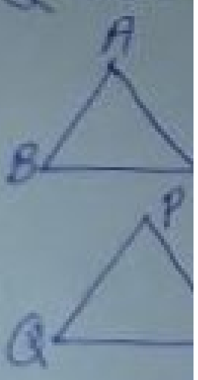
KUMHS, Naseembagh, Campus P-1

Class : 9th

Subject: Maths Triangles Term II

1. Congruent figures: Figures which are equal in all respects or figures whose shape and sizes are both the same.

2. Congruent triangles: If △ ABC is congruent to △ PQR, then sides of △ ABC fall on corresponding equal sides of △ PQR and so is the case of angles. It means AB covers PQ, BC covers QR and RP covers CA; ∠A covers ∠P, ∠B covers ∠Q and ∠C covers ∠R. Also, there is one-one correspondence between vertices. It means that A corresponds to P, B to Q and C to R and we write as



A ⟷ P, B ⟷ Q, C ⟷ R

∴ we can write now as

$$\triangle ABC \cong \triangle PQR$$

In congruent △'s, corresponding parts are equal and we write in short 'CPCT' corresponding parts of congruent triangles.

3. Criteria for congruent triangles

So $\triangle ABC \cong \triangle DEF$

$\longrightarrow$ (SAS rule)

Case (ii)

Let if possible, $AB > DE$

Let us take a point P on AB

such that $PB = DE$

In $\triangle PBC$ and $\triangle DEF$, we have

$PB = DE \longrightarrow$ (By construction)

$\angle B = \angle E \longrightarrow$ (Given)

$BC = EF \longrightarrow$ (Given)

Thus $\triangle PBC \cong \triangle DEF \longrightarrow$ (SAS rule)

$\therefore \angle PCB = \angle DFE \longrightarrow$ (CPCT)

But $\angle ACB = \angle DFE \longrightarrow$ (Given)

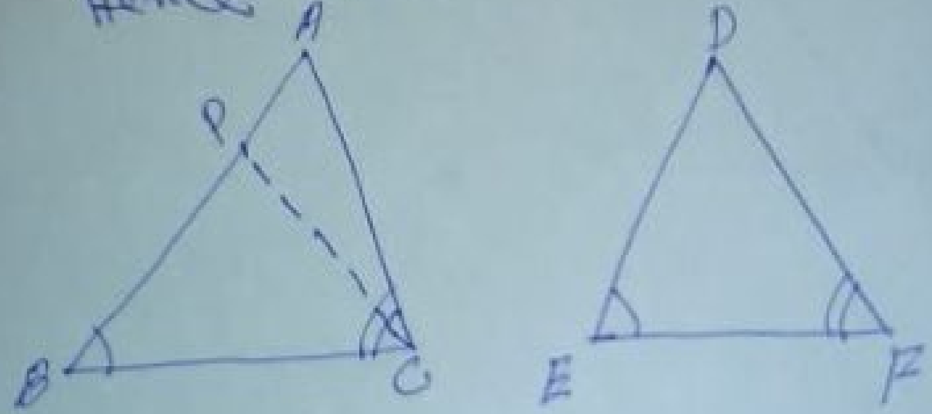
$\therefore \angle PCB = \angle ACB$

which is possible only if P

coincides with A.

$\therefore BA = ED$

Hence $\triangle ABC \cong \triangle DEF \rightarrow$ [SAS rule]



P.T.O

Axiom 1 (S A S congruence rule): Two triangles are congruent if two sides and the included angle of one triangle are equal to the corresponding sides and the included angle of the other triangle.

Theorem 1 (A S A congruence): Two triangles are congruent if two angles and the included side of one triangle are equal to two angles and the included side of other triangle.

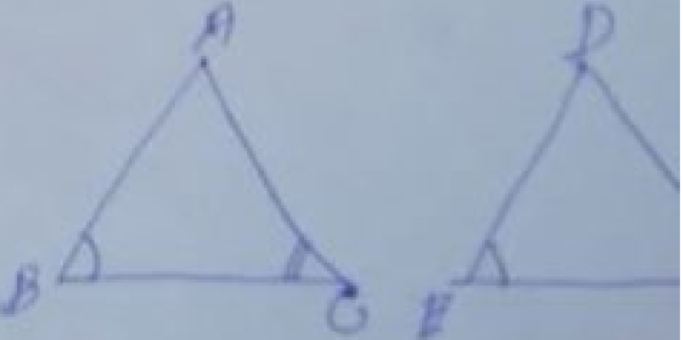
Solution Given: Two triangles $\triangle ABC$ and $\triangle DEF$ in which

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

and $BC = EF$

To prove: $\triangle ABC \cong \triangle DEF$

Proof: case(i)



Let $AB = DE$

In $\triangle ABC$ and $\triangle DEF$, we h[...]

$AB = DE$ ⟶ (Assumed)

$\angle B = \angle E$ ⟶ (Given)

$BC = EF$ ⟶ (Given)

Similarly, let $AB < DE$

Let us take a point M on DE

such that $ME = AB$

Now, in $\triangle ABC$ and $\triangle MEF$,

$AB = ME \longrightarrow$ (assumed)

$\angle B = \angle E \longrightarrow$ (Given)

$BC = EF \longrightarrow$ (Given)

$\therefore \triangle ABC \cong \triangle MEF \longrightarrow$ (SAS rule)

$\Rightarrow \angle C = \angle MFE \longrightarrow$ (CPCT)

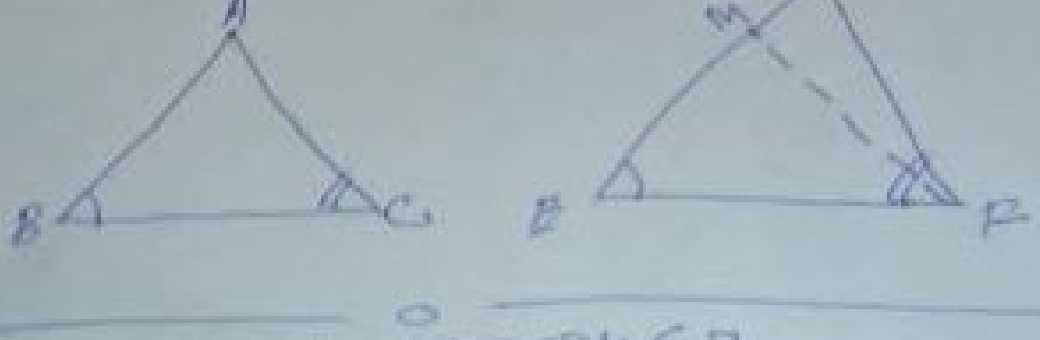
But $\angle C = \angle DFE \longrightarrow$ (Given)

$\therefore \angle MFE = \angle DFE$

which is possible only if M coincides with D.

$\therefore ME = DE$

Hence $\triangle ABC \cong \triangle DEF$ (SAS rule)



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