# Worksheet - Angles, shapes and symmetry

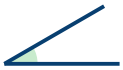
Year: Year 4 · 20

Show your working.

## Question 1

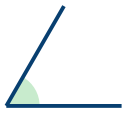
**Question 1 – Types of angle** *(Section A · Practice)*

Look at each angle. Write whether it is acute, a right angle or obtuse.

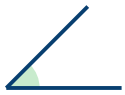
a. 

b. 

c. 

d. 

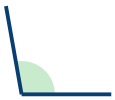
e. 

f. 

## Question 2

**Question 2 – Ordering angles** *(Section A · Practice)*

The angles below are labelled A, B and C. Put them in order, smallest first.

a. A: 

b. B: 

c. C: 

d. Which of them is acute, which is a right angle and which is obtuse?

## Question 3

**Question 3 – Naming polygons** *(Section A · Practice)*

Copy and complete the table by writing the name of each polygon, or the number of sides.

| Shape | Number of sides | Name |
|---|---|---|
| Triangle | ? | triangle |
| ? | 4 | quadrilateral |
| Pentagon | ? | ? |
| ? | 6 | hexagon |
| ? | 8 | octagon |

## Question 4

**Question 4 – Classifying triangles** *(Section A · Practice)*

Name each triangle: equilateral, isosceles or scalene.

a. Sides 5 cm, 5 cm, 5 cm
b. Sides 4 cm, 4 cm, 7 cm
c. Sides 3 cm, 5 cm, 6 cm
d. Sides 8 cm, 6 cm, 8 cm
e. A triangle with sides 3 cm, 4 cm and a right angle.

## Question 5

**Question 5 – Quadrilaterals** *(Section A · Practice)*

Which quadrilateral am I?

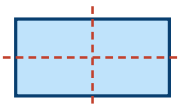
a. I have 4 equal sides and 4 right angles.
b. I have 2 pairs of equal sides and 4 right angles, but my sides are not all equal.

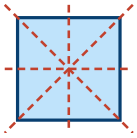
c. I have only 1 pair of parallel sides.
d. I have 4 equal sides but no right angles.

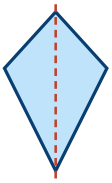
## Question 6

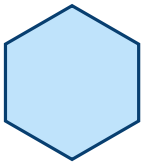
**Question 6 – Lines of symmetry** *(Section A · Practice)*

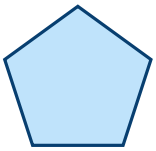
Write the number of lines of symmetry in each shape.

a. A rectangle that is not a square: 

b. A square: 

c. A kite: 

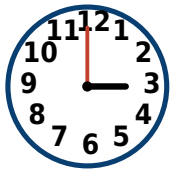
d. A regular hexagon: 

e. A regular pentagon: 

## Question 7

**Question 7 – The clock face** *(Section B · Real-life practice)*

Look at the clock. The angle between two neighbouring numbers is 30°. Dev says the hands of a clock make different angles at different times.




a. At 3 o'clock, what is the angle between the hands? What type is it?
b. At 1 o'clock, what is the angle? What type is it?
c. At 4 o'clock, what is the angle? What type is it?
d. At 6 o'clock, what is the angle? What is special about it?

## Question 8

**Question 8 – Turning round** *(Section B · Real-life practice)*

Maya faces north. She turns clockwise through different angles. A quarter turn is 90°, a half turn is 180° and three-quarters is 270°.

a. She makes a quarter turn clockwise. Which way does she face?
b. She starts facing north and makes a half turn. Which way does she face?
c. Starting from north, she turns 270° clockwise. Which way does she face?
d. Maya makes a full turn. How many degrees is that? Which way does she face at the end?

## Question 9

**Question 9 – Road signs** *(Section B · Real-life practice)*

Many road signs are polygons. A stop sign is an octagon. A give-way sign is a triangle. A speed limit sign is a circle, and a no-entry sign is also a circle.

a. How many sides does a stop sign have?
b. How many sides does a give-way sign have? What type of triangle is it if all its sides are equal?
c. A warning sign is a diamond shape, which is a square turned on its corner. How many lines of symmetry has it?
d. Roadworks signs are triangles with a point at the top. How many lines of symmetry does an equilateral triangle have?

## Question 10

**Question 10 – Making a pattern** *(Section B · Real-life practice)*

Ella makes a tile pattern with regular hexagons, squares and equilateral triangles. All the shapes have sides of the same length.

a. How many sides does each hexagon have? How many sides do 3 hexagons have altogether?
b. Ella uses 6 squares. How many corners do the squares have altogether?
c. Ella uses 8 triangles. How many sides do they have altogether?
d. Which shape in her pattern has the most lines of symmetry? How many?

## Question 11

**Question 11 – Inside the house** *(Section B · Real-life practice)*

Look at the roof of a house and at the objects inside it.



a. The roof is an isosceles triangle. How many equal sides does it have?
b. The front door is a rectangle. How many right angles does it have?
c. The window is a square. How many lines of symmetry does it have?
d. A kite hangs on the wall. How many lines of symmetry does it have?

## Question 12

**Question 12 – Letters and symmetry** *(Section B · Real-life practice)*

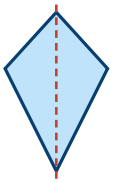
The children make name cards with capital letters. They use the letters A, H, M, S, T and F in a plain, square style,.

a. Which letters have a vertical line of symmetry (a line that goes down the middle)?
b. Which letter has both a vertical and a horizontal line of symmetry?
c. Which letters have no line of symmetry at all?
d. The word MAT is written with these letters side by side. Does the whole word have a vertical line of symmetry? Explain.

