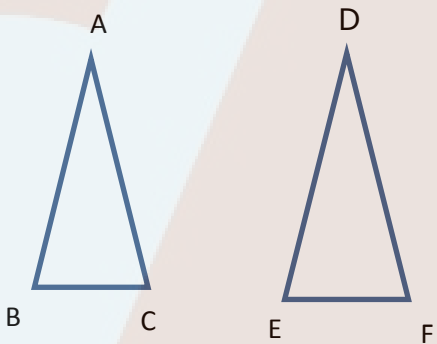


## Class 9 Important Formulas

### Chapter 7 - Triangles

S.no	Terms	Descriptions
1	Congruence	<p>Two Geometric figure are said to be congruence if they are exactly same size and shape Symbol used is <math>\cong</math></p> <p>Two angles are congruent if they are equal Two circle are congruent if they have equal radii Two squares are congruent if the sides are equal</p>
2	Triangle Congruence	<ul style="list-style-type: none"> <li>Two triangles are congruent if three sides and three angles of one triangle is congruent to the corresponding sides and angles of the other</li> </ul> <div style="text-align: center;">  </div> <ul style="list-style-type: none"> <li>Corresponding sides are equal <math>AB=DE</math> , <math>BC=EF</math> ,<math>AC=DF</math></li> <li>Corresponding angles are equal <math>\angle A = \angle D</math>, <math>\angle B = \angle E</math>, <math>\angle C = \angle F</math></li> <li>We write this as</li> </ul>

$$ABC \cong DEF$$

- The above six equalities are between the corresponding parts of the two congruent triangles. In short form this is called **C.P.C.T**
- We should keep the letters in correct order on both sides

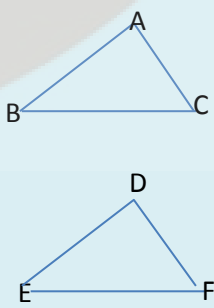
### 3 Inequalities in Triangles

- 1) In a triangle angle opposite to longer side is larger
- 2) In a triangle side opposite to larger angle is larger
- 3) The sum of any two sides of the triangle is greater than the third side

In triangle ABC

$$AB + BC > AC$$

### Different Criterion for Congruence of the triangles

N	Criterion	Description	Figures and expression
1	Side angle Side (SAS) congruence	<ul style="list-style-type: none"> <li>• Two triangles are congruent if the two sides and included angles of one triangle is equal to the two sides and included angle</li> <li>• It is an axiom as it cannot be proved so it is an accepted truth</li> </ul>	

- ASS and SSA type two triangles may not be congruent always

**If following condition**

$$AB=DE, BC=EF$$

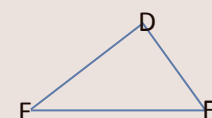
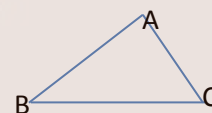
$$\angle B = \angle E$$

**Then**

$$ABC \cong DEF$$

**2** Angle side angle (ASA) congruence

- Two triangles are congruent if the two angles and included side of one triangle is equal to the corresponding angles and side
- It is a theorem and can be proved



**If following condition**

$$BC=EF$$

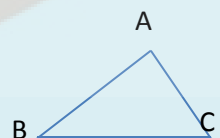
$$\angle B = \angle E, \angle C = \angle F$$

**Then**

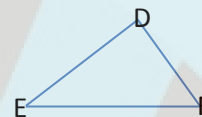
$$ABC \cong DEF$$

**3** Angle angle side (AAS) congruence

- Two triangles are congruent if the any two pair of angles and any side of one triangle is equal to the corresponding angles and side



- It is a theorem and can be proved



**If following condition**

$$BC = EF$$

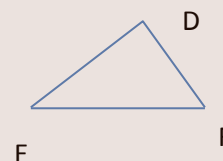
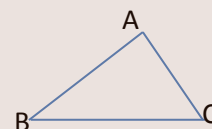
$$\angle A = \angle D, \angle C = \angle F$$

**Then**

$$ABC \cong DEF$$

#### 4 Side-Side-Side (SSS) congruence

- Two triangles are congruent if the three sides of one triangle is equal to the three sides of the another



**If following condition**

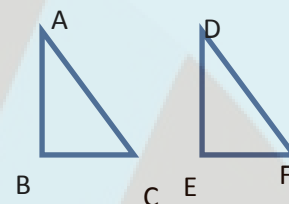
$$BC = EF, AB = DE, AC = DF$$

**Then**

$$ABC \cong DEF$$

**5** Right angle – hypotenuse-side(RHS) congruence

- Two right triangles are congruent if the hypotenuse and a side of the one triangle are equal to corresponding hypotenuse and side of the another



**If following condition**

$$AC=DF, BC=EF$$

**Then**

$$ABC \cong DEF$$

## Some Important points on Triangles

Terms	Description
<b>Orthocenter</b>	Point of intersection of the three altitude of the triangle
<b>Equilateral</b>	triangle whose all sides are equal and all angles are equal to $60^\circ$
<b>Median</b>	A line Segment joining the corner of the triangle to the midpoint of the opposite side of the triangle
<b>Altitude</b>	A line Segment from the corner of the triangle and perpendicular to the opposite side of the triangle
<b>Isosceles</b>	A triangle whose two sides are equal
<b>Centroid</b>	Point of intersection of the three median of the triangle is called the centroid of

<b>In center</b>	the triangle
<b>Circumcenter</b>	All the angle bisector of the triangle passes through same point
<b>Scalene triangle</b>	The perpendicular bisector of the sides of the triangles passes through same point
<b>Right Triangle</b>	Triangle having no equal angles and no equal sides
<b>Obtuse Triangle</b>	Right triangle has one angle equal to $90^\circ$
<b>Acute Triangle</b>	One angle is obtuse angle while other two are acute angles
	All the angles are acute