Answers - Properties of 2D and 3D shapes

Year: Year 2

Answer to Question 1

a. Count the straight sides: 3. A shape with 3 sides is a **triangle**. Each pair of sides meets at a vertex, so it has **3 vertices**.
b. Count the sides: 5. A 5-sided shape is a **pentagon**, with **5 vertices**.
c. Count the sides: 6. A 6-sided shape is a **hexagon**, with **6 vertices**. Honeycomb cells have this shape.
d. Count the sides: 8. An 8-sided shape is an **octagon**, with **8 vertices**. In any of these shapes the number of vertices equals the number of sides.

Answer to Question 2

a. Six square faces that are all the same size: a **cube**.
b. Two flat circle faces joined by one curved face: a **cylinder**.
c. One curved face all the way round, with no edges and no vertices: a **sphere**.
d. One flat circle face and one curved face that goes up to a point: a **cone**.
e. A square base and 4 triangle faces meeting at the top: a **square-based pyramid**.
f. Six rectangle faces, like a cereal box: a **cuboid**.

Answer to Question 3

Shape	Faces	Edges	Vertices
Cube	6	12	8
Cuboid	6	12	8
Square-based pyramid	5	8	5

Check for the cube: 4 edges on the top, 4 on the bottom and 4 going up: 4 + 4 + 4 = 12.

Answer to Question 4

a. Every shape except the circle is made only of straight lines: **triangle, square, rectangle, pentagon, hexagon**.
b. Only the **circle** has a curved side; it has no straight sides at all.
c. More than 4 sides means 5 or more. The **pentagon** has 5 and the **hexagon** has 6.
d. Exactly 4 sides: the **square** and the **rectangle**. The triangle has 3, so it does not

belong here.

Answer to Question 5

a. A square has **4** lines of symmetry.
b. A rectangle has **2** lines of symmetry.
c. An equilateral triangle has **3** lines of symmetry.
d. The letter A has **1** line of symmetry (down the middle).
e. A circle has **lots** (infinite) lines of symmetry.

Answer to Question 6

a. A flat shape with 3 sides and 3 vertices is a **triangle**.
b. A solid with 6 faces that are all squares is a **cube**. A cuboid can have rectangle faces, so it does not fit.
c. A solid with 1 curved face and no edges or vertices is a **sphere**. A cone has a vertex, so it is not a cone.
d. A flat shape with 6 sides is a **hexagon** (hex means six).

Answer to Question 7

a. Ball: sphere. Dice: cube. Tin drum: cylinder. Party hat: cone. Toy pyramid: square-based pyramid.
b. The sphere, cylinder and cone can roll (they have curved surfaces).
c. The cube, the cylinder (on its flat end) and the pyramid (base down) have flat faces: the **cube and cylinder** stack best.
d. The **square-based pyramid** has 5 vertices.

Answer to Question 8

a. An octagon has **8 sides**.
b. The speed limit sign, which is a **circle**.
c. Triangle 3 + square 4 = **7 vertices**.
d. The circle has lots of lines of symmetry, so the **speed limit sign** has the most.

Answer to Question 9

a. Circle: 1 curved side. Rectangle: 4. Square: 4. Triangle: 3.
b. Cutting a square from top to bottom makes two **rectangles**. Cutting it from corner to corner makes two **triangles**.
c. Yes, cut down the middle (top to bottom or left to right) along a line of symmetry.

A rectangle has **2** such lines.

d. A square has **4** lines of symmetry, so Mum can make 4 different cuts.

Answer to Question 10

a. Hexagon 6 + pentagon 5 = **11 sides**.
b. A rectangle has **4 vertices**.
c. A hexagon has 6 sides and 6 vertices, so **yes**, it is correct.
d. The **circle** has no vertices.

Answer to Question 11

a. A cube has **6 faces, 12 edges and 8 vertices**.
b. Each face of a cube has 4 edges: 4 + 4 = **8 edges**.
c. There are **4 edges** going up. 8 + 4 = 12 edges in all.
d. 12 × 10 = **120 cm** of ribbon.

Answer to Question 12

a. **8 slices**.
b. A **rectangle**.
c. Cut once from top to bottom and once from left to right to get **4 equal pieces**.
d. Yes. Two cuts along lines of symmetry that cross in the middle make **4 equal pieces**.

Answer to Question 13

a. Tower: cylinder. Roof: cone. Ball: sphere.
b. A cylinder has **2 flat faces** and 1 curved face.
c. A cone has **1 vertex**, which is the point at the top.
d. The **sphere**, the cylinder (on its side) and the cone (on its side) can all roll.

Answer to Question 14

a. 20 − 6 = **14 square tiles**.
b. 6 × 2 = **12 triangular tiles**.
c. A triangle has **3 vertices**.
d. 14 × 4 = **56 vertices**.

Answer to Question 15

a. 4 + 3 + 2 + 1 = **10 shapes**.
b. 4 × 6 = **24 faces**.
c. Cubes 4 × 8 = 32 and cuboids 3 × 8 = 24. 32 + 24 = **56 vertices**.
d. Each cylinder has 1 curved face and the sphere has 1: 2 × 1 + 1 = **3 curved faces**.
e. Faces: 4 × 6 + 3 × 6 + 2 × 3 + 1 × 1 = 24 + 18 + 6 + 1 = 49. 49 is not 100, so she is **not right**.

Answer to Question 16

a. 5 × 4 = **20 sides**.
b. 5 × 4 = **20 triangles**.
c. 5 × 2 = **10 lines of symmetry**.
d. 20 × 3 = **60 vertices**.
e. She has 10 lines in total, which is 10 or more. **Yes**, she follows the rule.

Answer to Question 17

a. **Cube**.
b. **Square-based pyramid** (5 faces: 1 square and 4 triangles; 8 edges).
c. **Cylinder**.
d. **Cuboid**.
e. The **sphere**, because it has just 1 curved surface and no edges or vertices.

Answer to Question 18

a. Table 4, the hexagon, with **6**.
b. 4 + 2 = **6 lines**.
c. Table 3 (3) and table 4 (6): 3 + 6 = **9**.
d. 6 − 3 = **3 more**.
e. A rectangle that is not a square has only **2** lines of symmetry (across the middle). The diagonal does not work. The child is **not right**.

Answer to Question 19

a. A cube has a top, a bottom and 4 side faces: 1 + 1 + 4 = **6** faces.
b. The pyramid has a square base and 4 triangle faces: 1 + 4 = **5** faces.
c. Each cylinder has 2 flat circle faces (top and bottom). 2 cylinders have 2 + 2 = **4** flat faces.

d. A cube has 8 vertices (4 at the top, 4 at the bottom). The pyramid has 4 at the base and 1 at the top, which is 5. Together: 8 + 5 = **13** vertices.

Answer to Question 20

a. A **square**.
b. The diagonals make **4 small triangles**. There are also 4 bigger triangles made of 2 small ones, so **8 triangles** in all.
c. A **cube** or a **cuboid**.
d. A cylinder has 3 faces and a sphere has 1. 3 − 1 = 2, so **yes**, Sam is right.