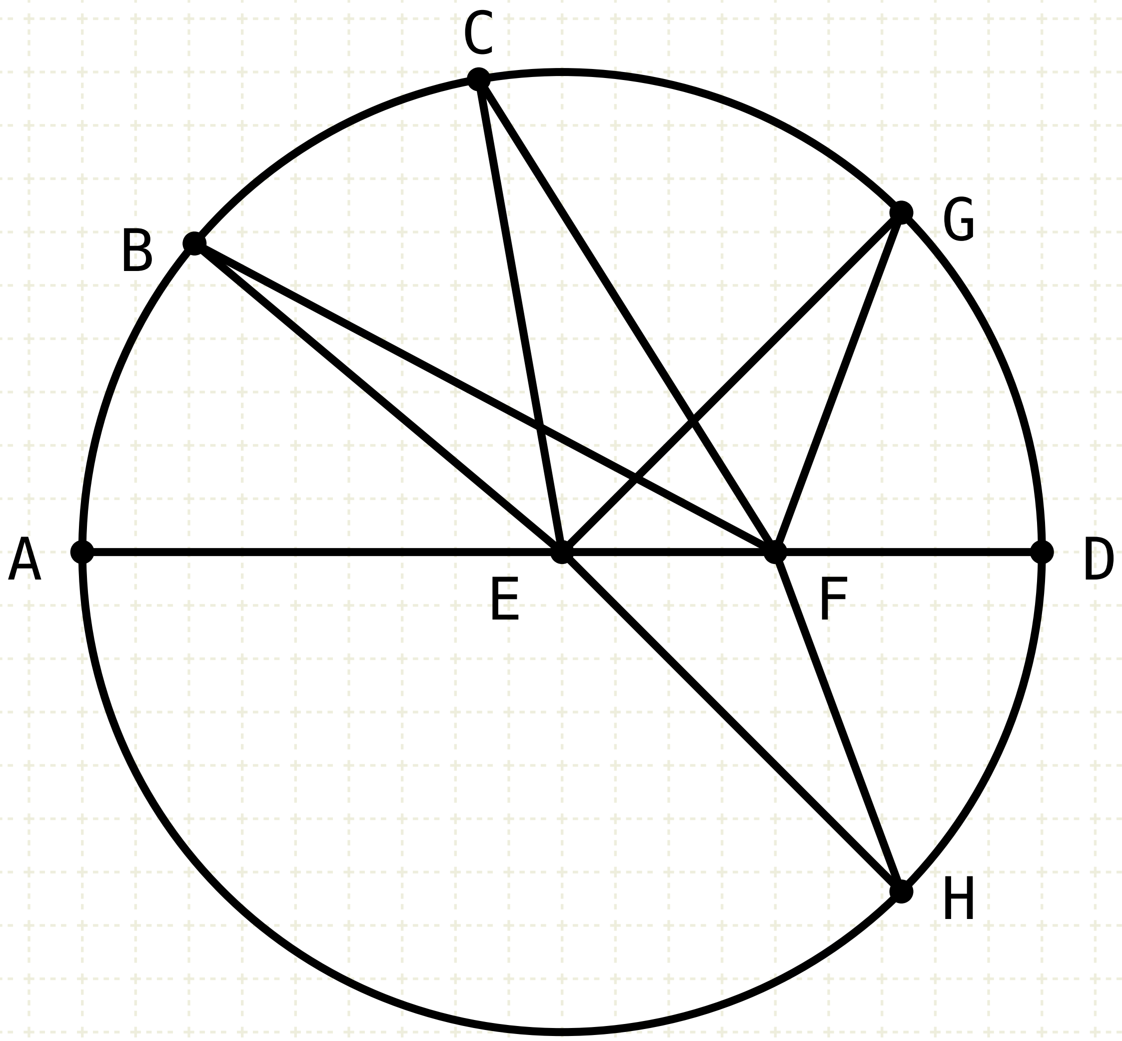

Euclid's Elements

Book III

A circle is a round straight line with a hole in the middle.

Mark Twain

quoting a schoolchild in "-English as She Is Taught-"

If people stand in a circle long enough, they'll eventually begin to dance.

George Carlin, Napalm and Silly Putty (2001)

