

MENSURATION

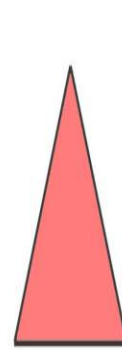


DEFINITION

THE BRANCH OF
GEOMETRY THAT DEALS
WITH THE MEASUREMENT
OF LENGTH , AREA AND
VOLUME

POLYGONS

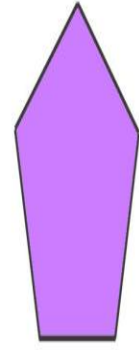
Polygons are many-sided figures, with sides that are line segments. Polygons are named according to the number of sides and angles they have . The most familiar polygons are the triangle, the rectangle, and the square. A regular polygon is one that has equal sides.



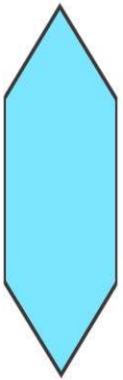
Triangle



Quadrilateral



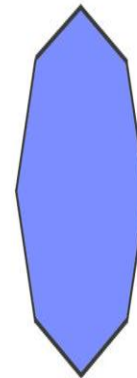
Pentagon



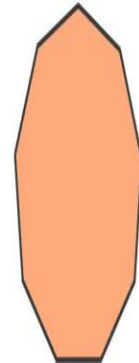
Hexagon



Heptagon



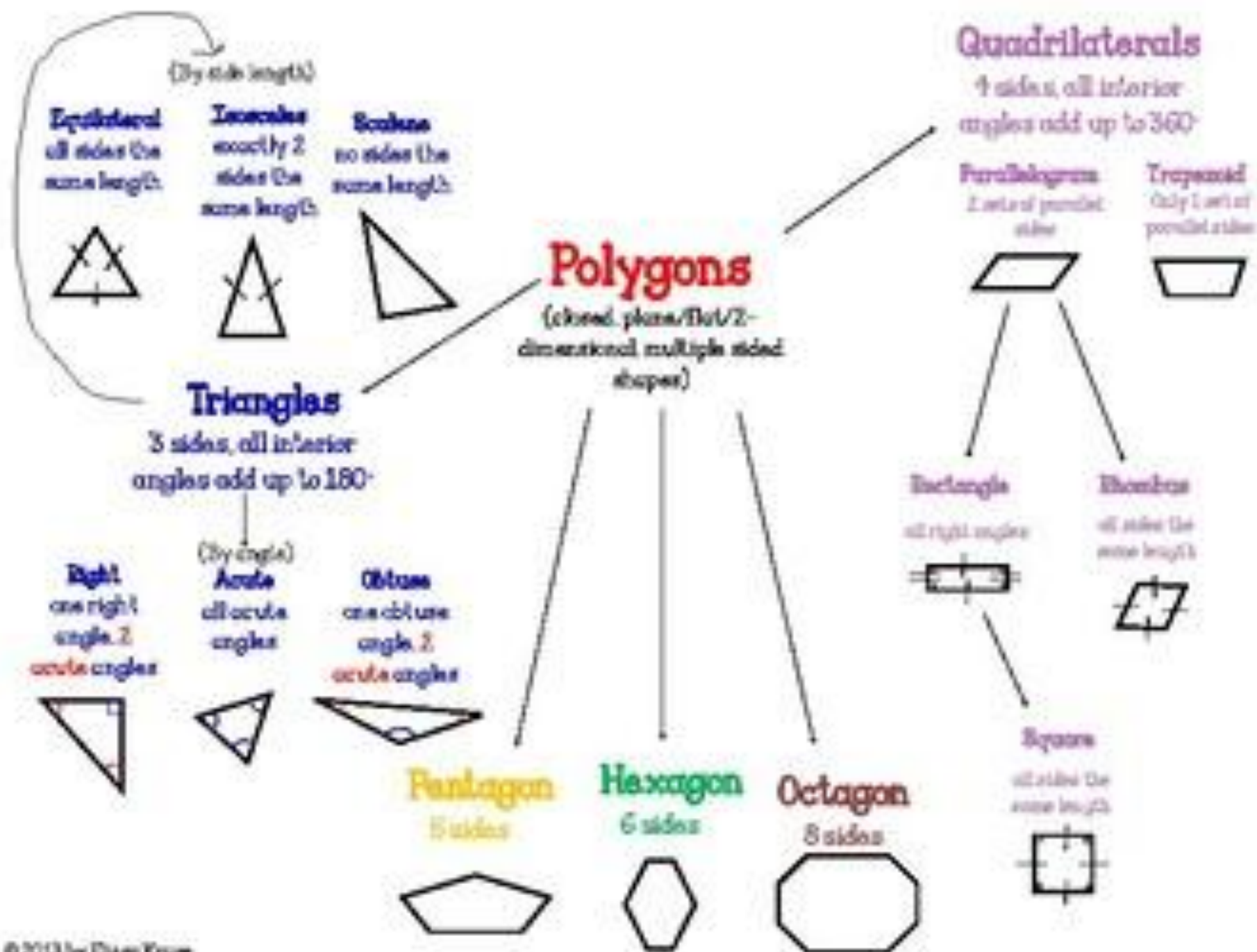
Octagon



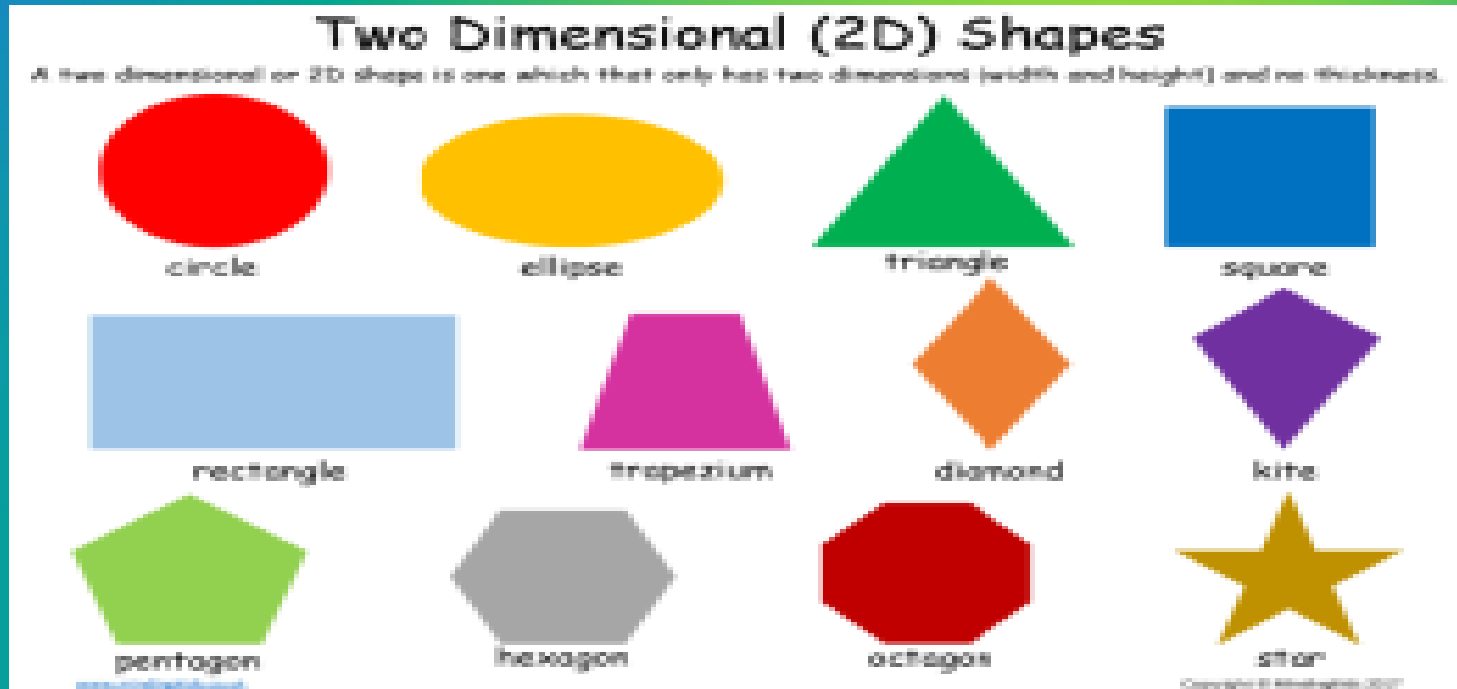
Nonagon



Decagon

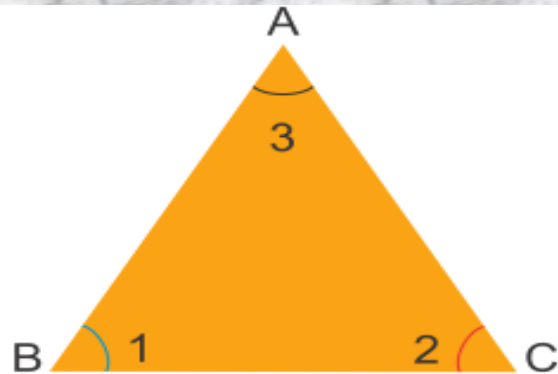


2D SHAPES



HAVING ONLY TWO DIMENSIONS, SUCH AS WIDTH AND HEIGHT BUT NO THICKNESS. SQUARES, CIRCLES, TRIANGLES, ETC ARE TWO-DIMENSIONAL OBJECTS AND ARE ALSO KNOWN AS "2D".

TRIANGLE



