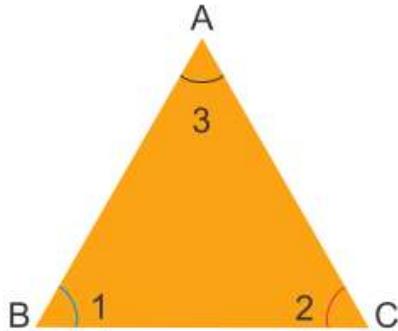


# TRIANGLES

## Properties of Triangles



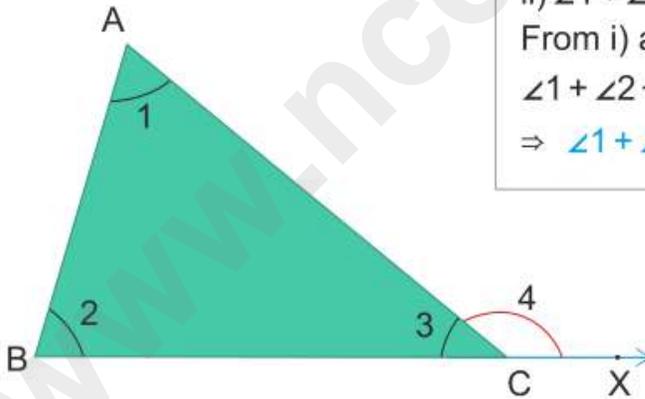
- The **sum of the interior angles** of a triangle is  **$180^\circ$** .  $\angle 1 + \angle 2 + \angle 3 = 180^\circ$
- The Sum of any two sides of a triangle is always greater than its third side.  
 $AB + BC > AC$
- In a triangle, the angle opposite to the longest side is the largest angle

## Exterior Angle Property of a Triangle

If a side of a triangle is stretched, the exterior angle so formed is equal to the sum of two opposite interior angles.

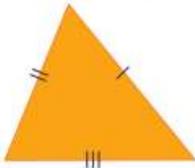
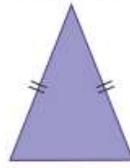
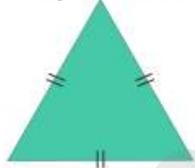
Proof:

- i)  $\angle 3 + \angle 4 = 180^\circ$  (Linear pair)  
ii)  $\angle 1 + \angle 2 + \angle 3 = 180^\circ$  (Angle sum property)  
From i) and ii) we get,  
 $\angle 1 + \angle 2 + \angle 3 = \angle 3 + \angle 4$   
 $\Rightarrow \angle 1 + \angle 2 = \angle 4$

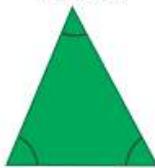
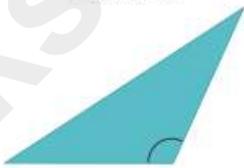


## Types of Triangles

### Triangles Based on Sides

Scalene	Isosceles	Equilateral
		
Length of all sides are different	Length of two sides are equal	Length of all sides are equal

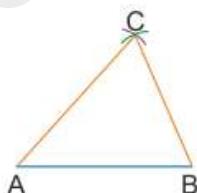
### Triangles Based on Angles

Acute	Right	Obtuse
		
Each angle is $< 90^\circ$	One angle is $= 90^\circ$	One angle is $> 90^\circ$

## Construction of Triangles

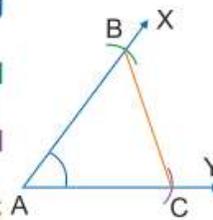
**SSS Triangle:** Given AB, AC and BC

- Draw line segment AB
- With B as centre and radius = BC draw an arc
- With A as centre and radius = AC draw an arc intersecting the arc in step (ii)
- Join CA and CB to obtain  $\triangle ABC$



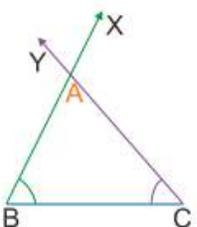
**SAS Triangle:** Given AB, AC and  $\angle A$

- Draw ray AY
- Draw  $\angle XAY = \angle A$  using protractor
- With A as centre and radius = AB cut AX at B
- With A as centre and radius = AC cut AY at C
- Join BC to obtain  $\triangle ABC$



**ASA Triangle:** Given  $\angle B$  and  $\angle C$  and BC

- Draw line segment BC
- Draw  $\angle CBX = \angle B$  using protractor
- Draw  $\angle BCY = \angle C$  using protractor, such that Y is on same side of BC as X
- The point where BX and CY intersect is A, thus we obtain  $\triangle ABC$



**RHS Triangle:** Given  $\angle C = 90^\circ$ , hypotenuse AB and BC

- Draw line segment BC
- Draw  $\angle BCX = 90^\circ$  using protractor
- With B as centre and radius = AB cut CX at A
- Join BA to obtain  $\triangle ABC$