Table of Contents, Chapter 3

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Proposition 4 of Book III

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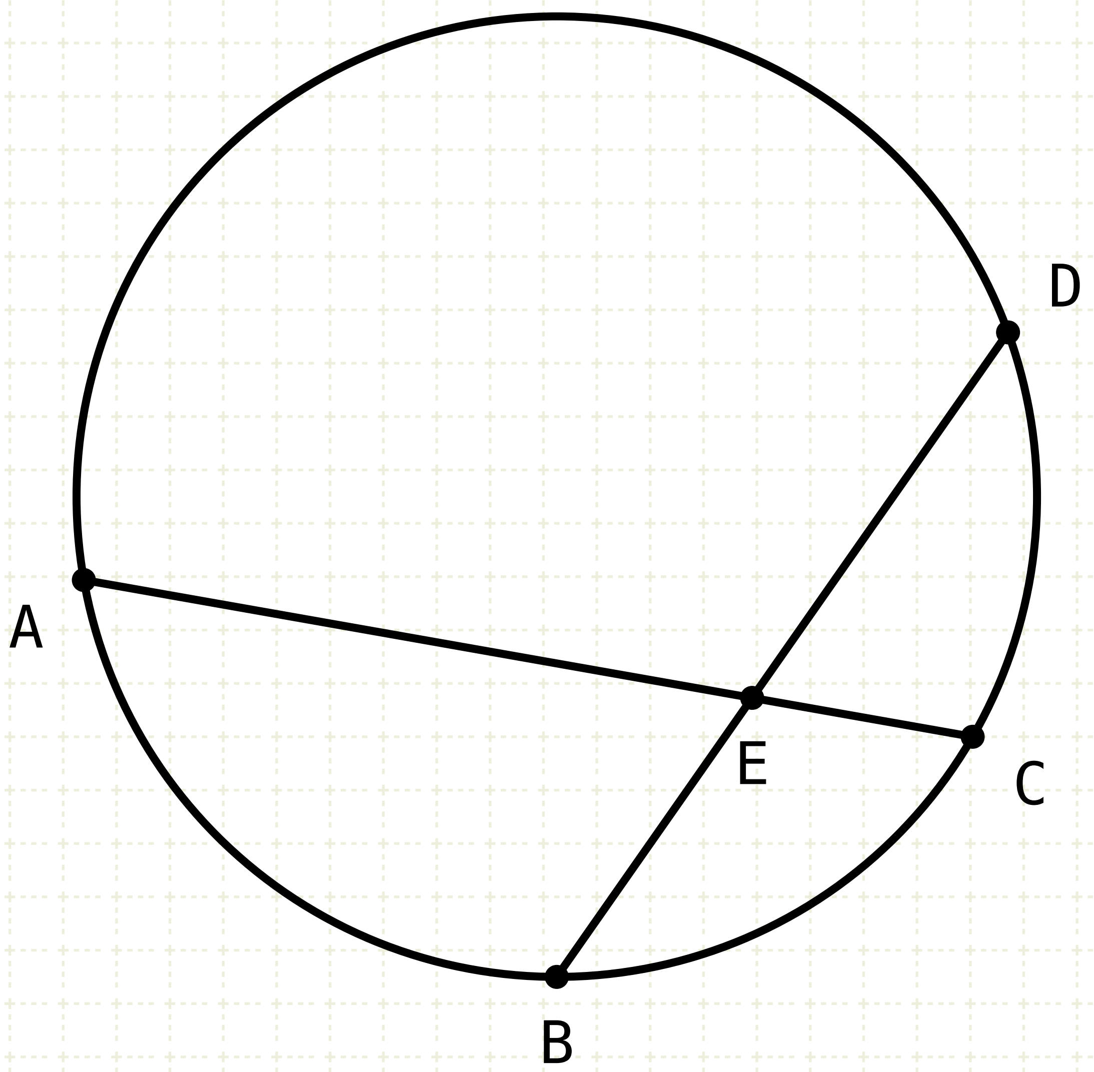

In other words

Let two straight lines AC and BD, not passing through the center of the circle, intersect at point E

