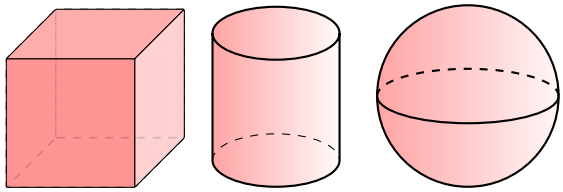
THREE-DIMENSIONAL SHAPES

A THREE-DIMENSIONAL SHAPES

Definition Solid Geometry

Solid geometry studies **three-dimensional shapes**, such as cubes, cylinders, and spheres. The diagrams show examples of these shapes.



Definition Surface

A **surface** is the exterior of a three-dimensional shape.

Definition Face

A **face** is a flat surface of a three-dimensional shape.

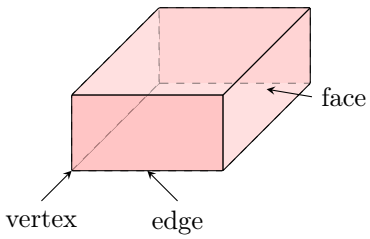
Definition Edge

An **edge** is a line segment where two faces meet.

Definition Vertex

A **vertex** is a point where two or more edges meet.

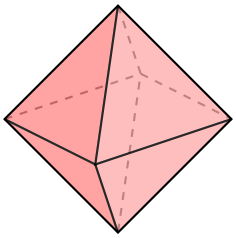
Ex:



B POLYHEDRON

Definition Polyhedron

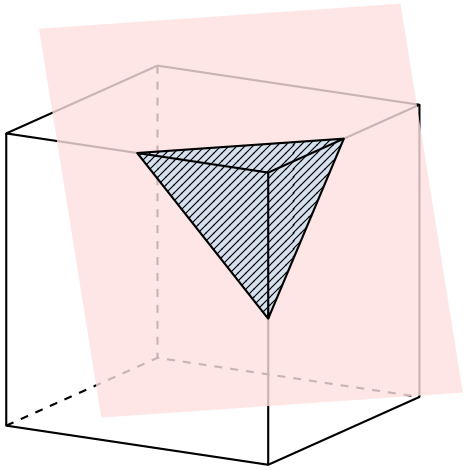
A **polyhedron** is is a three-dimensional shape with polygonal flat faces.



C CROSS SECTIONS

Definition Cross Section

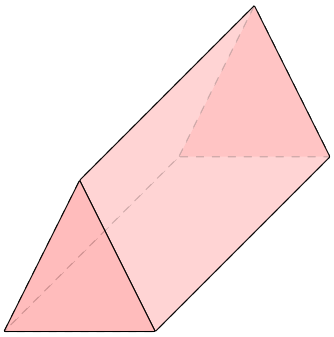
A **cross section** of a solid is a flat shape created when a plane cuts through the solid.



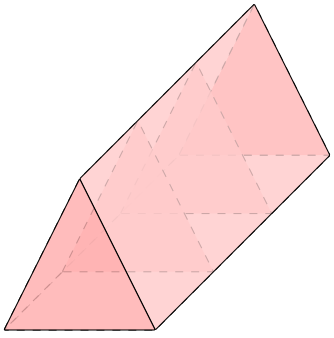
Definition Uniform Cross Section

A **uniform cross section** means the cross section of a solid has the same size and shape at every point along its length.

Ex: Does this solid have a uniform cross section?

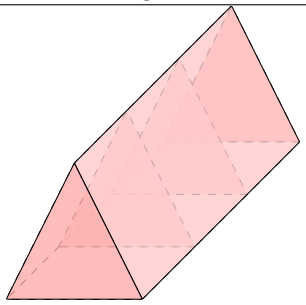
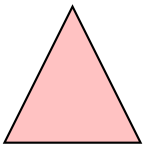
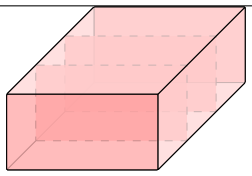


Answer: When sliced perpendicular to its length, each cross section is a triangle of the same size and shape. So, it has a uniform cross section. The solid is a triangular prism.



