

WARM UP

Multiplication Gym – 3 minutes

1.

2.

Compare using $<$, $>$, $=$ (remember about order of operations)

$$585 - 73 + 227$$

$$585 - (73 + 227)$$

$$76 + 124 \times 10$$

$$(76 + 124) \times 10$$

$$680 \div 5 \times 2$$

$$680 \div (5 \times 2)$$

3.

Insert brackets to the following number sentences to make the equality true.

$$5 \times 154 + 46 = 1000$$

$$248 \div 4 \times 2 = 31$$

$$100 \div 5 + 5 - 5 \times 2 = 0$$

Homework REVIEW

4.

Construct a set A, which is equal to the set D, and another set B which is not equal to the set D.

$$\{a; \img alt="A red butterfly with yellow and black markings" data-bbox="715 692 795 732"; 5\}$$

D =

A = _____

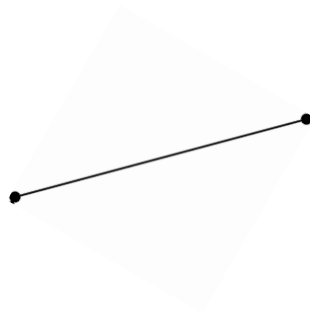
B = _____

NEW MATERIAL I**3D (dimensional) shapes**

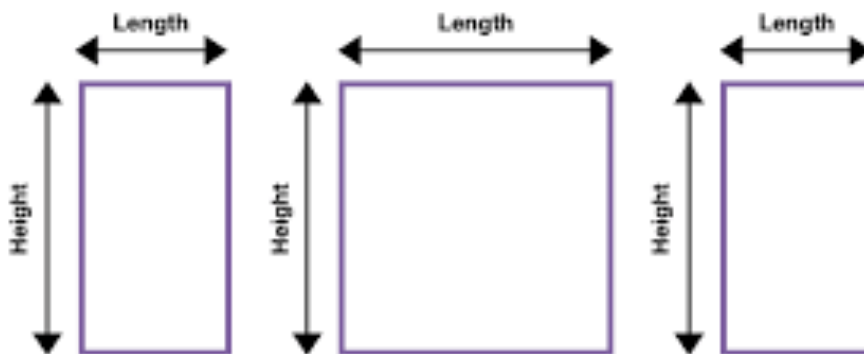
In mathematical terms, a **3D shape** has three dimensions. The D in '**3D**' stands for dimensional. In a world with three dimensions, you can travel forwards, backwards, right, left, and even up and down. The ability to travel up into space and back down differentiates **3D** from 2D. The world we live in is all **3D**

Dimension – is a measurement in one direction.

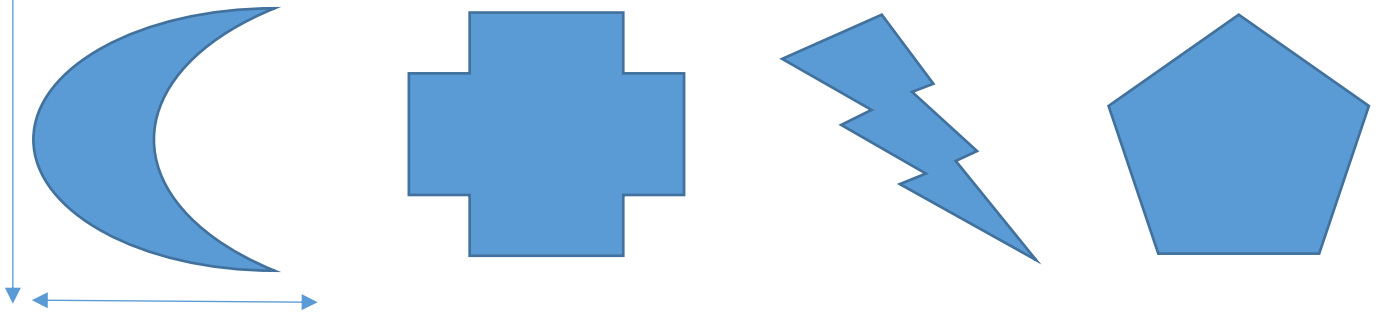
Example: Line segment has only one dimension. Why? We can only measure its length.



