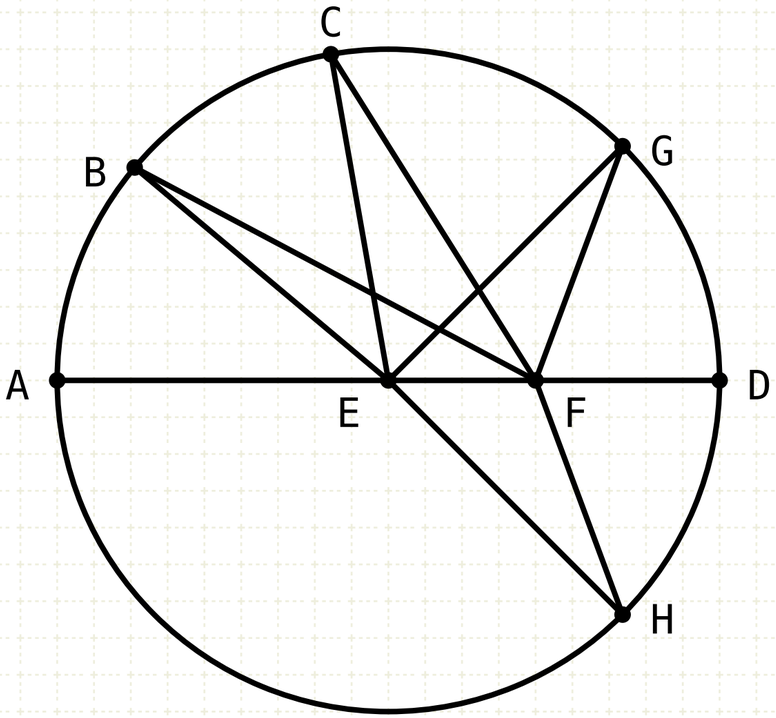
Euclid's Elements

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)

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Proposition 6 of Book III

If two circles touch one another, they will not have the same center.

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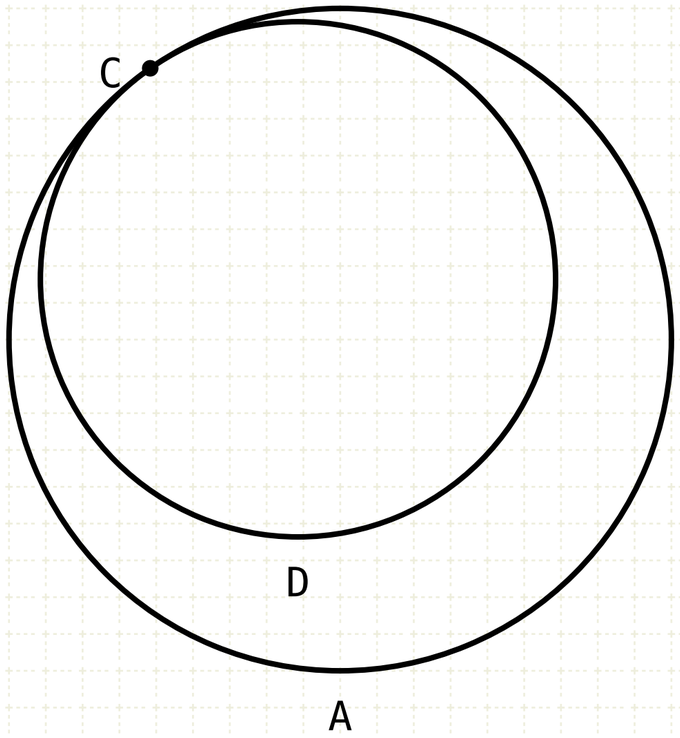

In other words

If two circles AC, and CD touch each other, then the center of the circle AC is not the same as the center of CD