∴ AC and BD do not bisect each other

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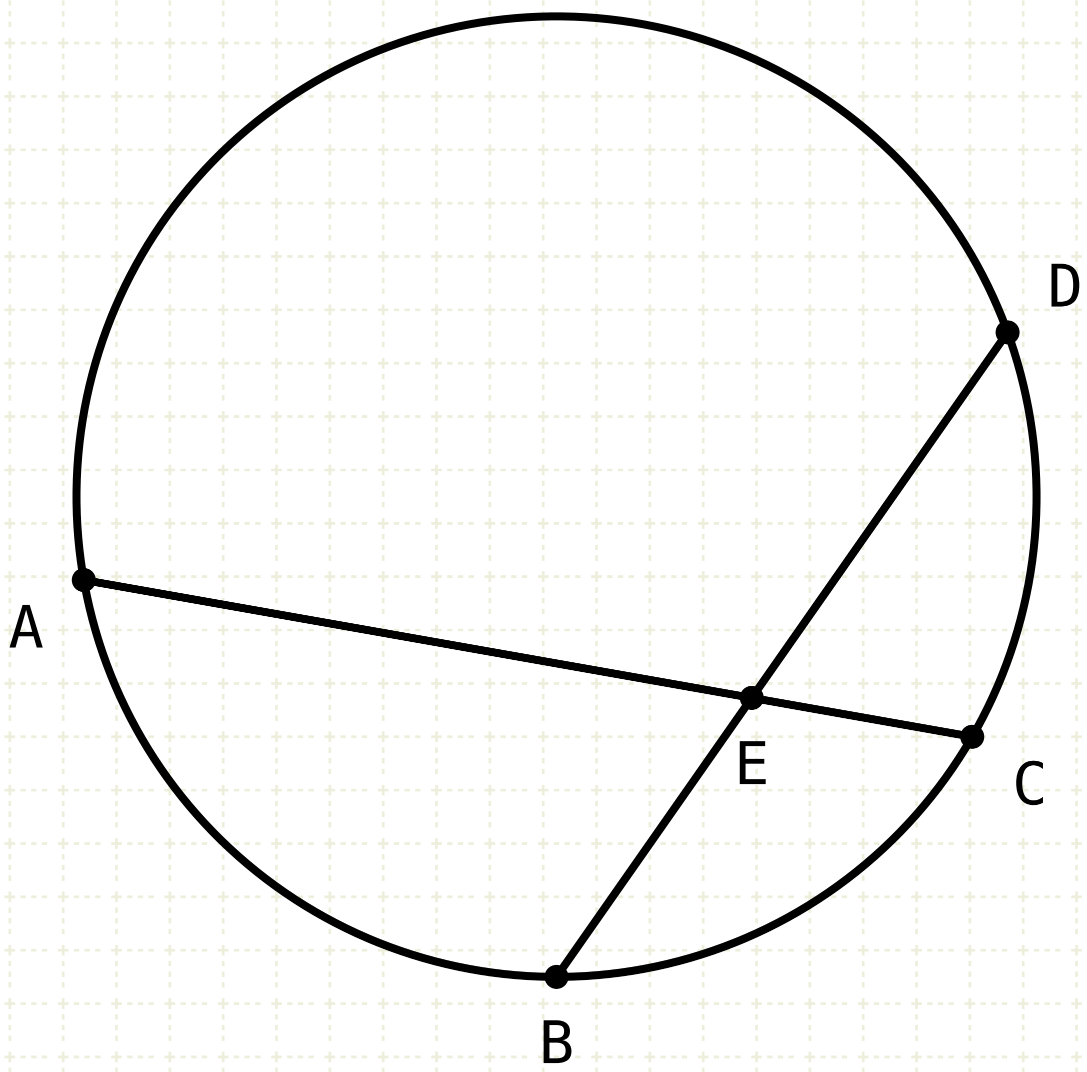

Assume …

AE = EC, BE = ED

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Proof by contradiction

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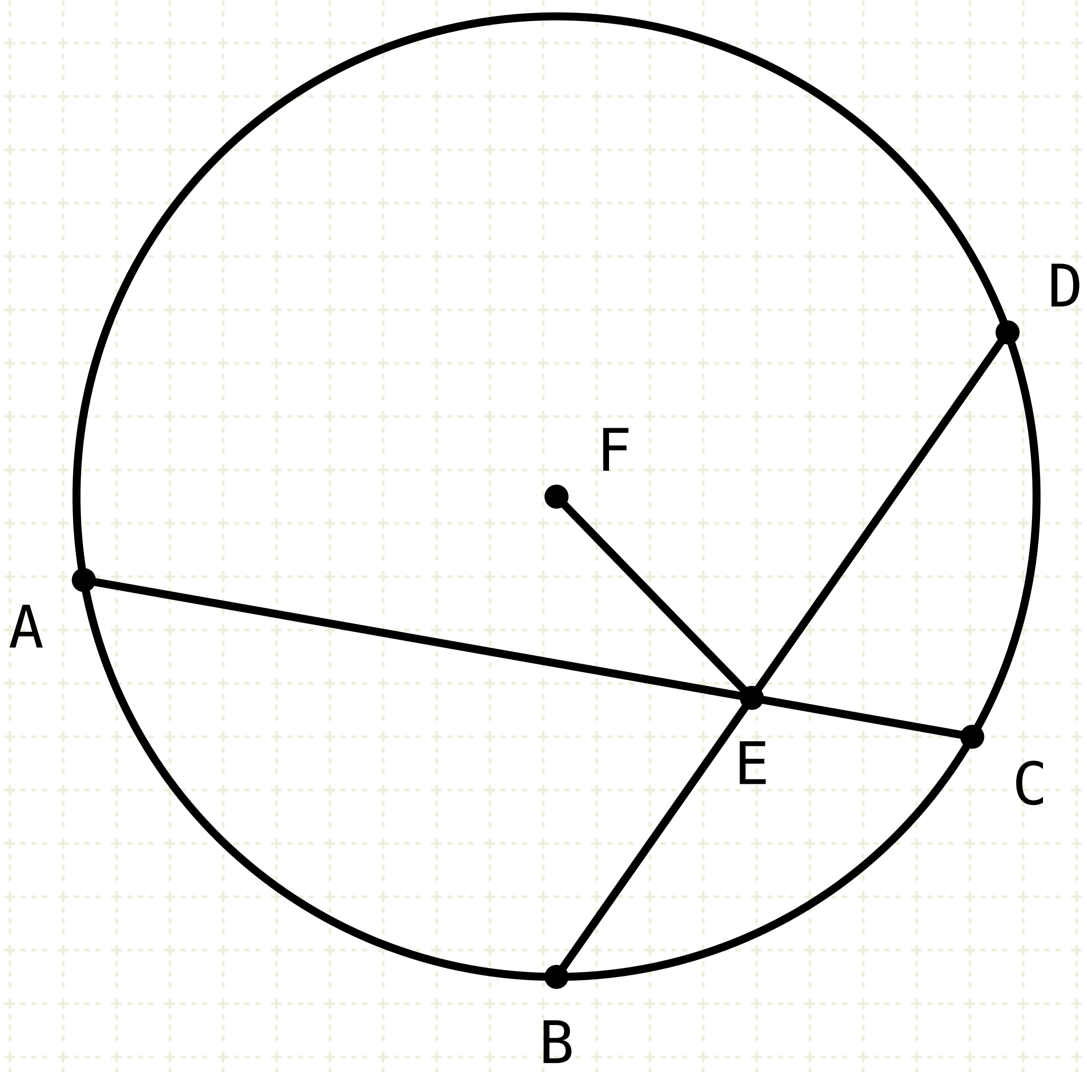

