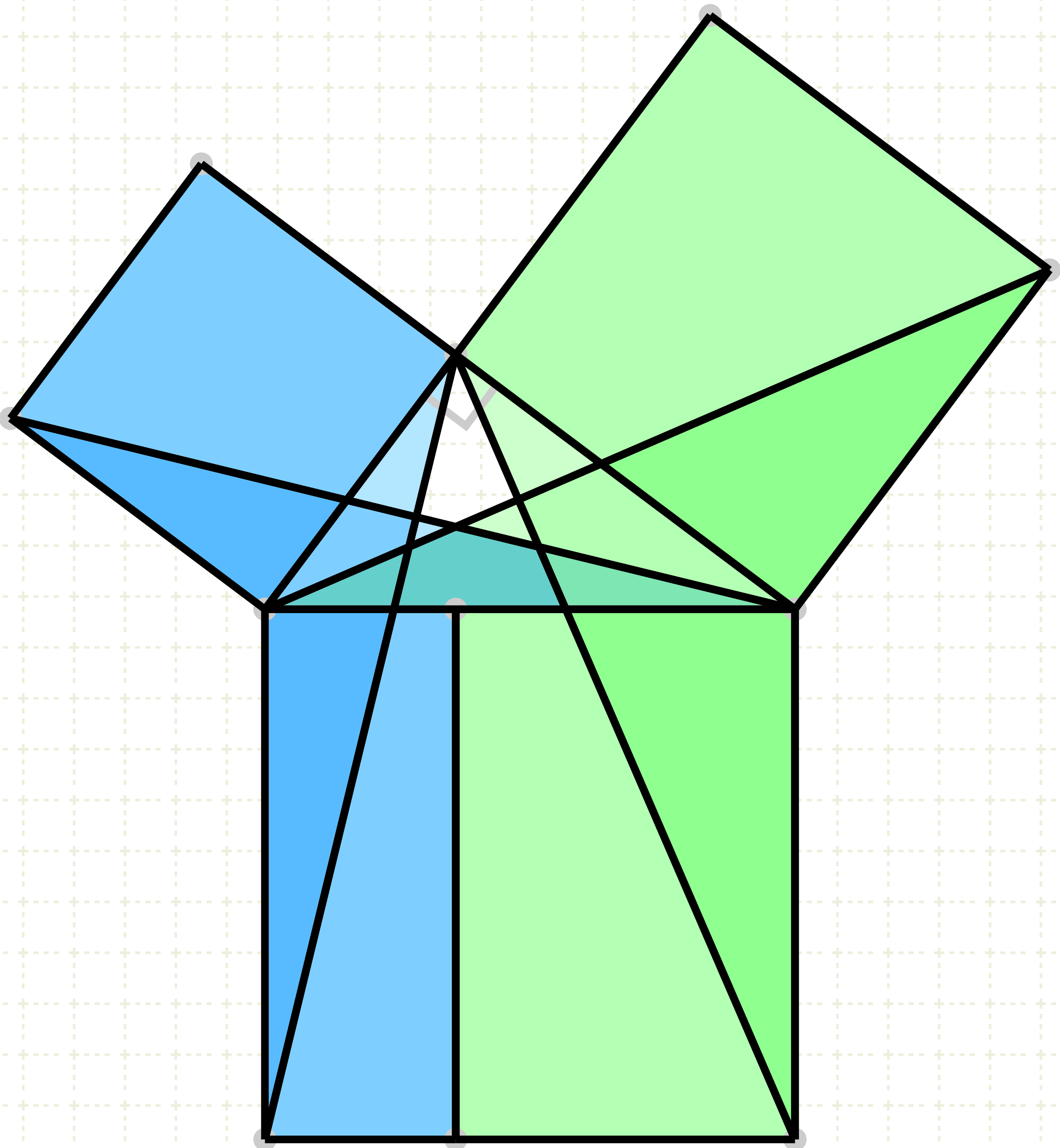
Euclid's Elements

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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Proposition 8 of Book I

If two triangles have the two sides equal to two sides respectively, and also have the base equal to the base, then they also have the angles equal which are contained by the equal straight lines.

