Worksheet - Properties of 2D and 3D shapes

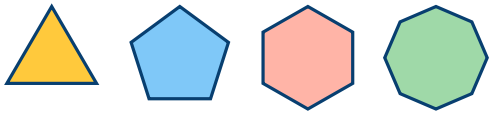
Year: Year 2 · 20

Show your working.

Question 1

Question 1 – Name the 2D shapes *(Section A · Practice)*

Write the name, the number of sides and the number of vertices for each shape.



Question 2

Question 2 – Name the 3D shapes *(Section A · Practice)*

Write the name of each 3D shape.

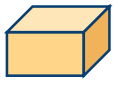
a. 

b. 

c. 

d. 

e. 

f. 

Question 3

Question 3 – Faces, edges and vertices *(Section A · Practice)*

Complete the table for these 3D shapes.

Shape	Faces	Edges	Vertices
Cube	__	__	__
Cuboid	__	__	__
Square-based pyramid	__	__	__

Question 4

Question 4 – Sort the shapes *(Section A · Practice)*

Sort these 2D shapes: circle, triangle, square, rectangle, pentagon, hexagon. Write each one in the right group.

a. Shapes with straight sides only
b. Shapes with a curved side
c. Shapes with more than 4 sides
d. Shapes with exactly 4 sides

Question 5

Question 5 – Lines of symmetry *(Section A · Practice)*

Say how many lines of symmetry each shape has. Draw the lines on a copy of the shape.

a. Square
b. Rectangle (not a square)
c. Equilateral triangle (3 equal sides)
d. The letter A
e. A circle

Question 6

Question 6 – Shape riddles *(Section A · Practice)*

Read each riddle and say which shape it is.

a. I am a 2D shape with 3 sides and 3 vertices.
b. I am a 3D shape with 6 square faces.
c. I am a 3D shape. I have 1 curved face and no edges or vertices.
d. I am a 2D shape with 6 sides.

Question 7

Question 7 – The toy box *(Section B · Real-life practice)*

Zara tidies her toy box. She finds a ball, a dice, a tin drum, a party hat and a toy pyramid. She wants to put them into groups using the names of 3D shapes. The toy

pyramid has a square base.

a. Name the 3D shape of each toy.
b. Which toys can roll?
c. Which toys can be stacked easily on top of each other?
d. Which toy has 5 vertices?

Question 8

Question 8 – Road signs *(Section B · Real-life practice)*

On the way to school, Amir looks at the road signs. The warning sign is a triangle. The stop sign is an octagon. A speed limit sign is a circle. The sign for a school crossing is a square. He wants to describe each sign.

Sign	Shape
Warning	Triangle
Stop	Octagon
Speed limit	Circle
School crossing	Square

a. How many sides does the stop sign have?
b. Which sign has no straight sides?
c. How many vertices do the warning sign and school crossing sign have altogether?
d. Which sign has the most lines of symmetry? Explain.

Question 9

Question 9 – Baking tins *(Section B · Real-life practice)*

Mum has four baking tins. One is a circle, one is a rectangle, one is a square and one is a triangle. She makes a cake in each. She cuts the square cake along a line of symmetry into two halves.

a. How many sides has each tin got?
b. Mum cuts the square cake in half along a line of symmetry. What shape could each half be?
c. Mum cuts the rectangle cake in half. Is there a way to cut it into two halves that are the same shape and size? Explain.
d. How many different cuts along a line of symmetry could Mum make for the square cake?

Question 10

Question 10 – The playground design *(Section B · Real-life practice)*

The school is designing a new playground. The architect has drawn plans that use

shapes. The sandpit is a hexagon, the climbing wall is a rectangle and the seating area is a pentagon. A small tree is planted in the middle of a circle of flowers.

a. How many sides do the sandpit and the seating area have in total?
b. How many vertices does the rectangle have?
c. The architect says that the sandpit has 6 sides and 6 vertices. Is that correct?
d. Which shape in the plan has no vertices?

Question 11

Question 11 – Packing boxes *(Section B · Real-life practice)*

Dev works in a toy factory. He packs toys into boxes. One box is a cube with edges that are all 10 cm long. Another box is a cuboid. A cube has 12 edges. Dev wants to stick a ribbon along every edge of a cube box for a gift.

a. How many faces, edges and vertices does the cube box have?
b. How many edges are there on the top face and the bottom face together?
c. How many edges go up from the bottom to the top?
d. What is the total length of ribbon needed for all the edges?

Question 12

Question 12 – Pizza shapes *(Section B · Real-life practice)*

At the pizza restaurant, Ben orders a round pizza and a rectangular pizza. The waiter cuts the round pizza into 8 equal slices. The slices are triangles with one curved side. The rectangular pizza is cut into 6 equal pieces.

a. How many slices does the round pizza have?
b. What shape is the rectangular pizza?
c. The rectangular pizza is cut along its lines of symmetry. How many pieces can you get with those 2 cuts?
d. Is it possible to cut a circle into 4 equal pieces using lines of symmetry? Explain.

