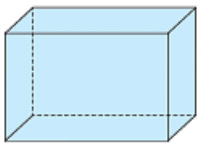
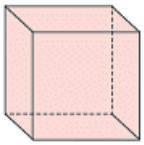
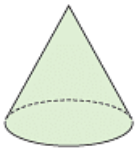
3D Shapes

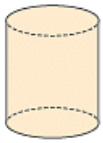
Solids

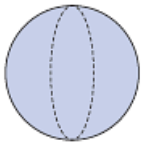
Look around you! Do you see any of the objects around you resembling the shapes shown here?


Cuboid


Cube


Cone


Cylinder


Sphere

A few objects are shown below:


Gift box


Rubiks cube


Joker's cap


Post box


Ball

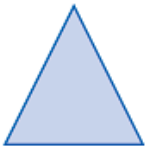
What special things do you notice about these shapes?

- You can hold them in your hands.
- They are solids.

You have also learnt about some basic shapes drawn below:

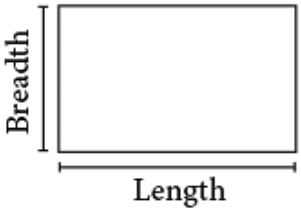

Square


Rectangle

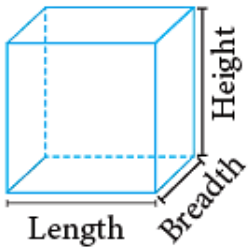

Triangle


Circle

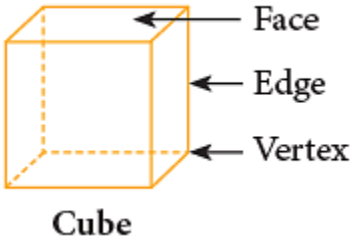
You can touch them only on paper, you cannot hold them in your hands. These shapes are called **2D shapes** or **2-dimensional shapes**. They have two dimensions, **length and breadth.**



The shapes shown in the beginning of the chapter, also called solid shapes, are known as **3D shapes** or **3-dimensional shapes**. They have three dimensions: **length, breadth and height.**

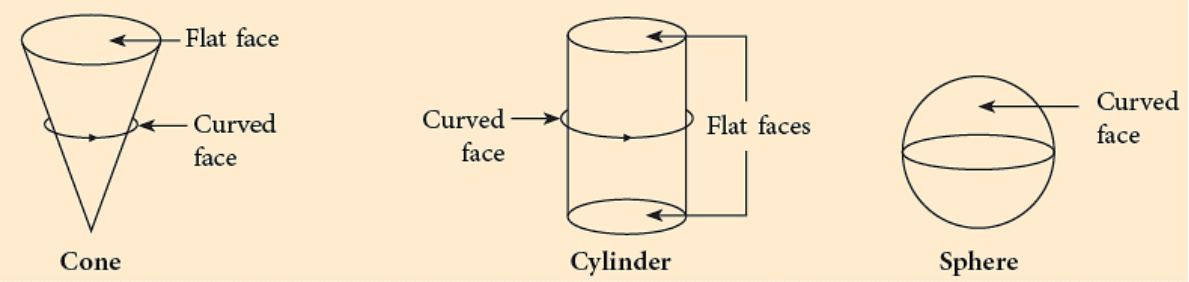


Faces, Edges and Vertices of a Solid Figure



- A **face** is a flat surface.
- An **edge** is the line segment where two faces meet.
- A **vertex** is a point or corner where two or more edges meet.

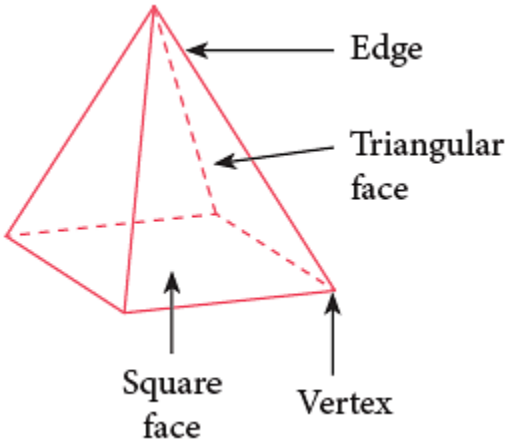
As you can observe, the faces of a cube and cuboid are **flat**, whereas a cylinder, cone and sphere have **curved** faces.



