

Triangle  
 3 congruence - 2 NOT AT SAME TIME  
 (SAS, ASA, AAS, SSS, RHS)

Two triangles

Prove the congruence



Observation:  
 (i) Two sides must be equal  
 (ii) Included angle must be equal



$\angle BAC = \angle DEF$   
 $AB = DE$   
 $AC = EF$  (SAS rule)

Axiom

PSA



Given:  $\angle B = \angle E$ ,  $BC = EF$ ,  $\angle C = \angle F$

To prove:  $AB \cong DF$

Proof: Let  $AB = PA$

$AB = PA$  (Construction)

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

$BC = EF$  (Given)

$AB \cong PA$  (SAS rule)



$AB > PA$

$PA > AB$



$\angle B > \angle E$

In  $\triangle MBL$  &  $\triangle PAR$ ,

$MB = PA$  (by construction)

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

$BC = EF$  (Given)

$\triangle MBL \cong \triangle PAR$  (SAS rule)

$\angle MCB = \angle R$  (CPCT)

$\angle C = \angle R$  (Given)

$\angle MCB > \angle C$

but this is not possible,  
 is possible only when point  
 M tends to point A.

$BM = BA$

$BA = AP$

(iii)



$\angle A < \angle P$

$AB = MP$  (by construction)

$\angle B = \angle P$  (Given)

$BC = QR$  (Given)

$\triangle ABC \cong \triangle MPQ$  (SAS rule)

$\angle ACB = \angle MPQ$  (CPCT)

$\angle C = \angle MPQ$  (CPCT)

$\angle C = \angle R$  (Given)

$\angle MPQ = \angle R$

This is not possible, only possible when  
 point M tends to point P.  
 then,  $MP = PB$

$PA = AB$

RULES

(i) SAS rule (Axiom)



(ii) ASA rule (Thm - 3 sides)



(iii) AAS rule



If two angles are  
 equal, 3rd angle  
 will be equal  
 of  $\triangle$ 's

$\triangle ABC \cong \triangle DEF$  (AAS rule)

(i)



= SAS rule



= ASA rule



= AAS rule



= AAS rule

$\triangle ABC \cong \triangle DEF$

CPCT

$AB = DE$  ,  $\angle ACB = \angle DFE$   
 $BC = EF$  ,  $\angle CAB = \angle FED$   
 $AC = DF$  ,