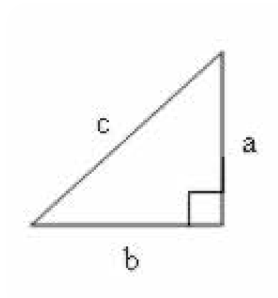
Important Formulaes of AREA

1. Pythagorean Theorem
(Pythagoras' theorem)

In a right angled triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides

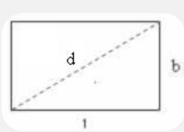
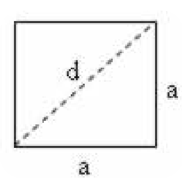


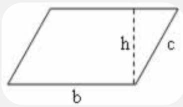
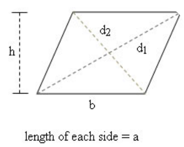
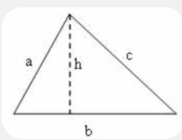
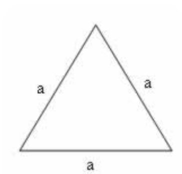
$c^2 = a^2 + b^2$
where c is the length of the hypotenuse and a and b are the lengths of the other two sides

2. Pi is a mathematical constant which is the ratio of a circle's circumference to its diameter. It is denoted by π

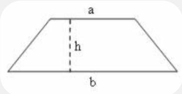
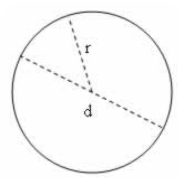
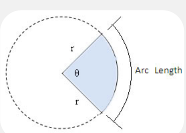
$\pi \approx 3.14 \approx 22/7$

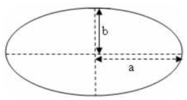
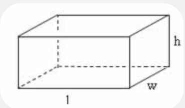
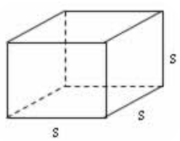
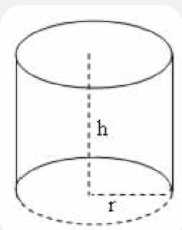
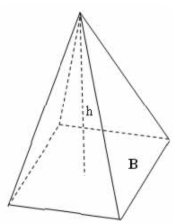
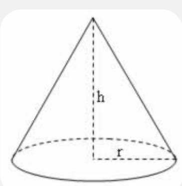
3. Geometric Shapes and solids and Important Formulas

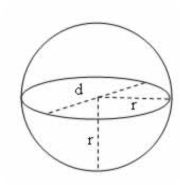
Geometric Shapes	Description	Formulas
	Rectanglel = Lengthb = Breadthd= Length of diagonal	Area = lbPerimeter = 2(l + b)d =√ l^2+b^2
	Squarea = Length of a sided= Length of	Area = a^2=1/2 d^2Perimeter = 4ad = √2a

	diagonal	
	Parallelogramb and c are sidesb = baseh = height	Area = bhPerimeter = 2(b + c)
	Rhombusa = length of each sideb = baseh = heightd1, d2 are the diagonal	Area = bh (Formula 1 for area)Area = $1/2\ d1d2$ (Formula 2 for area)Perimeter = 4a
	Trianglea , b and c are sidesb = baseh = height	Area = 1/2 bh (Formula 1 for area)Area = $\sqrt{S(S-a)(S-b)(S-c)}$ where S is the semiperimeter = $(a+b+c)/2$ (Formula 2 for area – Heron's formula)Perimeter = a + b + c Radius of incircle of a triangle of area A = A/S where S is the semiperimeter = $(a+b+c)/2$
	Equilateral Trianglea = side	Area = $\sqrt{3}/4\ a^2$Perimeter = 3aRadius of incircle of an equilateral triangle of side a = $a/2\sqrt{3}$Radius of circumcircle of an

equilateral triangle of side a = $a/\sqrt{3}$

 a is parallele to base b	Trapezium (Trapezoid Base in American English)h = height	Area = $1/2(a+b)h$
	Circler = radiusd = diameter	d = 2rArea = $\pi r^2 = 1/4\ \pi d^2$Circumference = $2\pi r = \pi d$Circumference$/d = \pi$
	Sector of Circler = radiusθ = central angle	Area, A =$(\theta/360)\pi r^2$ (if angle measure is in degrees) $=1/2\ r^2\theta$ (if angle measure is in radians)Arc Length, s = $(\theta/180)\pi r$ (if angle measure is in degrees) $=r\theta$ (if angle measure is in radians) Plese note that in the radian system for angular measurement, 2π radians = $360°$ 1 radian = $180°/\pi$ $1° = \pi/180$ radians Hence, Angle in Degrees = Angle in Radians $\times 180°/\pi$