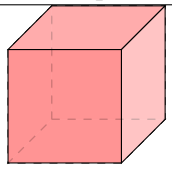
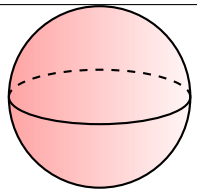
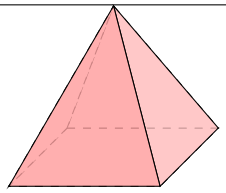
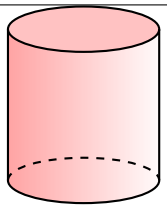
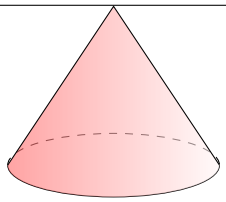
Definition **Prism**

A **prism** is a polyhedron with a uniform cross section that is a polygon. Prisms are named according to the shape of their base.

Name	Figure	Cross Section
Triangular prism		
Rectangular prism		

D CLASSIFICATION

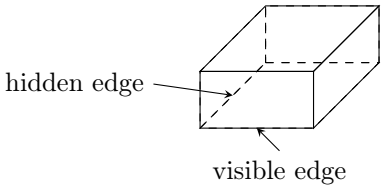
Definition **Classification**

Name	Shape	Faces	Edges	Vertices
Cube (square prism)		6 (flat)	12	8
Sphere		1 (curved)	0	0
Square Pyramid		5 (flat)	8	5
Cylinder		3 (1 curved, 2 flat)	0	0
Cone		3 (1 curved, 1 flat)	0	0

E DRAWING THREE-DIMENSIONAL SHAPES

Method **Drawing 3D Shapes**

When drawing 3D shapes, some edges are hidden because they are at the back of the shape. We call these **hidden edges**. To show the shape clearly, we use dotted lines for hidden edges. This helps us see the shape and its depth.

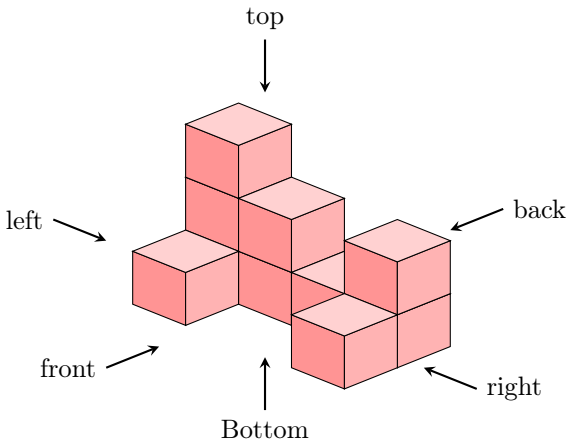


F MULTI-VIEW PROJECTION

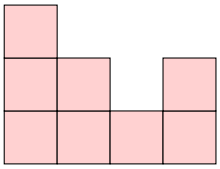
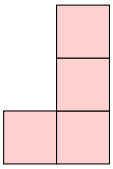
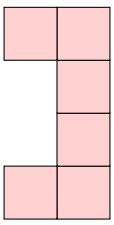
Definition **Multi-view Projection**

A **multi-view projection** is a way to draw a 3D shape using 2D views. You show how the shape looks from different sides, like the front, right, and top, to help understand its form.

Ex: Draw the front, right, and top views of this solid.



Answer:

1. Front view: 
2. Right view: 
3. Top view: 

G SOLID CONSTRUCTIONS

Definition **Net**

A **net** is a flat 2D shape that can be folded along its edges to form a 3D solid. Dashed lines show where to fold.