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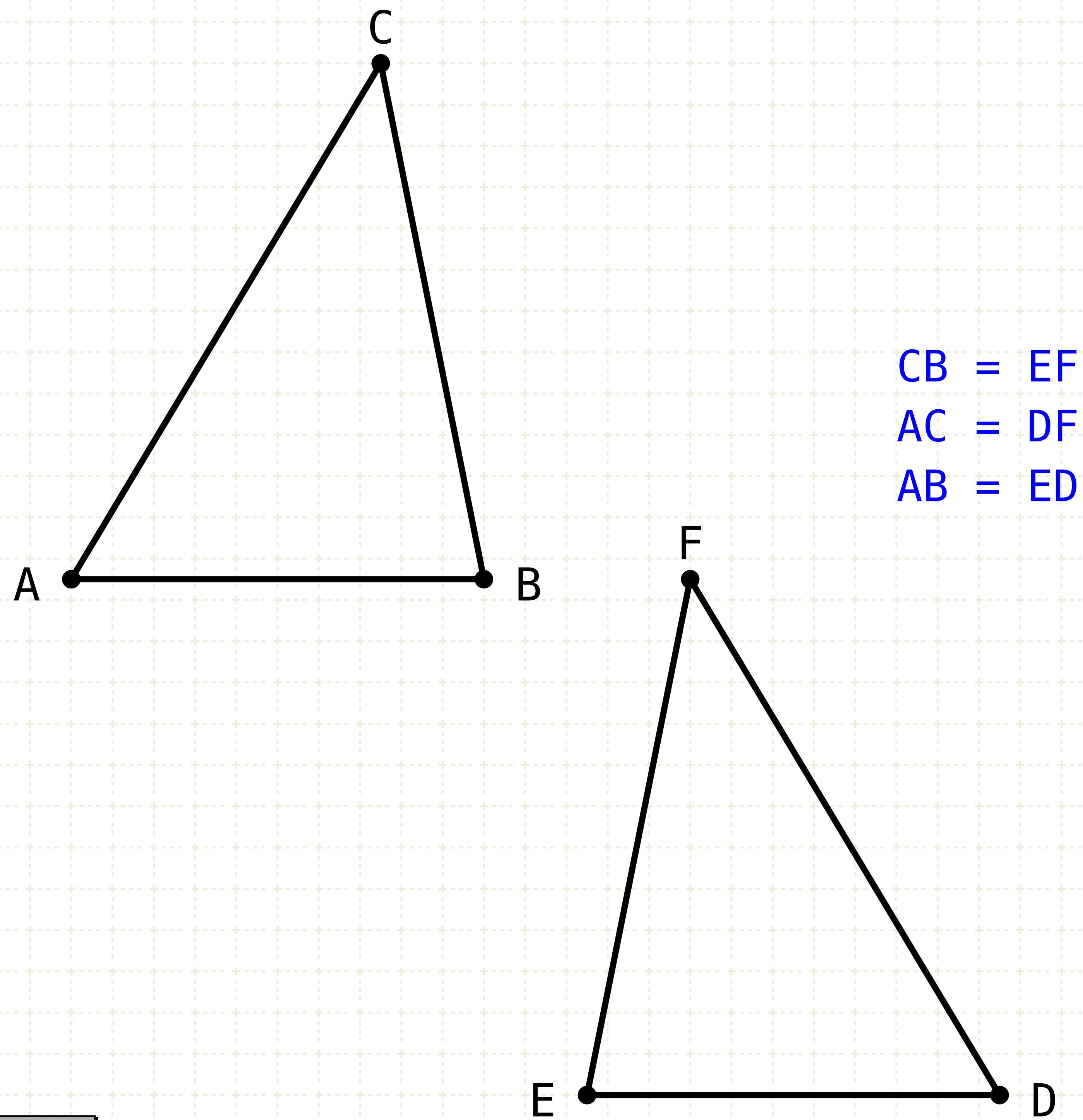
Given two triangles with three sides of one triangle equal to the three sides of the other triangle (SSS)



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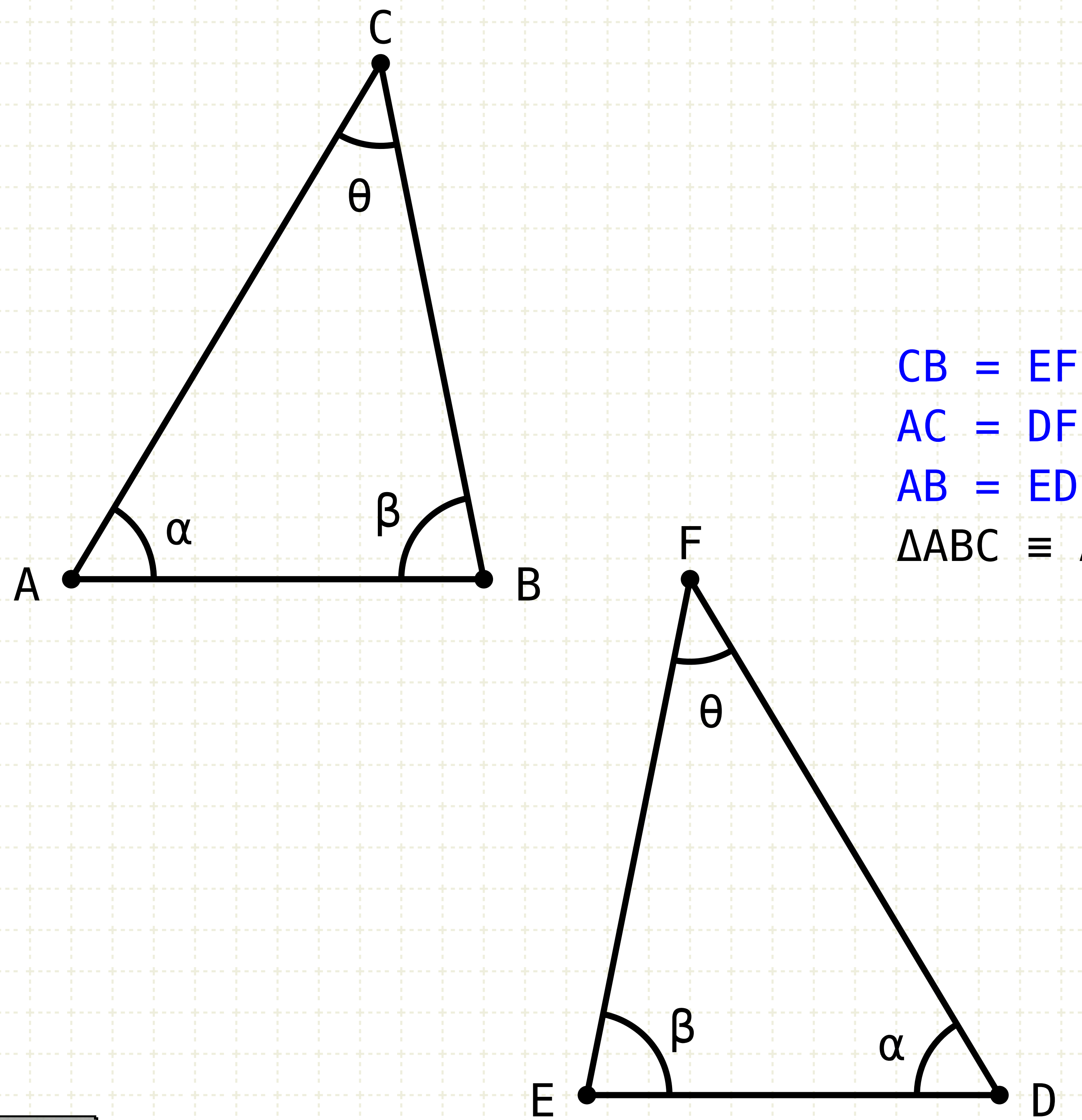

$CB = EF$
$AC = DF$
$AB = ED$
$\Delta ABC \equiv \Delta DEF$

In other words...

