## Congruence of Triangles

## NOTES

## **FUNDAMENTALS**

- Two figures, having exactly the same shape and size are said to be congruent.
- Two triangles are said to be congruent, if pairs of corresponding sides and corresponding angles are equal.

**Note:** The symbol  $\cong$  is used to denote 'is congruent to'.

- Two line segments are congruent, If they have the same length, i.e.  $\overrightarrow{AB} \cong \overrightarrow{CD}$  and is read as line segment  $\overrightarrow{AB}$  is congruent to the line segment  $\overrightarrow{CD}$ .
- Two angles are congruent, if they have the same measure. " $\angle A$  is congruent to  $\angle B$ " is written symbolically as  $\angle A \cong \angle B$  or  $\angle A = \angle B$ .
- **(S.S.S.) Congruence criteria:** If the three sides of a triangle are equal to the three corresponding sides of another triangle, then the two triangles are congruent.

e.g.,



In the given figure,  $\triangle ABC \cong \triangle DEF$  by S. S. S. congruence condition.

(S.A.S.) congruence condition: If two sides and the included angle of a triangle are respectively equal to the two corresponding sides and the included angle of another triangle, then the two triangles are congruent.
e.g.,



In the given figure,  $\triangle ABC \cong \triangle DEF$  by S.A.S. congruence condition.

• **A.S.A. congruence condition:** If two angles and an included side of one triangle are respectively equal to the two corresponding angles and the corresponding included side of another triangle, then the two triangles are congruent. e.g.,



In the given figure,  $\triangle ABC \cong \triangle DEF \cong \triangle PRQ$  by A.S.A. congruence condition.

• R.H.S. congruence condition: If the hypotenuse and a side of a right angled triangle, are equal to the hypotenuse and the corresponding side of another right angled triangle, then the two triangles are congruent.





In the given figure,  $\triangle ABC \cong \triangle DEF$  by R.H.S. congruence condition.

- There is no A.A.A. congruence condition for congruence of triangles. Two triangles with equal corresponding angles need not be congruent. In such case,  $\Delta les$  are called similar triangles but not congruent.
- The order of the letters in the names of congruent triangles displays the corresponding relationships.

Thus, If  $\triangle ABC \cong \triangle EDF$ , A lies on E, B on D and C on F. Also  $\overrightarrow{AB}$  lies along  $\overrightarrow{ED}, \overrightarrow{BC}$  along  $\overrightarrow{DF}$  and  $\overrightarrow{AC}$  along  $\overrightarrow{EF}$ .

For e.g., In the following figure, if we consider  $\triangle ABC \cong \triangle FED$  then AB = FE, BC = ED and CA = DF.



Elementary Question: See the figure below and state True or False.



Then,  $\Delta ABC \cong \Delta PQR \ (T/F)$ 

Answer: False, correct statement will be

 $\Delta ABC \cong \Delta PRQ$