Euclid's Elements

Book I

If Euclid did not kindle your youthful enthusiasm, you were not born to be a scientific thinker.

Albert Einstein

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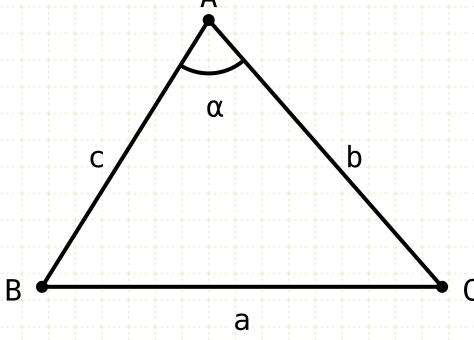
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If two triangles have two sides equal to two sides respectively, but have the base greater than the base, then they also have the one of the angles contained by the equal straight lines greater than the other.

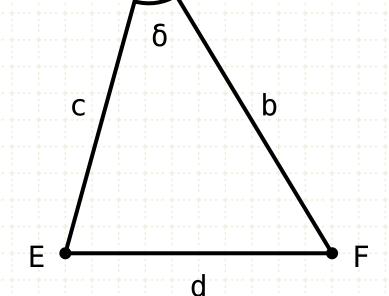


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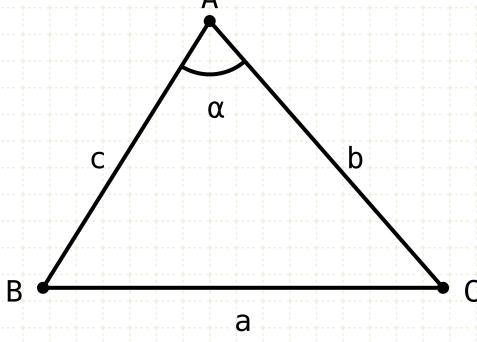
In other words

Given two triangles ABC and DEF, where lengths AB equals DE and AC equals DF, but the base BC is greater than the base EF



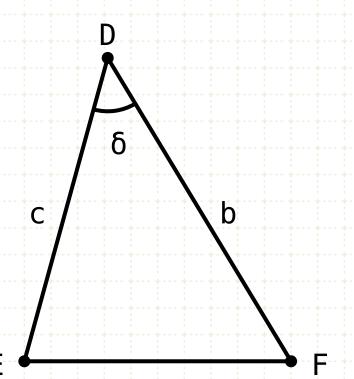


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AB = DE = c
AC = DF = b
BC > EF, a > d

$$\alpha$$
 > δ



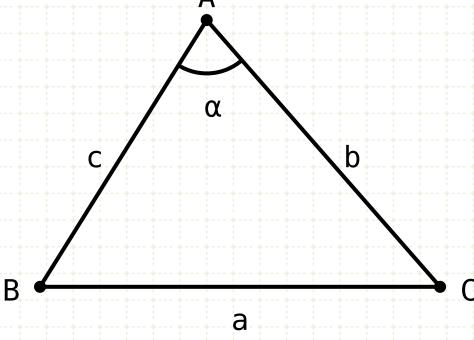
d

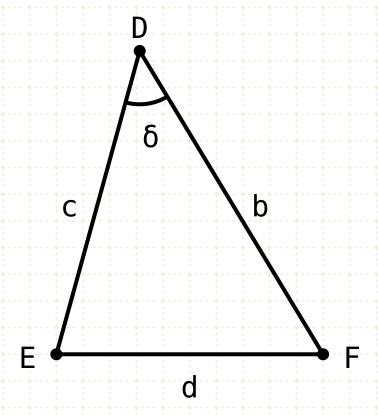
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Given two triangles ABC and DEF, where lengths AB equals DE and AC equals DF, but the base BC is greater than the base EF

Angle CAB is greater than angle FDE

If two triangles have two sides equal to two sides respectively, but have the base greater than the base, then they also have the one of the angles contained by the equal straight lines greater than the other.





