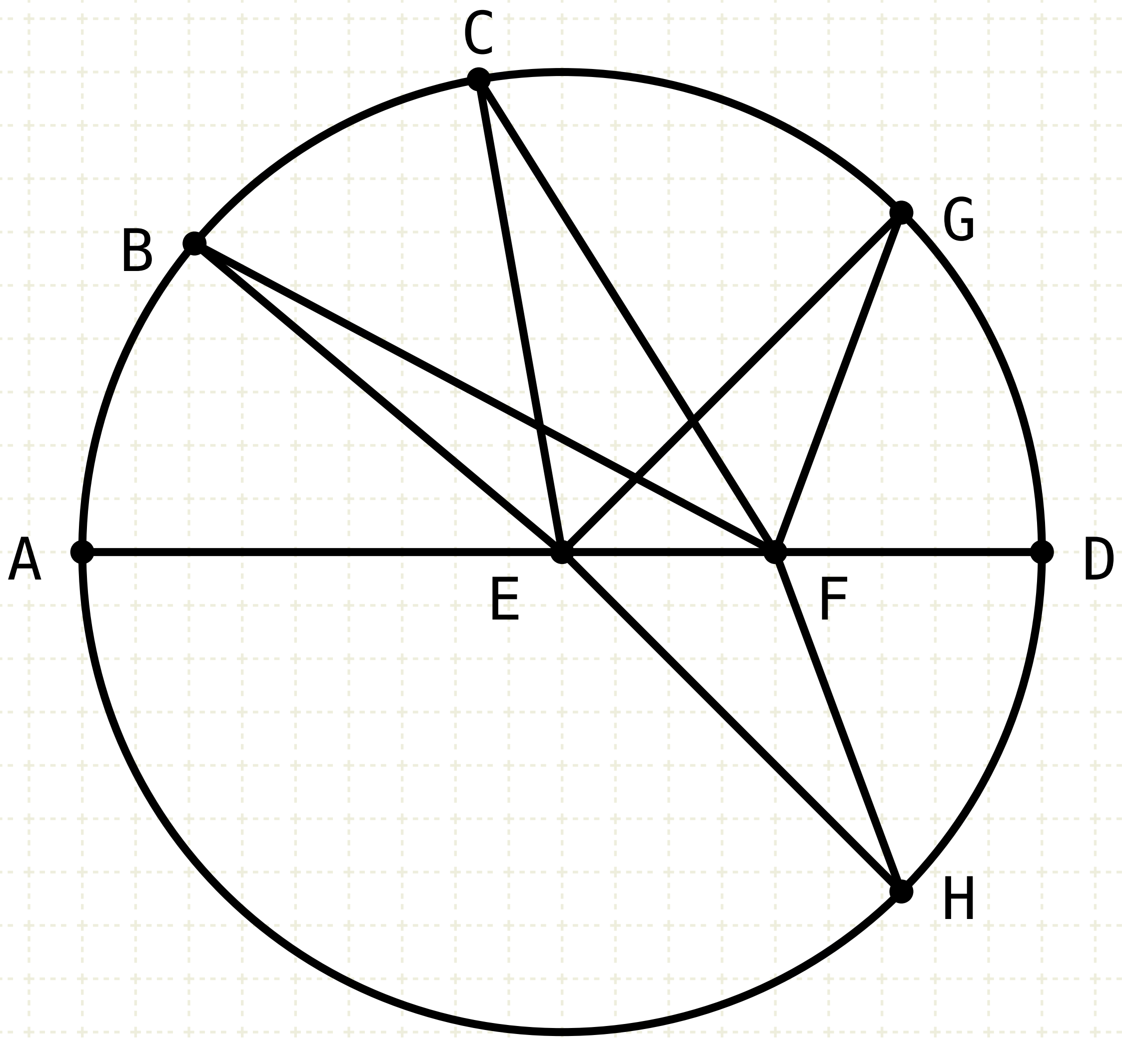
Euclid's Elements

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

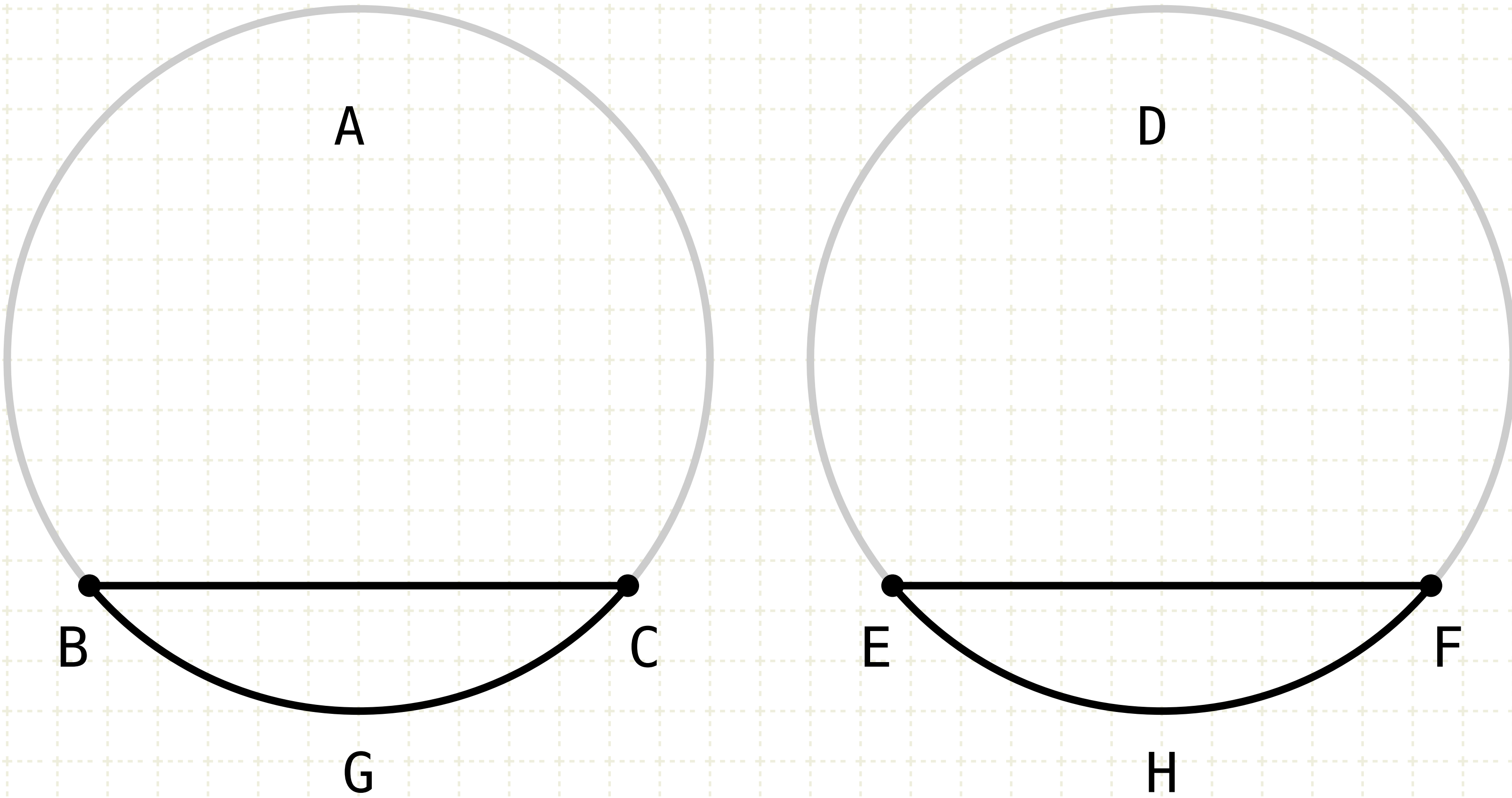
Table of Contents, Chapter 3

Proposition 29 of Book III

In equal circles equal circumferences are subtended by equal straight lines.

Proposition 29 of Book III

In equal circles equal circumferences are subtended by equal straight lines.



