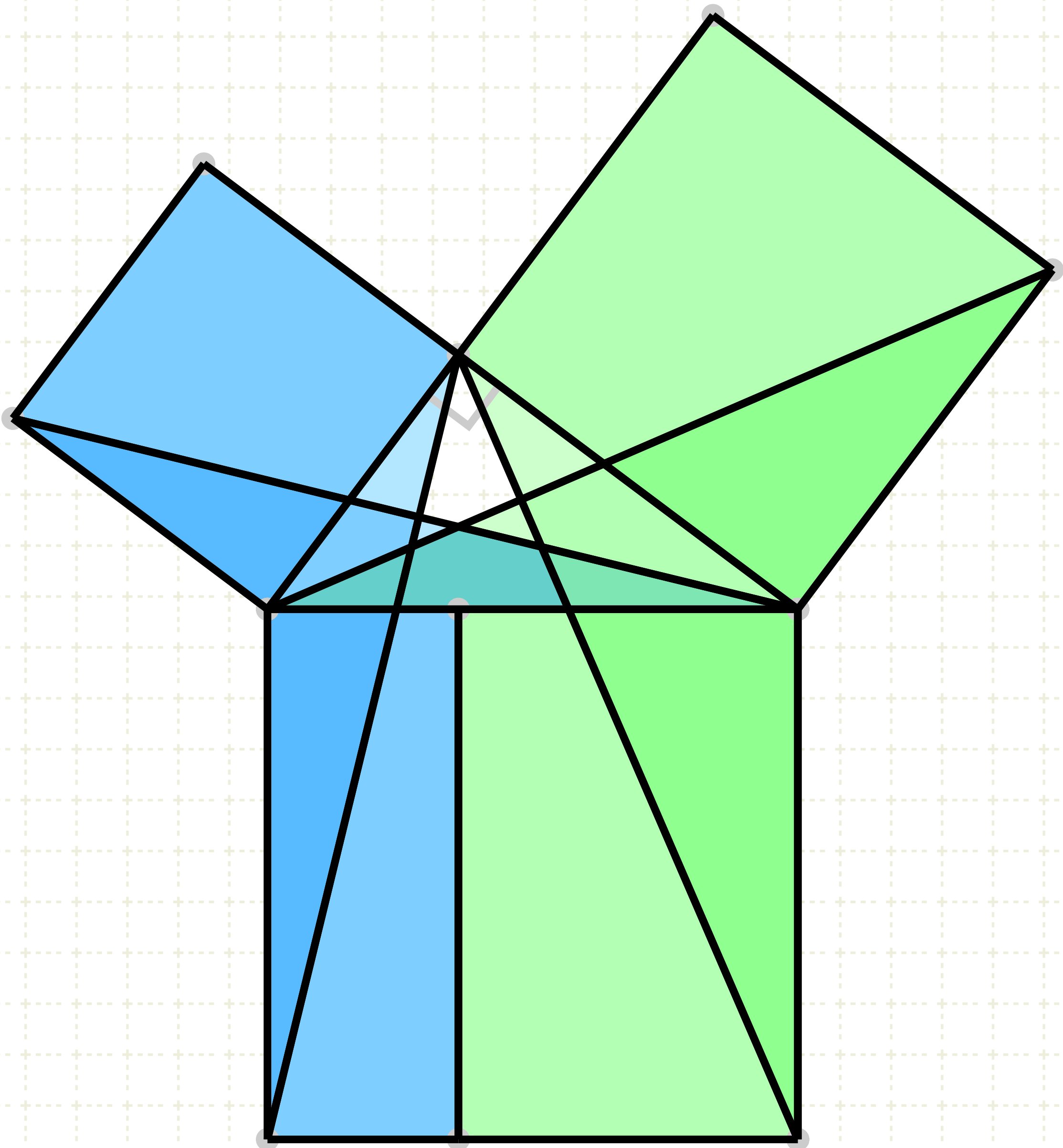
Euclid's Elements

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 17 of Book I

Any two angles of a triangle are together less than two right angles.