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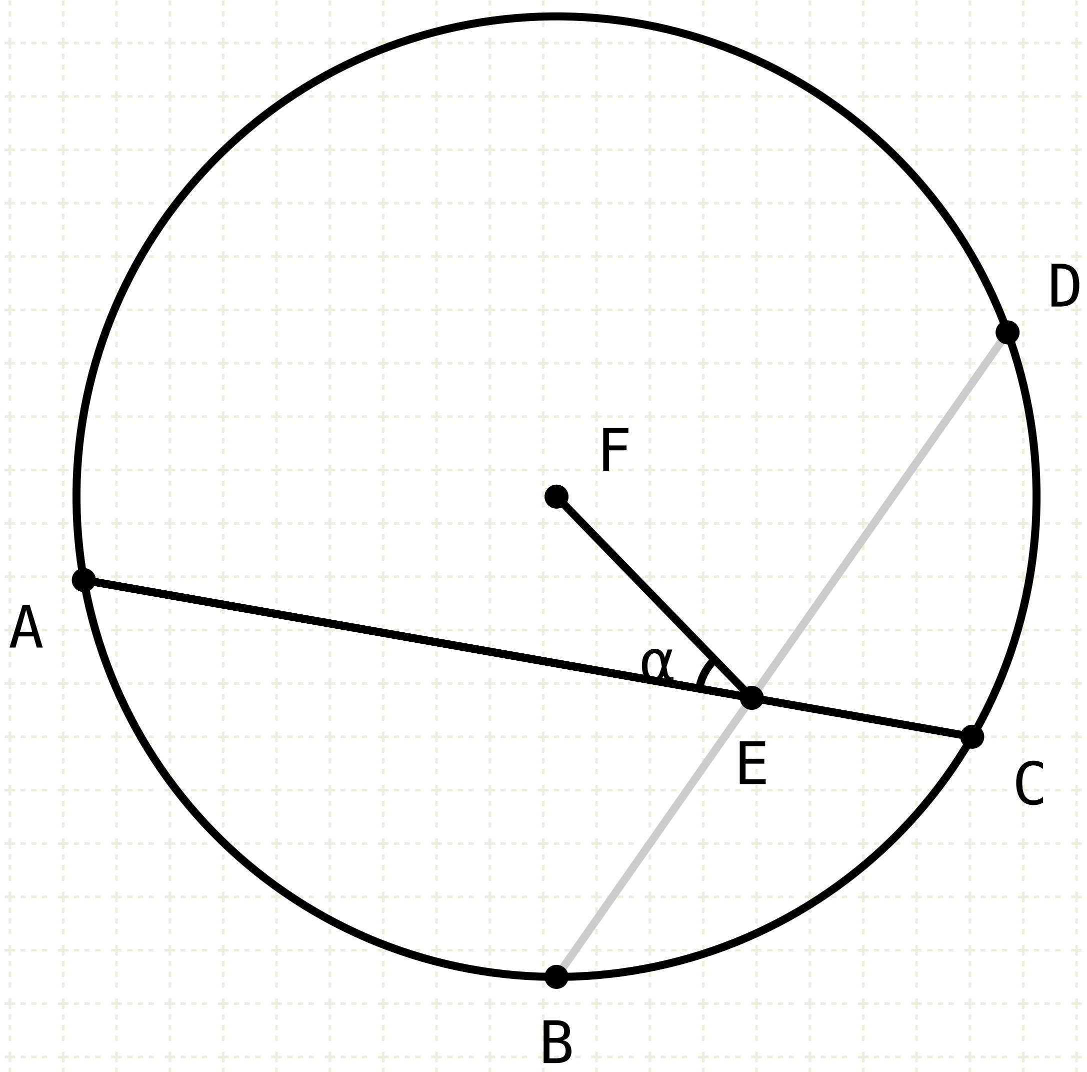

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$\alpha = ⌊$

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Since FE is a line passing through the center of a circle, bisecting AC, a line not through the center, then the angle FEA (α) is right (III·3)