$\odot A = \odot D$

$\circlearrowleft BGC = \circlearrowleft EHF$

$\rightarrow BC = EF$

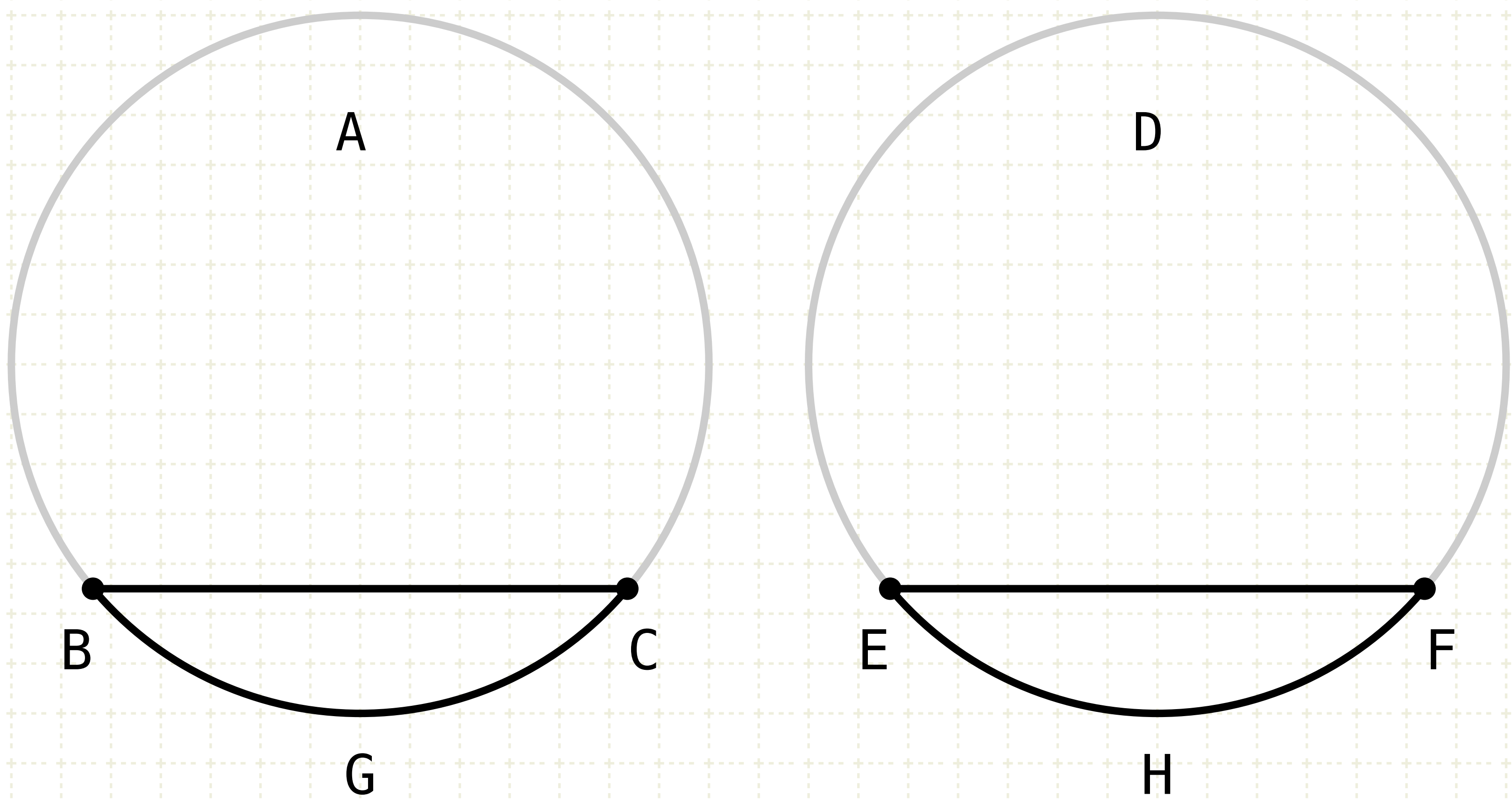
In other words

Given two equal circles (as shown)

If the circumference BGC equals EHF, then line BC equals line EF

Proposition 29 of Book III

In equal circles equal circumferences are subtended by equal straight lines.