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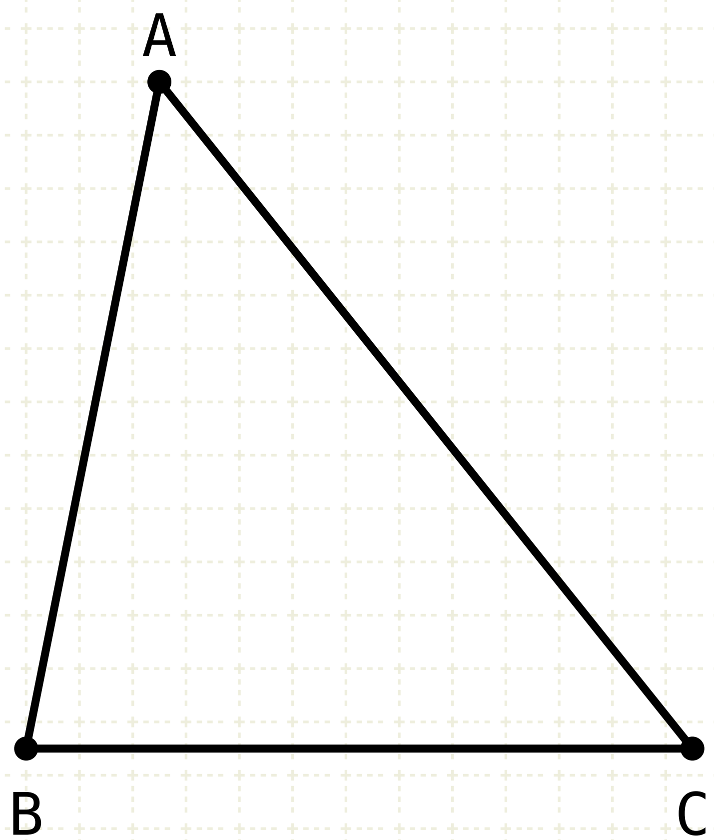
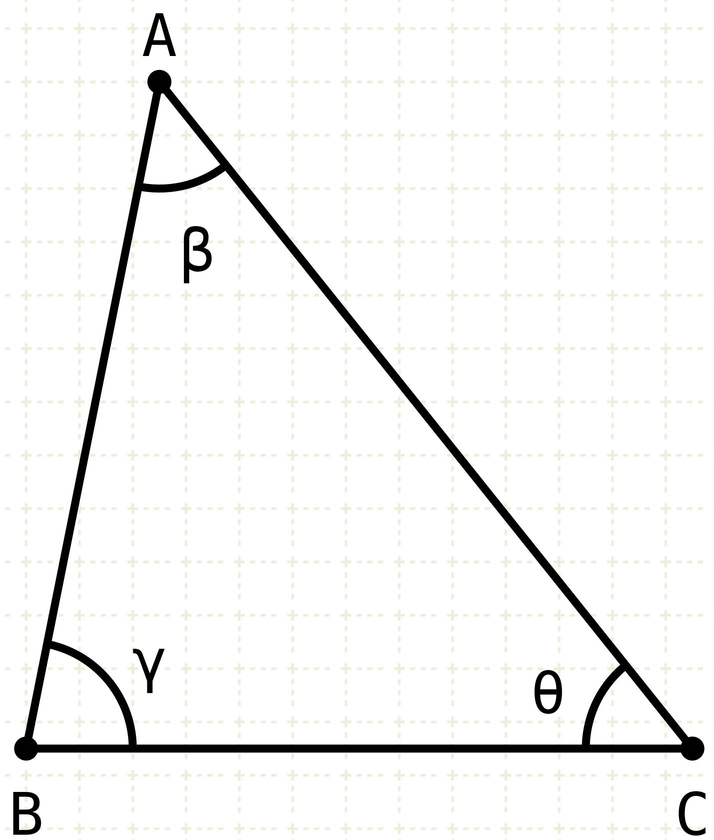


In other words

Given any triangle ABC

Proposition 17 of Book I

Any two angles of a triangle are together less than two right angles.