What are **2D objects**? **Example:** Rectangle has two dimensions – length and height.



5. What about the following shapes? **2D or not 2D?**

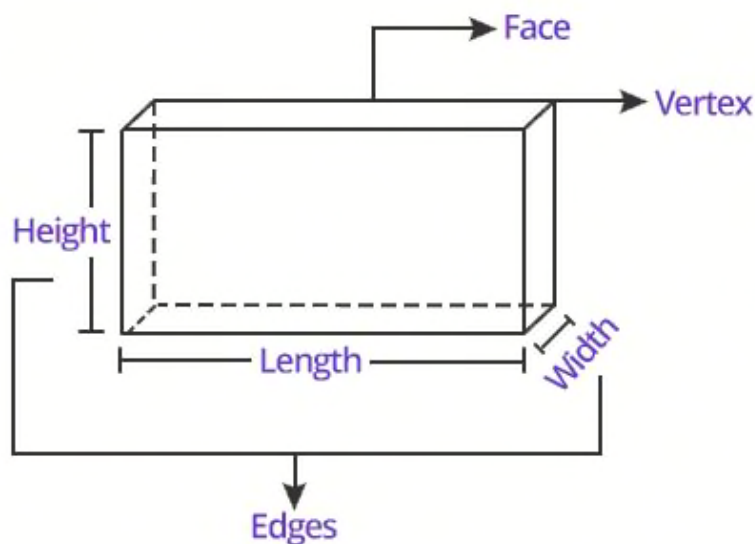


All of them are 2D! All flat shapes are two dimensional! They have length and height, but no width (thickness or depth).

Geometric solids are enclosed, three-dimensional object.

In our day to day life, we see several objects like books, ball, ice-cream cone etc., around us which have different shapes. One thing common to most of these objects is that they all have some length, breadth and height or depth.

Therefore, they all occupy space (not a plane) and have three dimensions. These objects cannot be drawn onscreen as it is a three-dimensional figure



When we draw 3D objects on paper, we often use dashed lines to show hidden edges.

Examples of 3D shapes:

Some 3D shapes only have flat faces. Such shapes are called **polyhedrons (or polyhedra)**:



Other 3D shapes also have non-flat surfaces:

**Polyhedrons:**

- **Tetrahedrons** has 4 faces, each face is an equilateral triangle, it has 6 edges and 4 vertices. At each vertex 3 edges meet
- **Cube** has 6 faces; each face has 4 edges and is a square. It has 8 vertices and at each vertex 3 edges meet
- **Octahedrons** has 8 faces; each face is equilateral triangle. It has 12 edges and 6 vertices and at each vertex 4 edges meet
- **Dodecahedron** has 12 faces; each face has 5 edges (pentagon). It has total 30 edges and 20 vertices and at each vertex 3 edges meet
- **Icosahedron** has 20 faces; each face is equilateral triangle. It has 30 edges and 12 vertices and at each vertex 5 edges meet
- **Square pyramid** has 5 faces, the 4 side faces are triangles, the base is square. It has 8 edges and 5 vertices
- **Prism** has 2 identical bases; all faces are flat, and prism has the same cross section all along the length.