Given two triangles with three sides of one triangle equal to the three sides of the other triangle (SSS)

Then the two triangles are equivalent in all respects

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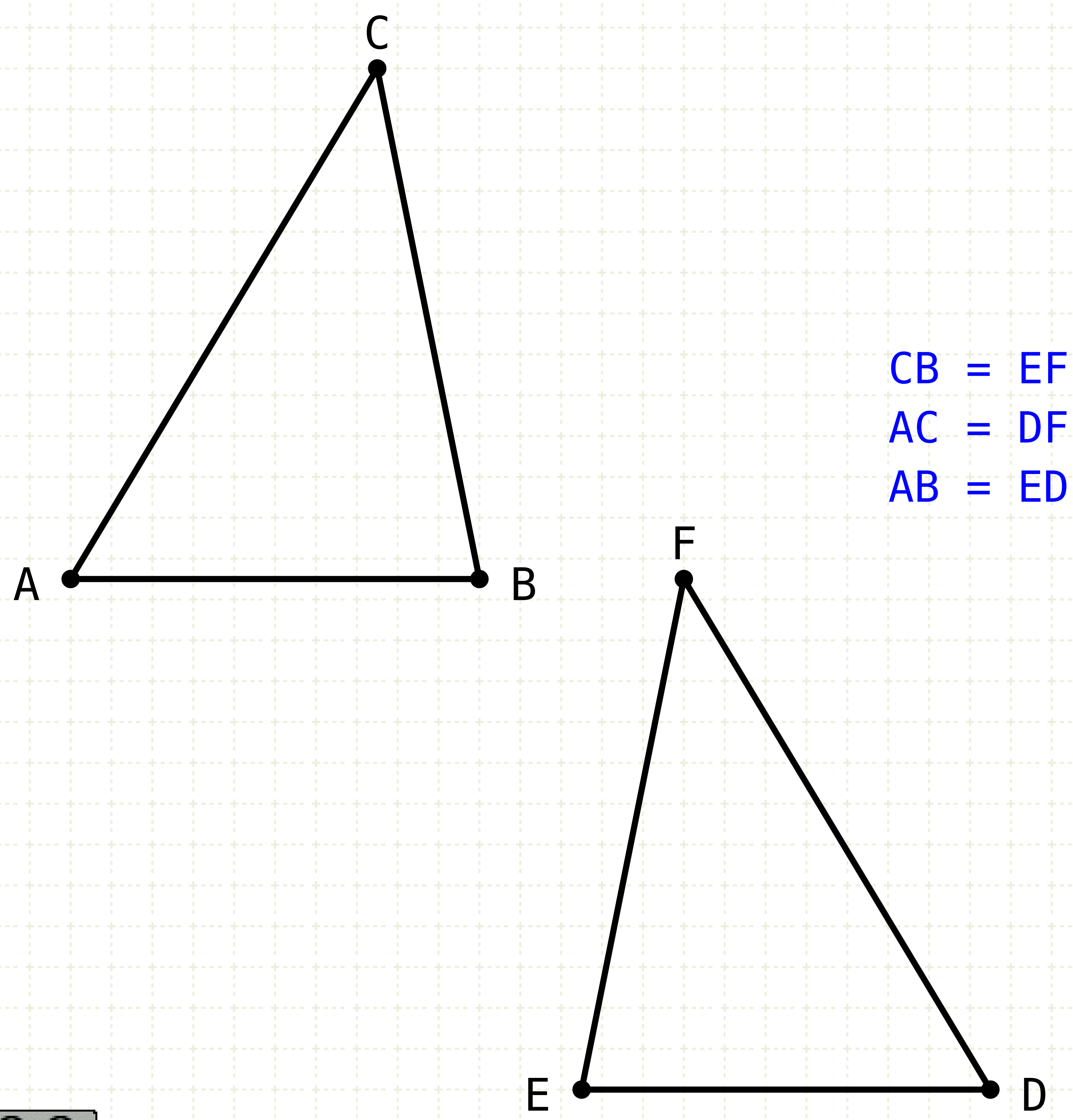

