

FUNDEMENTAL CONCEPTS

I.RESULTS ON TRIANGLES:

1.Sum of the angles of a triangle is 180 degrees.

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

3.Pythagoras theorem:

In a right angle triangle,

$$(\text{Hypotenuse})^2 = (\text{base})^2 + (\text{Height})^2$$

4.The line joining the midpoint of a side of a triangle to the opposite vertex is called the

MEDIAN

5.The point where the three medians of a triangle meet is called **CENTROID**.

Centroid divides each of the medians in the ratio 2:1.

6.In an isosceles triangle, the altitude from the vertex bi-sects the base

7.The median of a triangle divides it into two triangles of the same area.

8.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.

II.RESULTS ON QUADRILATERALS:

1. The diagonals of a parallelogram bisect each other .
2. Each diagonal of a parallelogram divides it into two triangles of the same area
3. The diagonals of a rectangle are equal and bisect each other.
4. The diagonals of a square are equal and bisect each other at right angles.
5. The diagonals of a rhombus are unequal and bisect each other at right angles.
6. A parallelogram and a rectangle on the same base and between the same parallels are equal in area.
7. Of all the parallelograms of a given sides , the parallelogram which is a rectangle has the greatest area.

IMPORTANT FORMULAE

I.1. Area of a rectangle = (length * breadth)

Therefore length = (area/breadth) and breadth = (area/length)

2. Perimeter of a rectangle = $2 * (\text{length} + \text{breadth})$

II. Area of a square = (side)² = $\frac{1}{2}(\text{diagonal})^2$

III Area of four walls of a room = $2 * (\text{length} + \text{breadth}) * (\text{height})$

IV 1. Area of the triangle = $\frac{1}{2}(\text{base} * \text{height})$

2. Area of a triangle = $(s * (s-a)(s-b)(s-c))^{1/2}$, where a,b,c are the sides of a triangle and $s = \frac{1}{2}(a+b+c)$

3. Area of the equilateral triangle = $(\frac{\sqrt{3}}{4}) * (\text{side})^2$

4. Radius of incircle of an equilateral triangle of side a = $\frac{a}{2}(\frac{\sqrt{3}}{2})$

5. Radius of circumcircle of an equilateral triangle of side a = $\frac{a}{\sqrt{3}}$

6. Radius of incircle of a triangle of area Δ and semiperimeter $S = \Delta/S$

V.1. Area of the parallelogram = (base * height)

2. Area of the rhombus = $\frac{1}{2}(\text{product of the diagonals})$

3. Area of the trapezium = $\frac{1}{2}(\text{sum of parallel sides}) * \text{distance between them}$

VI 1. Area of a circle = $\pi * r^2$, where r is the radius

2. Circumference of a circle = $2\pi R$.

3. Length of an arc = $\frac{2\pi R\theta}{360}$ where θ is the central angle

4. Area of a sector = $\frac{1}{2}(\text{arc} \times R) = \frac{\pi * R^2 * \theta}{360}$.

VII. 1. Area of a semi-circle = $\frac{\pi}{2} * R^2$.

2. Circumference of a semi-circle = $\pi * R$.