- The **sum of the interior angles** of a triangle is **180°** . $\angle 1 + \angle 2 + \angle 3 = 180^\circ$
- The Sum of any two sides of a triangle is always greater than its third side.
 $AB + BC > AC$
- In a triangle, the angle opposite to the longest side is the largest angle

Classification of triangles

Based on the sides

➤ Scalene Triangles

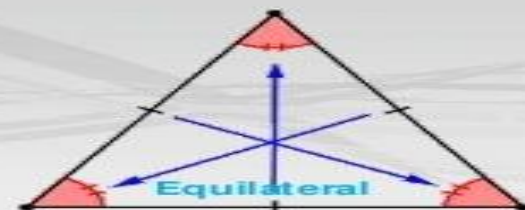
- **No** equal sides
- **No** equal angles

➤ Isosceles Triangles

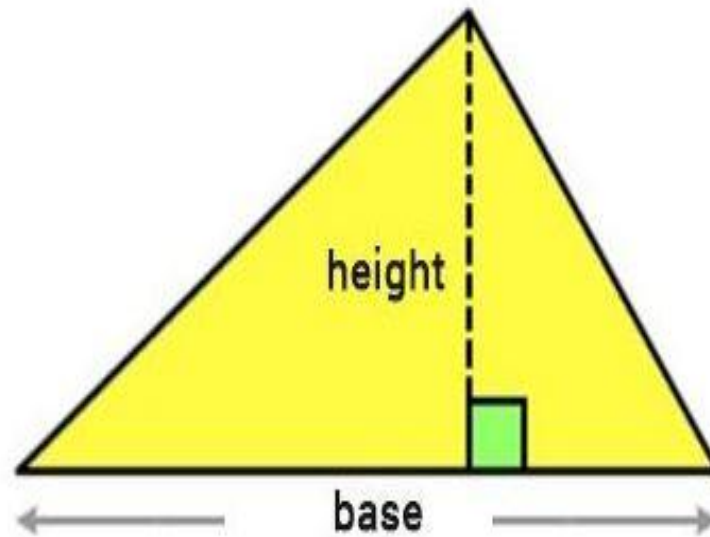
- **Two** equal sides
- **Two** equal angles

➤ Equilateral Triangles

- **Three** equal sides
- **Three** equal angles, always 60°



AREA OF TRIANGLE

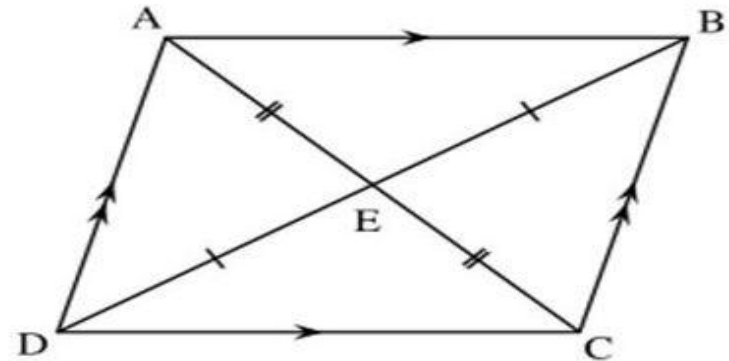


$$\text{Area} = \frac{1}{2} \times \text{base} \times \text{perpendicular height}$$

PARALLELOGRAM

Properties of Parallelograms

- The diagonals of a parallelogram bisect each other.
- Opposite sides of a parallelogram are congruent.
- Opposite angles of a parallelogram are congruent.
- Each diagonal bisects the parallelogram into two congruent triangles.



