Geometry, *You Can Do It !*
Proofs: Congruent Δ's

by Bill Hanlon

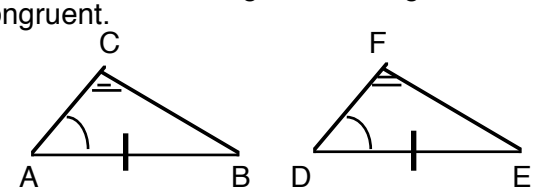
To prove other triangles are congruent, we'll use the the **SSS, SAS, and ASA** congruence postulates. We also need to remember other theorems that will lead us to those postulates.

For instance, you should already know by theorem the sum of the measures of the angles of a triangle is 180º. A corollary to that theorem is if two angles of one triangle are congruent to two angles of another triangle, the third angles must be congruent. OK, that's stuff you know

Using that information, let's try to prove this theorem.

AAS Theorem

If two angles and the non included side of one triangle are congruent to the corresponding parts of another triangle, the triangles are congruent.



Given : ∠A ≅ ∠D, ∠C ≅ ∠F, ~~AB~~ ≅ ~~DE~~
Prove: Δ ABC ≅ Δ DEF

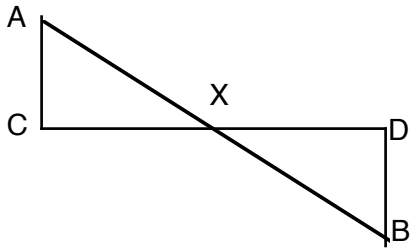
1. ∠A ≅ ∠D ∠C ≅ ∠F AB ≅ DE	Given
2. ∠B ≅ ∠E	2 ∠ 's Δ congruent 2 ∠ 's of another Δ, 3rd ∠'s congruent
3. Δ ABC ≅ ΔDEF	ASA

That was too easy. Now we have 4 ways of proving triangles congruent; **SSS, SAS, ASA, and AAS**. You need to know those.

I know what you are thinking, you want to try another one. OK, we'll do it !

Here's what you need to be able to do. First, label congruences in your picture using previous knowledge. After that, look to see if you can use one of the four methods of proving triangles congruent. Finally, write those

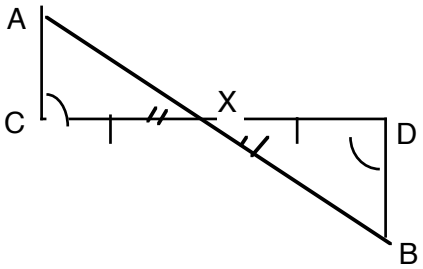
relationships in the body of the proof. You are done. Piece of cake !



Given : $\overline{AC}$ II $\overline{BD}$
$\overline{AB}$ bisects $\overline{CD}$

Prove : Δ ACX ≅ Δ BDX

Remember to mark up your picture with thatinformation as I did.



1. AC II BD $\overline{AB}$ bis. CD	Given
2. $\overline{CX}$ ≅ $\overline{DX}$	Def. of bisector
3. ∠C ≅ ∠ D	II lines cut by tran, alt int ∠ 's are ≅
4. ∠ACX ≅ ∠BDX	Vert. ∠ 's are ≅
5. Δ ACX ≅ ΔBDX	ASA

I can't tell you how important it is to fill in the picture by labeling the relationships you know from prvious theorems, postulates, and definitions.

 ©1997 Mathematical Systems

Geometry, *You Can Do It !*
Proofs: Congruent Δ's

by Bill Hanlon

 ©1997 Mathematical Systems