⊙A = ⊙D
↺BGC = ↺EHF

In other words

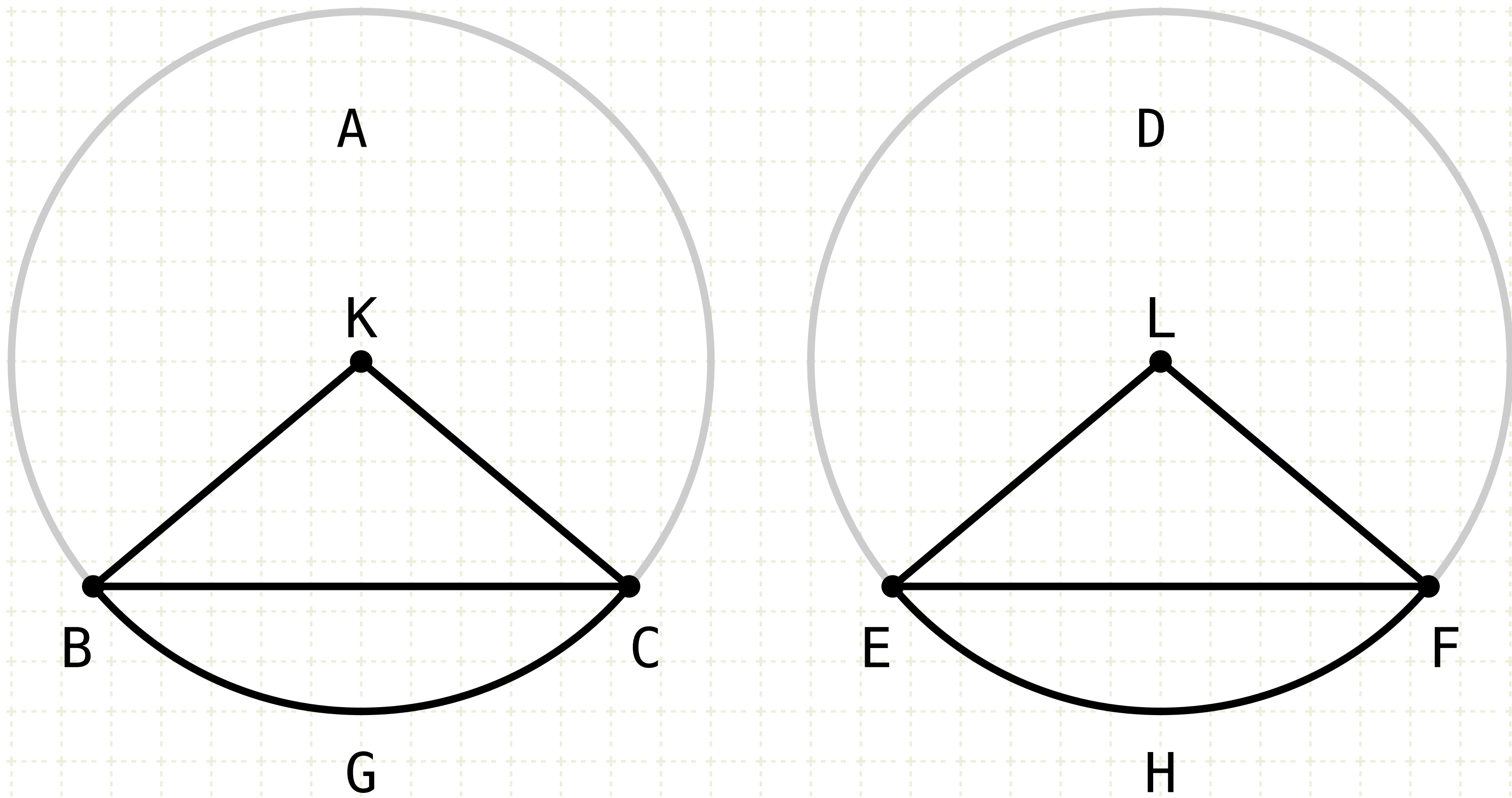
Given two equal circles (as shown)

If the circumference BGC equals EHF, then line BC equals line EF

Proof

Proposition 29 of Book III

In equal circles equal circumferences are subtended by equal straight lines.



