GCSE Maths: Properties of 3D solids (Foundation): answers

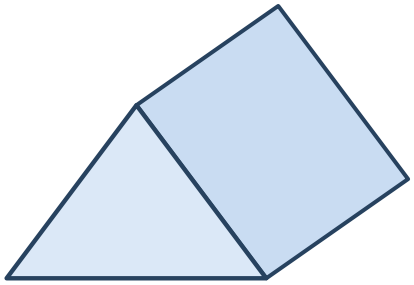
GCSE Maths - Volume, Surface Area and 3D Shapes - Foundation - Lesson 19.1

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at **websink.site/gcse/maths/ch19-volume-surface-area-3d/foundation/properties-of-3d-solids/**

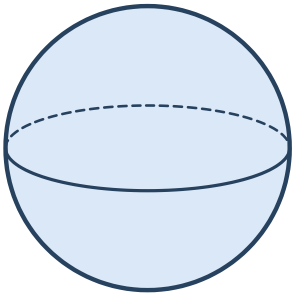
Exercise 19A Properties of 3D solids

Non-calculator

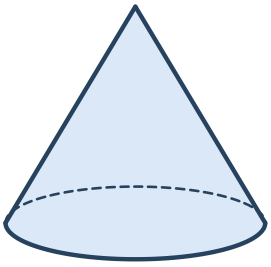
1 Write down the name of each solid.



A



B



C

D

(a) Solid A

Answer: triangular prism

(b) Solid B

Answer: sphere

(c) Solid C

Answer: cone

(d) Solid D

Answer: cuboid

2 Write down the number of faces, edges and vertices of each solid.

(a) a cube

Answer: 6 faces, 12 edges, 8 vertices

(b) a triangular prism

Answer: 5 faces, 9 edges, 6 vertices

(c) a square-based pyramid

Answer: 5 faces, 8 edges, 5 vertices

(d) a hexagonal prism

Answer: 8 faces, 18 edges, 12 vertices

3 **For each solid, write down the number of flat faces, curved surfaces, edges and vertices.**

(a) a cylinder

Answer: Flat faces 2, curved surfaces 1, edges 2, vertices 0

(b) a cone

Answer: Flat faces 1, curved surfaces 1, edges 1, vertices 1

(c) a sphere

Answer: Flat faces 0, curved surfaces 1, edges 0, vertices 0

4 **Name the solid described.**

(a) It has 6 square faces.

Answer: cube

(b) It has 2 triangular faces and 3 rectangular faces.

Answer: triangular prism

(c) It has 1 square face and 4 triangular faces.

Answer: square-based pyramid

(d) It has 1 flat circular face, 1 curved surface and 1 vertex.

Answer: cone

5 **A cuboid has 12 edges. Four edges are 5 cm long, four are 3 cm long and four are 2 cm long. Work out the total length of all 12 edges.**

Answer: 40 cm

6 **Work out the number of faces, edges and vertices of each solid.**

(a) a pentagonal prism

Answer: 7 faces, 15 edges, 10 vertices

(b) a pentagonal-based pyramid

Answer: 6 faces, 10 edges, 6 vertices

(c) a triangular-based pyramid (tetrahedron)

Answer: 4 faces, 6 edges, 4 vertices

7 **Samira makes a model of a square-based pyramid from straws. The straws for the base are each 8 cm long and the four straws that slope up to the top are each 9 cm long. Work out the total length of straw she uses.**

Answer: 68 cm

8 **Name the solid with each set of numbers.**

(a) 5 faces, 9 edges and 6 vertices

Answer: triangular prism

(b) 5 faces, 8 edges and 5 vertices

Answer: square-based pyramid

(c) 4 faces, 6 edges and 4 vertices

Answer: triangular-based pyramid (tetrahedron)

(d) 7 faces, 15 edges and 10 vertices

Answer: pentagonal prism

9 **Use Euler's formula, $V - E + F = 2$, to find the missing number for each solid.**

(a) Hexagonal prism: F = 8, E = 18. Find V.

Answer: 12

(b) Hexagonal prism: V = 12, F = 8. Find E.

Answer: 18

(c) Square-based pyramid: V = 5, E = 8. Find F.

Answer: 5

10 **A prism has 24 edges. (a) How many sides does the end face have? (b) How many faces does the prism have?**

(a) How many sides does each end have?

Answer: 8

(b) How many faces does the prism have?

Answer: 10

11 **A pyramid has 10 faces. How many edges and how many vertices does it have?**

Answer: 18 edges and 10 vertices

12 **Ali says, "A cone has 2 faces, 1 edge and 1 vertex." Is Ali correct? Explain.**

Answer: Yes, if the curved surface is counted as a face: 1 flat face + 1 curved surface, 1 edge, 1 vertex.

13 **Write "True" or "False" for each statement and give a reason.**

(a) A cube is a type of cuboid.

Answer: True

(b) A sphere has no edges and no vertices.

Answer: True

(c) Every prism has a rectangle as its cross-section.

Answer: False

(d) Every pyramid has an even number of faces.

Answer: False

14 **A solid has 6 vertices and 10 faces. (a) Use Euler's formula to work out its number of edges. (b) Could the solid be a prism? Give a reason.**

(a) Number of edges

Answer: 14

(b) Could it be a prism?

Answer: No

15 **Name the solid for each object.**

(a) A tin of beans

Answer: cylinder

(b) A football

Answer: sphere

(c) A dice

Answer: cube

(d) An ice-cream cone (the cone only)

Answer: cone

16 **Complete: a cube has ___ faces, ___ edges and ___ vertices.**

Answer: 6 faces, 12 edges, 8 vertices

17 **Which of these solids has a curved surface: cube, cylinder, triangular prism, sphere, square-based pyramid?**

Answer: cylinder and sphere

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