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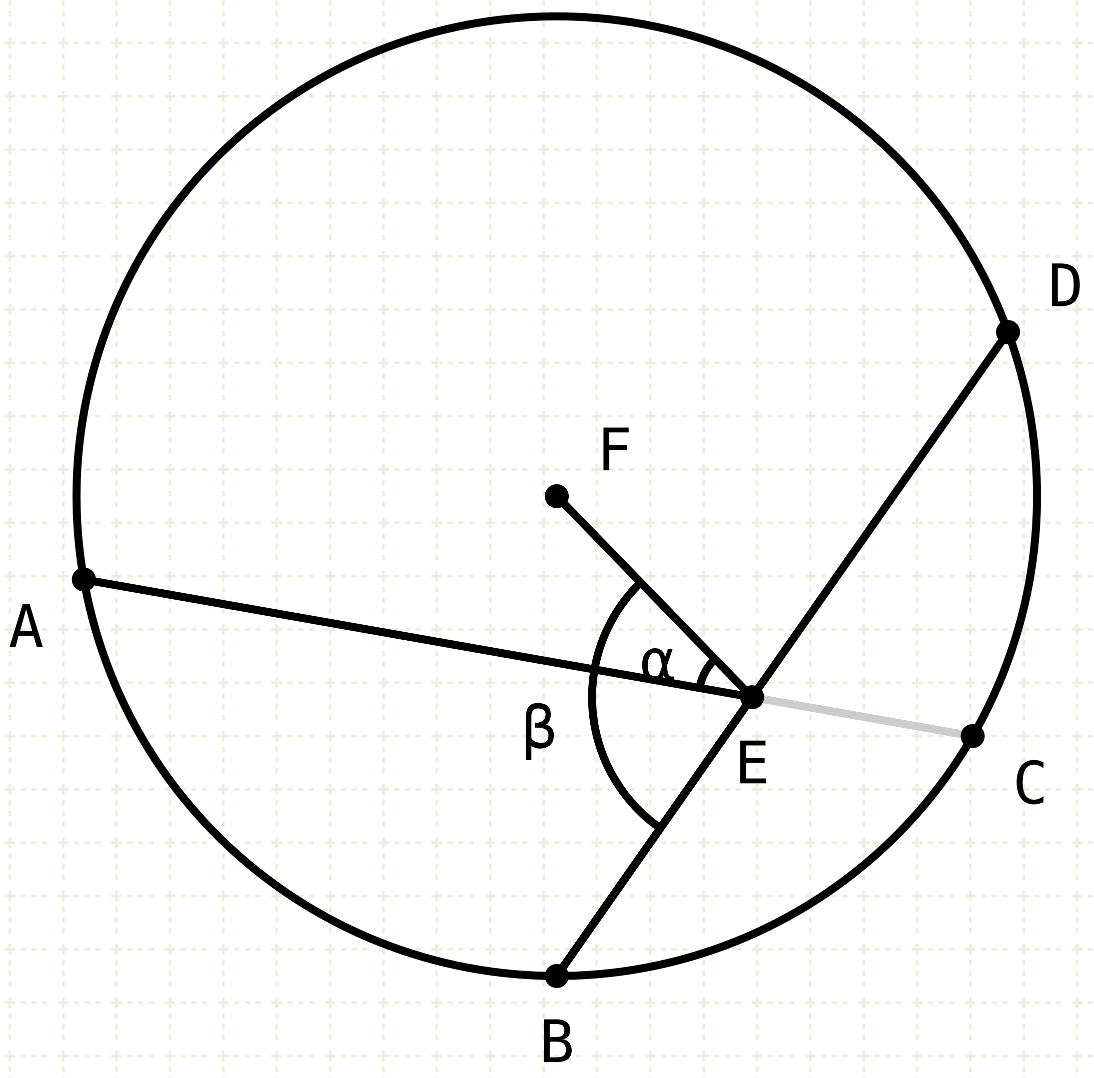