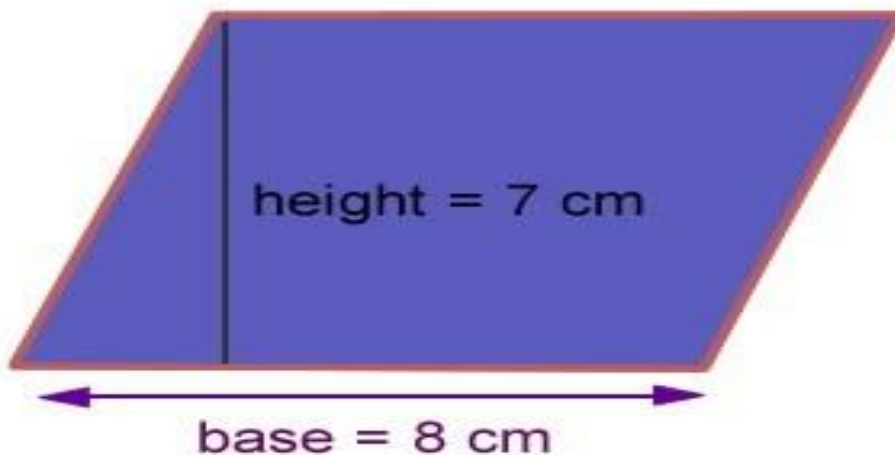
Parallelogram

AREA OF PARALLELOGRAM

Area of Parallelogram

The area of a Parallelogram equals the base times the height.

$$A = b \times h$$



$$A = b \times h$$

$$A = 8 \times 7$$

$$A = 56 \text{ cm}^2$$

RECTANGLE AND ITS PROPERTIES

Properties of Rectangles

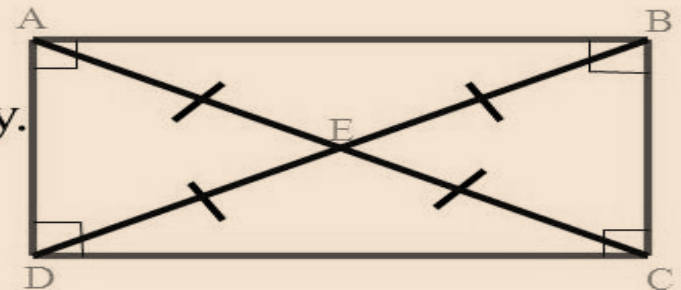
Parallelogram Properties:

- Opposite sides are parallel.
- Opposite sides are congruent.
- Opposite angles are congruent.
- Consecutive angles are supplementary.
- Diagonals bisect each other.

Plus:

- **All angles are right angles.**
- **Diagonals are congruent.**

- **Also:** $\triangle AEB$, $\triangle BEC$, $\triangle CED$, and $\triangle AED$ are isosceles triangles

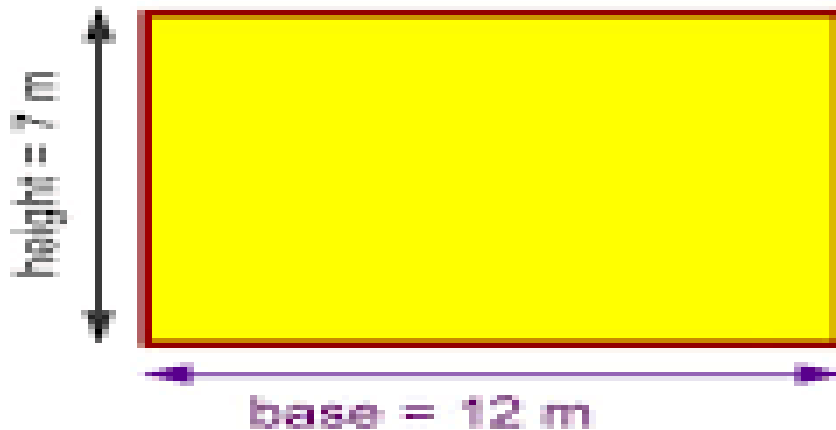


AREA OF RECTANGLE

Area of Rectangle

The area of a Rectangle equals the base times the height.

$$A = b \times h$$



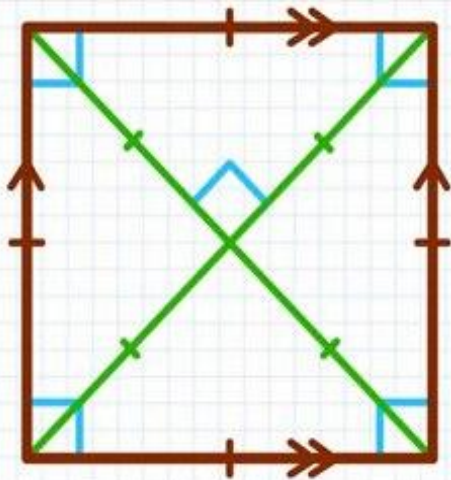
$$A = b \times h$$

$$A = 12 \times 7$$

$$A = 84 \text{ m}^2$$

SQUARE

identifying properties of SQUARES



DIAGONALS

- have two congruent diagonals that intersect at right angles and bisect each other
- the diagonals bisect their interior angles

SIDES

- all four sides are equal in length
- opposite sides must be parallel (like rhombi)

INTERIOR ANGLES

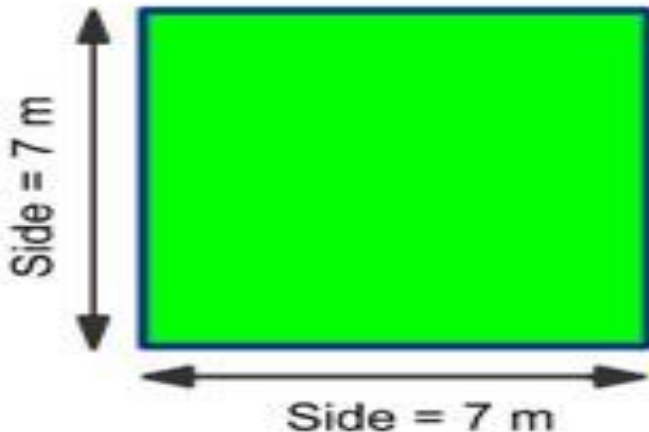
- all four interior angles are 90° (like rectangle)

AREA OF SQUARE

Area of Square

The area of a Square equals any of its two sides multiplied together.

