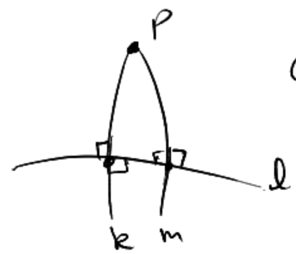
Last time:

- AIA, Isosceles: equal sides ⇔ equal angles, ASA, ⊥-bisector goes thru vertex.

<u>today</u>: Cor AIA, SSS, EA, application of that

<u>AIA</u>: Cor. <u>Unique Feet</u>

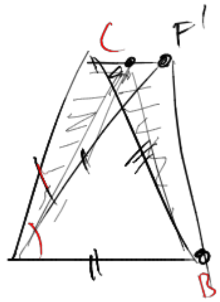
(1)

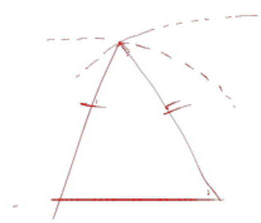


(1) l is transversal to m, k
(2) AIA's are ≅, ∴ $k \parallel m$ ✗ P.

(2)  Isosceles ⊥-bisector of base passes thru vertex :

<u>SSS</u>:





$\triangle ABC \cong \triangle ABF'$ by SAS. then $BF' \cong BC$

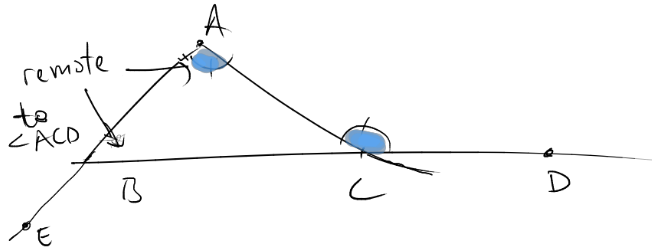
get isosceles $\triangle$'s (2)

the ⊥-bisector to each gives contradiction

Next EA

EA theorem: Exterior Angle Theorem

(an exterior angle of a triangle $\triangle ABC$. is an angle supplementary to an interior angle of a triangle.



$\angle ACD$ is an ext. angle of $\triangle ABC$.

$\angle ACD$ is greater than either of the remote interior angles

Proof: If $\angle ACD \cong \angle BAC$ then

AC is a transversal cutting AB & CD & this makes $\angle ACD$ & $\angle BAC$ alternate interior angles that are congruent
$\Rightarrow AB \parallel CD$ contradicts existence of A (as a member of both lines)

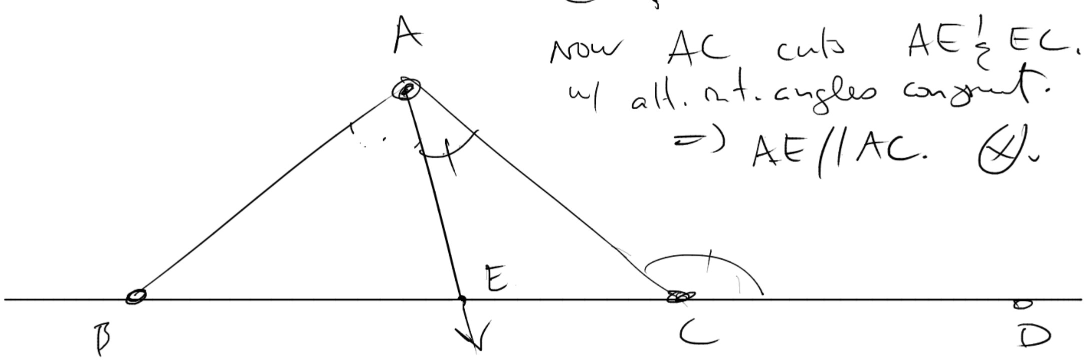
Else, if $\angle ACD > \angle BAC$ we're done.

So assume

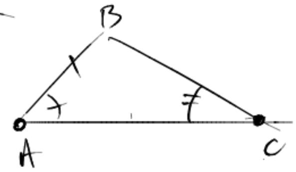
$\angle ACD < \angle BAC$ (you can cut the larger to equal the lesser

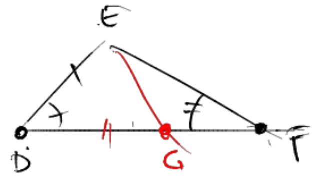
create point E s.t $\angle CAE \cong \angle ACD$.

Now AC cuts AE & EC.
w/ alt. int. angles congruent.
$\Rightarrow AE \parallel AC$. ⊗.



SAA





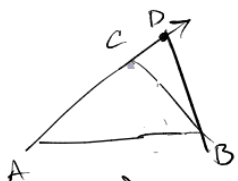
ASA $\Rightarrow$ $\triangle ABC \cong \triangle DEG$

$\angle DGE$ is exterior angle to $\triangle EGF$

yet $\angle DGE \cong \angle C \cong F$, yet Ext. Ang thm says it is $>$.

$\otimes$

(ext. angle isn't always obtuse)

Thm: 

If $AB > AC$ then $\angle C > \angle B$

extend $\overrightarrow{AC}$ to D s.t. $AD \cong AB$. Get isosceles. $\angle D \cong \angle ABD > \angle B$

$\angle C$ is ext to $\triangle CDB$. $\angle C > \angle D > \angle B$