Proposition 6 of Book III

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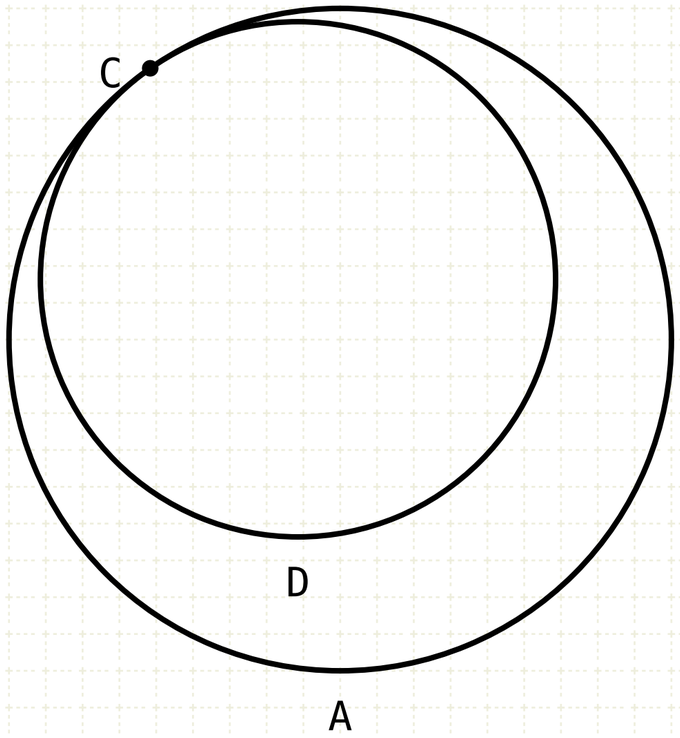

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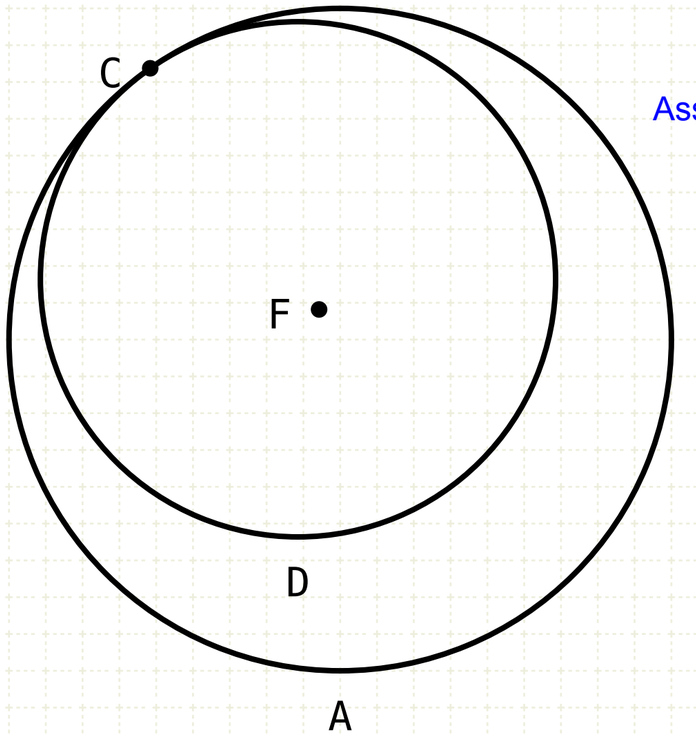

Assume F is centre of both circles

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If two circles AC, and CD touch each other, then the center of the circle AC is not the same as the center of CD

Proof by contradiction

Assume that F is the center of both circles

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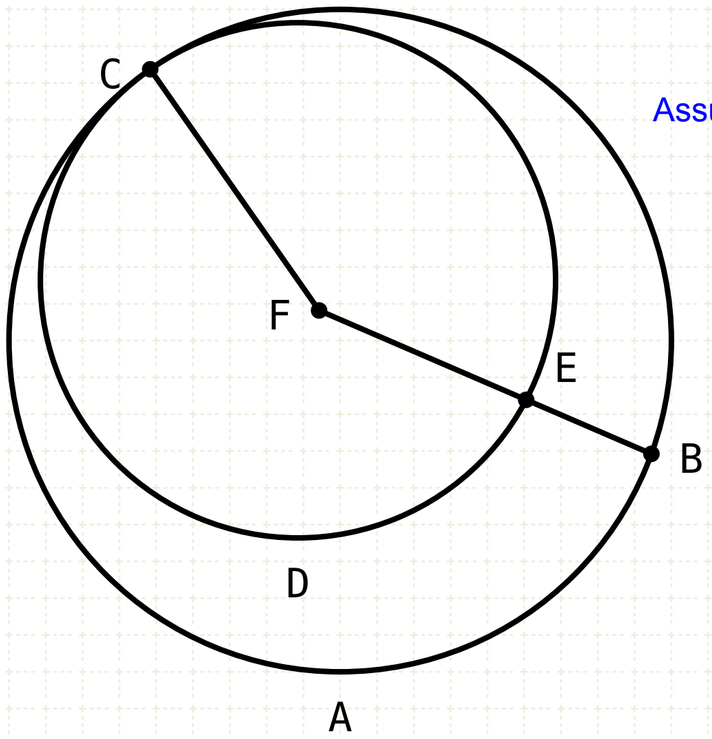

