

Name _____

Date _____

8.4 3D shapes and nets — worksheet

Name 3D shapes, count their faces, edges and vertices, and recognise their nets. · 52 questions ·
Show your working.

Remember

- A **face** is a flat surface, an **edge** is where two faces meet, a **vertex** is a corner.
- A **net** is the flat shape that folds up into the solid — a box cut open and laid out.
- A **prism** has the same cross-section all the way along; a **pyramid** rises to a single apex.
- A prism on an n -sided shape has **$n + 2$ faces, $3n$ edges and $2n$ vertices**.
- A pyramid on an n -sided base has **$n + 1$ faces, $2n$ edges and $n + 1$ vertices**.
- **Euler's rule:** faces + vertices – edges = **2** for any solid with flat faces and no holes.
- Use Euler's rule as a check on every count you make.
- A cube has **eleven** different nets — there is rarely only one right answer.

A · Fluency — Count faces, edges and vertices.

- 1 How many **faces** does a cube have?

- 2 How many **edges** does a cube have?

- 3 How many **vertices** does a cube have?

- 4 How many **faces** does a cuboid have?

- 5 How many **edges** does a cuboid have?

- 6 How many **vertices** does a cuboid have?

- 7 How many **faces** does a triangular prism have?

- 8 How many **edges** does a triangular prism have?

- 9 How many **vertices** does a triangular prism have?

- 10 How many **faces** does a square-based pyramid have?

- 11 How many **edges** does a square-based pyramid have?

- 12 How many **vertices** does a square-based pyramid have?

- 13 How many **faces** does a tetrahedron have?

- 14 How many **edges** does a tetrahedron have?

- 15 How many **vertices** does a tetrahedron have?

- 16 How many **faces** does a pentagonal prism have?

- 17 How many **edges** does a pentagonal prism have?

- 18 How many **vertices** does a pentagonal prism have?

- 19 How many **faces** does a hexagonal prism have?

- 20 How many **edges** does a hexagonal prism have?

- 21 How many **vertices** does a hexagonal prism have?

- 22 How many **faces** does a triangular-based pyramid have?

- 23 How many **edges** does a triangular-based pyramid have?

- 24 How many **vertices** does a triangular-based pyramid have?

- 25 For a cube, work out faces + vertices – edges.

- 26 For a cuboid, work out faces + vertices – edges.

- 27 For a triangular prism, work out faces + vertices – edges.

- 28 For a square-based pyramid, work out faces + vertices – edges.

- 29 For a tetrahedron, work out faces + vertices – edges.

B · Reasoning — Prisms, pyramids and nets.

- 30 What is a **face** of a solid?
- ☐ A corner
 - ☐ A flat surface
 - ☐ A straight line
 - ☐ The whole solid
- 31 What is an **edge**?
- ☐ A corner
 - ☐ A flat surface
 - ☐ A line where two faces meet
 - ☐ The base

- 32** What is a **vertex**?
- ☐ A corner where edges meet
 - ☐ A flat surface
 - ☐ A line
 - ☐ A curve
- 33** What is a **net**?
- ☐ A drawing of a solid
 - ☐ A flat shape that folds up into the solid
 - ☐ The base of a solid
 - ☐ The volume
- 34** What do all prisms have in common?
- ☐ Six faces
 - ☐ The same cross-section all the way along
 - ☐ Triangular faces
 - ☐ A curved surface
- 35** What do all pyramids have in common?
- ☐ A square base
 - ☐ Faces that meet at a single apex
 - ☐ Six edges
 - ☐ Two identical ends
- 36** For any solid with flat faces and no holes, faces + vertices – edges equals ...
- ☐ 0
 - ☐ 1
 - ☐ 2
 - ☐ it varies
- 37** Does a cube have more than one possible net?
- ☐ Yes
 - ☐ No
- 38** A prism has a hexagonal cross-section. How many faces?
- ☐ 6
 - ☐ 7
 - ☐ 8
 - ☐ 12

C · Challenge — Euler's rule, and big polygons.

- 39** A prism has a 10-sided cross-section. How many faces has it?
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- 40** A prism has a 10-sided cross-section. How many edges has it?
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- 41** A pyramid has a hexagonal base. How many faces has it?
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42 A pyramid has a hexagonal base. How many vertices has it?

43 A solid has 8 faces and 12 vertices. How many edges, using Euler's rule?

44 A solid has 20 faces and 30 edges. How many vertices?

D · Word problems — Boxes, tents and pyramids.

45 A dice is a cube. How many faces does it have?

46 A cereal box is a cuboid. How many edges does it have?

47 A tent is a triangular prism. How many faces does it have?

48 The Great Pyramid has a square base. How many triangular faces does it have?

49 A chocolate box is a hexagonal prism. How many vertices does it have?

50 A cardboard box is cut open and laid flat. What is that flat shape called? Answer 1 for net, 0 for face.

51 A pencil is a hexagonal prism. How many rectangular faces does it have?

52 A paperweight is a square-based pyramid. How many edges does it have?
