8th Standard- Maths

Mensuration Class

We know that the perimeter of a closed figure is the distance around its boundary. Also, the area of a closed figure is the measurement of the region covered by it. We know how to find the areas and perimeters of various plane figures such as triangles, parallelograms, rectangles, rhombuses, squares, circles, pathways and borders in rectangular shapes, etc.

Here, we shall learn to solve the problems related to perimeters and areas of general quadrilaterals and trapeziums. We shall also learn to solve the problems related to areas of polygons (regular and irregular) by using the formula for the area of a triangle and that for the area of a trapezium. Moreover, we shall also learn to find out the surface areas, and volumes, of cubes, cuboids and cylinders.

The magnitude of a plane region is called its area.

Length of the boundary of a simple closed figure is known as perimeter.

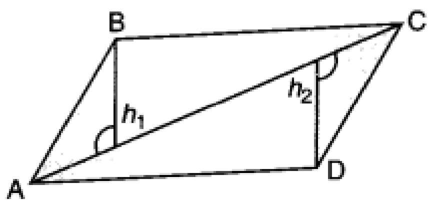
Perimeter of a rectangle = $2(l + b)$ units.

Area of rectangle = $l \times b$ square unit.

Perimeter of a square = $4 \times$ side unit.

Area of a square = $(\text{side})^2$ square unit.

Area of a quadrilateral = 12 d(h_1 + h_2) square unit, where, d denotes the length of diagonal AC.



Area of parallelogram = Base × Height square unit.

Area of trapezium = 12 × [Sum of parallel sides] × Height square unit.

Area of an equilateral triangle = √34 × $(\text{Side})^2$ square unit.

Area of a triangle = 12 × Base × Height square unit.

The perimeter of a circle is called its circumference.

The ratio of the circumference of a circle to its diameter is always constant and denoted by the Greek letter π. Thus, cd = π. The value of π is 3.14 correct to two decimal places.

The number π is not a rational number. It is often used as a rational approximation and its value is 227.

Circumference of a circle = 2π × Radius = 2πr unit.

Area of a circle = π × $(\text{Radius})^2$ = πr^2 square unit.

Area of rhombus = 12 (Product of diagonals) = 12 × d_1 × d_2 square unit.

Surface area of a cuboid = 2[lb + bh + hl] square unit

Surface area of a cube = $6l^2$ square unit

Surface area of a cylinder = 2πr(h + r) square unit

Surface area of Lateral surface area of cuboid = $[2(l + b) \times h]$ square unit

Surface area of Diagonal of cuboid = $l2+b2+h2-\sqrt{}$ units

Surface area of Lateral surface area of the cube = $4a^2$ square unit

Surface area of Lateral (curved) surface area of a cylinder = $2\pi rh$ square unit

Volume of Cuboid = $l \times b \times h$ $(\text{unit})^3$

Volume of Cube = l^3 $(\text{unit})^3$

Volume of Cylinder = $\pi r^2 h$ $(\text{unit})^3$

Volume of Diagonal of the cube = $(\sqrt{3}a)$ units.

$1\ m^2 = 100\ dm^2 = 10000\ cm^2$

$1\ cm^2 = 100\ mm^2$

Area of a Trapezium

Area of a trapezium = 12 (sum of parallel sides) × height

So to find the area of a trapezium we require the length of parallel sides and the perpendicular distance between them.

Product of half of the sum of the lengths of parallel sides and the perpendicular distance between them gives the area of trapezium.

Area of a Polygon

We use the method of triangulation which means splitting into triangles.

Solid Shapes

Two-dimensional figures are in fact the faces of three-dimensional shapes. If two faces of a shape are identical, then they are called congruent faces.

Right Circular Cylinder

In a right circular cylinder, the line segment joining the centres of circular faces is perpendicular to the base. In case otherwise, the cylinder will not be a right circular cylinder.

Surface Area of Cube, Cuboid and Cylinder

The surface area of a solid is the sum of the areas of its faces.

Cuboid

Total surface area of a cuboid = 2 (lb + bh + hl)

where l, b and h are the length, width and height of the cuboid respectively.

Cylinders

Lateral (curved) surface area of a cylinder = $2\pi rh$

Total surface area of a cylinder = $2\pi r(h + r)$

where r is the radius of the base and h is the height of the cylinder.

We take π to be 227 unless otherwise stated.

Volume of Cube, Cuboid and Cylinder

The volume of a three-dimensional object is the amount of space occupied by it. Volume is measured in cubic units.

Cuboid

Volume of cuboid = lbh

where l, b and h are the length, width and height of the cuboid respectively.

OR

Volume of cuboid = area of the base × height

Cube

Total surface area of a cube = $6l^2$, where l is the side of the cube.

Cylinder

Volume of cylinder = $\pi r^2 h$

where r is the radius of the base and h is the height of the cylinder.

Volume and Capacity

There is not much difference between these two words.

- Volume refers to the amount of space occupied by an object.
- Capacity refers to the quantity that a container holds.

Note: If a water tin holds 100 cm3 of water, then the capacity of water tin is 100 cm3. Capacity is also measured in terms of litres.

The relation between litre and cm3 is,

1 mL = 1 cm^3, 1 L = 1000 cm^3.

Thus, 1 m^3 = 1000000 cm^3 = 1000 L.