Assume …

$AE = EC,\ BE = ED$

$\alpha = \llcorner$

$\beta = \llcorner$

In other words

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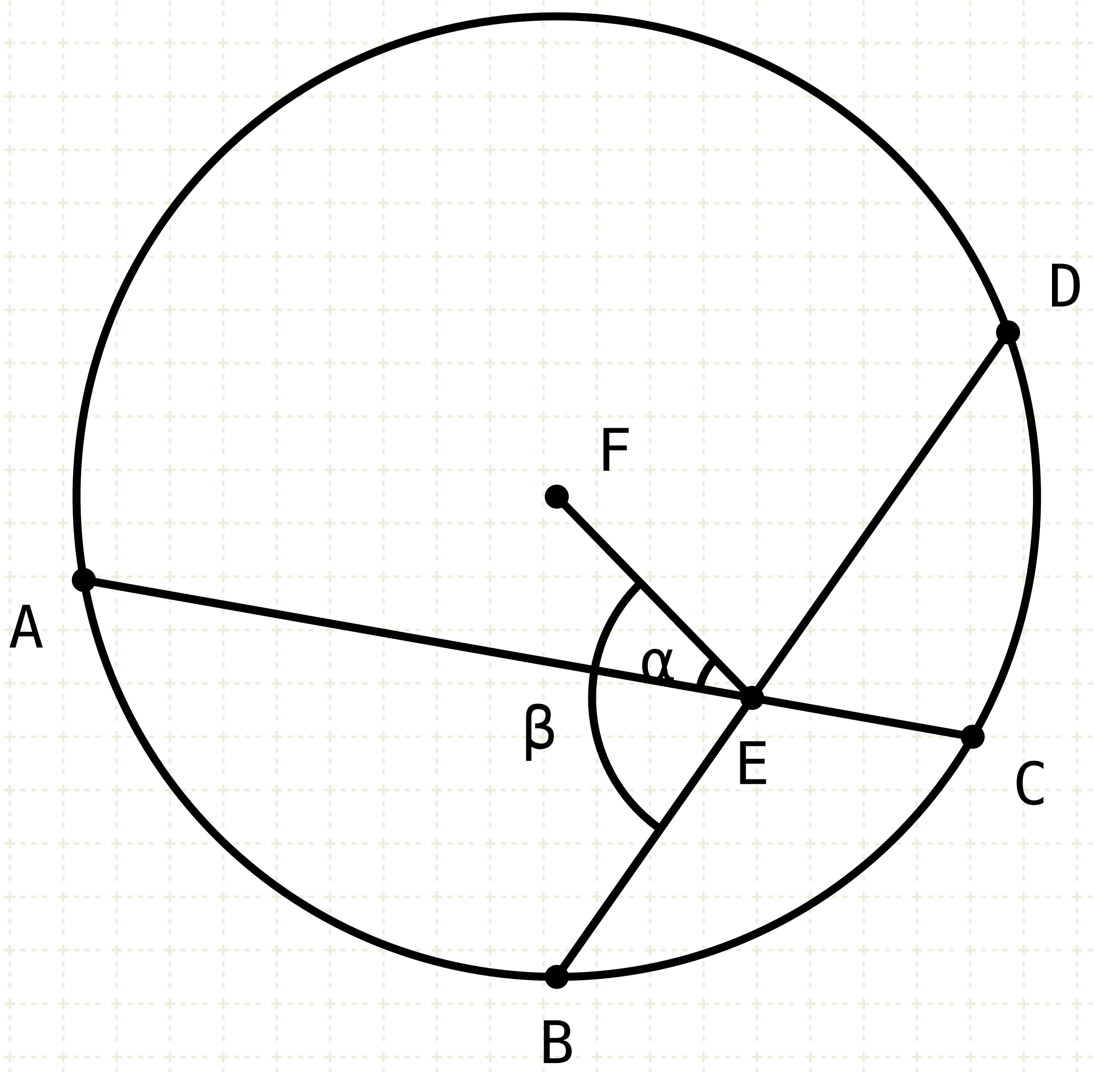

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β = ∟

α = β

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If α and β are both right angles, they are equal to each other

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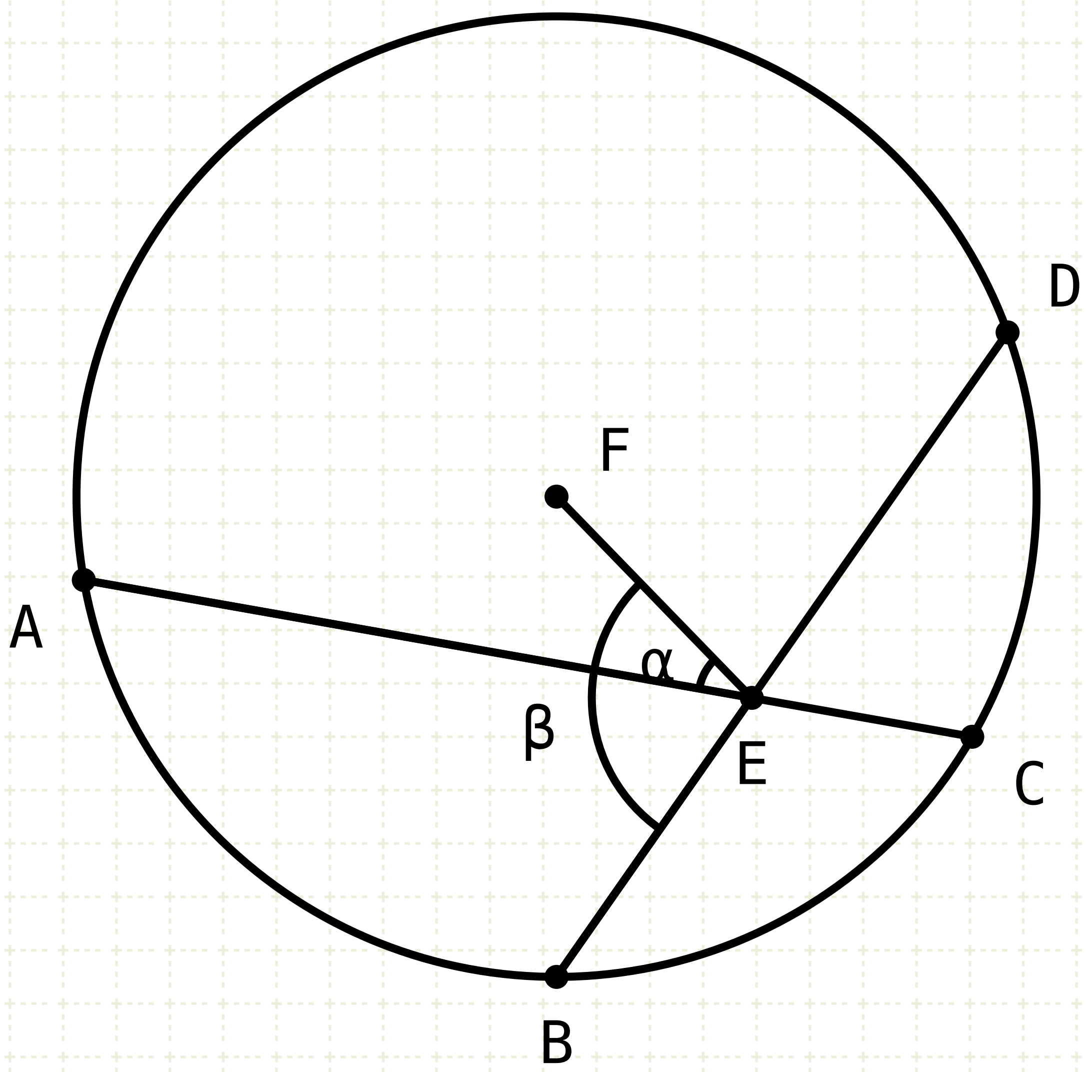