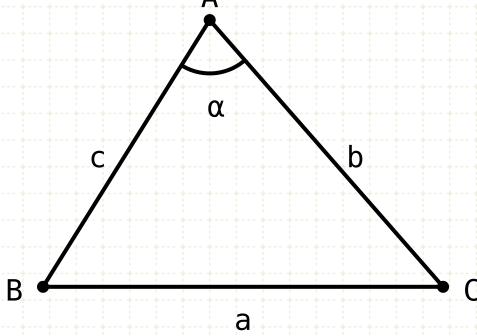
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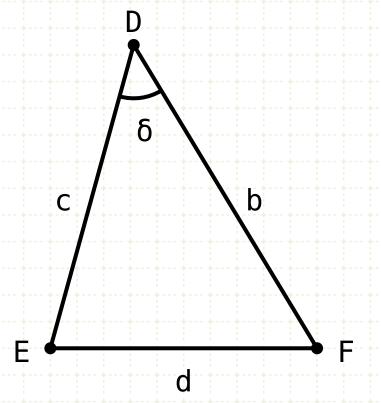
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Proof by contradiction

If two triangles have two sides equal to two sides respectively, but have the base greater than the base, then they also have the one of the angles contained by the equal straight lines greater than the other.



$$\alpha = \delta$$



© () (S)

In other words

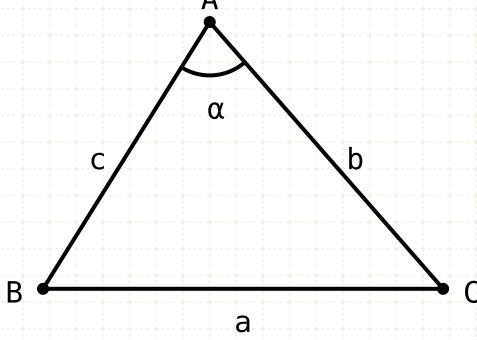
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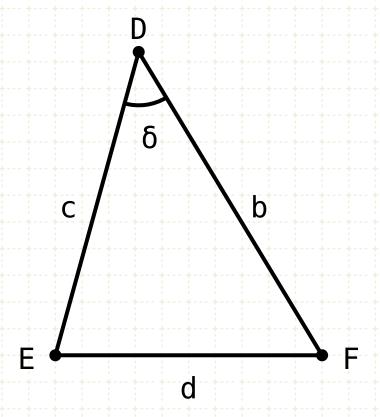
Proof by contradiction

Assume angle CAB is equal to angle FDE

If two triangles have two sides equal to two sides respectively, but have the base greater than the base, then they also have the one of the angles contained by the equal straight lines greater than the other.



$$\alpha = \delta$$
=> BC = EF



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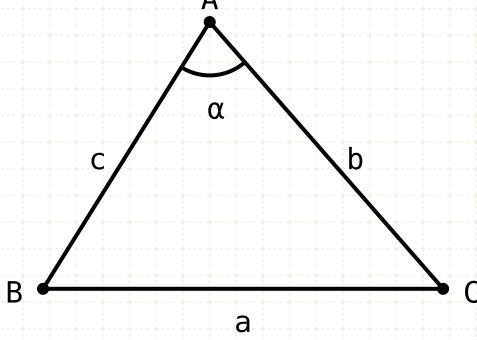
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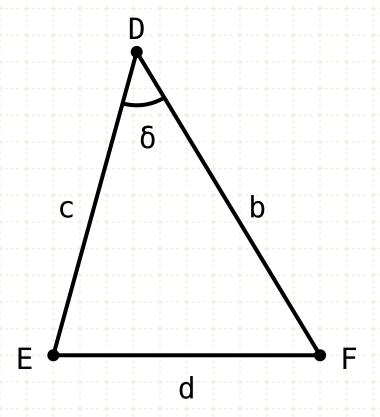
Assume angle CAB is equal to angle FDE

Then length BC would equal EF because the side-angle-side of both triangles are equal (I·4)



If two triangles have two sides equal to two sides respectively, but have the base greater than the base, then they also have the one of the angles contained by the equal straight lines greater than the other.