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Join FC and draw a line FEB at random

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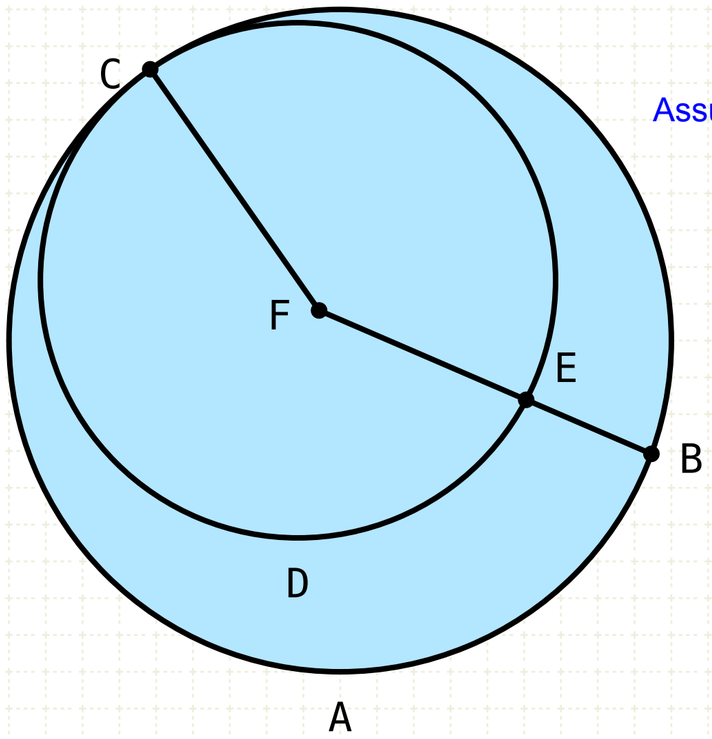

Assume F is centre of both circles

FC = FB

In other words

If two circles AC, and CD touch each other, then the center of the circle AC is not the same as the center of CD

Proof by contradiction

Assume that F is the center of both circles

Join FC and draw a line FEB at random

Since FC and FB are radii of the circle AC, they are equal

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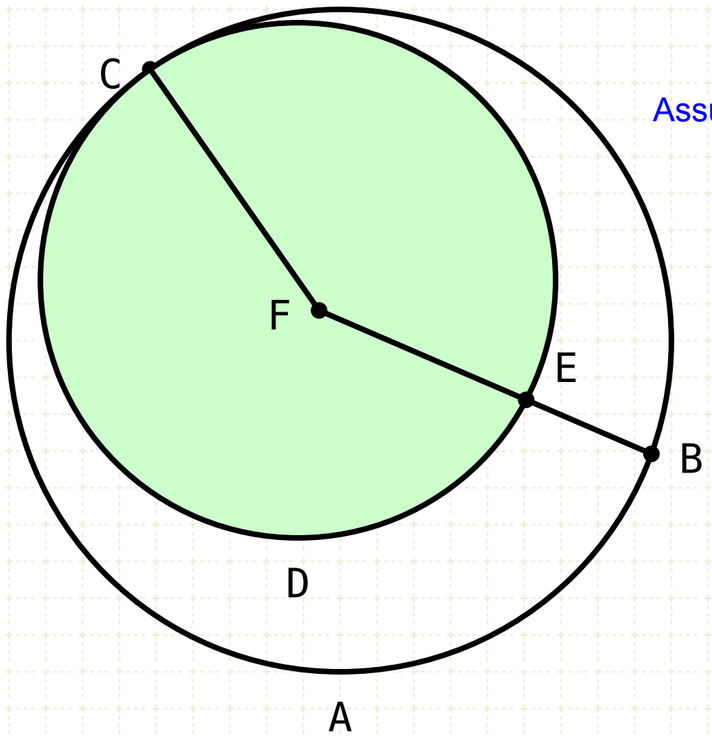