Now, let us find out how many faces, edges and corners does each shape have. For a cube and cuboid, pick up a die and a geometry box and count the number of faces, edges and corners.
You will notice that both the cube and cuboid have 6 faces, 12 edges and 8 corners.
Now, from the figure given above, try to count the same for cone, cylinder and sphere. You will find that:
A **cylinder** has **3 faces (2 flat, 1 curved), 2 edges** and **0 corners.**
A **cone** has **2 faces (1 flat, 1 curved), 1 edge** and **1 corner.**
A **sphere** has only **1 curved surface.**

Pyramid

A **pyramid** is a solid whose base is a polygon and the sides are triangles which meet at the top.



This is a square pyramid, but there are also triangular pyramids, pentagonal pyramids and so on.

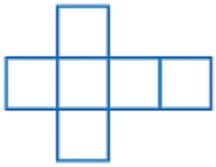
A square pyramid has **4 triangular faces** and **a square face**. It has **8 edges** and **5 vertices.**

Nets

Net of a Cube

Take a die or any other cube and trace all its faces on a sheet of paper. What is the shape of all the six faces?

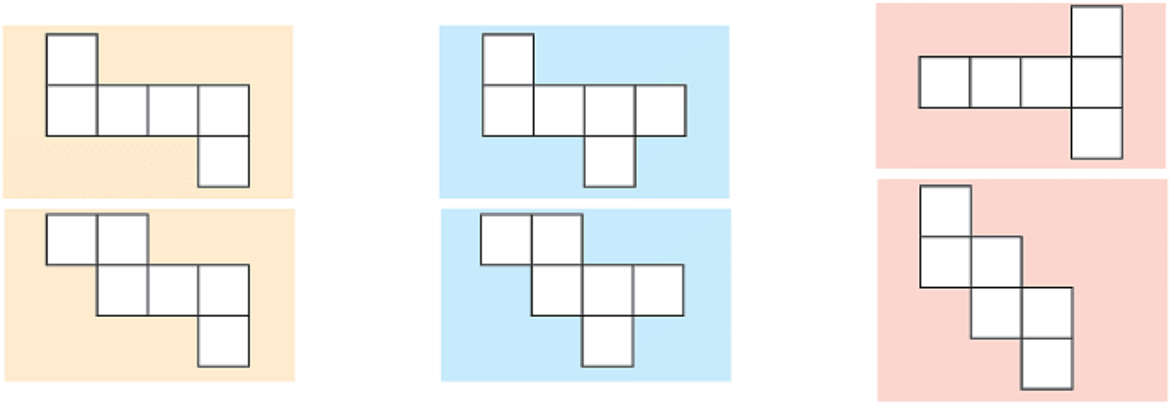
They are all **squares** of the same size. Thus, you see that a cube can be made from six squares joined together in a particular manner.



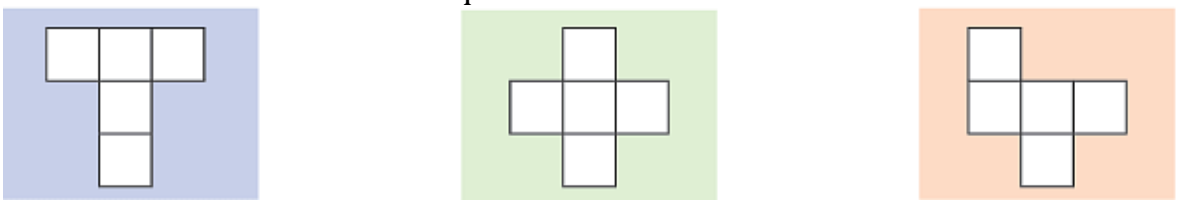
Let us try this combination:

A **net** is a two-dimensional figure that can be folded into a three-dimensional object.