$$A = s \times s$$



$$A = s \times s$$

$$A = 7 \times 7$$

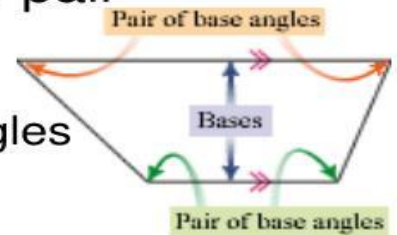
$$A = 49 \text{ cm}^2$$

TRAPEZOID

Trapezoid Properties

- A **trapezoid** is a quadrilateral with exactly one pair of parallel sides

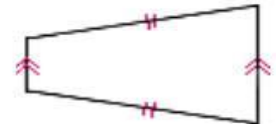
- The **bases** of a trapezoid are the parallel sides
- The **base angles** of a trapezoid are the pairs of angles that share a common base



- A **trapezium** is a quadrilateral with no parallel sides
- There are two bones in your wrist called the trapezoid and trapezium because of their shapes



- An **isosceles trapezoid** is a trapezoid in which the two non-parallel sides are congruent

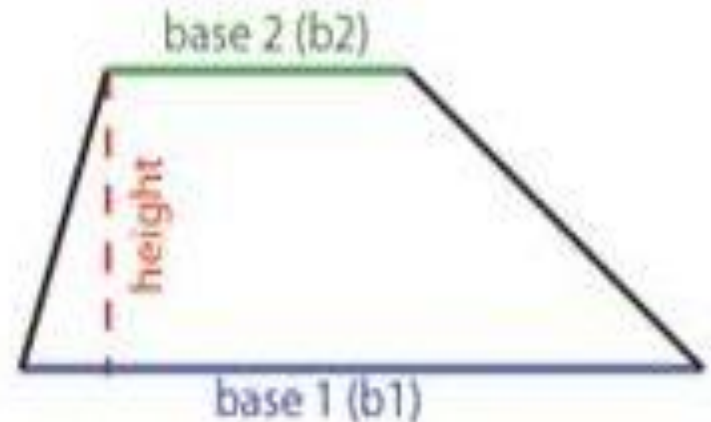


AREA OF TRAPEZOID

Area of a trapezoid

A trapezoid has one pair of parallel sides.

$$A = \frac{(b1 + b2) \times h}{2}$$



Where **A** is area, **b1** is base 1, **b2** is base 2 and **h** is height

Example: if $b1=7$; $b2=5$; $h=3$ then $A=?$

$$A = \frac{(b1 + b2) \times h}{2} = \frac{(7 + 5) \times 3}{2} = \frac{12 \times 3}{2} = \frac{36}{2} = 18 \text{ square units}$$

CIRCLE

Arc

Part of a circle named by its endpoints

Radius

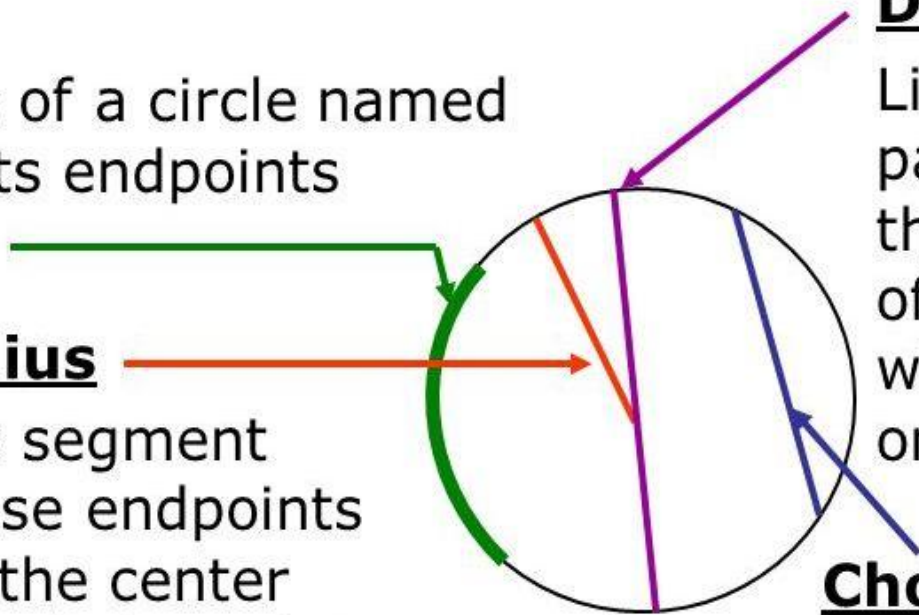
Line segment whose endpoints are the center of a circle and any point on the circle

Diameter

Line segment that passes through the center of a circle, and whose endpoints lie on the circle