⊙A = ⊙D

↺BGC = ↺EHF

In other words

Given two equal circles (as shown)

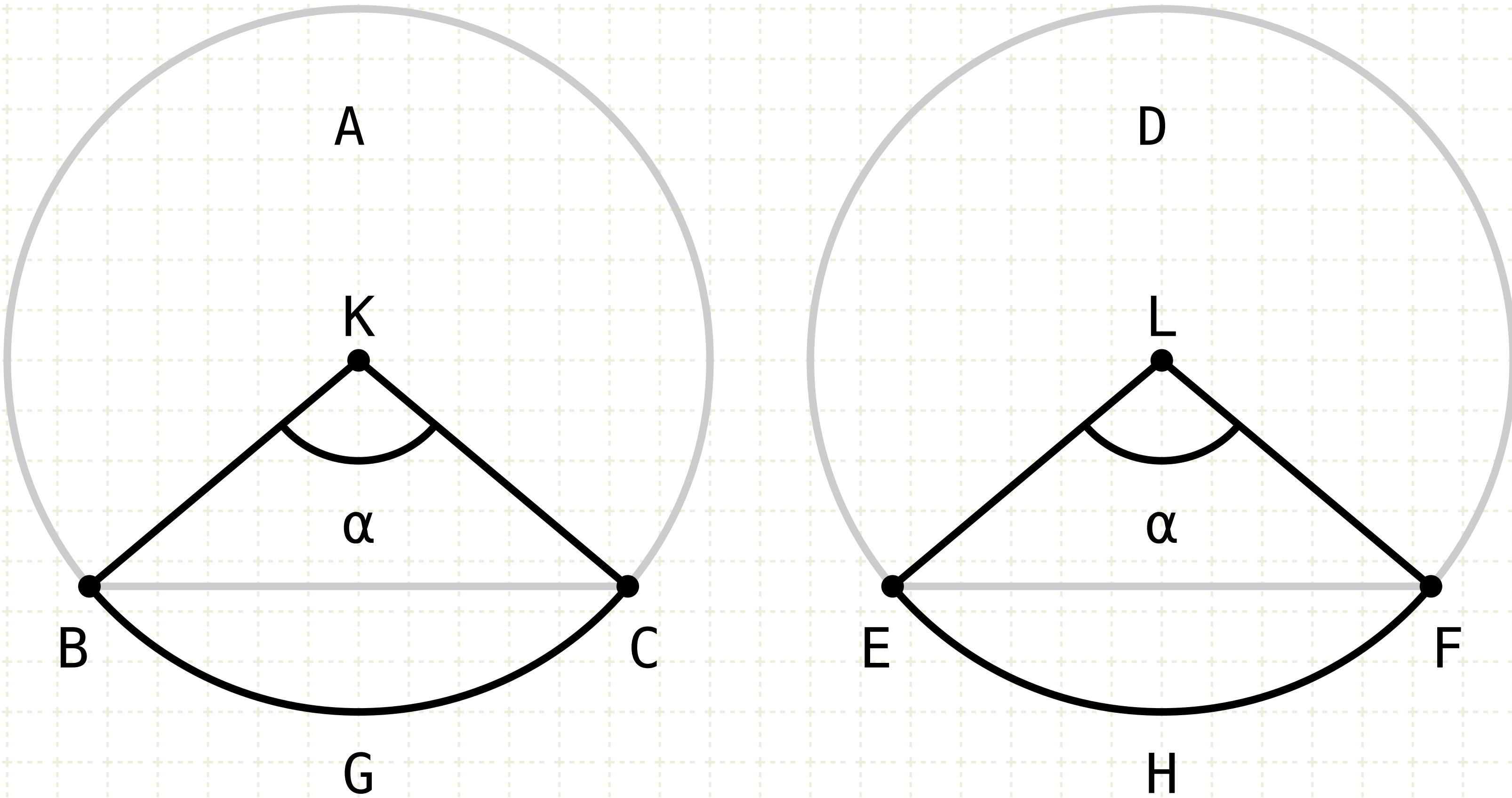
If the circumference BGC equals EHF, then line BC equals line EF

Proof

Take the centre (K,L) of the circles A and D and and draw the radii KB, KC, LE and LF

Proposition 29 of Book III

In equal circles equal circumferences are subtended by equal straight lines.