Question 13

Question 13 – Beach day *(Section B · Real-life practice)*

On the beach, Isla builds a sandcastle using buckets. One bucket is a cylinder and one bucket is a cone shape. She makes a tower from the cylinder and a roof from the cone. She puts a flag on the top and a ball next to the castle.

a. Name the 3D shapes of the tower, roof and the ball.
b. How many flat faces does the tower have?
c. The roof has 1 flat face and 1 curved face. How many vertices does it have?
d. Which of the three shapes can roll across the sand?

Question 14

Question 14 – Tiling the bathroom *(Section B · Real-life practice)*

Dad is tiling the bathroom wall. He uses square tiles and triangular tiles. Each square tile can be cut along a diagonal into 2 triangles. He uses 20 square tiles on the wall and cuts 6 of them into triangles.

a. How many square tiles are not cut?
b. How many triangular tiles does Dad make from the 6 square tiles?
c. How many vertices does each triangular tile have?
d. How many vertices are there on all the uncut square tiles together?

Question 15

Question 15 – The shape museum *(Section C · Problem solving)*

A museum has a display of 3D shapes made of wood. The display has 4 cubes, 3 cuboids, 2 cylinders and 1 sphere. The museum guide asks the children to count the faces, edges and vertices.

Shape	Number	Faces each	Edges each	Vertices each
Cube	4	6	12	8
Cuboid	3	6	12	8
Cylinder	2	3	2	0
Sphere	1	1	0	0

a. How many shapes are in the display?
b. How many faces do the cubes have altogether?
c. How many vertices do the cubes and cuboids have altogether?
d. How many curved faces do the cylinders and sphere have altogether?
e. The guide says the shapes have 100 faces in total. Is she right? Work it out.

Question 16

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

Aisha is making kites from paper. A kite has a diamond shape with 4 sides. She cuts the paper into 4 triangles for the tail. She decorates each kite with 2 lines of symmetry drawn in ribbon. She wants to make 5 kites for the school fair.

a. How many sides do 5 diamond-shaped kites have in total?
b. How many triangles does she need for the tails of all 5 kites if each kite needs 4 triangles?
c. How many lines of symmetry are drawn in ribbon on all 5 kites?
d. Each triangle has 3 vertices. How many vertices are there on all the triangles?
e. The school fair has a rule: kites must have 10 or more lines of symmetry in total. Does she follow the rule?

Question 17

Question 17 – Mystery shape clues *(Section C · Problem solving)*

Otto has four mystery shapes hidden in a bag. He gives the children clues. The children have to guess each shape from the clues. All of the shapes are in the list: cube, cylinder, cone, sphere, square-based pyramid, cuboid.

a. Shape A has 6 faces, 12 edges and 8 vertices, and all the faces are squares. What is it?
b. Shape B has 5 faces and 8 edges. What is it?
c. Shape C has 2 flat faces and 1 curved face. What is it?
d. Shape D has 6 faces, but they are rectangles and not all squares. What is it?
e. Which shape in the list has only one face? Explain.

Question 18

Question 18 – Symmetry in the art room *(Section C · Problem solving)*

In the art room the children fold paper and cut out shapes. The teacher gives each table a different shape. The children fold the shapes to find lines of symmetry. Table 1 has a square, table 2 has a rectangle, table 3 has an equilateral triangle and table 4 has a regular hexagon with 6 lines of symmetry.

Table	Shape	Lines of symmetry
1	Square	4
2	Rectangle	2
3	Equilateral triangle	3
4	Regular hexagon	6

a. Which table has the most lines of symmetry?
b. How many lines of symmetry are there on tables 1 and 2 together?
c. Which two tables have a total of 9 lines of symmetry?
d. How many more lines of symmetry does the hexagon have than the triangle?
e. A child says, "A rectangle has 4 lines of symmetry, like a square." Is the child right? Explain.

Question 19

Question 19 – Building with solids *(Section C · Problem solving)*

Hana builds a model house from solids. The house uses 1 cube for the walls, 1 square-based pyramid for the roof and 2 cylinders for the chimneys. She puts them on a flat board. She then counts the faces and vertices of her shapes.

a. How many faces does the cube have?
b. How many faces does the pyramid have?
c. How many flat faces do the 2 cylinders have altogether?

d. How many vertices do the cube and the pyramid have altogether?

Question 20

Question 20 – Challenge: shape detective *(Section D · Challenge)*

Otto has set you some shape puzzles. Give reasons for your answers.

a. I have 4 sides. All my sides are equal and I have 4 lines of symmetry. What am I? Draw me.
b. How many triangles can you find in a square when you draw both diagonals? Count carefully.
c. A 3D shape has 8 vertices and 12 edges. What is it?
d. Sam says, "A cylinder has 2 more faces than a sphere." Is he right? Explain.