Assume …

AE = EC, BE = ED

α = ∟

β = ∟

α = β

α < β

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But β is larger than α, which is inconsistent with the previous statement

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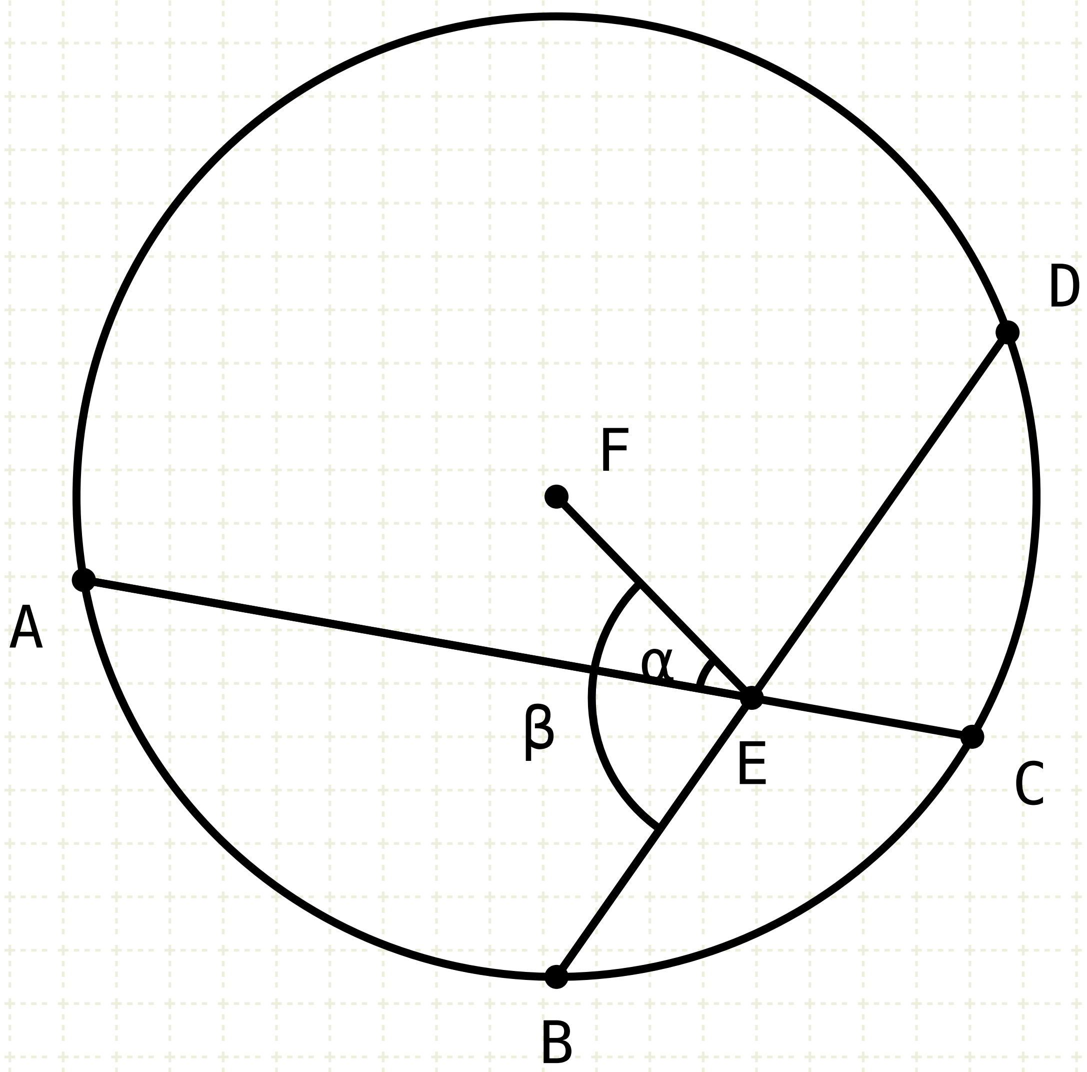