⊙A = ⊙D
↺BGC = ↺EHF
∠BKC = ∠ELF

In other words

Given two equal circles (as shown)

If the circumference BGC equals EHF, then line BC equals line EF

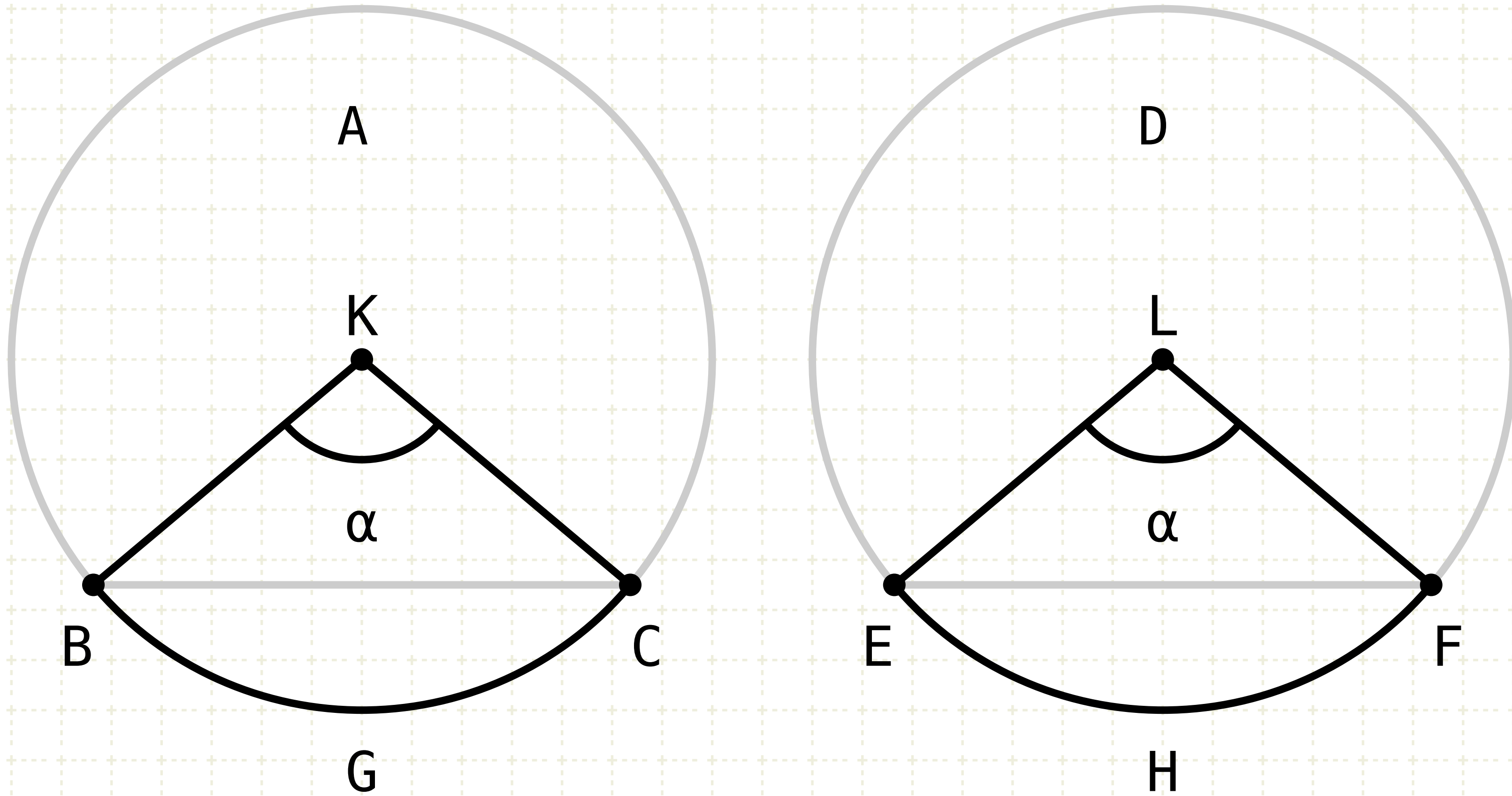
Proof

Take the centre (K,L) of the circles A and D and and draw the radii KB, KC, LE and LF

Since the circumferences BGC and EHF are equal, then the angles from the centre are also equal (III·27)

Proposition 29 of Book III

In equal circles equal circumferences are subtended by equal straight lines.