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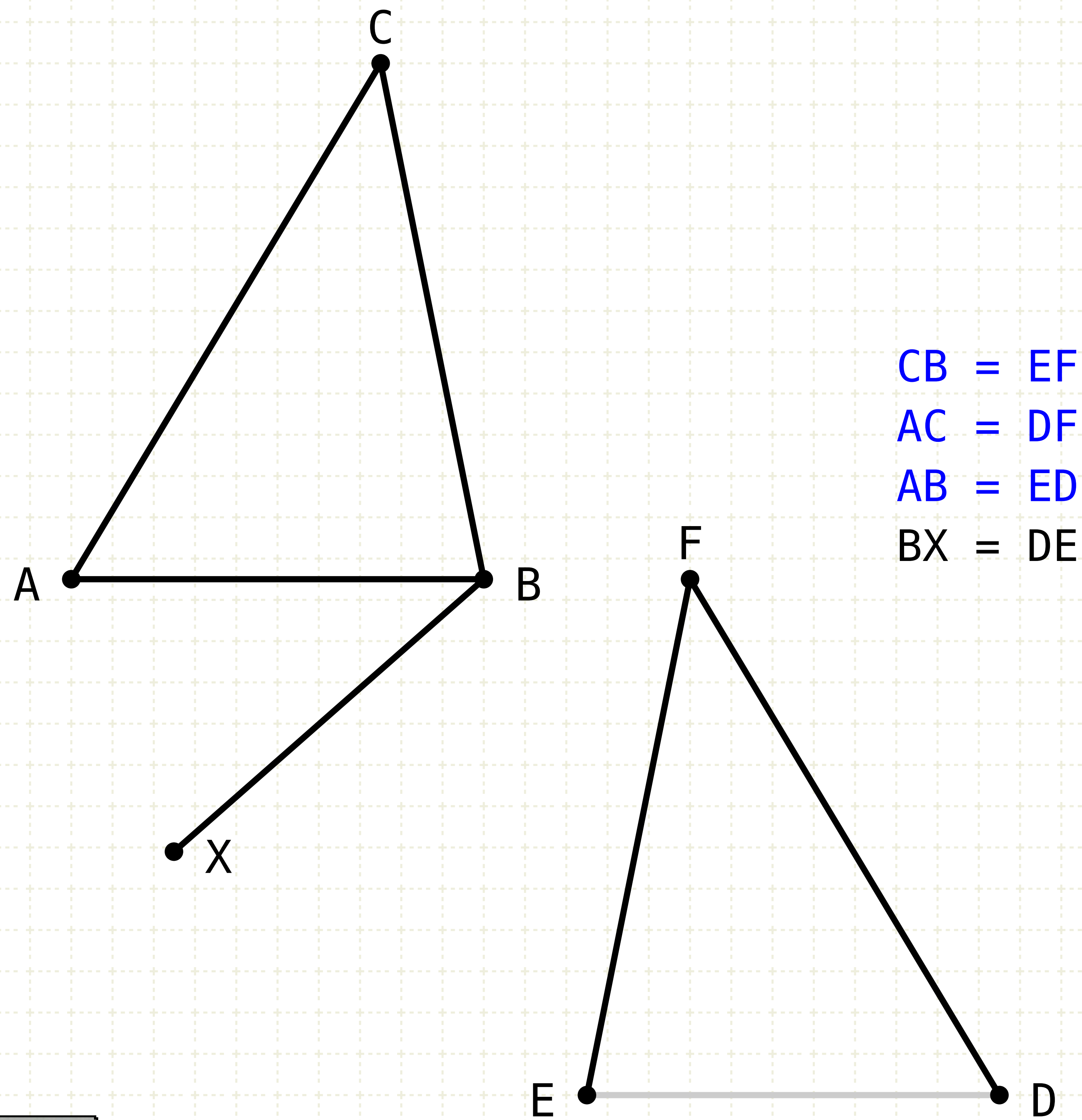

CB = EF
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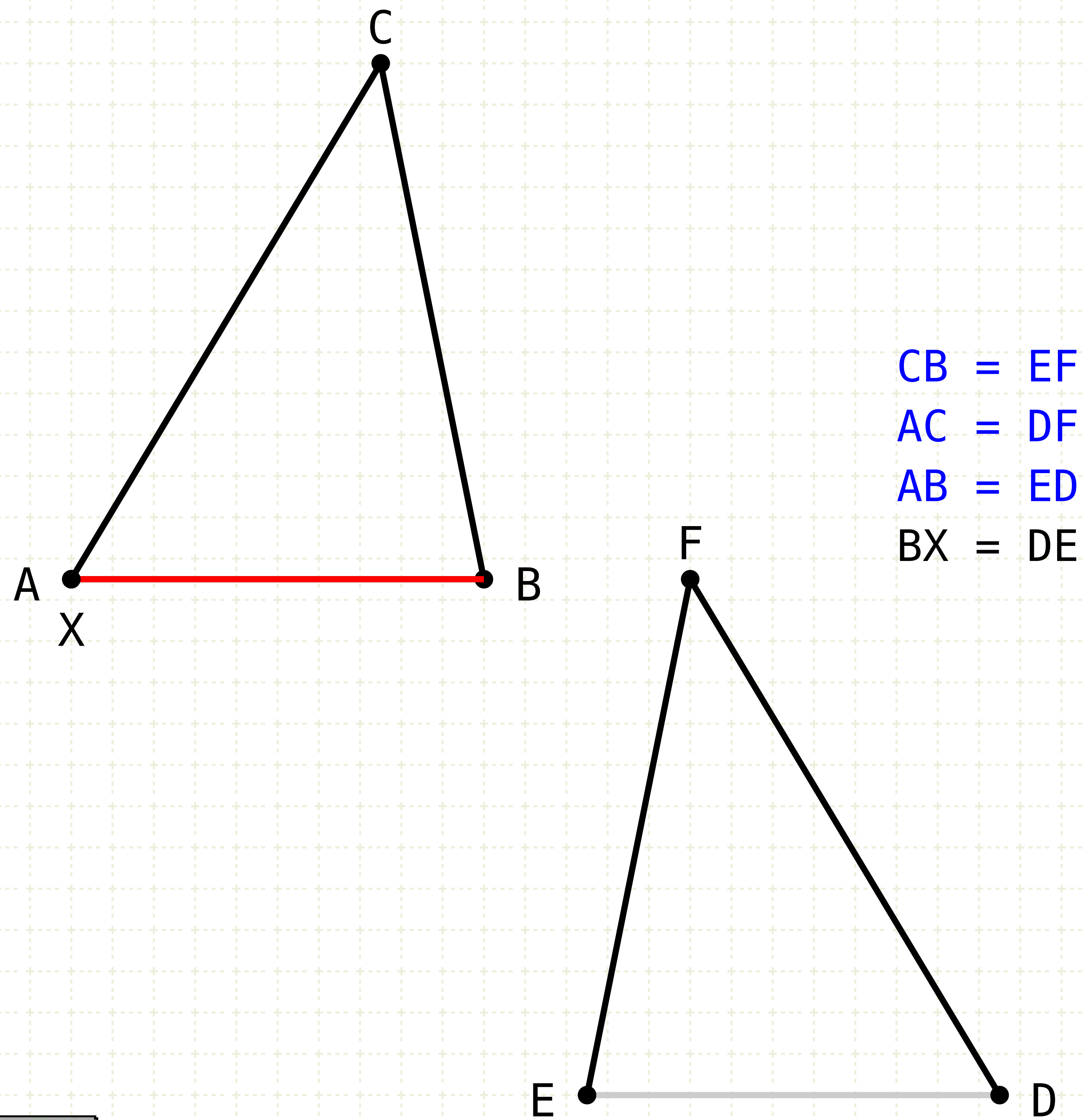

