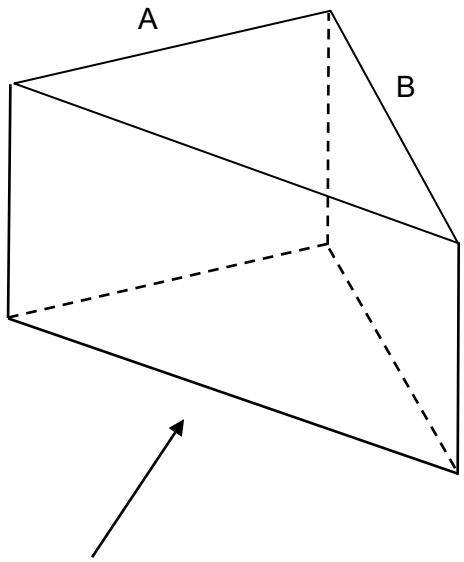
OCR
Oxford Cambridge and RSA

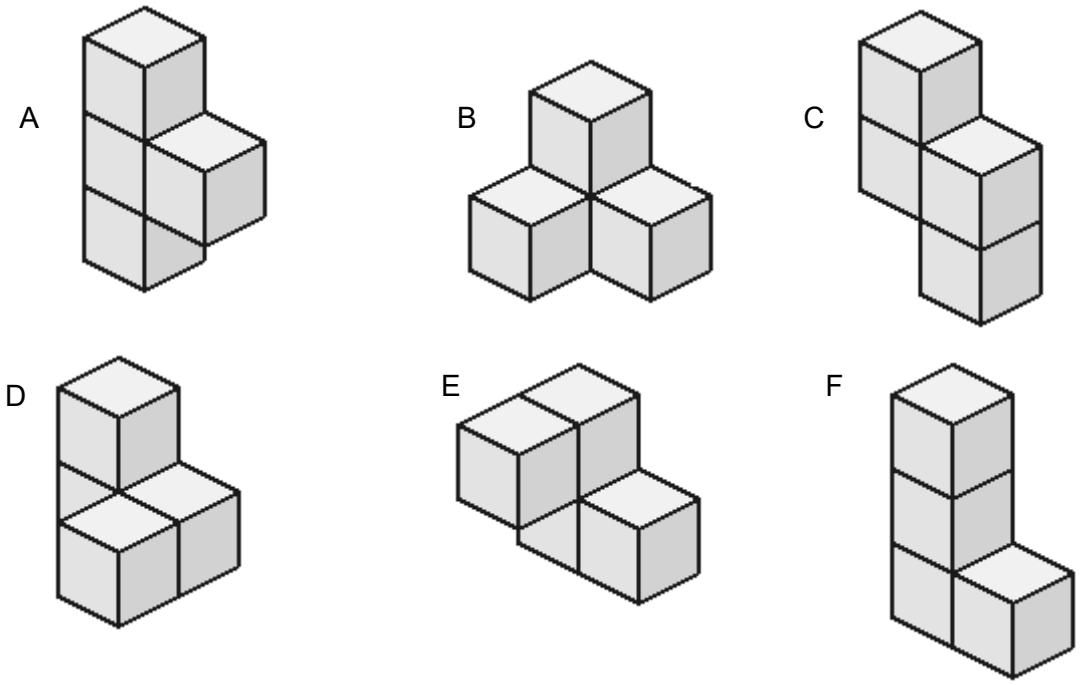
Higher Check In - 08.06 Three-dimensional shapes

1. Give the name of the type of pyramid which has seven faces.

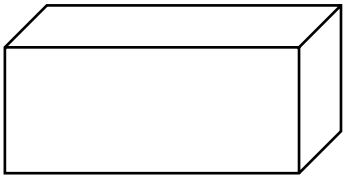
2. Draw the plan, front and side elevations of the triangular prism shown below. The sides marked A and B are the same length. The front of the prism is marked with an arrow.



3. Name the solid which has 1 vertex, 1 edge and 2 faces.



4. How many planes of symmetry does a cuboid have?



5. Which of the following statements are true?

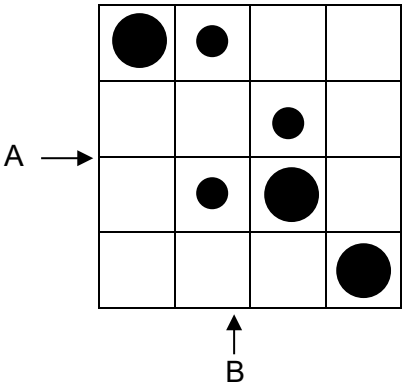
A A plan view shows the length and width of an object.

B A plan view shows the height and width (or length) of an object.

C A side view shows the width and length and height of an object.

D A front view shows the height and width (or length) of an object.

