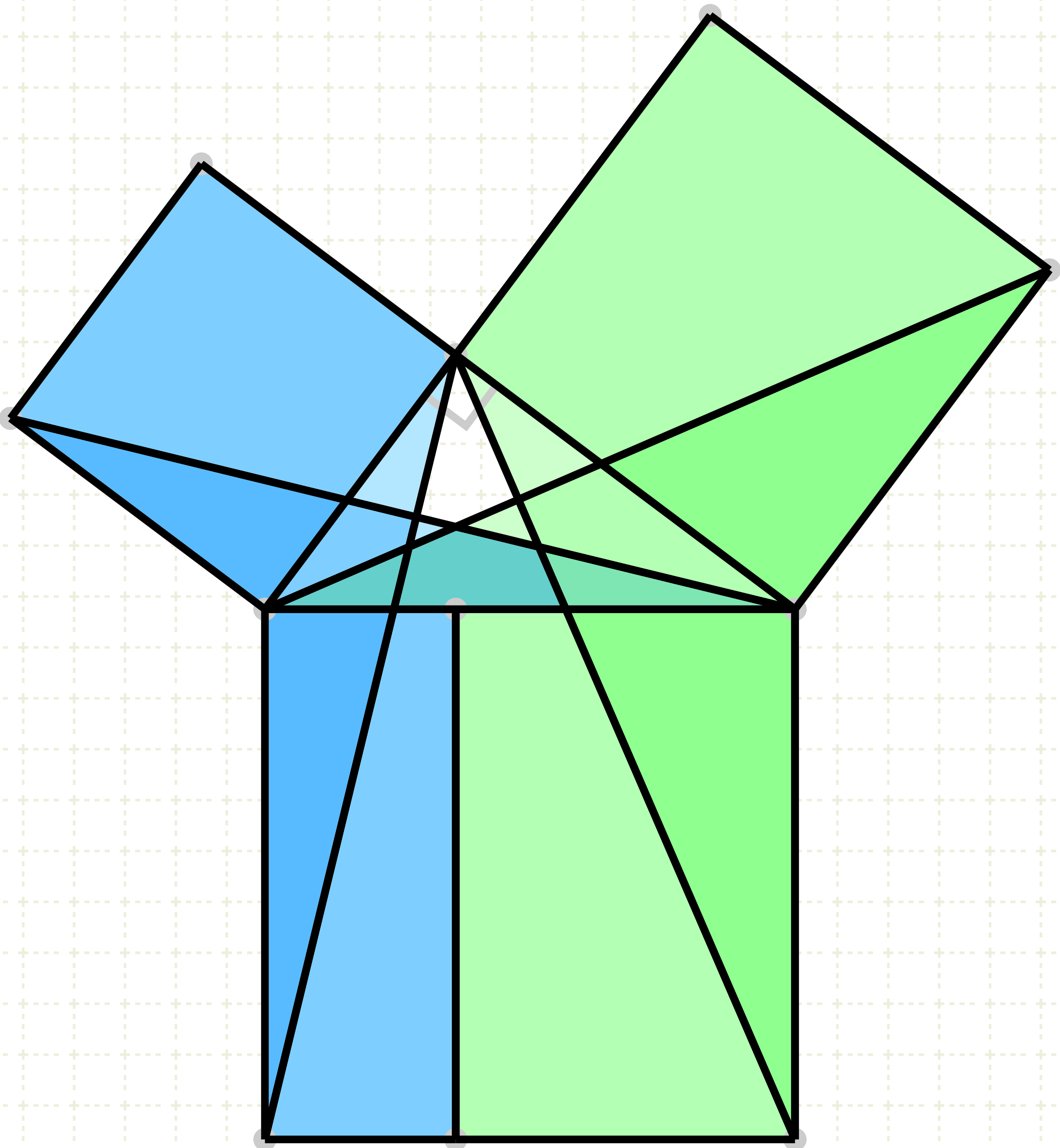
Euclid's Elements

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 18 of Book I

A greater side of a triangle is opposite a greater angle.

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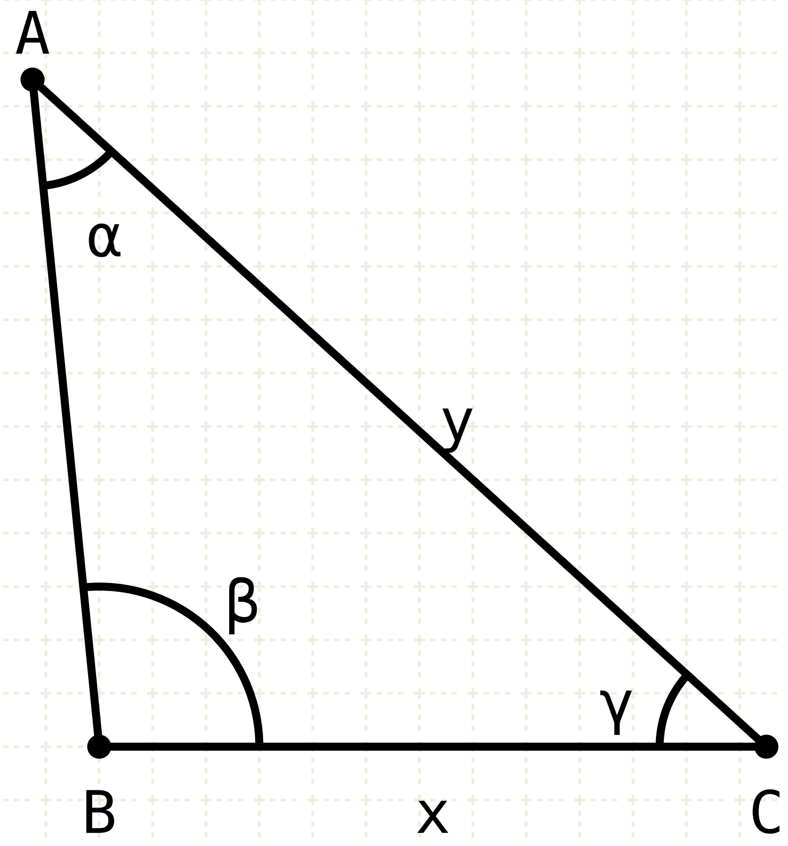
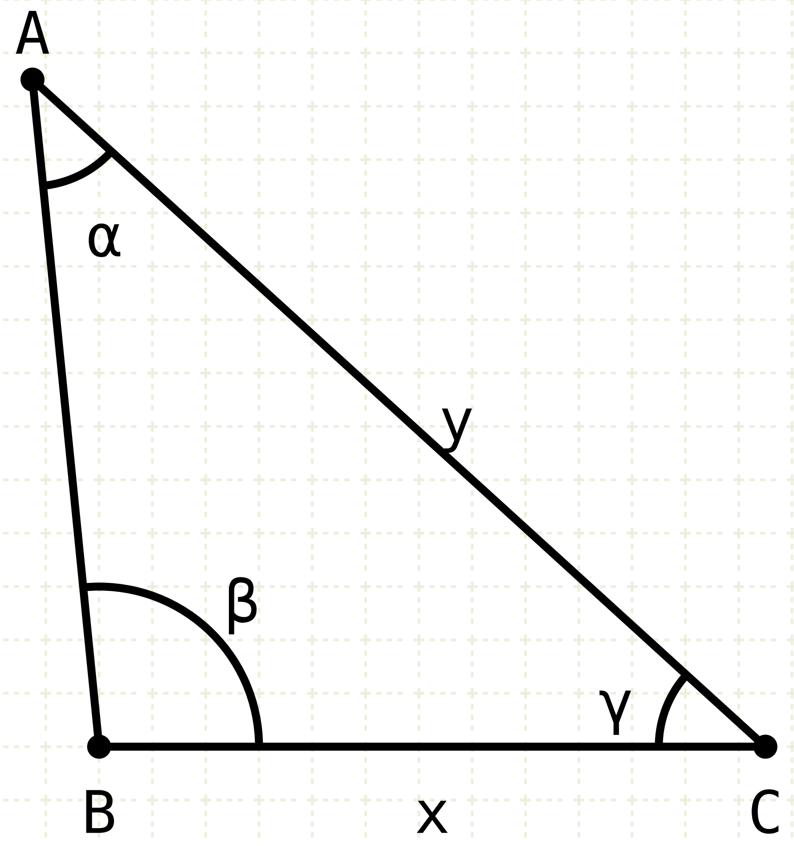


In other words

Given a triangle ABC

Proposition 18 of Book I

A greater side of a triangle is opposite a greater angle.



In other words

Given a triangle ABC

If line AC is greater than BC, then angle ABC is greater than BAC

$$y > x \quad \Rightarrow \quad \beta > \alpha$$

Proposition 18 of Book I

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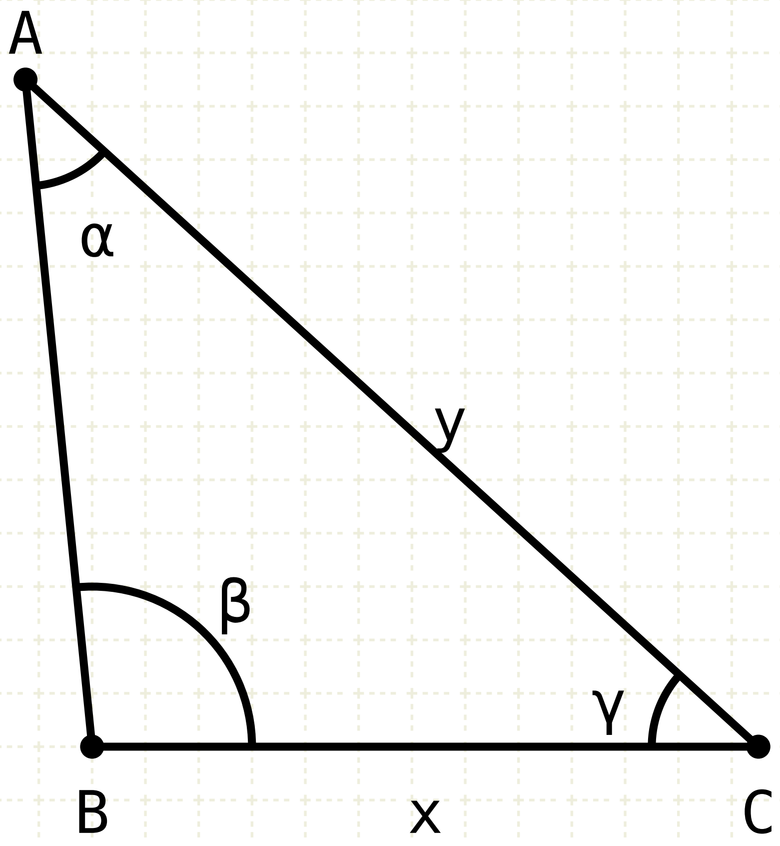

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Given a triangle ABC

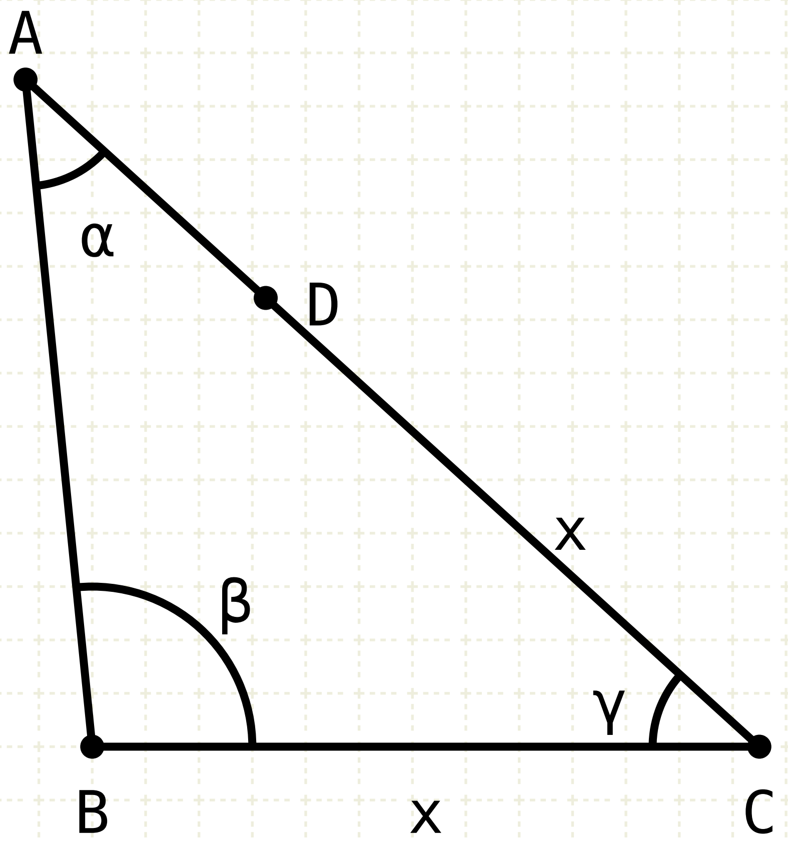
If line AC is greater than BC, then angle ABC is greater than BAC

Proof

AC > BC

Proposition 18 of Book I

A greater side of a triangle is opposite a greater angle.



In other words

Given a triangle ABC

If line AC is greater than BC, then angle ABC is greater than BAC

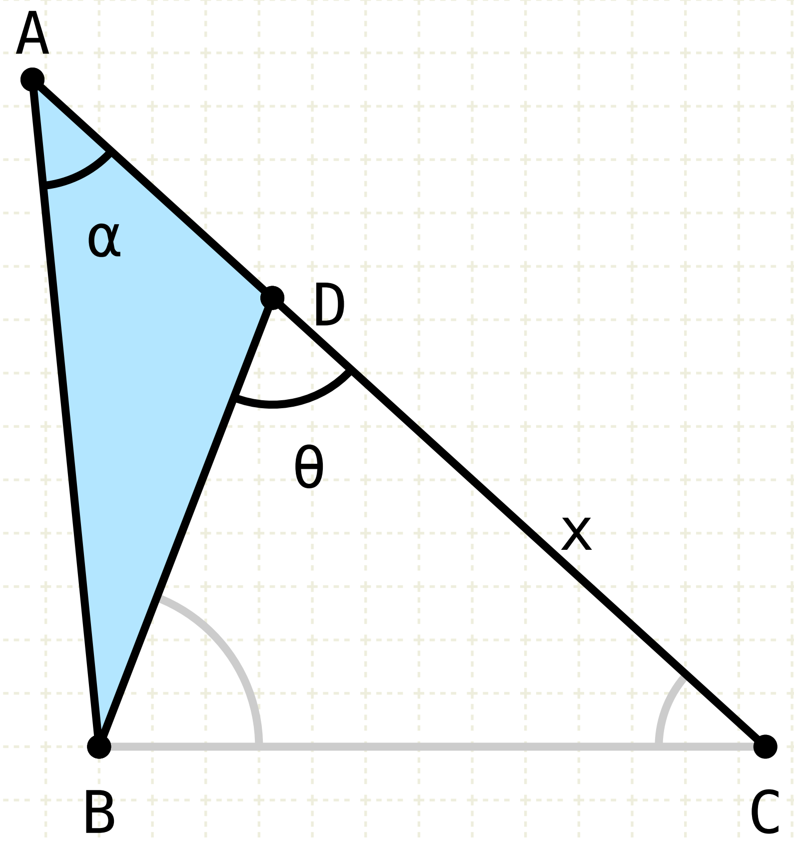
Proof

Create point D on line AC, such that CD equals BC

AC > BC
DC = BC

Proposition 18 of Book I

A greater side of a triangle is opposite a greater angle.



$AC > BC$

$DC = BC$

$\theta > \alpha$

In other words

Given a triangle ABC

If line AC is greater than BC, then angle ABC is greater than BAC

Proof

Create point D on line AC, such that CD equals BC

Create line BD

The angle CDB is an exterior angle to triangle ADB, thus angle CDB is greater than angle DAB (I·16)

Proposition 18 of Book I

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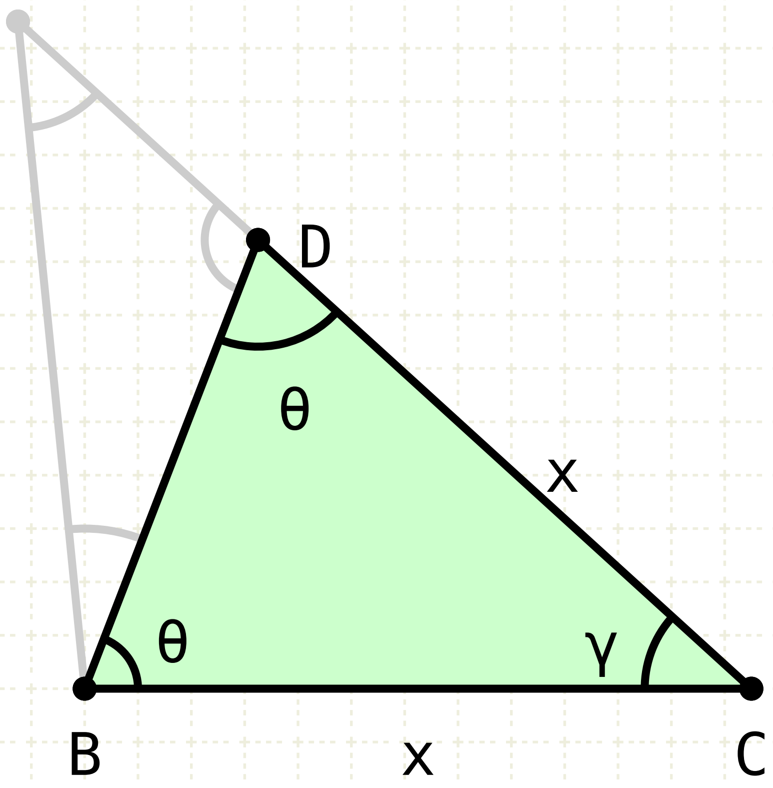

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The triangle BCD is an isosceles triangle, thus angles CDB and DBC are equal (I·5)

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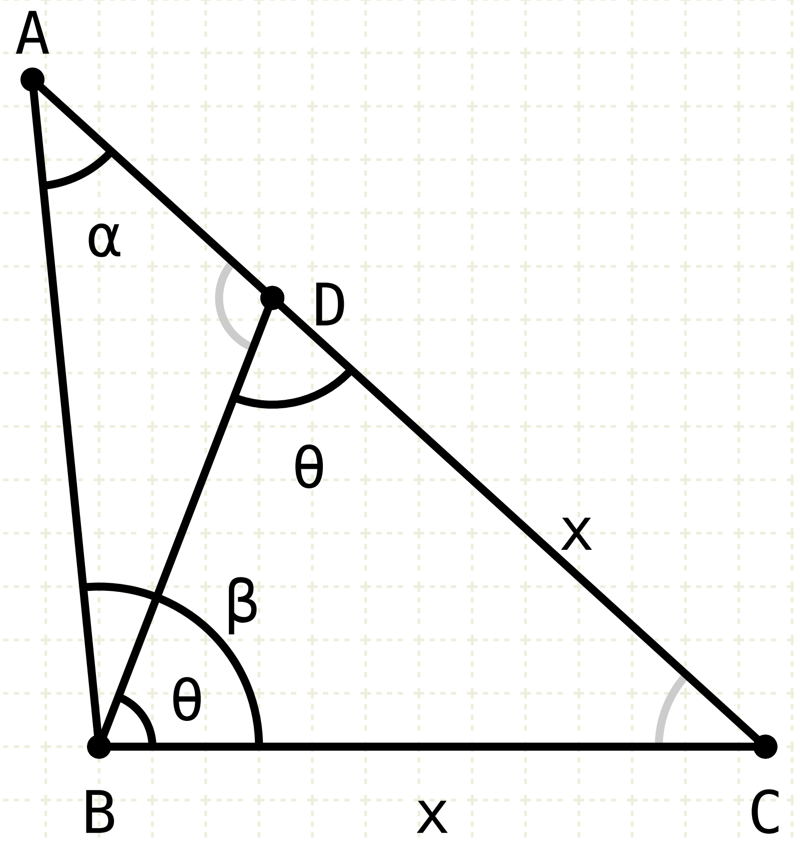

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Angle ABC is greater than angle DBC, so angle ABC is greater than angle BAC

Proposition 18 of Book I

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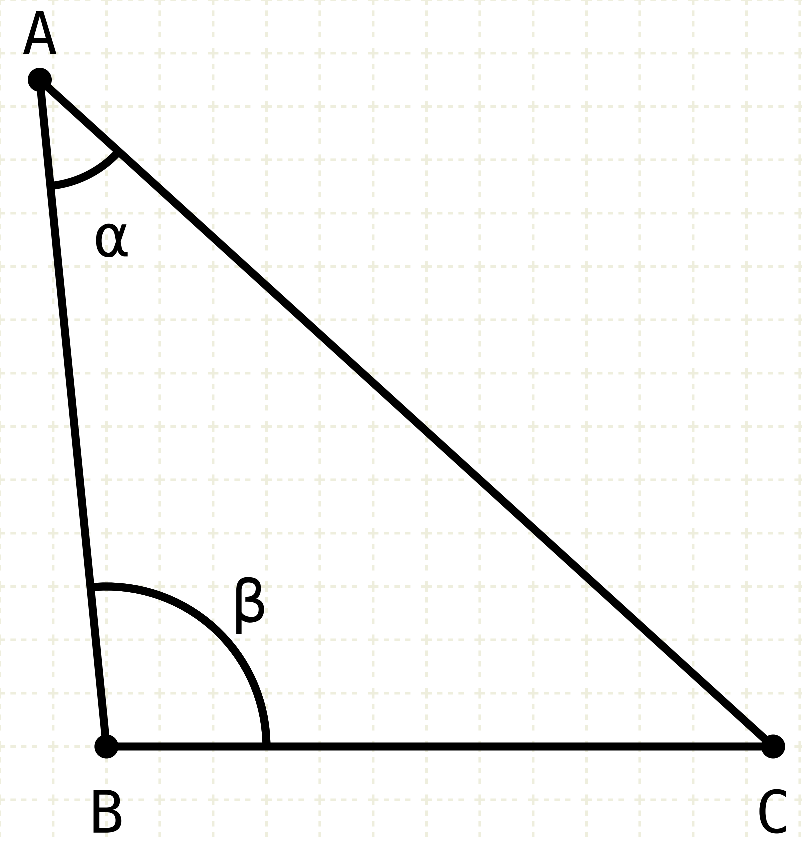

$AC > BC$

$DC = BC$

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$\angle ABC > \angle BAC$

In other words

Given a triangle ABC

If line AC is greater than BC, then angle ABC is greater than BAC

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