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Align BX to AB. Since they are the same lengths, the endpoints are congruent

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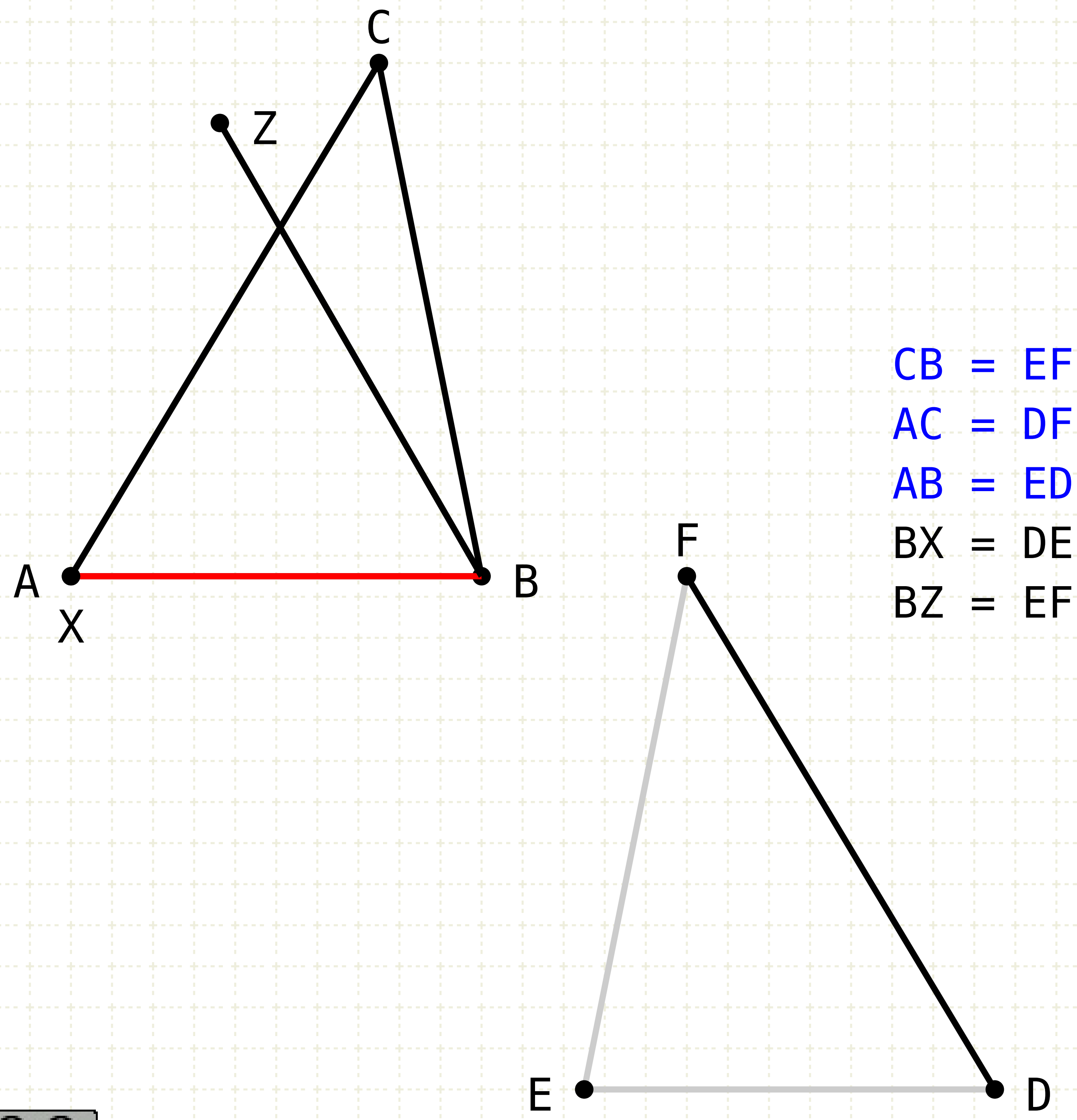

CB = EF
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AB = ED
BX = DE
BZ = EF