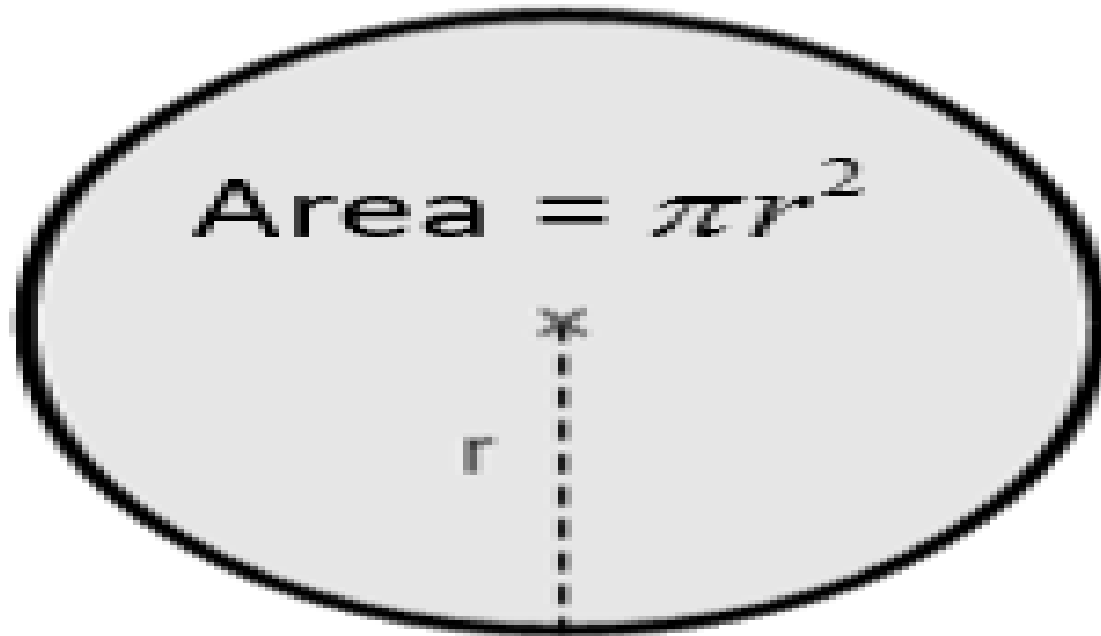
Chord

Line segment whose endpoints are any two points on a circle

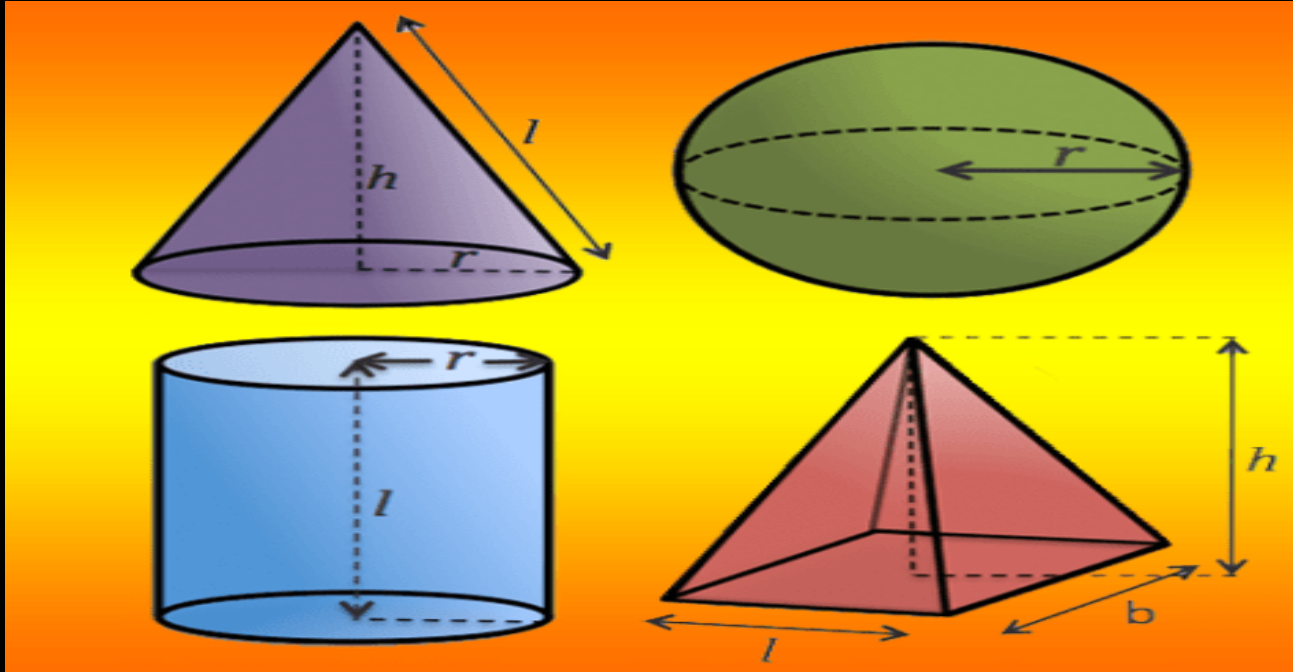


AREA OF CIRCLE

Area of Circle



3D SHAPES



3D shapes are solid objects that have three dimensions. These dimensions are length, width, and height. 3D shapes objects that have depth to them.

SURFACE AREA AND VOLUME

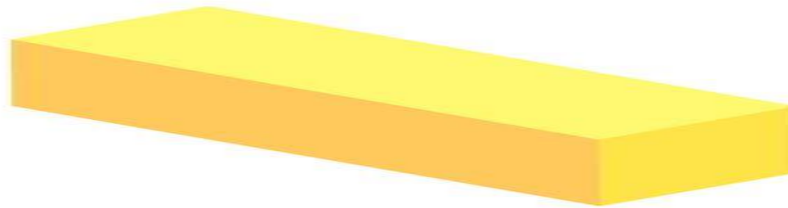
SURFACE AREA

The total area of the surface of a three-dimensional object.

VOLUME

Volume is the measure of the amount of space inside of a solid figure, like a cube, ball, cylinder or pyramid. It's units are always "cubic", that is, the number of little element cubes that fit inside the figure.

CUBOID

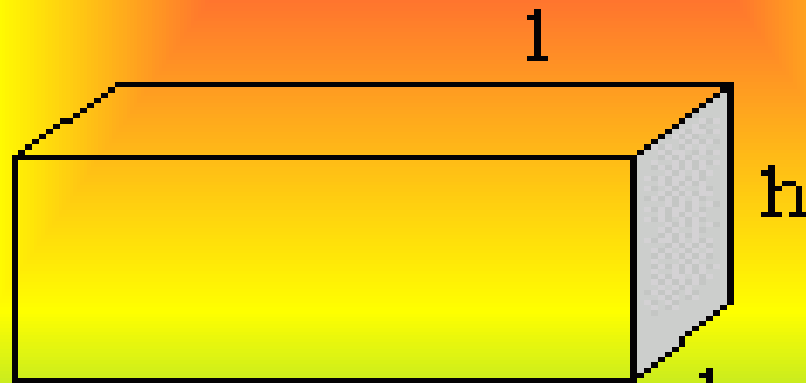


CUBOID:

1. It is rectangular in shape.
2. It is three dimensional and solid.
3. It is also called a rectangular prism.
4. All its angles are right angles (they measure up to 90 degrees)
5. The opposite faces of a cuboid are equal.

SURFACE AREA OF CUBOID

Rectangular Prism or Cuboid



$$S = 2lb + 2bh + 2hl$$

$$= 2(lb + bh + hl)$$

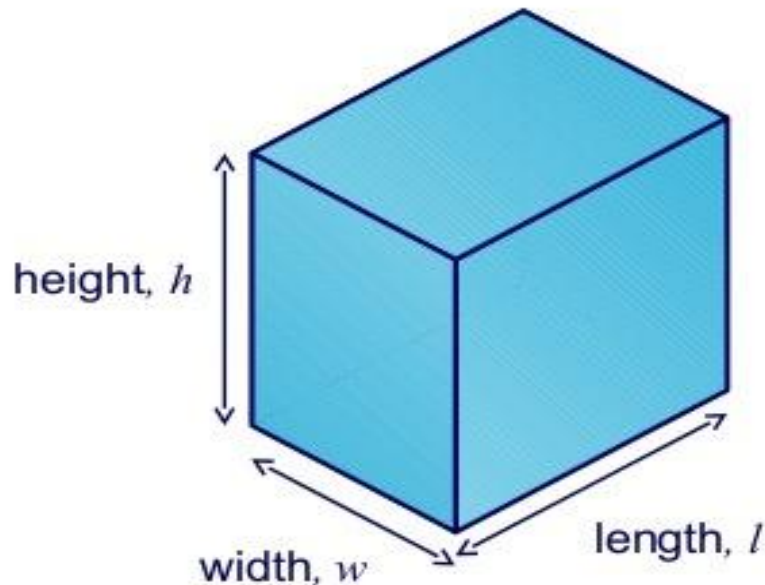
$$\text{Lateral } S = 2hl + 2hb$$

$$= 2h(l + b)$$

VOLUME OF CUBOID

Volume of a cuboid

We can find the volume of a cuboid by multiplying the area of the base by the height.