$$\theta+\gamma < \llcorner + \llcorner$$
$$\theta+\beta < \llcorner + \llcorner$$
$$\gamma+\beta < \llcorner + \llcorner$$

In other words

Given any triangle ABC

The sum of any of the two inner angles is less than two right angles

Proposition 17 of Book I

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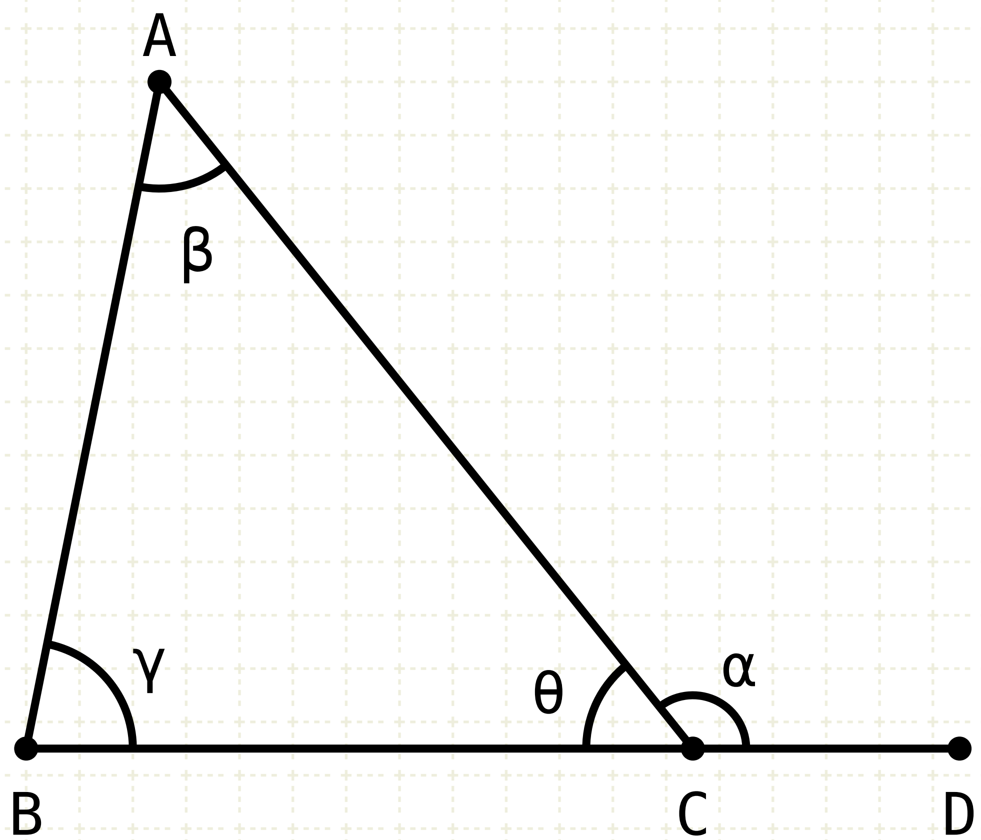