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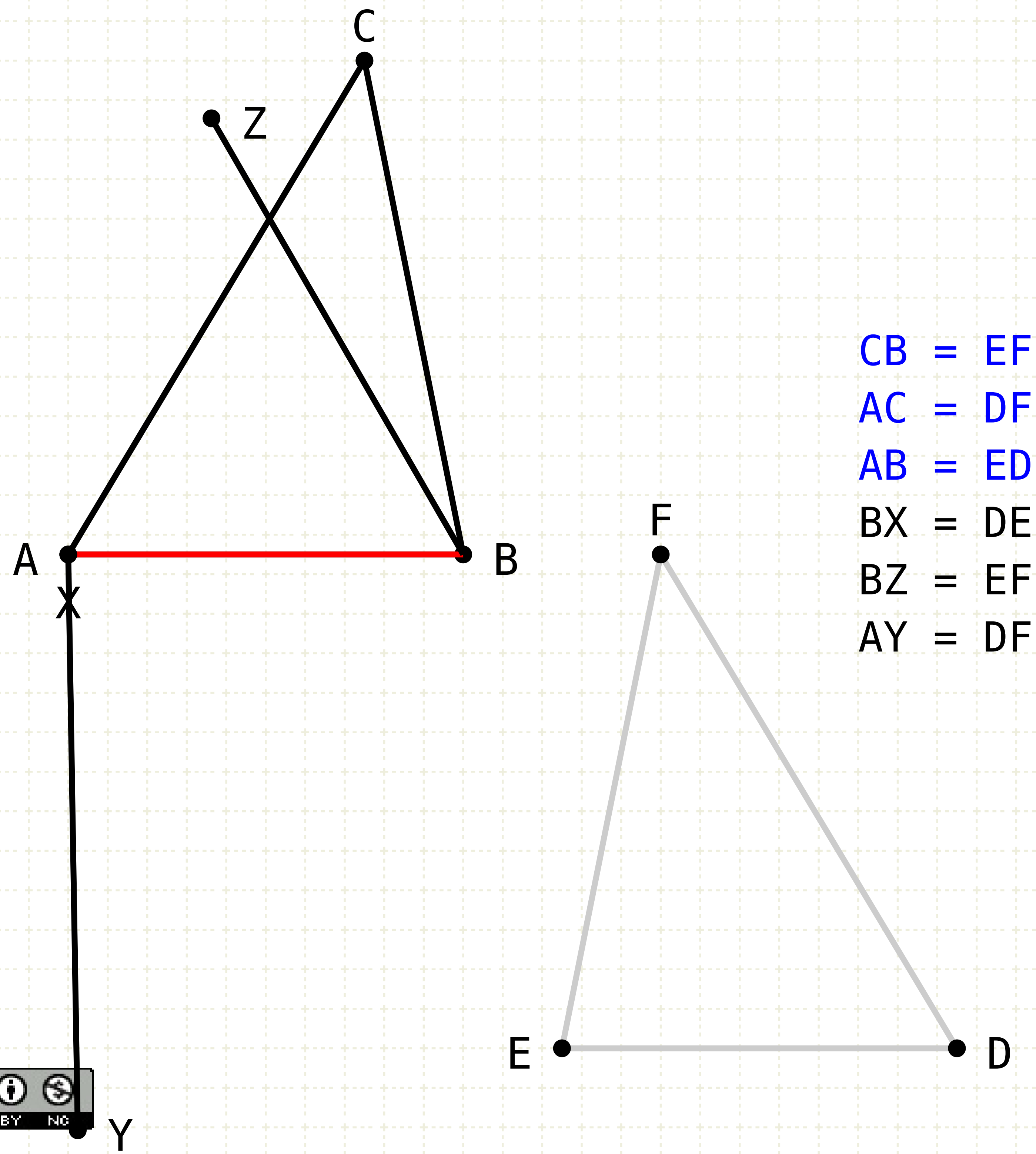

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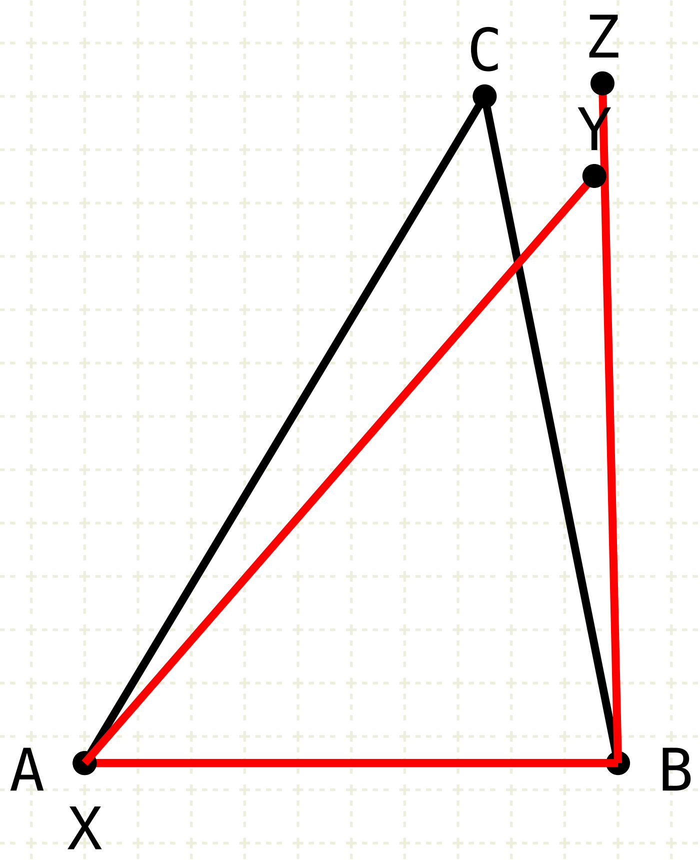

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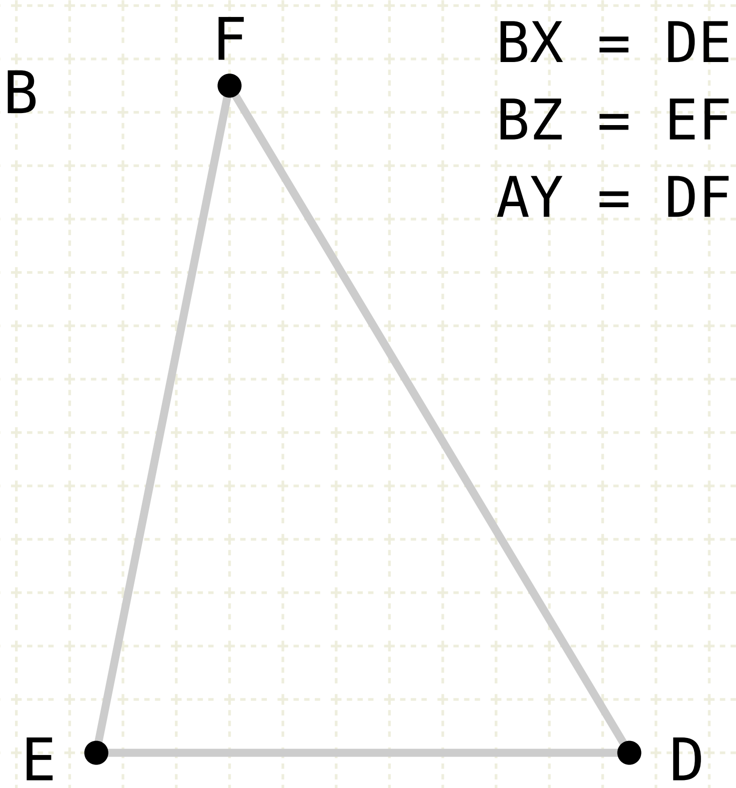

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Where do ends of the lines BZ and AY meet?

