Triangles

Understanding: Triangles

- A triangle is a closed figure made of three sides, three angles, and three vertices.
- The sum of all interior angles of a triangle is always 180°.
- The side opposite the largest angle is the longest side.
- A triangle is the smallest polygon.
- It is classified based on sides or angles.

Types of Triangles by Sides

- Scalene Triangle: No sides are equal
- Isosceles Triangle: Two sides are equal
- Equilateral Triangle: All three sides are equal

Types of Triangles by Angles

- Acute Triangle: All angles are less than 90°
- Right Triangle: One angle is exactly 90°
- Obtuse Triangle: One angle is more than 90°

Median of a Triangle:

- The line segment joining the mid-points of the sides of a triangle to the opposite vertices are called medians of the triangle.
- Let D, E and F are the mid- points of sides BC, AC and AB respectively of \triangle ABC. Then, the line segments AD, BE and CF are the medians of \triangle ABC.

Altitudes of a Triangle

• In a triangle, the line segment drawn from the vertex to its opposite side so that it becomes perpendicular to its opposite side is called the altitude of the triangle. A triangle has three altitudes with respect to each side.







• In the figure, AD, BE and CF are the three altitudes of ΔABC drawn respectively from A on BC, from A to BC, from B on AC and from C on AB.

Let us understand with an example:

Example: In an isosceles triangle, if the measure of each equal angle is $50^{\circ}50^{\circ}$, then find the measure of the third angle.

Solution: Given:

The measure of each equal angle in an isosceles triangle is 50°. Let the measure of the third angle be x.



We know that the sum of the measure of interior angles of a triangle is 180°.

Now, $50^{\circ} + 50^{\circ} + x = 180^{\circ}$

⇒x=180°–100 = 80°

Hence, the measure of the third angle is 80°.

Example

Check if angles 60°, 60°, and 60° form a triangle

Sum = 60° + 60° + 60° = 180°

Yes, it forms an equilateral triangle

Summary Points

- A triangle has 3 sides, 3 angles, and 3 vertices.
- The sum of all angles in a triangle is always 180°.
- Triangles can be classified by sides or angles.
- Check the sum of angles to confirm if it is a valid triangle.
- Triangle properties are used in geometry and real-life construction.