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Given any triangle ABC

The sum of any of the two inner angles is less than two right angles

Proof

Extend line BC to point D

Proposition 17 of Book I

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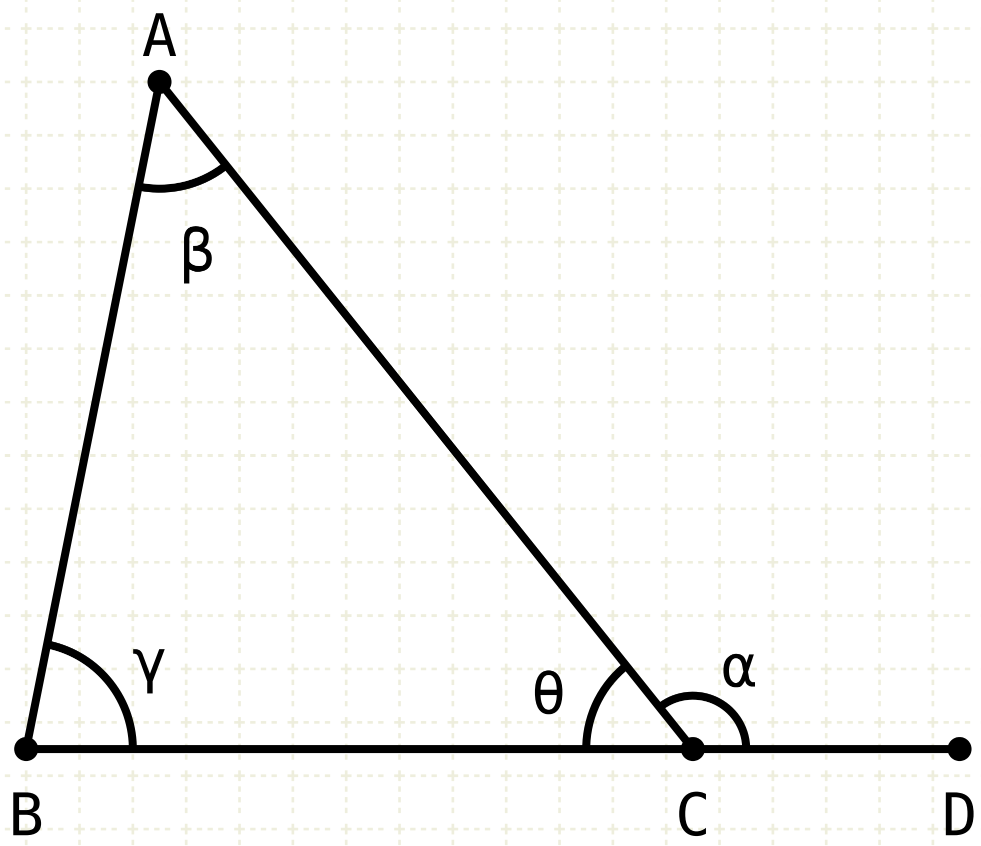

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The sum of the angles ACB and ACD is equal to two right angles (I·13)

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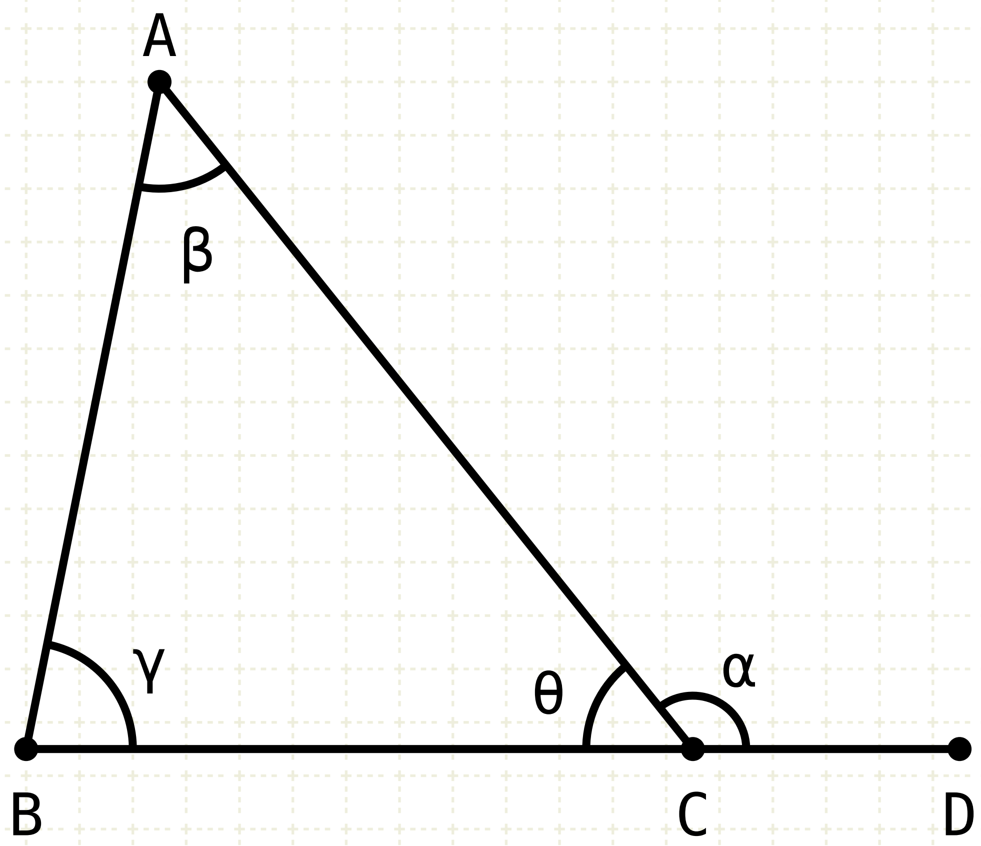

$$\alpha+\theta = \llcorner+\llcorner$$

$$\beta < \alpha \quad \therefore \quad \beta+\theta < \alpha+\theta$$

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In other words

Given any triangle ABC

The sum of any of the two inner angles is less than two right angles

Proof

Extend line BC to point D

The sum of the angles ACB and ACD is equal to two right angles (I·13)

The angle ACD is greater than either angle ABC or CAB (I·16)

Therefore the sum of either ABC or CAB with angle ACB will be less than 2 right angles

Proposition 17 of Book I

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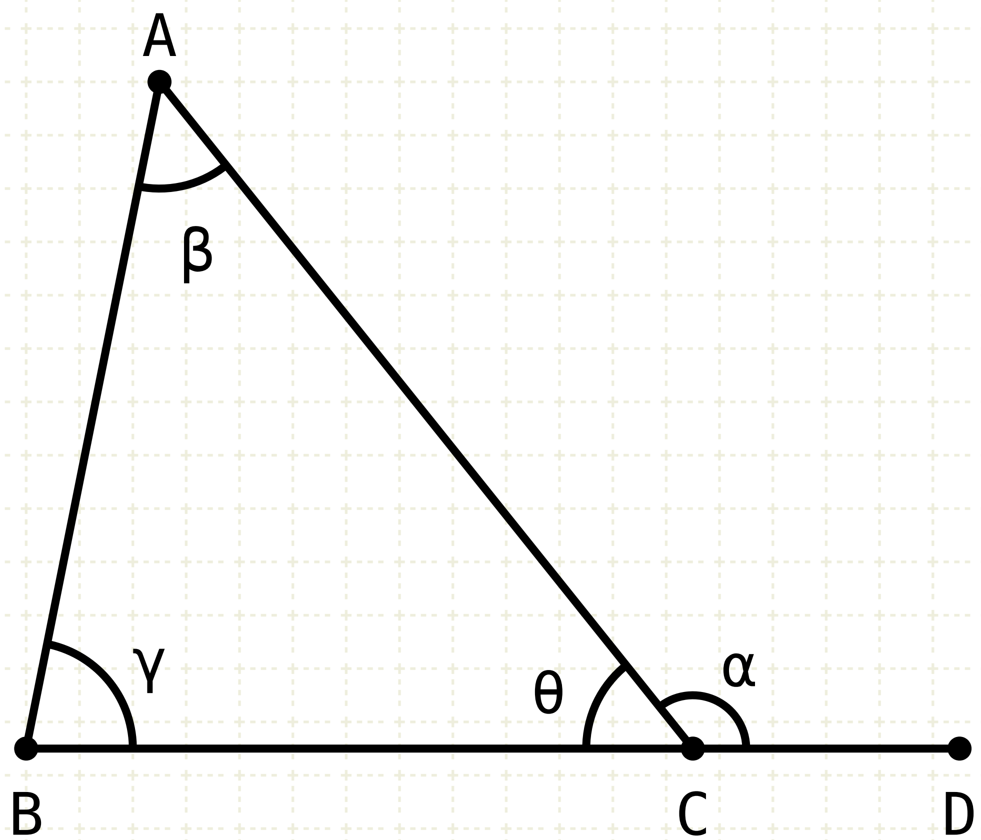

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The same logic can be applied to the other vertices of the triangle

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