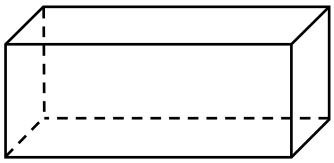
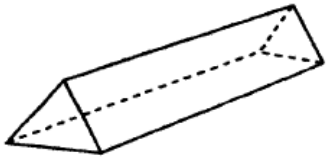
Foundation Check In - 8.06 Three-dimensional shapes

Q1-3. Write down the number of faces, edges and vertices of these three-dimensional shapes.

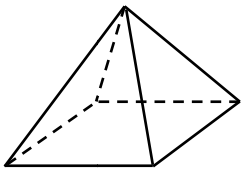
1.



2.

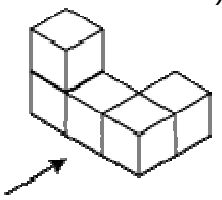


3.

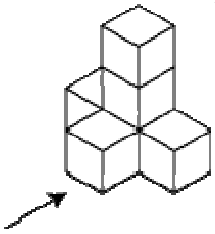


Q4-5. Draw the plan, front and side elevations of these three-dimensional shapes. The front of the shape is marked with an arrow.

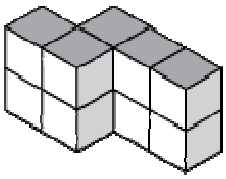
4.
(made of 5 cubes)



5.
(made of 6 cubes)

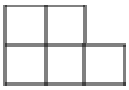


6. A prism is drawn below. Explain why you can be sure that you would need 10 cubes to build it, rather than just the 9 you can see.



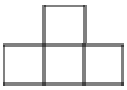
7. Here are the front elevation, side elevation and plan of a three-dimensional shape made from cubes.

Front



Right side

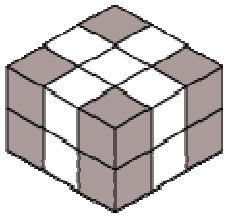
Plan



On isometric paper, show that it is possible to construct the three-dimensional shape using both 6 cubes and 7 cubes.

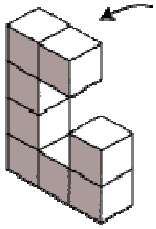
8. A piece of a cube is sliced off with a single straight cut. The new shape has 7 faces, 10 vertices and 15 edges. Describe how the cut could have been made.

9. The eight shaded cubes that contain the vertices of this cuboid are removed.



How many vertices does the new three-dimensional shape have?

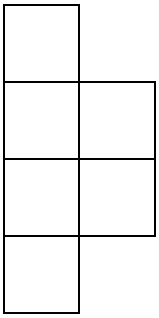
10. This three-dimensional shape sits upright on a table and consists of a single layer of cubes.



The shape is “toppled” in the direction of the arrow and rests so the shaded face is flat against the table. On isometric paper, draw the three-dimensional shape in its toppled position.

Extension

A “hexomino” is a 2D shape made from six connected squares. (Note that the squares are joined edge to edge and there are no overlaps or gaps.)
e.g.



On squared paper, draw some different hexominoes.

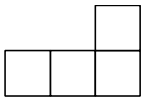
How many different hexominoes are there? Which ones could be folded into a cube?

Answers

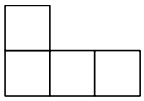
Question	1	2	3
Vertices	8	6	5
Faces	6	5	5
Edges	12	9	8

4.

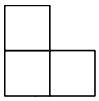
Plan



Front

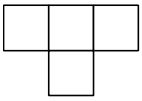


Side

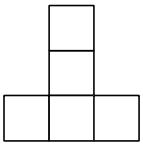


5.

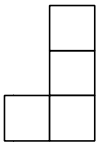
Plan



Front



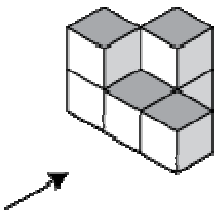
Side



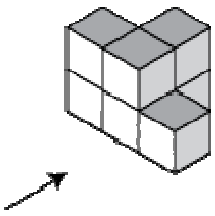
6. The 3D shape is a prism, so it has the same cross-section through its length. Therefore the bottom layer must be the same as the top layer.

7. For example:

6 cubes

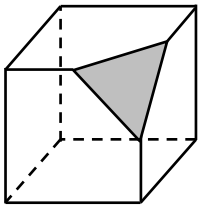


7 cubes

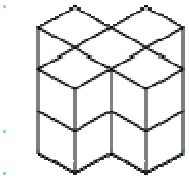


The missing/extra cube is hidden from the right, front and plan views and so is optional.

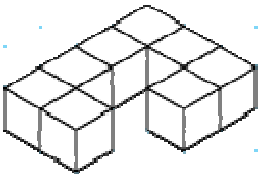
8. The new solid could be made by cutting off a single vertex by slicing through the midpoint of each edge that leads to this vertex.



9. 24 vertices



10.



Extension

There are 35 different hexominoes. Of these, 11 are the net of a cube.

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GCSE (9–1) MATHEMATICS

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Recognise and know the properties of a cuboid			
AO1	2	Recognise and know the properties of a prism			
AO1	3	Recognise and know the properties of a pyramid			
AO1	4	Construct plans and elevations of a simple 3D solid			
AO1	5	Construct plans and elevations of a simple 3D solid			
AO2	6	Know the properties of a prism			
AO2	7	Construct a representation of a 3D solid on isometric paper from plans and elevations			
AO2	8	Know the properties of a cube			
AO3	9	Solve a problem through representation of a 3D solid on isometric paper			
AO3	10	Solve a problem through representation of a 3D solid on isometric paper			

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