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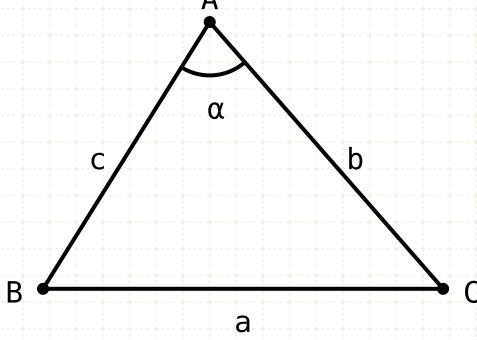
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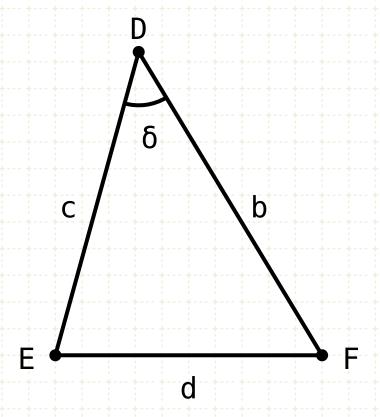
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$$AB = DE = C$$
 $AC = DF = b$
 $BC > EF, a > d$
 $\alpha = \delta$
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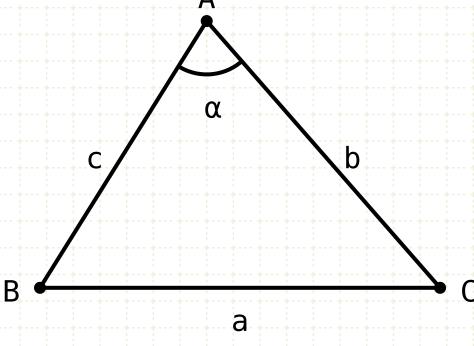
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Therefore the original assumption that the angles CAB and FDE are equal is also wrong

If two triangles have two sides equal to two sides respectively, but have the base greater than the base, then they also have the one of the angles contained by the equal straight lines greater than the other.



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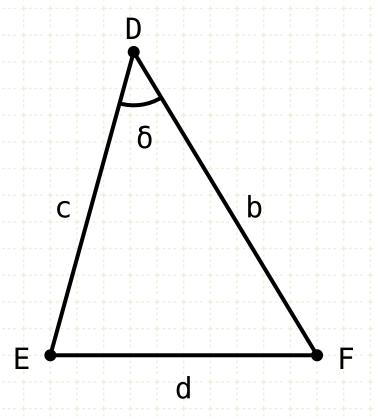
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BC > EF, a > d

$$\alpha = \delta$$

=> BC = EF

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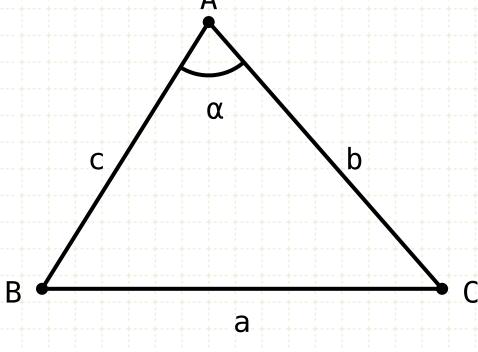
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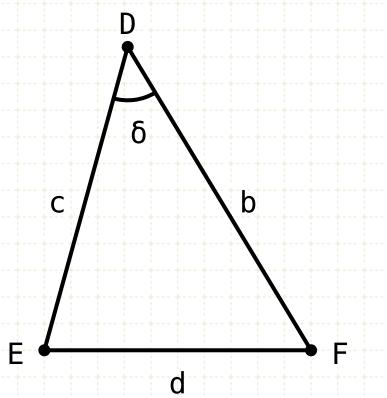


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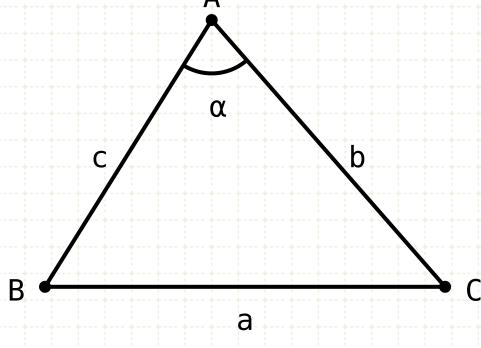
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Then length BC would less than EF, since it is the triangle with the lesser angle (I·24),



If two triangles have two sides equal to two sides respectively, but have the base greater than the base, then they also have the one of the angles contained by the equal straight lines greater than the other.