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Hence lines AC and BD cannot both be bisected at point E

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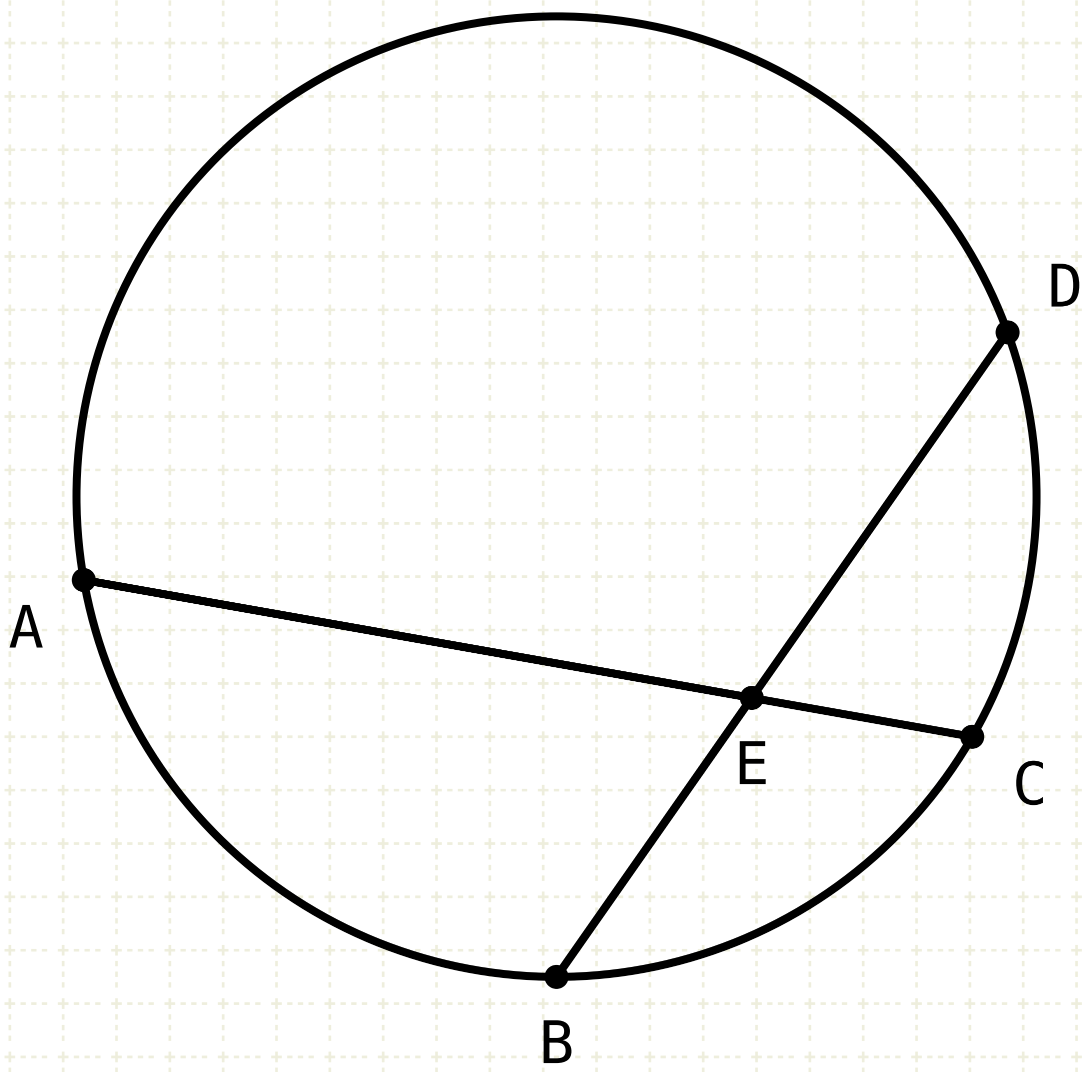

Assume ...

$AE = EC,\ BE = ED$

$\alpha = \llcorner$

$\beta = \llcorner$

$\alpha = \beta$

$\alpha < \beta$

$AE \neq EC,\ BE \neq ED$

In other words

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