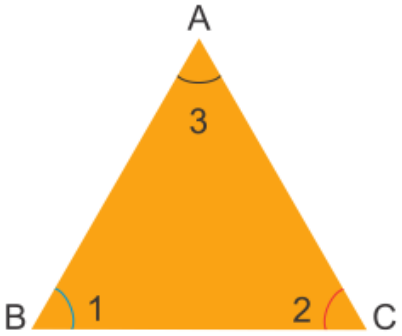
TRIANGLES

Properties of Triangles



- The **sum of the interior angles** of a triangle is **180°.** $\angle 1 + \angle 2 + \angle 3 = 180^\circ$
- The Sum of any two sides of a triangle is always greater then 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:

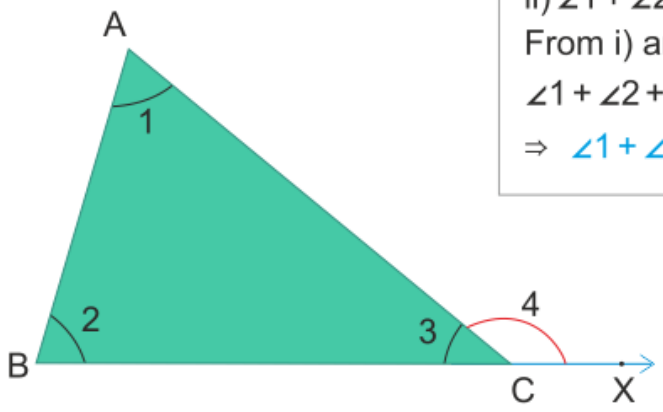
i) $\angle 3 + \angle 4 = 180^\circ$ *(Linear pair)*

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

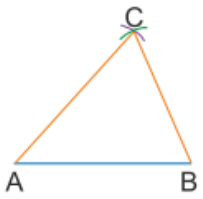
Triangles Based on Angles

Acute	Right	Obtuse
		
Each angle is < 90°	One angle is = 90°	One angle is > 90°

Construction of Triangles

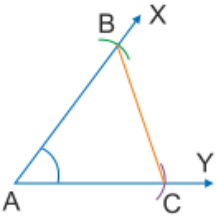
SSS Triangle: Given AB, AC and BC

i Draw line segment AB
ii With B as centre and radius = BC draw an arc
iii With A as centre and radius = AC draw an arc intersecting the arc in step (ii)
iv Join CA and CB to obtain △ ABC



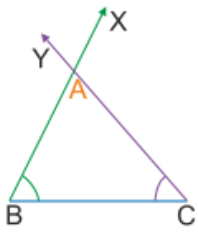
SAS Triangle: Given AB, AC and ∠A

i Draw ray AY
ii Draw ∠XAY = ∠A using protractor
iii With A as centre and radius = AB cut AX at B
iv With A as centre and radius = AC cut AY at C
v Join BC to obtain △ ABC



ASA Triangle: Given ∠B and ∠C and BC

i Draw line segment BC
ii Draw ∠CBX = ∠B using protractor
iii Draw ∠BCY = ∠C using protractor, such that Y is on same side of BC as X
iv The point where BX and CY intersect is A, thus we obtain △ ABC



RHS Triangle: Given ∠C = 90°, hypotenuse AB and BC

i Draw line segment BC
ii Draw ∠ BCX = 90° using protractor
iii With B as centre and radius = AB cut CX at A
iv Join BA to obtain △ABC