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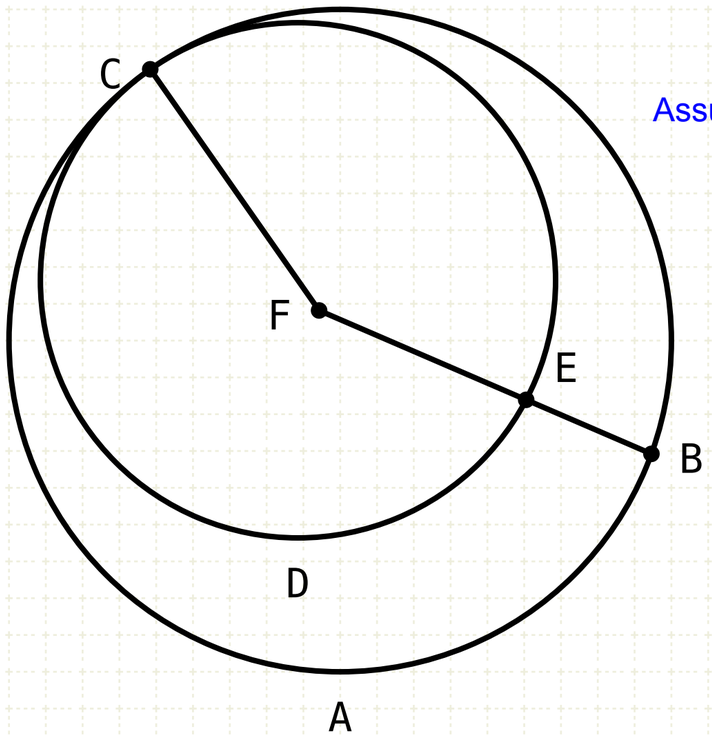

Assume F is centre of both circles

FC = FB
FC = FE
FB = FE

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If two circles AC, and CD touch each other, then the center of the circle AC is not the same as the center of CD

Proof by contradiction

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Join FC and draw a line FEB at random

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Since FB and FE are both equal to FC, they are equal to each other

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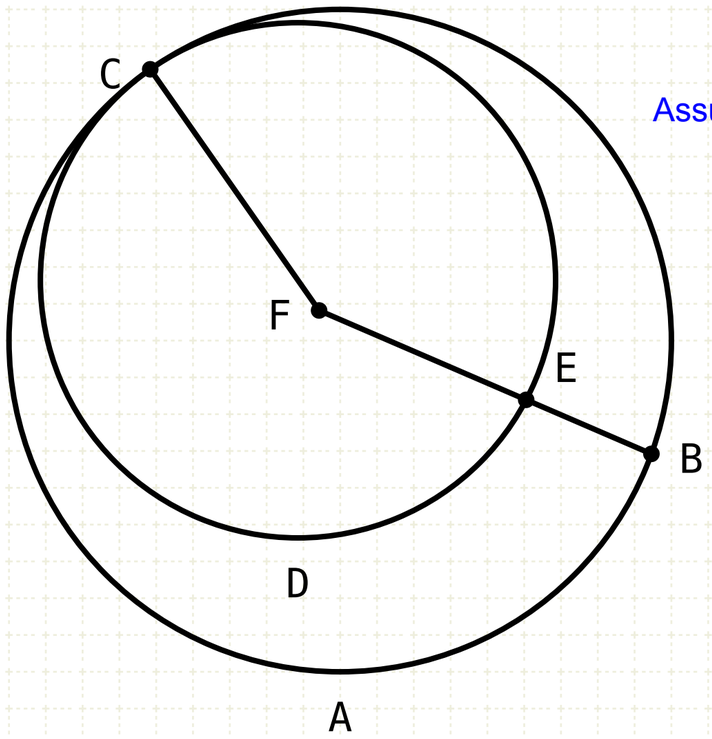

