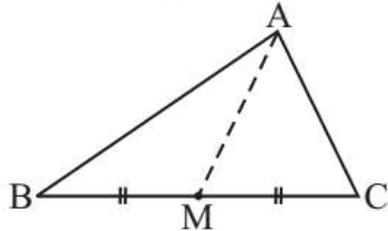# Triangles - Including Types, Properties and Constructions

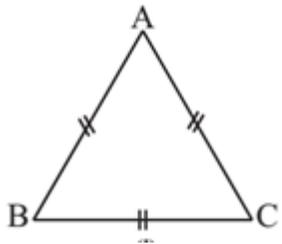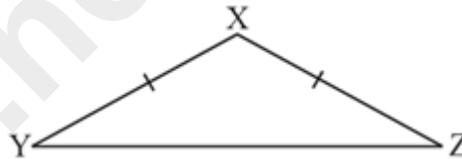| A triangle is a polygon with • three sides • 3 vertices and • 3 angles	The line segment joining a vertex of a triangle to the mid point of its opposite side is called a median of the triangle. A triangle has 3 medians. ; AM is the median, drwan from vertex A to opposite side BC ; BM = MC	The perpendicular line segment from a vertex of a triangle to its opposite side is called an altitude of the triangle. A triangle has 3 altitudes ; PM is the altitude (height , when base is QR)
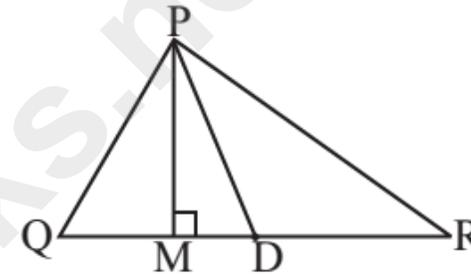
Classification based on sides

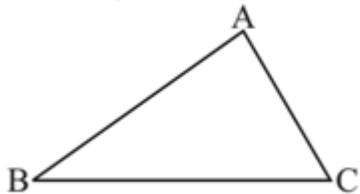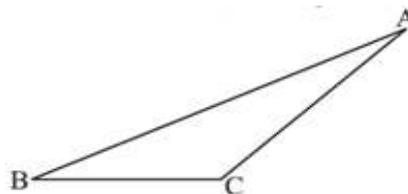| A triangle is said to be equilateral, if each of its sides has the same length; here, each angle measures 60°.	A triangle is said to be isosceles if at least two of its sides are of same length. Angles opposite to equal sides of an isosceles triangle are equal ; XY = XZ and XYZ = XZY . The unequal side ; YZ is the base	A scalene triangle • All sides are of different lengths • All angles are of different measures

Classification based on angles

| Acute angled triangle : has 3 acute angles.	Obtuse angled triangle : has 1 obtuse angle and other two are acute	Right angled triangle: has 1 right angle, other two angles are acute and complementary
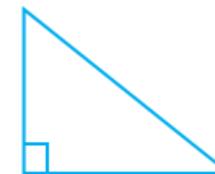
Properties of Triangles

The sum of any two sides of a triangle is greater than the third side	Angle Sum Property of Triangle

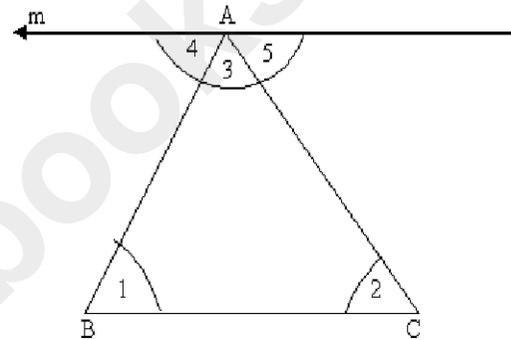The sum of any two sides of a triangle is greater than the third side
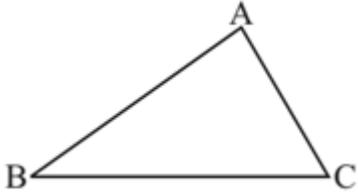
- **AB + BC > AC**
- **AC + AB > BC**
- **BC + AC > AB**

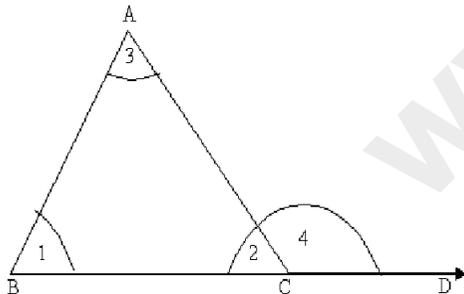The difference between any two sides of a triangle is less than the third side

Angle Sum Property of Triangle

The sum of the interior angles of a triangle is 180º : $\angle 1 + \angle 2 + \angle 3 = 180°$
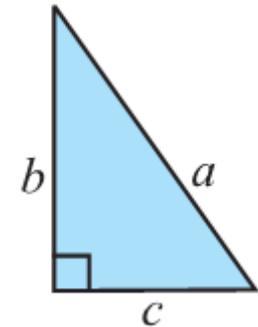

Exterior angle theorem : If a side of a triangle is produced, then the exterior angle so formed is equal to the sum of the two interior opposite angles ;

$$\angle 4 = \angle 1 + \angle 3$$

Pythagoras property
- In a right angled triangle, the side opposite to the right angle is called the hypotenuse and the other two sides are called its legs
- In a right-angled triangle, the square on the hypotenuse = the sum of the squares on its legs
- If the Pythagoras property holds, the triangle must be right-angled.

Here, $a^2 = b^2 + c^2$