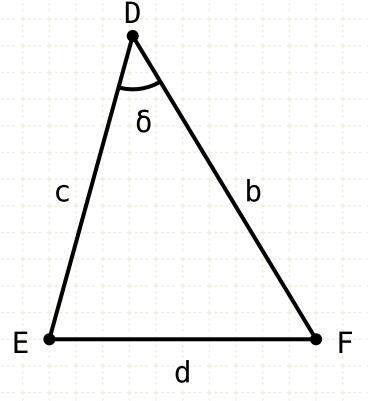
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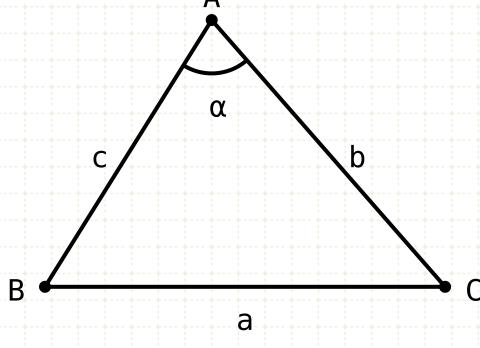
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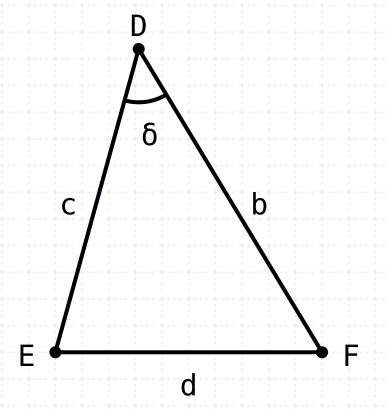


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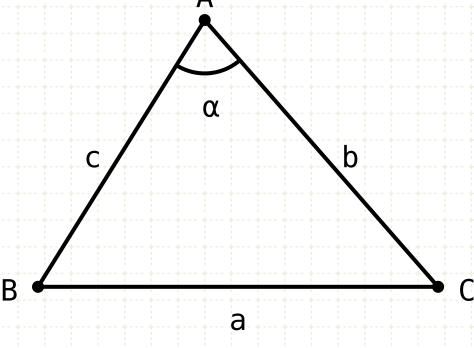
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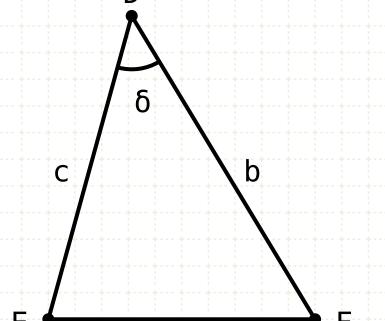
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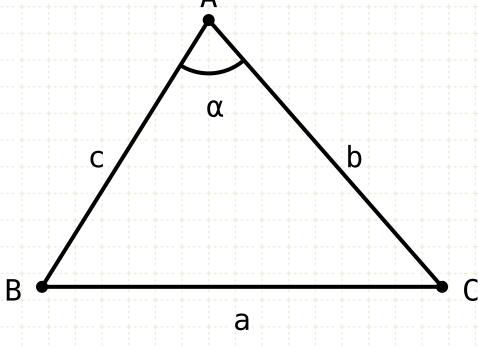
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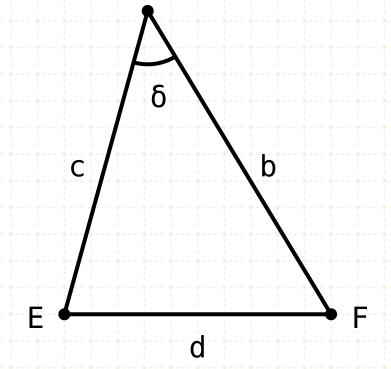
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