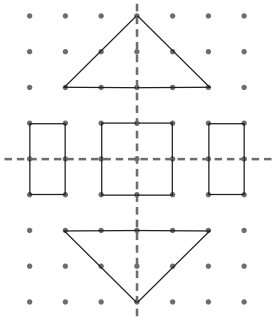
Answers will vary; ensure that pattern has 2 lines of symmetry.

Lesson I0: Completing a symmetric shape

→ pages 120–122

1. Check shapes are completed accurately to form:
a) Rectangle
b) Hexagon
c) Octagon
d) Triangle (isosceles)

2. 2 triangles (isosceles), 1 square and 2 (non-square) rectangles.



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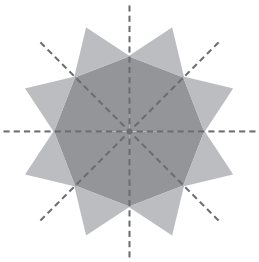
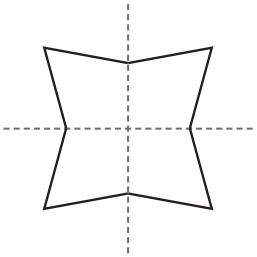


4. Answers will vary; for example:



5. No; it is correct that you cannot have a shape with exactly 2 lines of symmetry and an odd number of sides. Look for children drawing different shapes with an odd number of sides and finding the lines of symmetry.

Reflect

Answers will vary; for example:

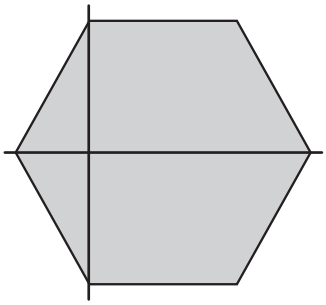
When completing a symmetric shape, it is important to use a mirror to check the shape; count the number of sides on one side of the line.

End of unit check

→ pages 123–125

My journal

1.



2. The angles of a triangle add up to 180°. An obtuse angle is more than 90°. If 2 of the angles in the triangle were obtuse then they would make more than 90° + 90° = 180, which is not possible. Any diagrams should show this.

Power puzzle

Answers will vary. Look for children using the minimum number of folds to make the shapes.