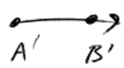
Congruence Axioms

C-1: You can lay off any length on any ray.
A, B distinct pts, A' any pt, $\forall$ ray emanating from A'
$\exists!$ B' s.t. $B' \neq A'$ & $AB \cong A'B'$

C-2 Transitivity for congruence of segments & $(AB \cong AB)$

C-3 Sum of congruent segments is congruent
If $A * B * C$, $A' * B' * C'$, $AB \cong A'B'$, $BC \cong B'C'$ $\Rightarrow$ $AC \cong A'C'$

C-4 Any given angle can be laid off.
Given 

& 

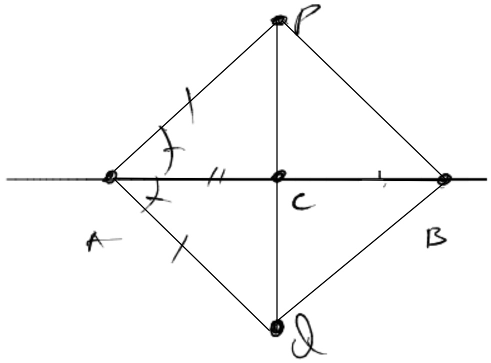
, $\exists$ C' s.t. $\angle C'A'B' \cong CAB$

C-5 transitivity of congruent angles

C-6 SAS

Cor to SAS One can lay off a given Δ on a given side of a line.

<u>Thm</u>: Given line l, point P $\exists$ line m, $m \perp l$ thru P.



1. choose $A, B \in l$
2. Lay off ΔPAB on other side (QAB)
3. $\angle PAC \cong QAC$, $AC \cong AC$, $PA \cong QA$

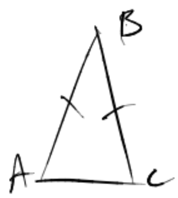
$\Rightarrow \angle PCA \cong \angle QCA$

& are supplements.

$\therefore$ right angles

<u>thm (Pappus)</u> (Euclid 1.5) the base angles of an isosceles Δ are $\cong$.

(we've seen Pons Asinorum)  $(3 \times SAS)$



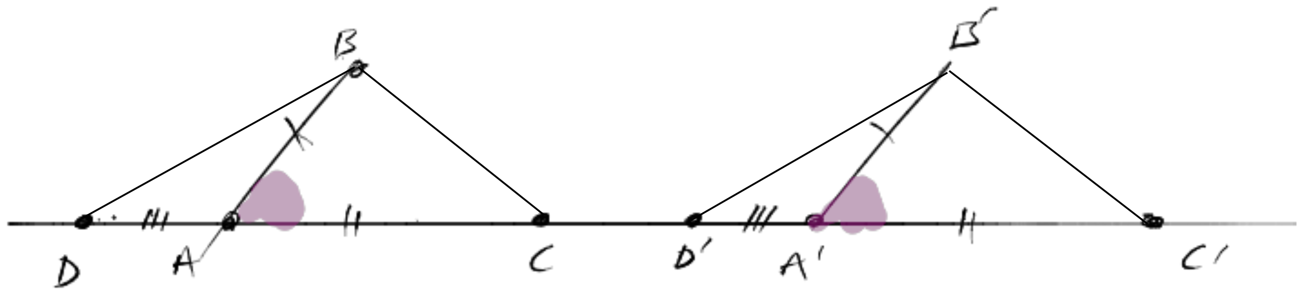
$$\left.\begin{array}{l} AB \cong BC \\ BC \cong AB \\ \angle ABC \cong \angle CBA \end{array}\right\} \; SAS \Rightarrow \angle BAC \cong$$

<u>correspondence</u>

$$\text{if} \begin{cases} AB & BC \\ \angle ABC & \angle CBA \\ BC & AB \end{cases}$$

then $\angle BAC \cong \angle BCA$ ☺

Prop. 3.14 - Supplements of $\cong$ angles are $\cong$



Given: $BAC \cong B'A'C'$

SAS $\Rightarrow$ $\triangle BAC \cong \triangle B'A'C'$ $\Rightarrow$ $\angle C \cong \angle C'$

$BC \cong B'C'$

$DC \cong D'C'$

$\Rightarrow$ $\triangle DBC \cong \triangle D'B'C'$

$\Rightarrow$ $DB \cong D'B'$, $\angle D \cong \angle D'$

$\Rightarrow$ $\triangle DAB \cong \triangle D'A'B'$

$\Rightarrow \angle DAB \cong \angle D'A'B'$

Prop. Vertical Angles are Equal.

know: supplements of $\cong$ are $\cong$

$\angle ABE \cong \angle ABE$

$\angle ABC$ is supplement of $\angle ABE$ $\cong$

$\angle DBE$ is supplement of $\angle ABE$

Prop. $\Rightarrow$ $\angle ABC \cong \angle DBE$