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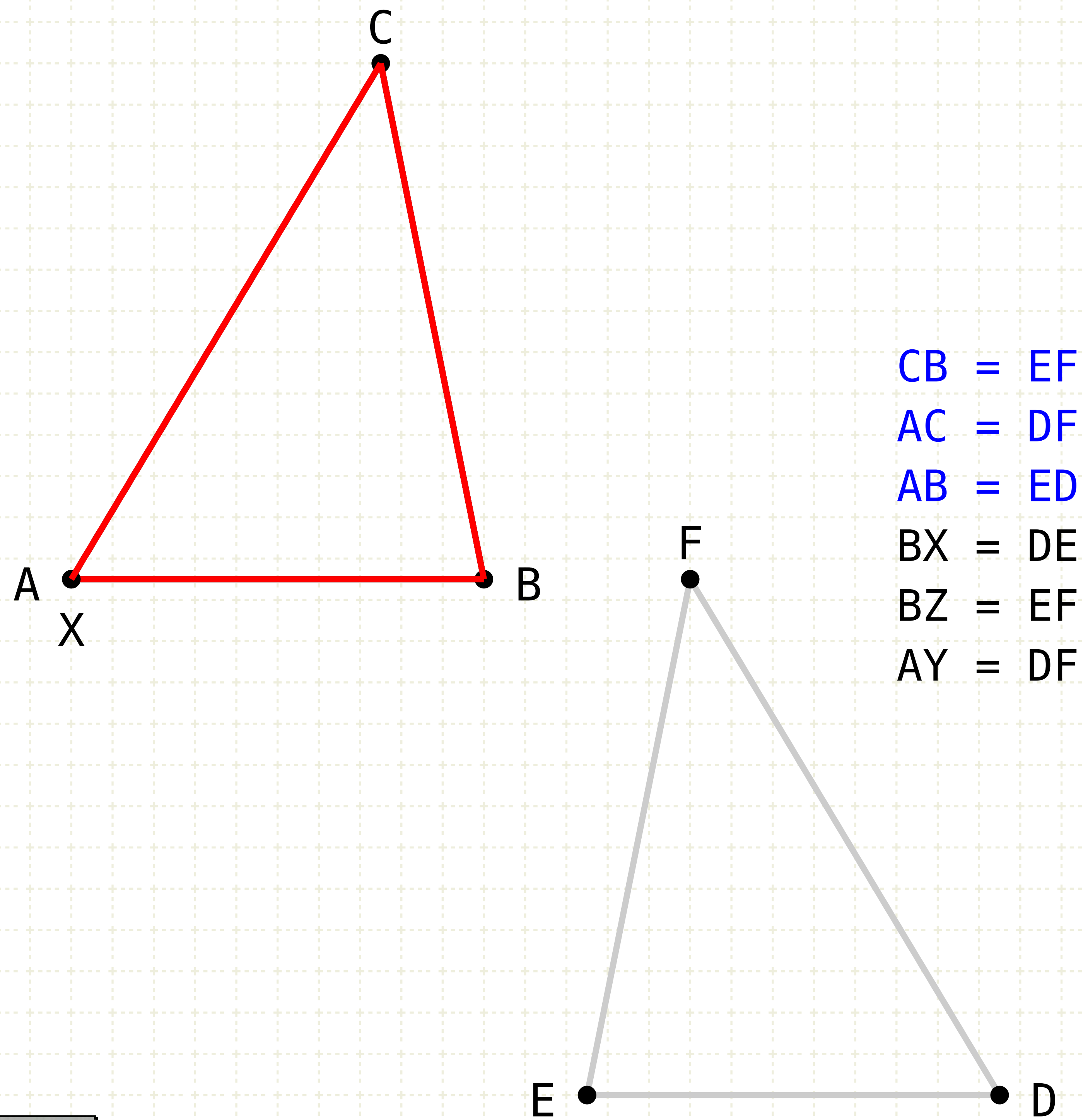

