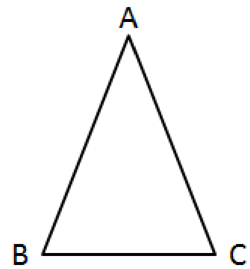
Class 8: Triangles (Lecture Notes I)

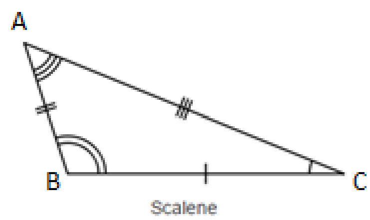
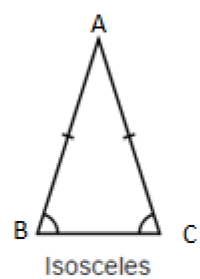
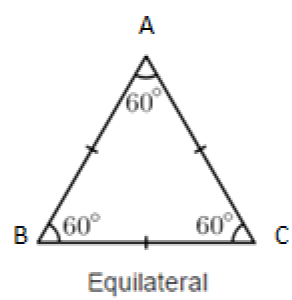


Triangle: We just studied polygons. Triangle is a polygon with three sides. So, we could define a triangle as a plane closed figure bounded by three line segments.

A triangle is a polygon with three edges and three vertices. It is one of the most basic shapes in geometry. A triangle with vertices A, B, and C is denoted by ΔABC.

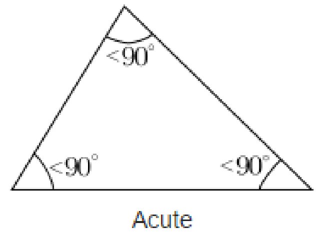
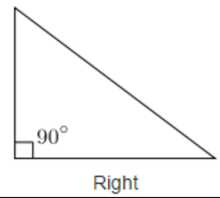
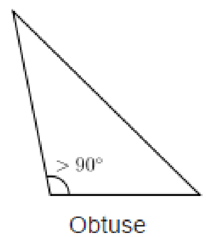
Kinds of Triangles

1. **This is a classification of triangles based on the length of the sides**

Scalene Triangle	A triangle in which all three sides are of different lengths is called Scalene Triangle. In this type of triangle: $\angle A \neq \angle B \neq \angle C$	
Isosceles Triangle	A triangle in which two sides are of the same length is called Isosceles Triangle In this type of triangle: $\angle B = \angle C$	
Equilateral Triangle	A triangle in which all three sides are of the same length is called Equilateral Triangle. In this type of triangle: $\angle A = \angle B = \angle C$	

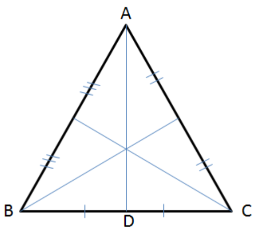
Some of the diagrams have been adopted from https://en.wikipedia.org/wiki/Triangle

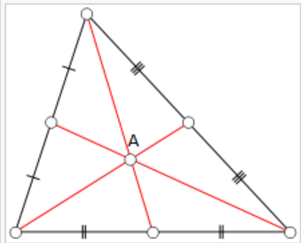
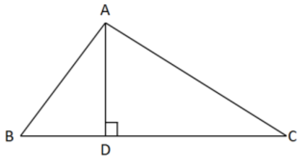
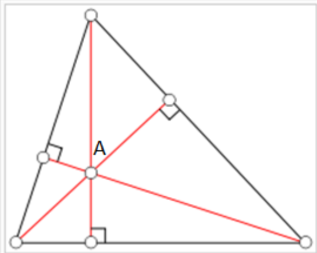
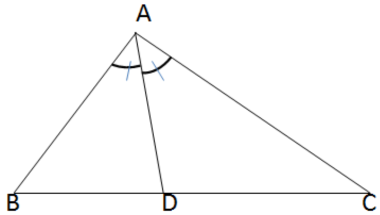
2. Classification of Triangles based on the angles

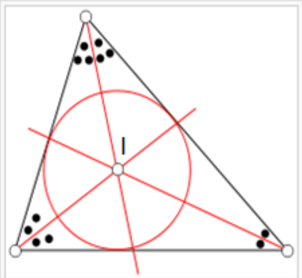
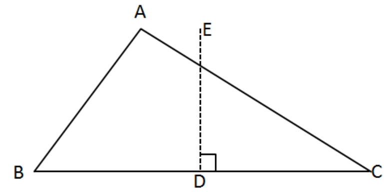
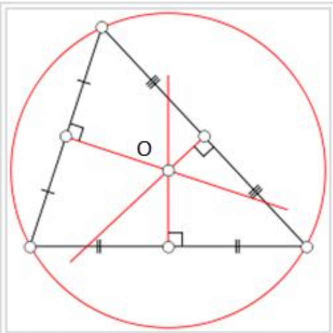
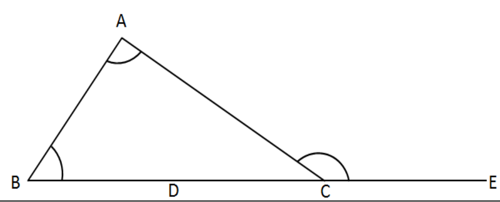
Acute-angled Triangle	A triangle in which all the three angles are more than 0° and less than 90° is called acute-angled triangle.	
Right-angles Triangle	A triangle in which one of the angles is 90° is called right-angled triangle.	
Obtuse-angled triangle	A triangle in which one of the angles is more than 90° but less than 180° is called obtuse-angled triangle.	

Some of the diagrams have been adopted from https://en.wikipedia.org/wiki/Triangle

Terms related to a Triangle

Median	A line segment joining the vertex to the mid-point of the opposite side of a triangle is called median. In this vertex A is meeting at point D (such that BD=DC) midpoint of BC	

Centroid	The point of intersection of three medians is called centroid.	 The intersection of the medians is the centroid.
Altitude	The perpendicular drawn from the vertex to the opposite side. Here AD is the altitude of the triangle AD and BC is the base.	
Orthocenter	The intersection of the three altitudes is called the Orthocenter of the triangle. Here A is the Orthocenter of the triangle.	 The intersection of the altitudes is the orthocenter.
Angle Bisector	A line segment that bisects and interior angle of a triangle is called angle bisector. Here AD is bisecting ∠BAC into two equal ∠BAD and ∠DAC	

Incentre and Incircle	The point of intersection of internal angle bisectors is called the Incentre. I is the Incentre of the triangle. Now if you draw a circle with the center I in such a way that it touches all the three sides of the triangle, then that is called Incircle.	 The intersection of the angle bisectors is the center of the incircle.
Perpendicular Bisector or Right Bisector	A line bisecting any side of the triangle and perpendicular to it is called perpendicular bisector of that side of the triangle. Here BC is being bisected by DE. BD=DC and ED ⊥ BC.	
Circumcenter and Circumcircle	The point of intersection of the perpendicular bisectors of the sides of the triangle is called Circumcenter. Here O is the circumcenter.	 The circumcenter is the center of a circle passing through the three vertices of the triangle.
Exterior Angle and Interior Opposite Angles of a Triangle	∠ACD is the exterior angle and ∠CBA and ∠ BAC are opposite interior angles of this exterior angle.	

Some of the diagrams have been adopted from https://en.wikipedia.org/wiki/Triangle