We have many more nets (arrangements of these squares) that can be folded up to form a cube.

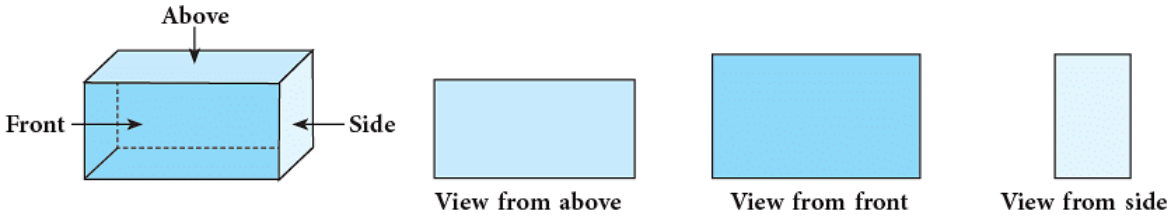


We can also form nets with 5 square faces. In this case it will be a box with no lid.

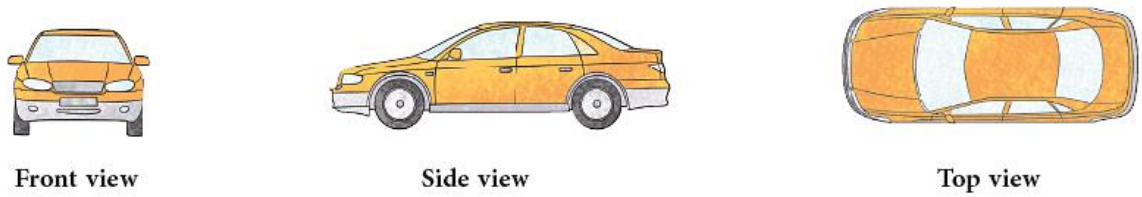


Viewing 3d Shapes

It is difficult to draw a 3D shape. So, designers use the different views of a solid to overcome this problem. A 3D shape can be viewed from the top, from the side and from the front and these views can be combined to visualise what the solid looks like.



Thus, we see that a cuboid appears to be rectangle, when viewed from any direction. Now, let us see the different views of a car, which is a 3D shape.

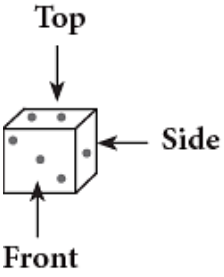


Special names are given to these three views from different directions.

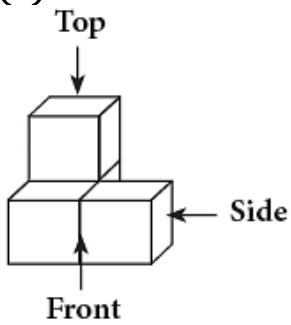
- When a solid is looked at **from above**, the view seen is called the **Plan**.
- The **front view** is called the **Front Elevation.**
- The **side view** is called the **Side Elevation.**

Examples:

(a) A die

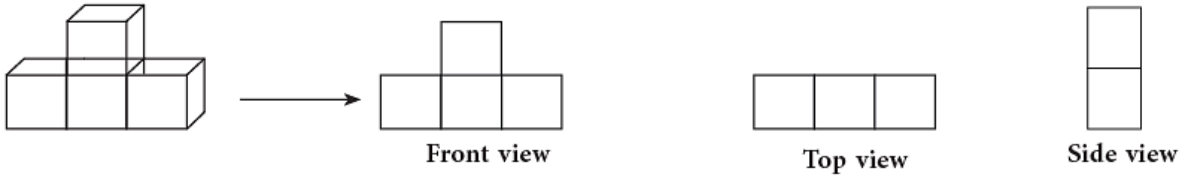


(b) A solid



(c) A tent

(d)



Tips: All the views of a die (cube) are squares.