A **triangle** is a **closed figure** made of **three line segments**. Every **triangle** has **three sides**, **three angles**, and **three vertices**. These are known as the **parts of a triangle**. The sides and the angles of every triangle differ from one another; therefore, they do not look alike.

Triangles can be classified based on their **sides and angles**.



- Based on their sides, there are **equilateral**, **isosceles** and **scalene triangles**.
- Based on their angles, there are **acute**, **obtuse** and **right-angled triangles**.

**Equilateral triangle**: A triangle in which **all the sides are equal** is called an equilateral triangle. All the three angles of an equilateral triangle are also equal, and each measures **60°.** 

**Isosceles triangle**: A triangle in which **any two sides are equal** is called an isosceles triangle. In an isosceles triangle, the **angles opposite the equal sides** are called the **base angles**, and they are equal.

Scalene triangle: A triangle in which **no two sides are equal** is called an Scalene triangle.

Acute-angled triangle: A triangle with all its **angles less than 90**° is known as an acute-angled triangle.

**Obtuse-angled triangle**: A triangle with **one of its angles more than 90° and less than 180°** is known as an obtuse-angled triangle.

Right-angled triangle: A triangle with **one of its angles equal to 90**° is known as a right-angled triangle. The **side opposite the 90**° **angle** is called the **hyponuse**, and is the **longest side of the triangle**.





Mark the **mid-point** of the side of a triangle, and join it to its opposite vertex. This **line segment** is called a **median**. It is defined as a line segment drawn from a **vertex** to the **mid-point** of the opposite side. You can draw three **medians** to a given triangle. The medians pass through a common point. Hence, the medians of a triangle are **concurrent**. This **point of concurrence** is called the **centroid**, and is denoted b y **G**. The centroid and medians of a triangle always lie inside the **triangle**. The **centroid of a triangle** divides the median in the **ratio 2:1**.



Altitude: The **altitude of a triangle** is a **line segment** drawn from a **vertex** and is **perpendicular** to the opposite side. A triangle has **three altitudes**. The **altitudes** of a triangle are **concurrent**. The **point of concurrence** is called the **orthocentre**, and is denoted by O. The altitude and orthocentre of a triangle need not lie inside the triangle.



## **Properties of Triangles**

- An exterior angle of a triangle is equal to the sum of its interior opposite angles.
- The total measure of the three angles of a triangle is 180°.
- Sum of the length of any two sides of a triangle is greater than the length of the third side.
- 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.
- The Pythagoras Property states that in a right-angled triangle, the square of the hypotenuse is equal to the sum of the squares on the legs.
- If the Pythagoras Property holds, the triangle must be right-angled.