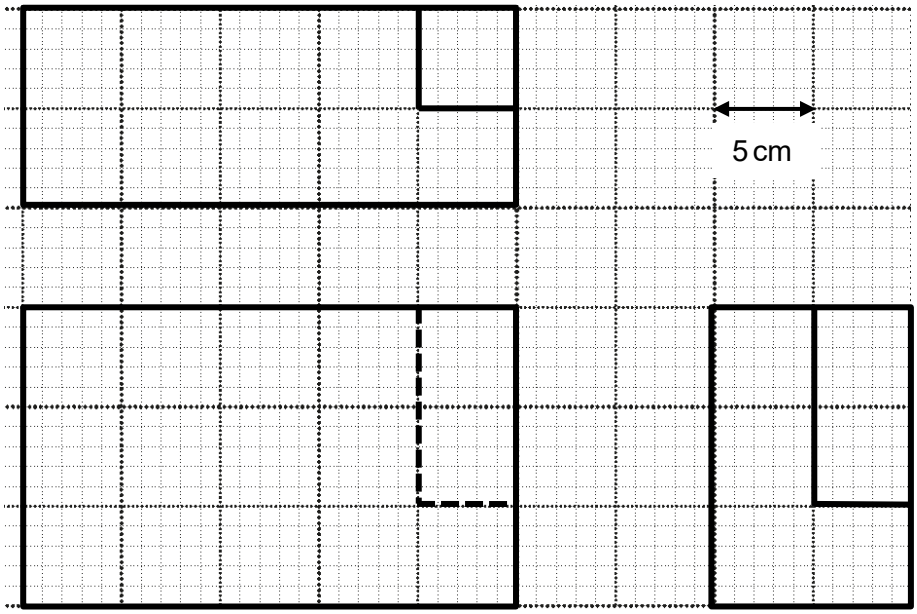
6. Three large cylinders  and three small cylinders  are placed on a board.
The plan view of the board is shown below.



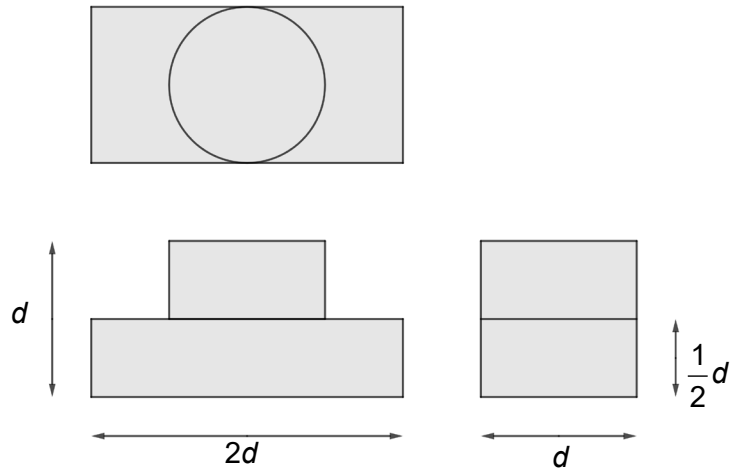
The view from both A and from B is  .

Draw a different arrangement of cylinders which gives this same view from both A and from B.

7. The diagram below shows the plan, front and side elevations of a solid, drawn to scale on squared paper, where 1 large square represents 5 cm. Show that the surface area of the solid is 1550 cm^2.



8. The plan, front and side elevations of a solid is given below. What is the volume of the solid in terms of d?



9. A 5 × 5 × 5 cube is constructed from unit cubes. The 5 × 5 × 5 cube is then completely dipped into a tin of paint and then split up into its unit cubes. How many of the unit cubes will have at least one painted face?

Extension

Complete this table.

3D shape	Number of		
	Faces	**Vertices**	**Edges**
Cuboid			
Square-based pyramid			
Triangular prism			

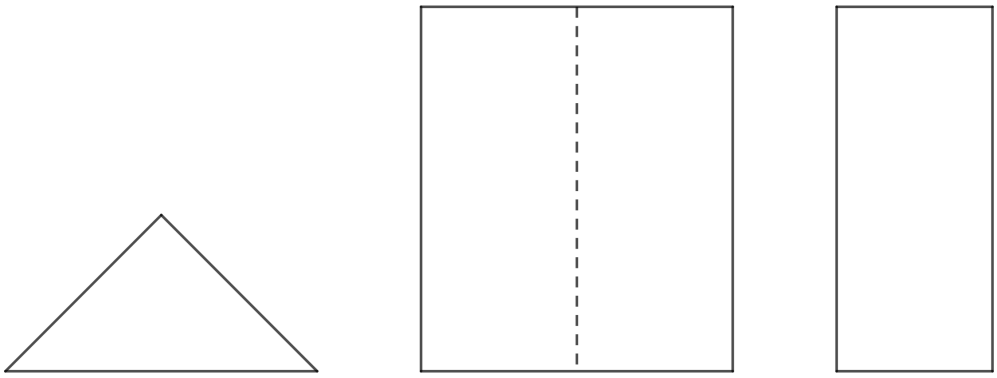
Do the same for some other polyhedra (closed solids made of flat faces and straight edges).

Use your results to suggest a relationship between the number of faces, vertices and edges for a polyhedron.