## Question 13

**Question 13 – Making a kite** *(Section B · Real-life practice)*

Hassan is making a kite from two sticks and some coloured paper. The kite is shaped like the shape in the picture.



a. How many sides does the kite have?
b. The kite has 2 short sides of 30 cm and 2 long sides of 50 cm. What is its perimeter?
c. How many lines of symmetry does the kite have?
d. He ties a ribbon along the edge of the whole kite. Ribbon costs 20p per 10 cm. What does the ribbon cost?

## Question 14

**Question 14 – Triangle puzzle** *(Section B · Real-life practice)*

Aisha has these triangle sides in centimetres: Triangle P 6, 6, 6. Triangle Q 5, 7, 7. Triangle R 4, 6, 9. Triangle S 8, 8, 5.

a. Which triangles are isosceles?
b. Which triangle is equilateral?
c. Which triangle is scalene?
d. What is the perimeter of triangle Q? Which triangle has the longest perimeter?

## Question 15

**Question 15 – Shape sorting** *(Section C · Problem solving)*

Zara sorts shapes into a table. The shapes are: square, rectangle, equilateral triangle, regular hexagon, kite and right-angled triangle.

| Shape | Number of sides | Number of right angles | Lines of symmetry |
|---|---|---|---|
| Square | ? | ? | ? |
| Rectangle | ? | ? | ? |
| Equilateral triangle | ? | ? | ? |
| Regular hexagon | ? | ? | ? |
| Kite | ? | ? | ? |

a. Complete the table.
b. Which shape has the most lines of symmetry?
c. Which shapes have no right angles?
d. Which two shapes have the same number of lines of symmetry as sides? Explain.

## Question 16

**Question 16 – Designing a logo** *(Section C · Problem solving)*

The school wants a new logo in the shape of a regular octagon, with a square in the middle. Zara draws it on squared paper. The octagon has sides of 4 cm.

a. What is the perimeter of the octagon?
b. The square in the middle has sides of 3 cm. What is its perimeter?
c. How many lines of symmetry does the octagon have? How many does the square have?
d. The designer wants the logo to have as many lines of symmetry as possible. What is the greatest number of lines the whole logo can have if the square is placed in the middle with its sides parallel to the octagon’s sides?
e. Zara makes 10 logos. What is the total length of the sides of the octagons (not the squares)?

## Question 17

**Question 17 – The playground design** *(Section C · Problem solving)*

The school wants to mark shapes on the playground floor. Each shape is drawn using lines 1 m long. The table shows the shapes the children choose.

| Shape | Number | Sides of 1 m each |
|---|---|---|
| Square | 6 | 4 |
| Equilateral triangle | 8 | 3 |

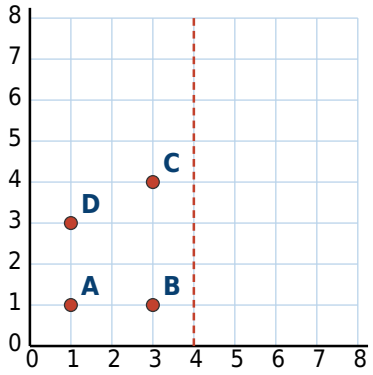
| Shape | Number | Sides of 1 m each |
|---|---|---|
| Regular hexagon | 5 | 6 |
| Regular pentagon | 4 | 5 |

a. How many metres of line are needed for the squares?
b. How many metres for the triangles?
c. How many metres for the hexagons and pentagons together?
d. What is the total length of line for all the shapes?
e. Paint for each 10 m of line costs £2. What is the total cost, rounding up to the next 10 m?

## Question 18

**Question 18 – Symmetry on a grid** *(Section C · Problem solving)*

A shape is drawn on a coordinate grid. A mirror line is drawn at x = 4. The corners of the shape are A (1, 1), B (3, 1), C (3, 4) and D (1, 3). You will draw the reflection of the shape on the other side of the mirror line.




a. How far is A from the mirror line? Write the coordinates of its reflection A′.
b. Write the coordinates of the reflections B′, C′ and D′.
c. How far apart are A and A′? How far apart are B and B′?
d. The reflected shape has the same area as the original. The original is made of a square 2 by 2 and a part that goes up. Explain why reflecting does not change the size of a shape.

## Question 19

**Question 19 – Angles in a pizza** *(Section C · Problem solving)*

A round pizza is cut from the centre into equal slices. A full turn is 360°.

a. The pizza is cut into 4 equal slices. What is the angle of each slice at the centre? What type of angle is it?
b. It is cut into 8 equal slices. What is the angle of each slice? What type?
c. It is cut into 6 equal slices. What is the angle of each slice?
d. Mia eats 3 of the 8 slices. Through what angle at the centre is her part?

e. Which is bigger, 2 slices from the 8-slice pizza or 1 slice from the 4-slice pizza? Explain.

## Question 20

**Question 20 – Challenge: counting shapes** *(Section D · Challenge)*

Look at a square that has both of its diagonals drawn. The two diagonals cross in the middle and make four small triangles.

a. How many small triangles are there?
b. How many triangles are there altogether, counting the larger triangles made from two small triangles?
c. How many lines of symmetry does the square have? Do the diagonals count?
d. A regular polygon with n sides has n lines of symmetry. How many lines does a regular decagon (10 sides) have? How many angles does it have?