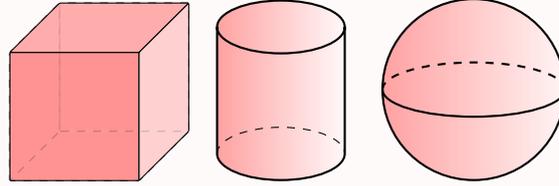# THREE-DIMENSIONAL SHAPES

A THREE-DIMENSIONAL SHAPES

Definition Solid Geometry

In solid geometry, we study **three-dimensional (3D) shapes**, such as cubes, cylinders, and spheres. The diagrams below show some examples of these shapes.

Definition Surface

A **surface** is the outside of a three-dimensional (3D) shape. It is the part of the shape you can touch.

Definition Face

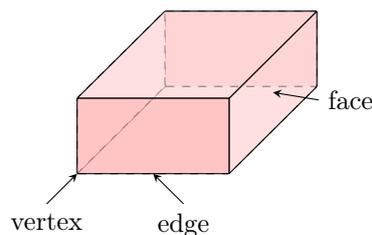A **face** is a flat surface on a three-dimensional shape.

Definition Edge

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

Definition Vertex

A **vertex** is a corner of a three-dimensional shape. It is a point where two or more edges meet.

Ex: This box-shaped solid has many faces, edges, and vertices. One example of each is shown.
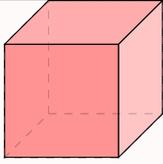
B DRAWING THREE-DIMENSIONAL SHAPES
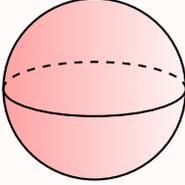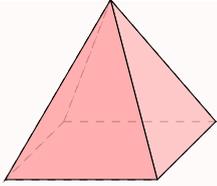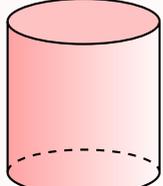

Method Drawing 3D Shapes

When we draw 3D (three-dimensional) shapes on paper, we can only see the front of the shape. Some edges are behind and cannot be seen. These are called **hidden edges**. To show that an edge is hidden but still part of the shape, we draw it with dashed lines. Solid lines show the edges we can see.
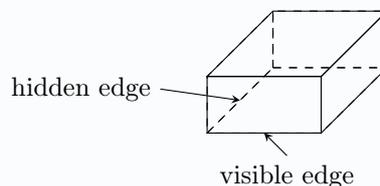
C CLASSIFICATION

Definition Classification

We can sort three-dimensional (3D) shapes by counting their faces, edges, and vertices. Some examples are shown in the table below.

| Name	Shape	Faces	Edges	Vertices
Cube		6 (flat faces)	12	8
Sphere		1 (curved surface)	0	0
Square Pyramid		5 (flat faces)	8	5
Cylinder		3 (1 curved, 2 flat faces)	0	0

Note: Shapes that have only curved surfaces, like the sphere and the cylinder, do not have edges or vertices.

D MULTI-VIEW PROJECTION

Definition Multi-view Projection

A **multi-view projection** is a way to show a 3D shape using several 2D drawings. Each drawing shows how the shape looks from a different side, such as the front, the right side, or the top. These views help us understand the shape more clearly.

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

Answer:

1. Front view:

2. Right view:

3. Top view:
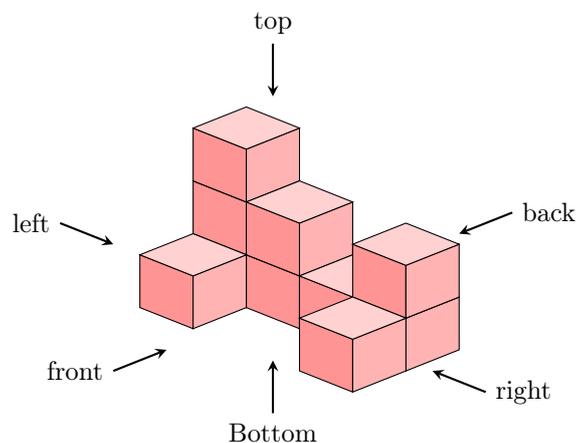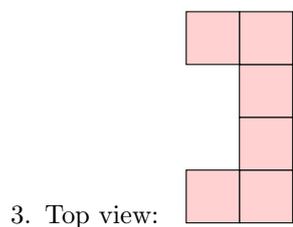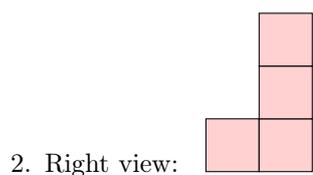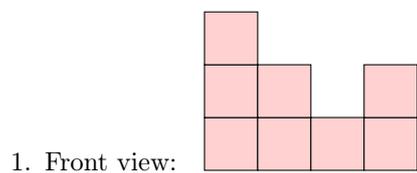
Each small square in a view represents one cube of the solid seen from that side.

E SOLID CONSTRUCTIONS

Definition Net

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