Answers

1. Hexagonal-based pyramid

2.



Plan view | Front view | Side view

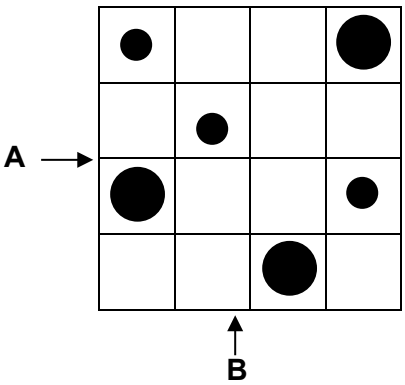
3. Cone

4. A, C, F

5. 3

6. **A** and **D**

7. Any correct answer e.g.



8. Surface area $= 2\times(10\times15+15\times25+10\times25) = 1550\,\text{cm}^3$

9. Solid is made of a cylinder and cuboid

Volume of cylinder $= \pi r^2 h = \pi \times \left(\frac{1}{2}d\right)^2 \times \left(\frac{1}{2}d\right) = \frac{1}{8}\pi d^3$

Volume of cuboid $= bhl = d \times \frac{1}{2}d \times 2d = d^3$

Volume of solid is $V = \frac{1}{8}\pi d^3 + d^3 = d^3\left(\frac{1}{8}\pi + 1\right)$

10. 98 [$5^3 - 3^3$ or (8 at corners) + (3 on each of 12 edges) + (9 on each of 6 faces)]

Extension

3D shape	Number of		
	Faces	**Vertices**	**Edges**
Cuboid	6	8	12
Square-based pyramid	5	5	8
Triangular prism	4	4	6

E = V + F – 2 or equivalent (known as Euler's formula)

We'd like to know your view on the resources we produce. Click 'Like' or 'Dislike' to send us an auto generated email about this resource. Add comments if you want to. Let us know how we can improve this resource or what else you need. Your email will not be used or shared for any marketing purposes.

Looking for another resource? There is now a quick and easy search tool to help find free resources for your qualification.

Resources*: the small print*

OCR provides resources to help you deliver our qualifications. These resources do not represent any particular teaching method we expect you to use. We update our resources regularly and aim to make sure content is accurate but please check the OCR website so that you have the most up to date version. OCR cannot be held responsible for any errors or omissions in these resources.

Though we make every effort to check our resources, there may be contradictions between published support and the specification, so it is important that you always use information in the latest specification. We indicate any specification changes within the document itself, change the version number and provide a summary of the changes. If you do notice a discrepancy between the specification and a resource, please contact us.

OCR acknowledges the use of the following content: N/A

Whether you already offer OCR qualifications, are new to OCR or are thinking about switching, you can request more information using our Expression of Interest form.

Please get in touch if you want to discuss the accessibility of resources we offer to support you in delivering our qualifications.

GCSE (9–1)
MATHEMATICS

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Identify type of pyramid			
AO1	2	Draw front, plan and side elevations for a simple 3D solid			
AO1	3	Identify a 3D solid from its properties			
AO1	4	Identify prisms			
AO1	5	Know the symmetrical properties of a 3D solid			
AO2	6	Understand plans and elevations definitions			
AO2	7	Interpret plan and elevation diagram			
AO2	8	Calculate surface area from a plan and elevations diagram			
AO3	9	Find a volume from a plan and elevation diagram			
AO3	10	Solve a 3D solid problem			

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Identify type of pyramid			
AO1	2	Draw front, plan and side elevations for a simple 3D solid			
AO1	3	Identify a 3D solid from its properties			
AO1	4	Identify prisms			
AO1	5	Know the symmetrical properties of a 3D solid			
AO2	6	Understand plans and elevations definitions			
AO2	7	Interpret plan and elevation diagram			
AO2	8	Calculate surface area from a plan and elevations diagram			
AO3	9	Find a volume from a plan and elevation diagram			
AO3	10	Solve a 3D solid problem			

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Identify type of pyramid			
AO1	2	Draw front, plan and side elevations for a simple 3D solid			
AO1	3	Identify a 3D solid from its properties			
AO1	4	Identify prisms			
AO1	5	Know the symmetrical properties of a 3D solid			
AO2	6	Understand plans and elevations definitions			
AO2	7	Interpret plan and elevation diagram			
AO2	8	Calculate surface area from a plan and elevations diagram			
AO3	9	Find a volume from a plan and elevation diagram			
AO3	10	Solve a 3D solid problem			

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Identify type of pyramid			
AO1	2	Draw front, plan and side elevations for a simple 3D solid			
AO1	3	Identify a 3D solid from its properties			
AO1	4	Identify prisms			
AO1	5	Know the symmetrical properties of a 3D solid			
AO2	6	Understand plans and elevations definitions			
AO2	7	Interpret plan and elevation diagram			
AO2	8	Calculate surface area from a plan and elevations diagram			
AO3	9	Find a volume from a plan and elevation diagram			
AO3	10	Solve a 3D solid problem			