		Angle in Radians = Angle in Degrees $\times \pi/180°$
	EllipseMajor axis length = 2aMinor axis length = 2b	Area = πabPerimeter $\approx 2\pi\sqrt{(a^2+b^2)/2}$
	Rectangular Solidl = lengthw = widthh = height	Total Surface Area = 2lw + 2wh + 2hl = 2(lw + wh + hl)Volume = lwh
	Cubes = edge	Total Surface Area = $6s^2$Volume = s^3
	Right Circular Cylinderh = heightr = radius of base	Lateral Surface Area = $(2\pi r)h$Total Surface Area = $(2\pi r)h + 2(\pi r^2)$Voulme = $(\pi r^2)h$
	Pyramidh = heightB = area of the base	Total Surface Area = B + Sum of the areas of the trianguar sidesVolume = 1/3Bh
	Right Circular Coneh = heightr = radius of base	Lateral Surface Area =$\pi r\sqrt{r^2+h^2}$ =π rs where s is the slant height = $\sqrt{r^2+h^2}$Volume= 1/3 $(\pi r^2 h)$



Spherer = radiusd = diameter | d = 2rSurface Area = $4\pi r$^2=πd^2Volume = 4/3(πr^3)=1/6πd^3

4. Important properties of Geometric Shapes

- Properties of Triangle

Sum of the angles of a triangle = 180°

Sum of any two sides of a triangle is greater than the third side.

The line joining the midpoint of a side of a triangle to the positive vertex is called the median

The median of a triangle divides the triangle into two triangles with equal areas

Centroid is the point where the three medians of a triangle meet.

Centroid divides each median into segments with a 2:1 ratio

Area of a triangle formed by joining the midpoints of the sides of a given triangle is one-fourth of the area of the given triangle.

An equilateral triangle is a triangle in which all three sides are equal

In an equilateral triangle, all three internal angles are congruent to each other

In an equilateral triangle, all three internal angles are each 60°

An isosceles triangle is a triangle with (at least) two equal sides

In isosceles triangle, altitude from vertex bisects the base.

Properties of Quadrilaterals

A. Rectangle

The diagonals of a rectangle are equal and bisect each other

opposite sides of a rectangle are parallel

opposite sides of a rectangle are congruent

opposite angles of a rectangle are congruent

All four angles of a rectangle are right angles

The diagonals of a rectangle are congruent

B. Square

All four sides of a square are congruent

Opposite sides of a square are parallel

The diagonals of a square are equal

The diagonals of a square bisect each other at right angles

All angles of a square are 90 degrees.

C. Parallelogram

The opposite sides of a parallelogram are equal in length.

The opposite angles of a parallelogram are congruent (equal measure).

The diagonals of a parallelogram bisect each other.

Each diagonal of a parallelogram divides it into two triangles of the same area

D. Rhombus

All the sides of a rhombus are congruent

Opposite sides of a rhombus are parallel.

The diagonals of a rhombus are unequal and bisect each other at right angles

Opposite internal angles of a rhombus are congruent (equal in size)

Any two consecutive internal angles of a rhombus are supplementary; i.e. the sum of their angles = 180° (equal in size)

Other properties of quadrilaterals

The sum of the interior angles of a quadrilateral is 360 degrees

A square and a rhombus on the same base will have equal areas.

A parallelogram and a rectangle on the same base and between the same parallels are equal in area.

Of all the parallelogram of given sides, the parallelogram which is a rectangle has the greatest area.

Each diagonal of a parallelogram divides it into two triangles of the same area

Sum of Interior Angles of a polygon

The sum of the interior angles of a polygon = $180(n - 2)$ degrees where n = number of sides

Example 1 : Number of sides of a triangle = 3. Hence, sum of the interior angles of a triangle = $180(3 - 2) = 180 \times 1 = 180^\circ$

Example 2 : Number of sides of a quadrilateral = 4. Hence, sum of the interior angles of any quadrilateral = $180(4 - 2) = 180 \times 2 = 360^\circ$