The area of the base
= length $\times$ width

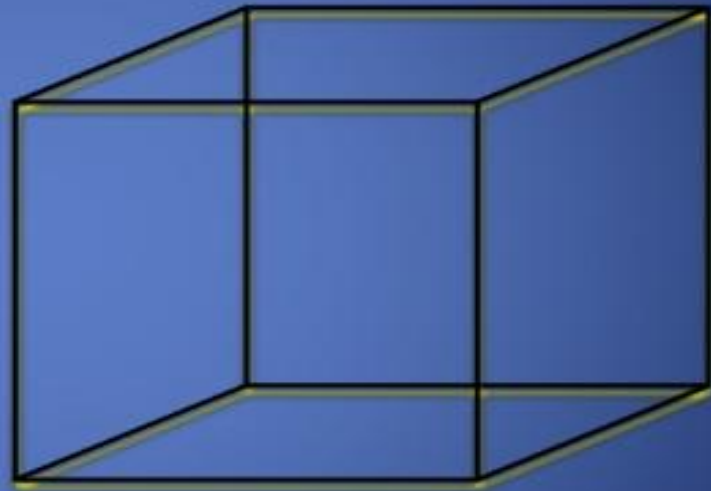
So,

Volume of a cuboid
= length $\times$ width $\times$ height
= lwh

CUBE

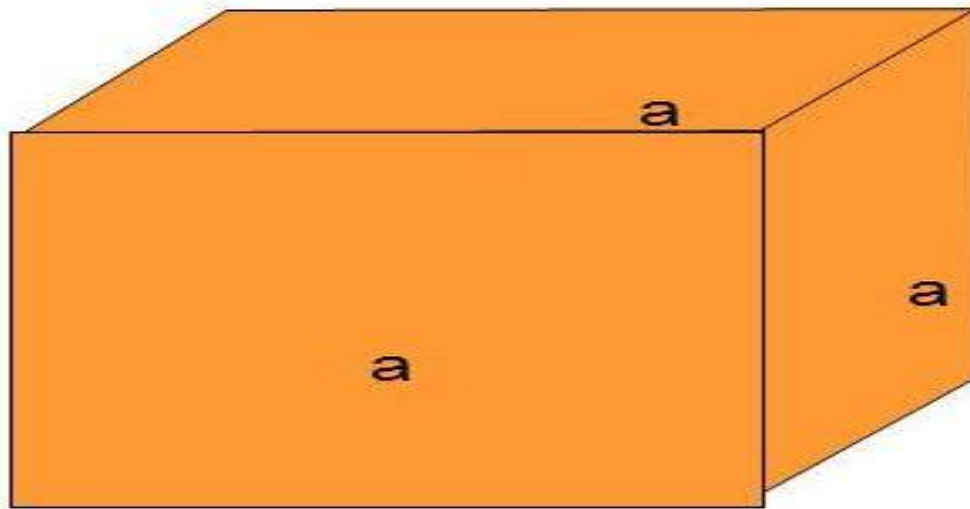
Cube

- 3-D geometrical shape
- Has six square sides
- All sides are equal
- The angle formed from an intersection is a 90° angle



SURFACE AREA OF CUBE

Cube

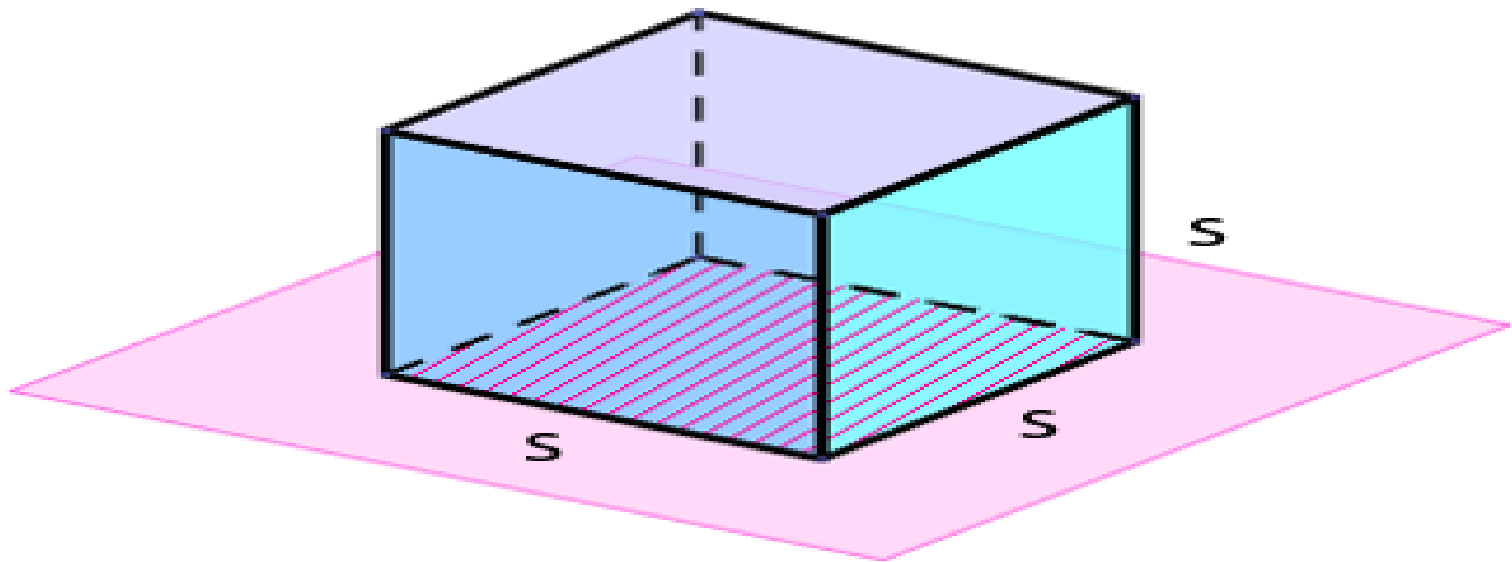


(Here all the faces are square)

$$\begin{aligned}\text{Surface area} &= \text{Area of all six faces} \\ &= 6a^2\end{aligned}$$