Not Polyhedrons:

- **Cone** has a circle at one end and a point at the other end, its side is curved
- **Cylinder** has a flat base and a flat top, both bases have circular shape, the base is equivalent to the top (same size and shape). From the base to the top the shape stays the same

- **Torus** has no edges or vertices
- **Sphere** - all points on the surface are the same distance (radius r) from the center, sphere has no edges or vertices, it has one surface (not a face as it isn't flat)

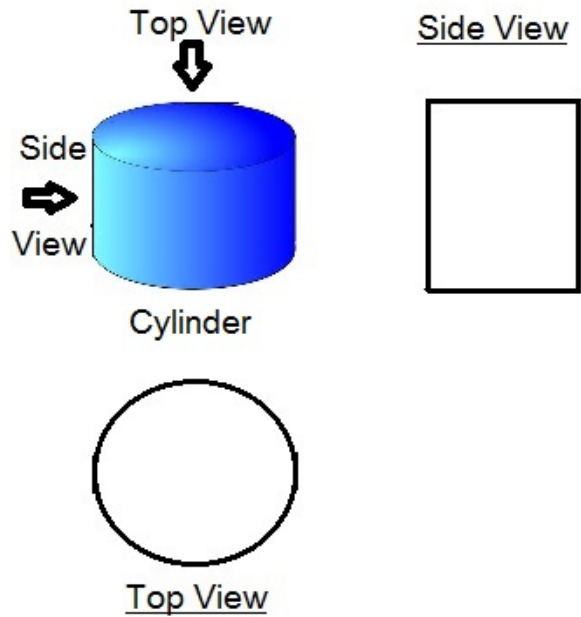
6. Sort these everyday objects into their approximate 3D shapes.

Cylinders
Rectangular prisms
Spheres
Triangular prisms
Others

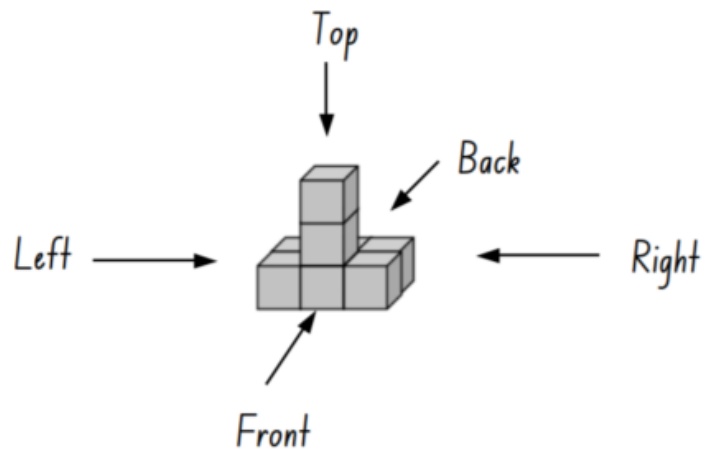


2D views of 3D shapes and objects

- a) There are different views of 3D shapes such as top view and side view. For example, the top view of a cylinder will be a circle, but its side view will be a rectangle.



- b) Example: the 3D object on the right is made from 8 identical cubes joined together.



Front View	Top View	Right Side View	Left Side View	Back View

7. a) Take a look at the front, right side and top projections. Match them with 3D objects. Circle the matching 3D object.

Front View	Top View	Right Side View

Top View	Right Side View	Left Side View

- b) Look at these 3D objects. Draw the 2D projections.

Front View	Top View	Right Side View

Top View	Right Side View	Left Side View

NEW MATERIAL II

8. What is the common property of the following set?

Is every *hedgehog* an animal? Is every animal a *hedgehog*? Which set is a part of another set?



Set B is a **subset** of set A, if every element of B is also an element of set A, or in other words, each element of the set B also belongs to the set A.

Examples:

- All squares are rectangles, but not all rectangles are squares, therefore a set of squares is a subset of a set of rectangles.
- All blond girls are girls, but not all girls are blond.

When one or more elements **belong** to the set, we use symbol \in between an element and a set.

When one set belongs to another set, we use a phrase “**subset of**” and the symbol \subset

For example: Element **M** *belongs to* the set **D** or $M \in D$

Set **M** is a *subset of* **D** or $M \subset D$

9. Define each set by stating its property. Which set is a subset of another set? Write down your answer:

