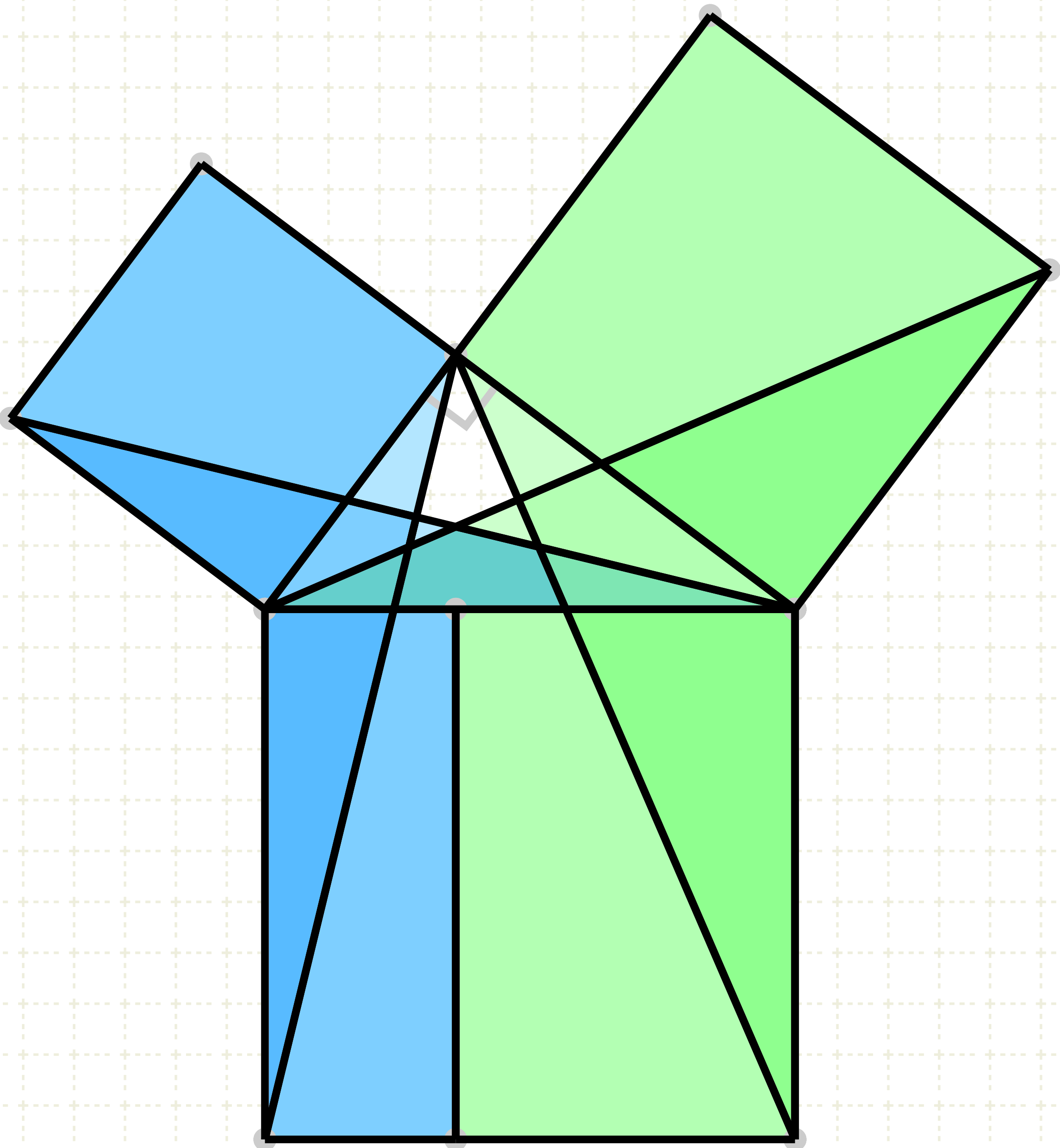
Euclid's Elements

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 14 of Book I

If with any straight line, and at a point on it, two straight lines not lying on the same side make the sum of the adjacent angles equal to two right angles, then the two straight lines are in a straight line with one another.

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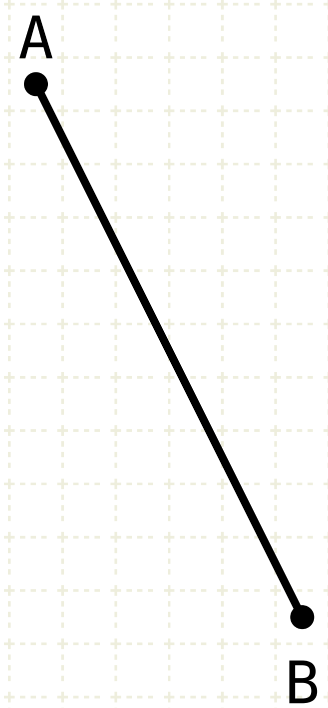

In other words

Start with an arbitrary line segment AB

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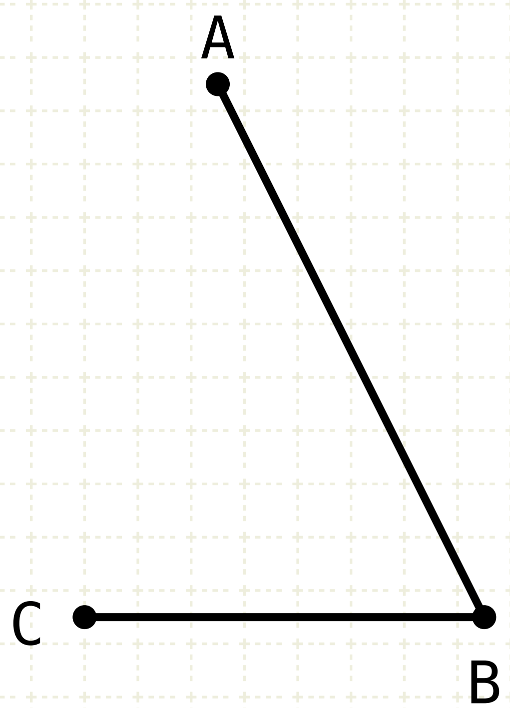

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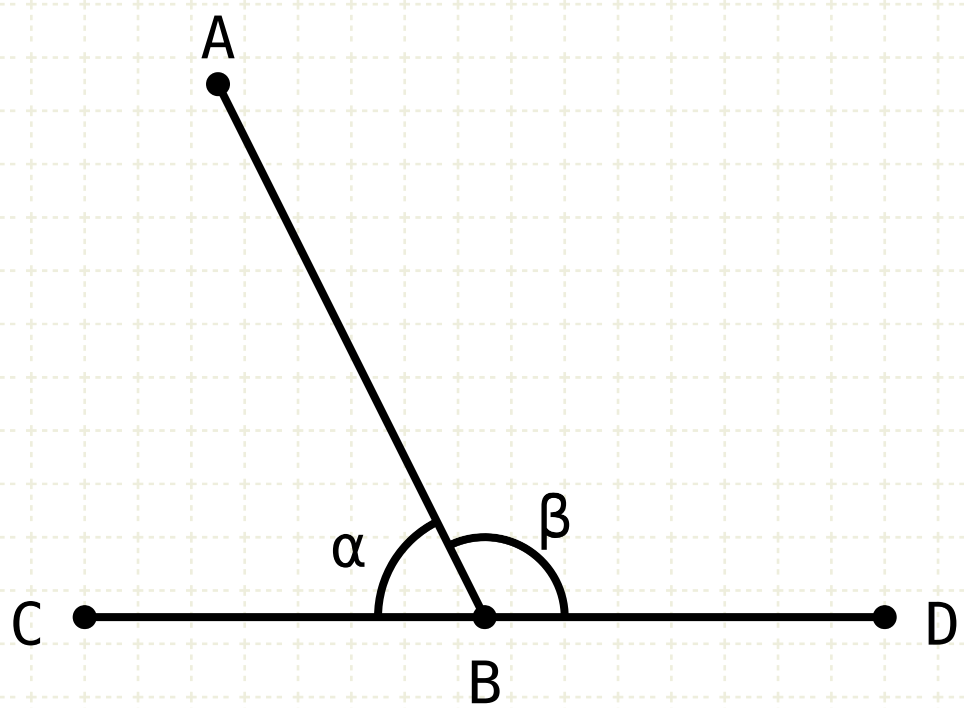

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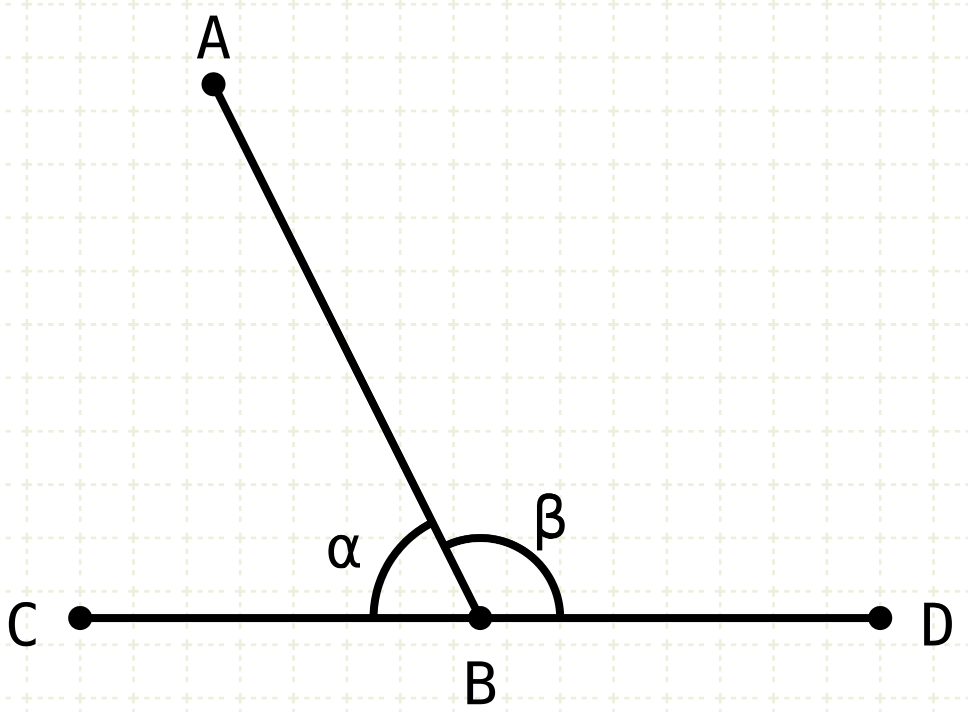
If the sum of the angles ABC and ABD equals the sum of two right angles…



α + β = ∟ + ∟

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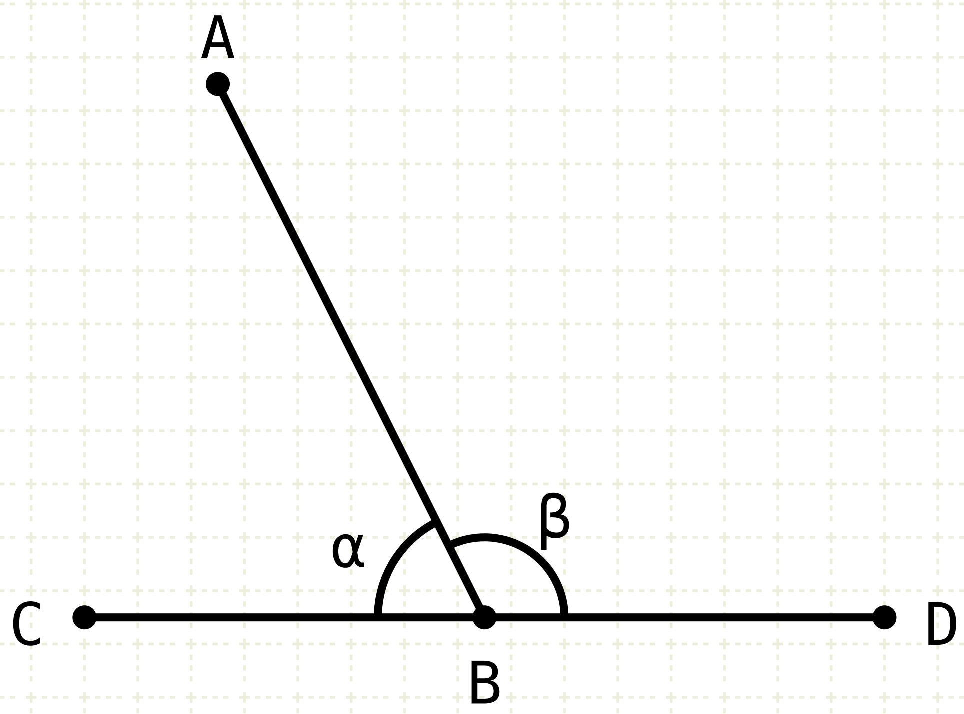

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CB, BD = CD

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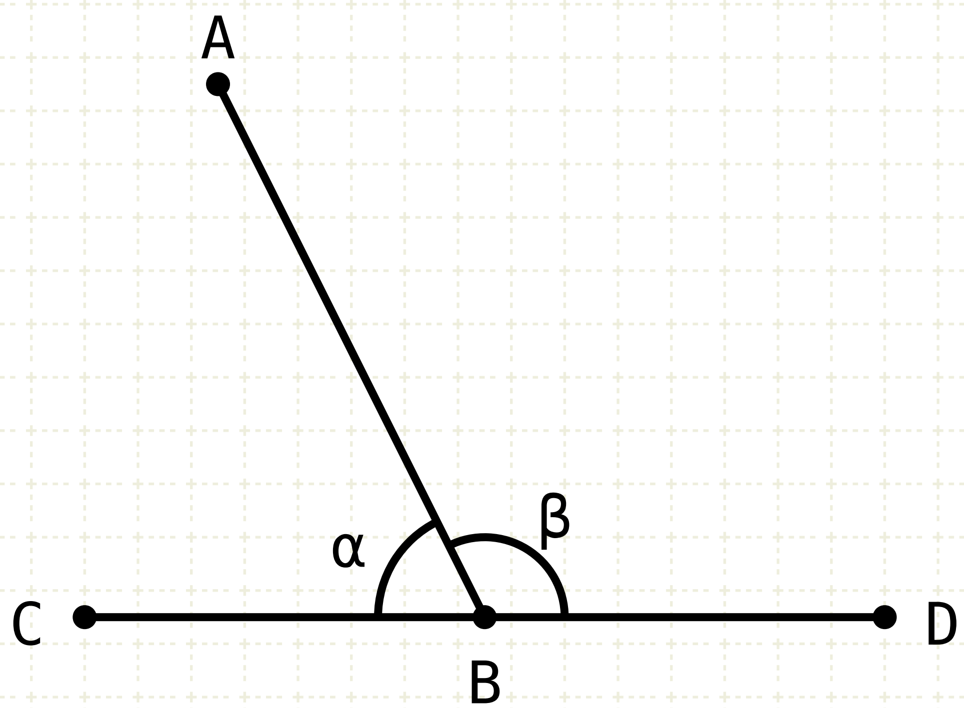

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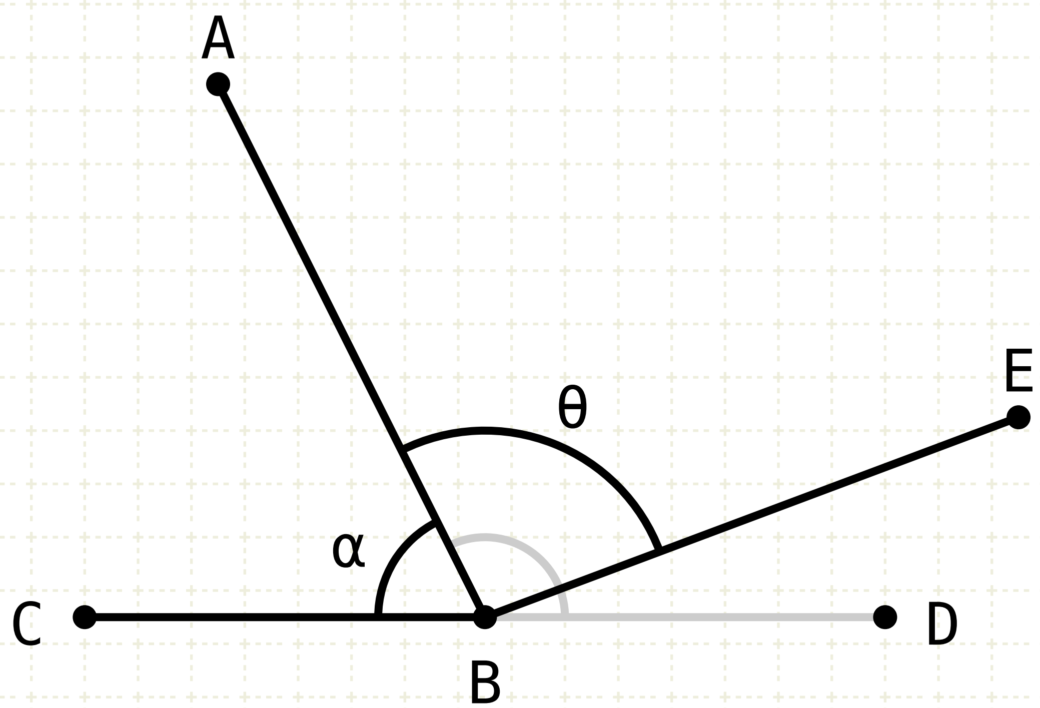

$$\alpha + \beta = \llcorner + \llcorner$$

$$CB, BE = CE$$

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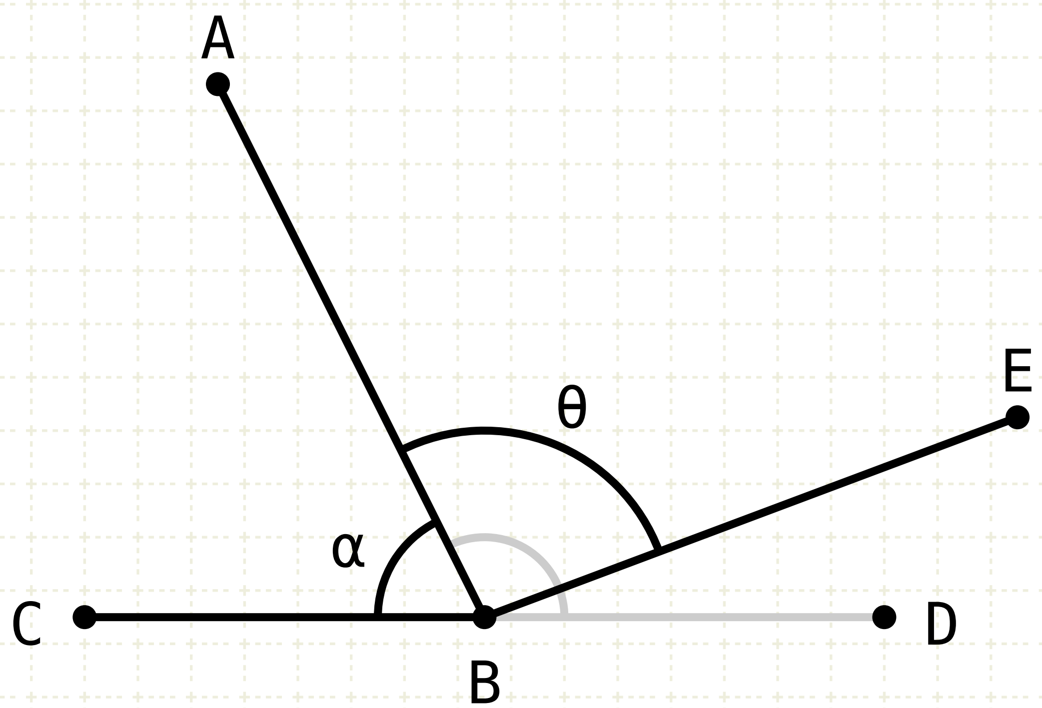

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If CBE is a straight line, then the sum of α and θ equals two right angles (I·13)

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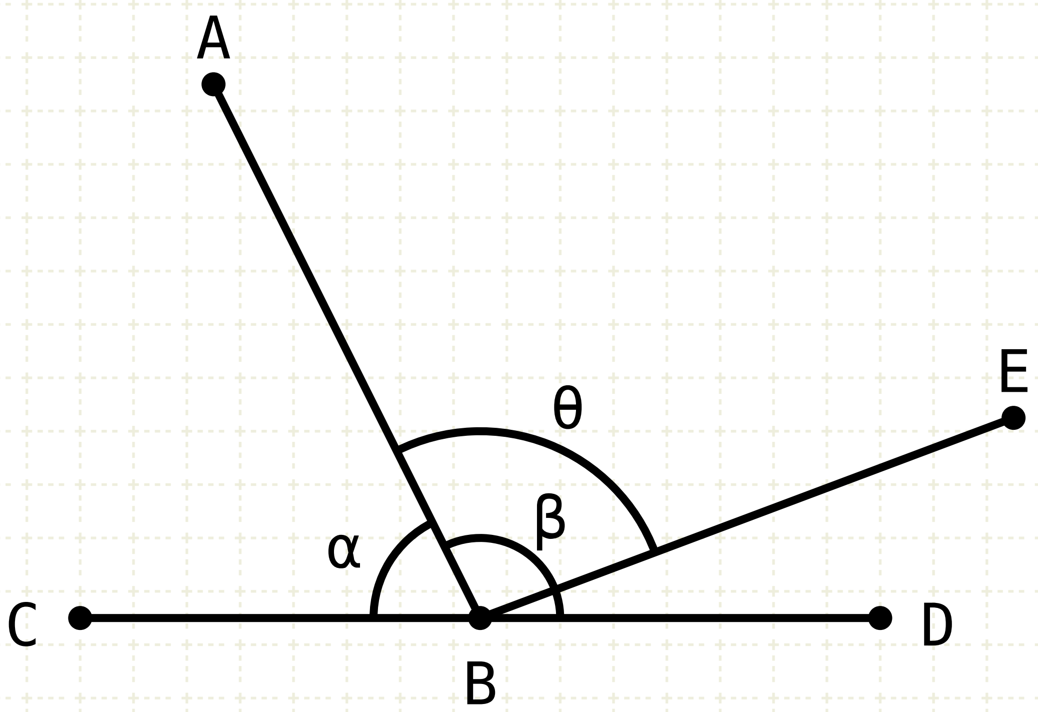

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If CBE is a straight line, then the sum of α and θ equals two right angles (I·13)

But the sum of α and β also equals two right angles

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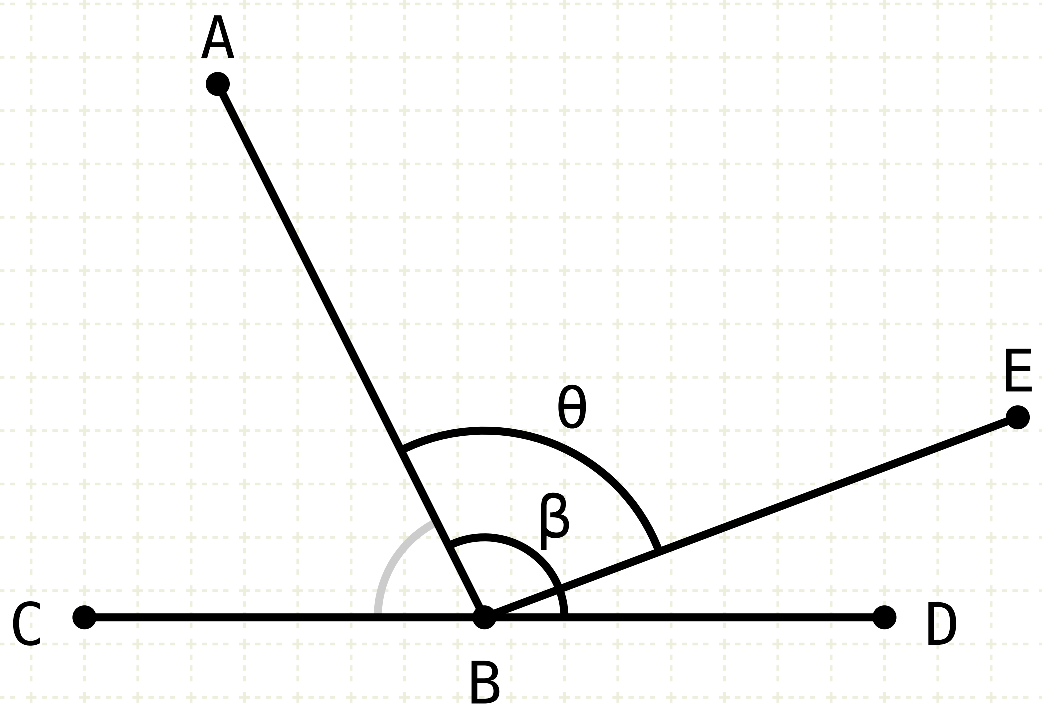

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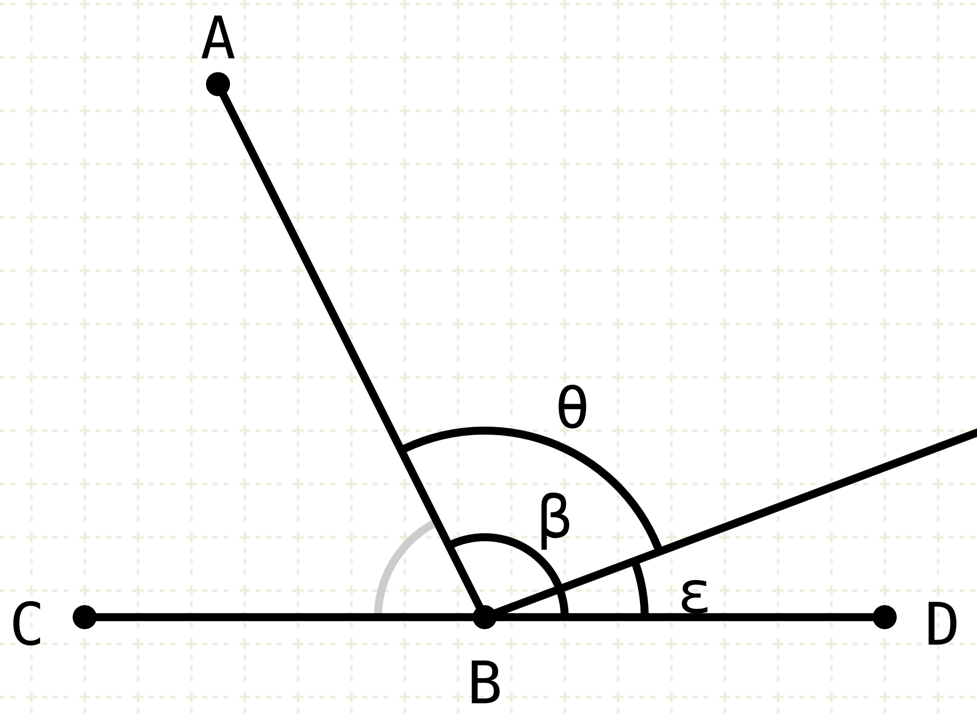

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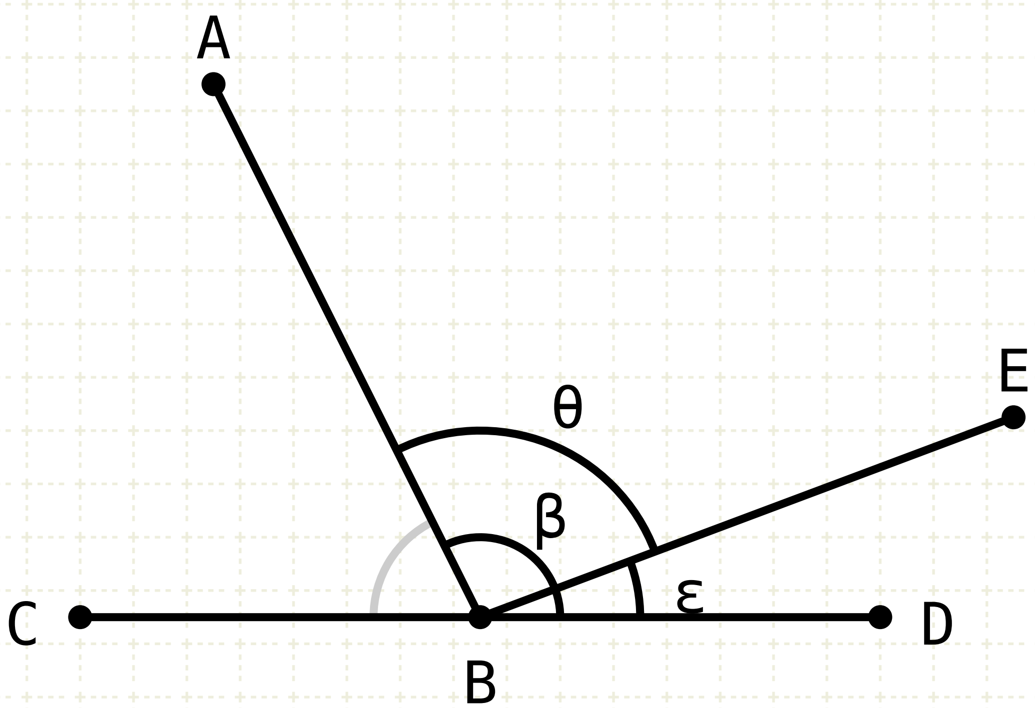

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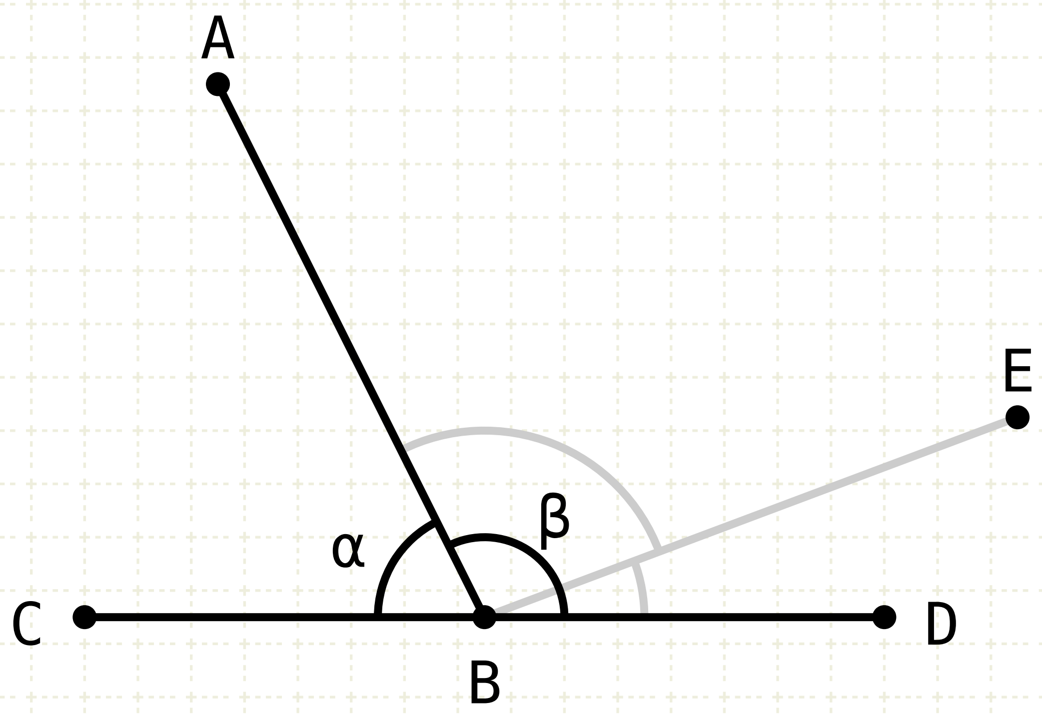

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Thus, CB and BD form a straight line

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