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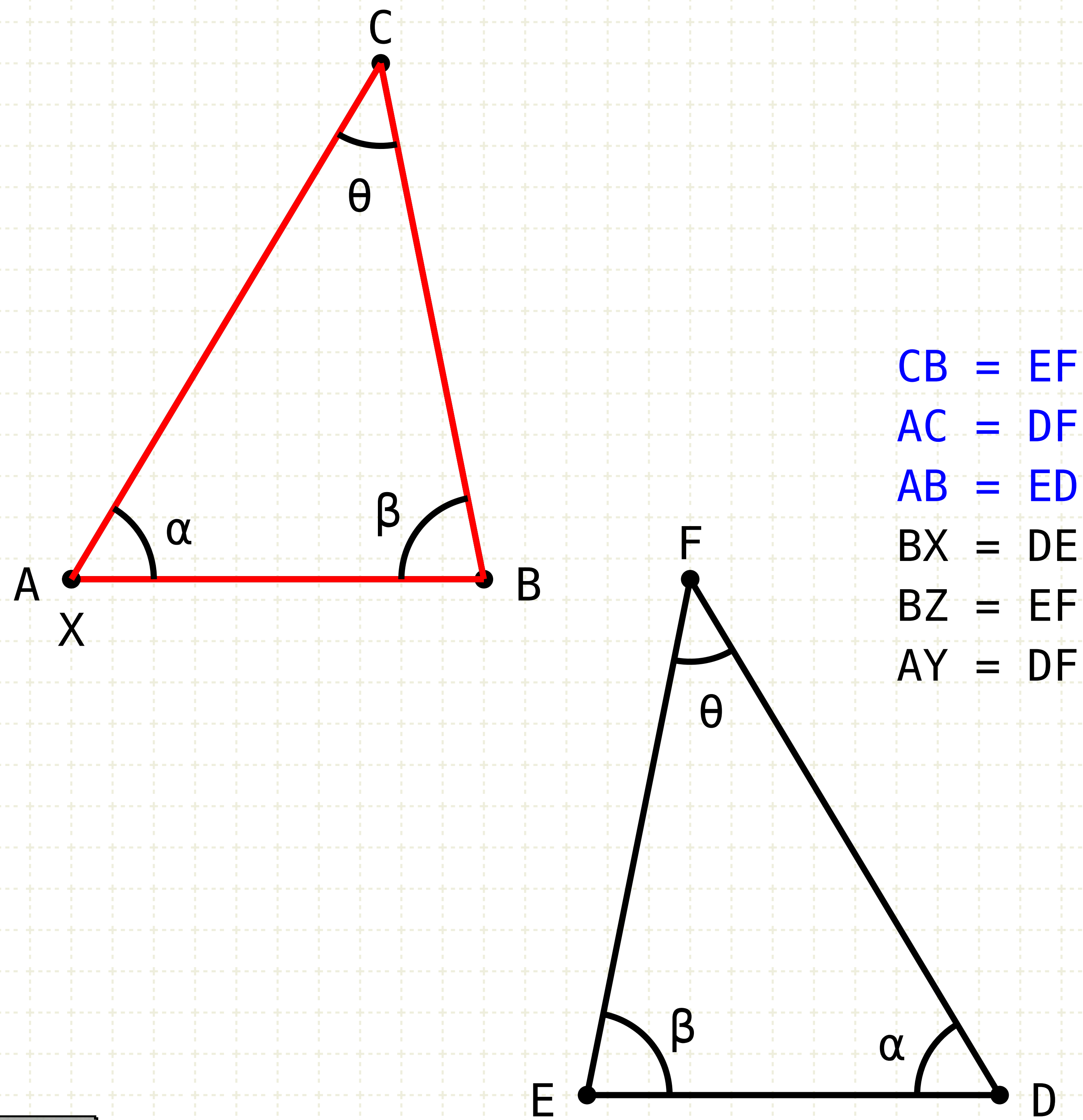

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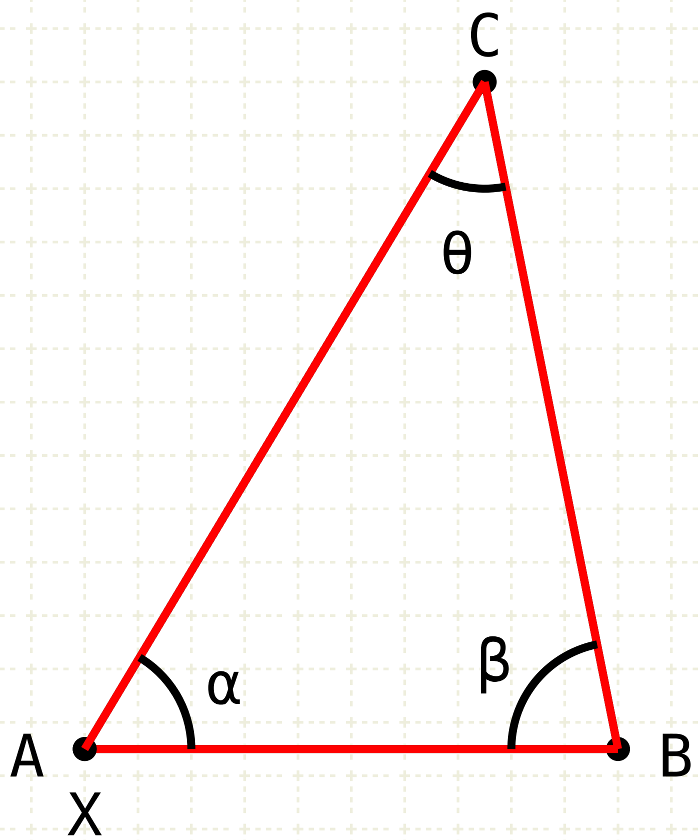

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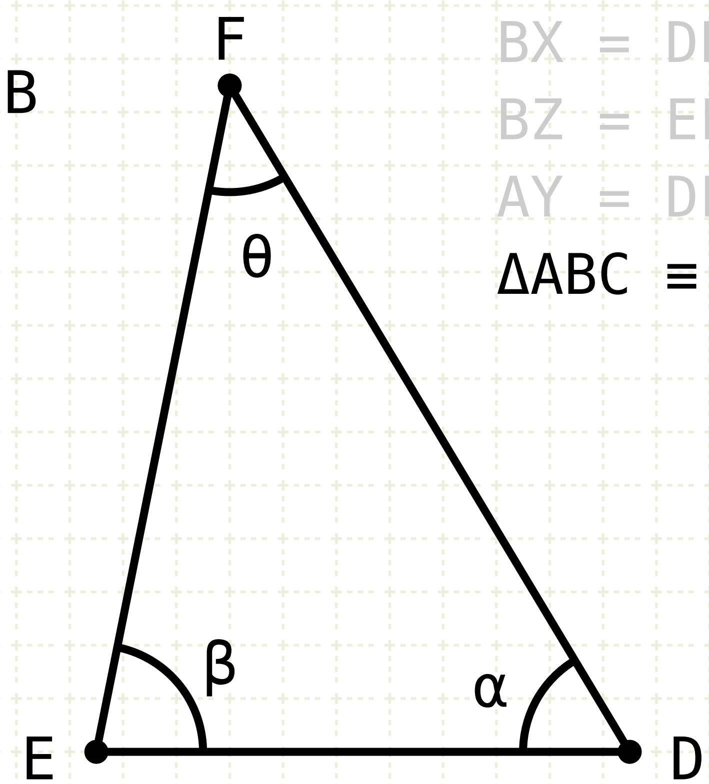
ΔABC ≡ ΔDEF



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