Assume F is centre of both circles

FC = FB

FC = FE

FB = FE

FB > FE

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Since FB and FE are both equal to FC, they are equal to each other

But FE is less than FB, which is inconsistent with the above statement

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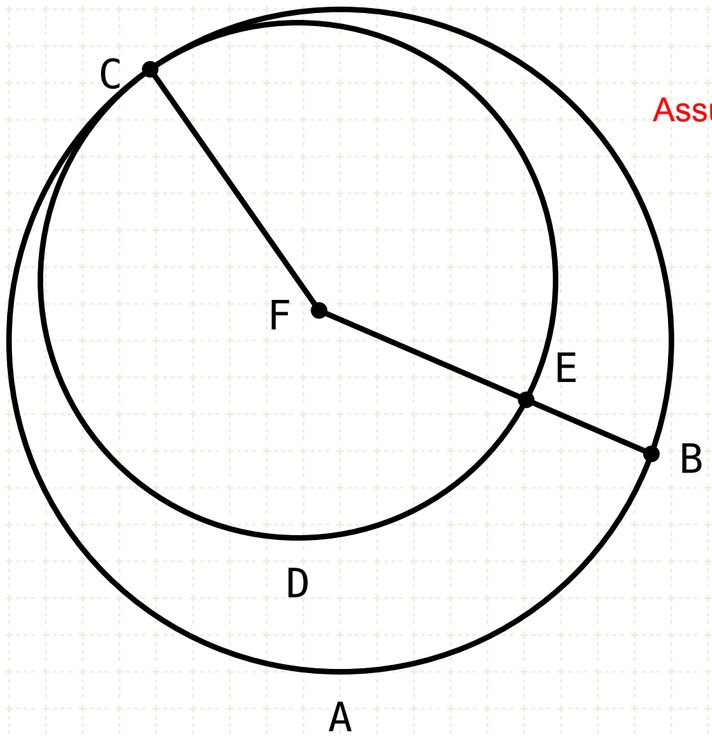

Assume F is centre of both circles

FC = FB
FC = FE
FB = FE
FB > FE

In other words

If two circles AC, and CD touch each other, then the center of the circle AC is not the same as the center of CD

Proof by contradiction

Assume that F is the center of both circles

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But FE is less than FB, which is inconsistent with the above statement

Therefore F cannot be the center of both circles

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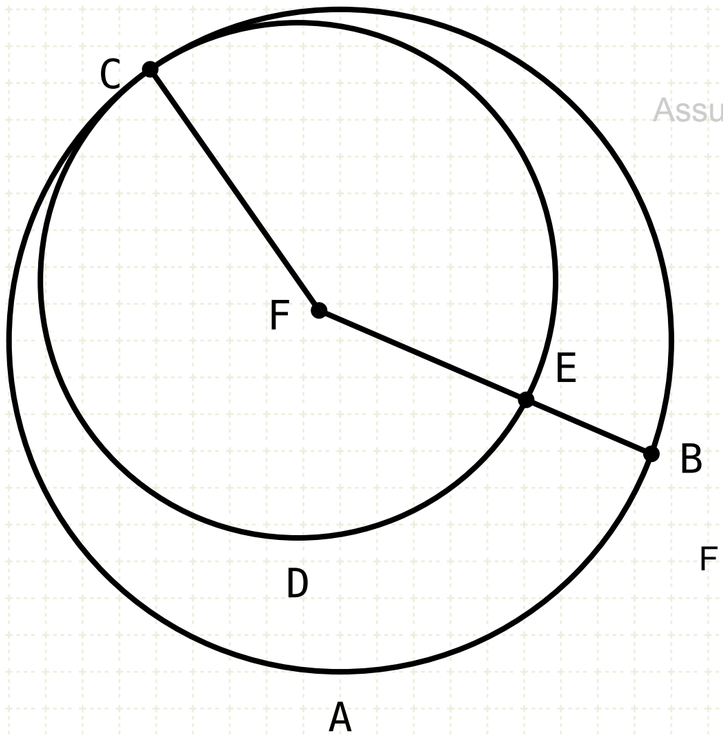

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