VOLUME OF CUBE

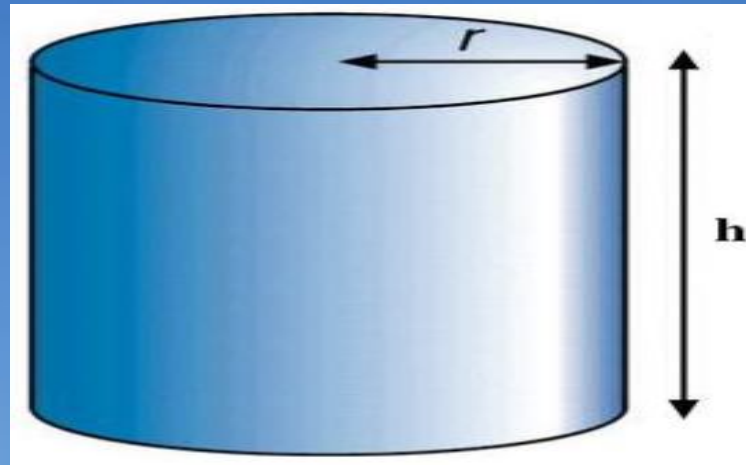
Volume of Cube



Volume of cube with side lengths s

$$V = s \times s \times s = s^3$$

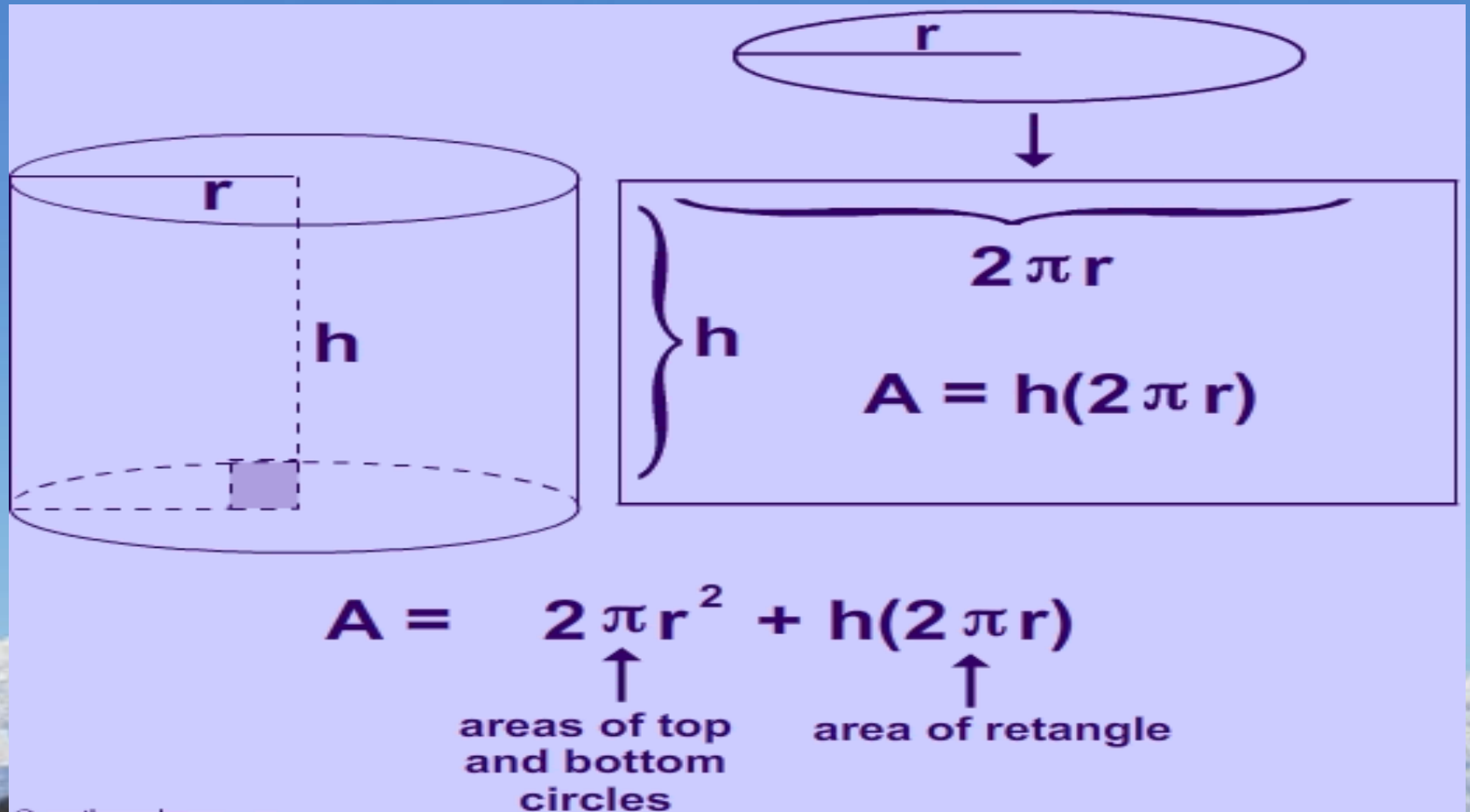
CYLINDER



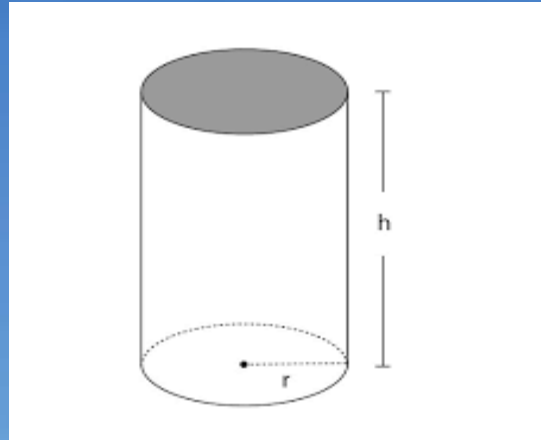
Properties of a Cylinder

- A solid bounded by two parallel circles
- The curved section that joins the two circles is rectangular in shape
- Cylinders can be defined in terms of the radius of the circles, r , and the height, h

SURFACE AREA OF CYLINDER



VOLUME OF CYLINDER



VOLUME OF A CYLINDER:

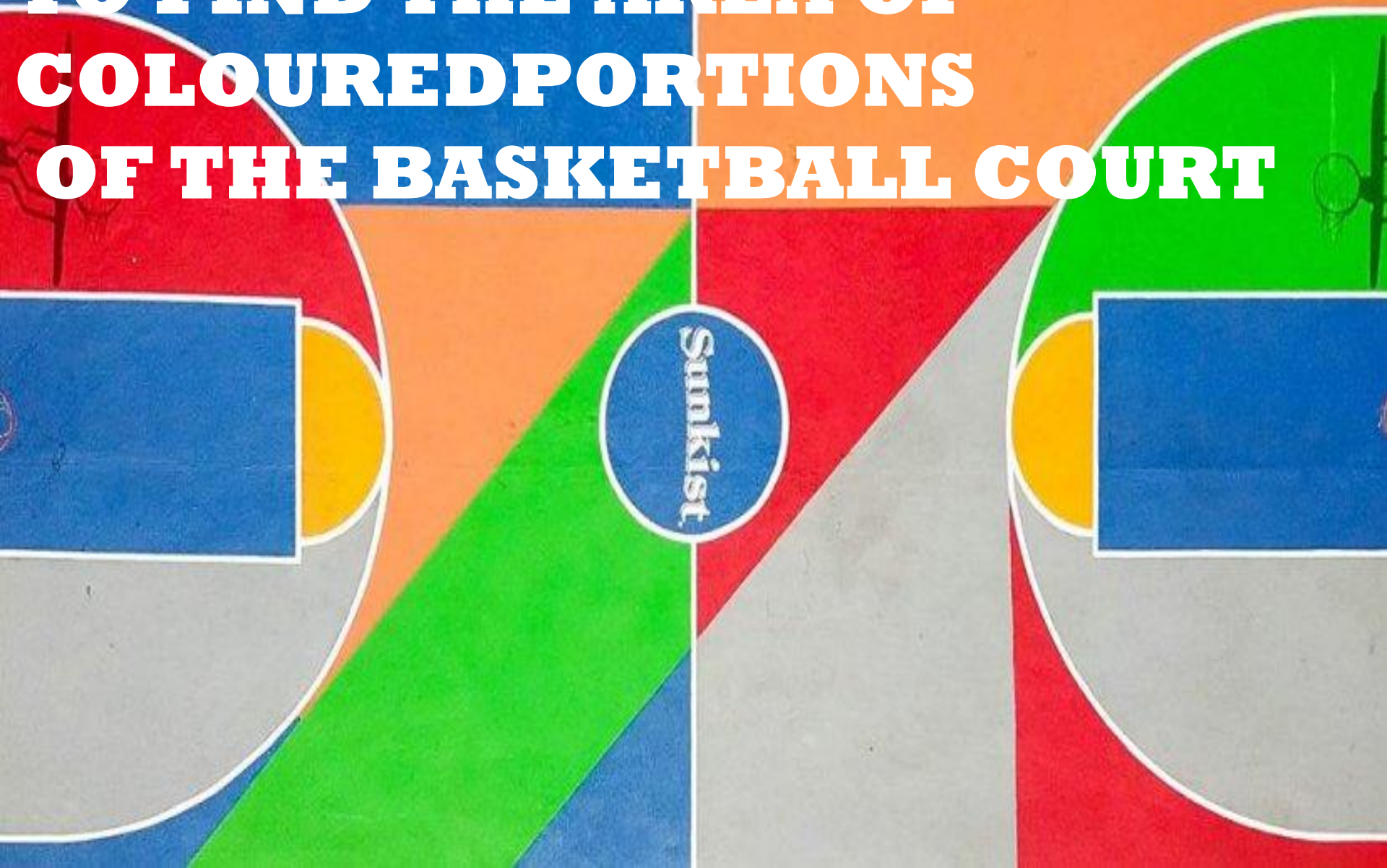
$$V = \pi r^2 h$$

where:

V = volume of the cylinder
r = radius of the base of the cylinder
h = height of the cylinder

ACTIVITY

**TO FIND THE AREA OF
COLOURED PORTIONS
OF THE BASKETBALL COURT**



**This activity was given to the children:-
[each group was of 5 children]**

Group 1 was told to find area of the RED portions.

Group 2 was told to find area of the GREY portions.

Group 3 was told to find area of the GREEN portions.



Area of red semicircle

$$\begin{aligned} &= [1/2 \times 22/7 \times 3.5 \times 3.5] - 4 \times 4 - \\ &\quad [1/2 \times 22/7 \times 0.7 \times 0.7] \\ &= 2.48 \text{m}^2 \end{aligned}$$

Area of triangle

$$\begin{aligned} &= 1/2 \times 4 \times 5 \\ &= 10 \text{m}^2 \end{aligned}$$

Area of red semi triangle

$$\begin{aligned} &= [7.5 \times 5 - 1/2 \times 22/7 \times 3.5 \times 3.5] \times 2 \\ &= 9.125 \text{m}^2 \end{aligned}$$

$$\begin{aligned} &\text{Area of grey semicircle} \\ &= [1/2 \times 22/7 \times 3.5 \times 3.5] - 4 \times 4 - \\ &\quad [1/2 \times 22/7 \times 0.7 \times 0.7] \\ &= 2.48\text{m}^2 \end{aligned}$$

$$\begin{aligned} &\text{Area of grey semicircle} \\ &= [1/2 \times 22/7 \times 3.5 \times 3.5] - 4 \times 4 - \\ &\quad [1/2 \times 22/7 \times 0.7 \times 0.7] \\ &= 2.48\text{m}^2 \end{aligned}$$

$$\begin{aligned} &\text{Area of trapezoid} \\ &= 1/2 \times [3.5 + 5.5] \times 3.5 \\ &= 9/2 \times 3.5 \\ &= 15.75\text{m}^2 \end{aligned}$$

Area of green semicircle

$$\begin{aligned} &= [1/2 \times 22/7 \times 3.5 \times 3.5] - 4 \times 4 - \\ &\quad [1/2 \times 22/7 \times 0.7 \times 0.7] \\ &= 2.48\text{m}^2 \end{aligned}$$

Area of green trapezoid

$$\begin{aligned} &= 1/2 \times [5 + 3] \times 4 \\ &= 16\text{m}^2 \end{aligned}$$

RECAPTUALATION

From this PPT children have learnt to find out the area of parallelograms, squares, rectangles, circles, trapezoids, cuboids, cubes and cylinders.

From the activity children are able to use formulae to find the areas of above mentioned figures and will learn to apply these formulae in day to day life.

THANK YOU