⊙A = ⊙D

↺BGC = ↺EHF

∠BKC = ∠ELF

KB = KC = LE = LF

In other words

Given two equal circles (as shown)

If the circumference BGC equals EHF, then line BC equals line EF

Proof

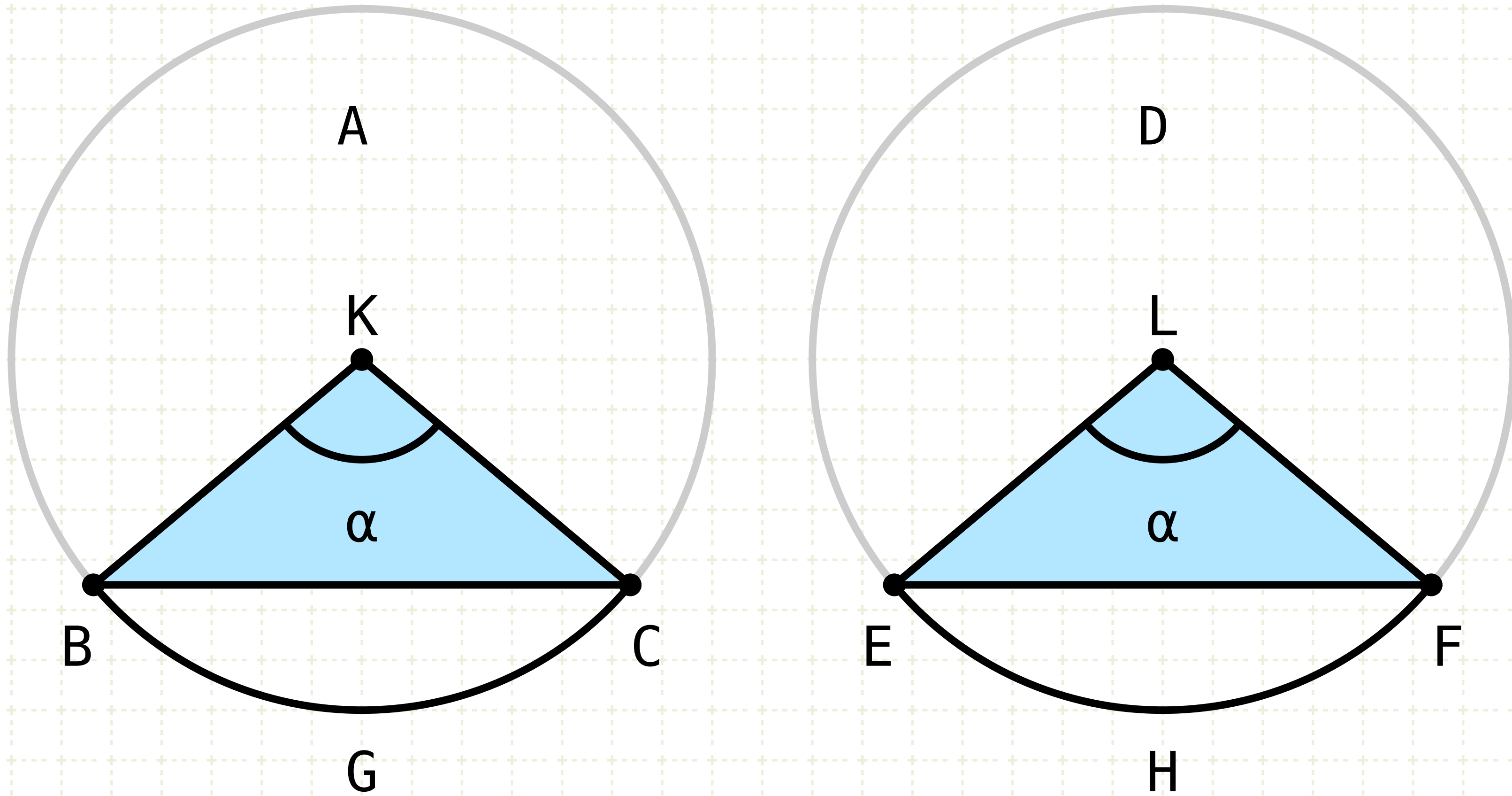
Take the centre (K,L) of the circles A and D and and draw the radii KB, KC, LE and LF

Since the circumferences BGC and EHF are equal, then the angles from the centre are also equal (III·27)

Since KB, KC, LE, LF are all radii of equal circles, they are all equal

Proposition 29 of Book III

In equal circles equal circumferences are subtended by equal straight lines.



$\odot A = \odot D$

$\circlearrowleft BGC = \circlearrowleft EHF$

$\angle BKC = \angle ELF$

$KB = KC = LE = LF$

$\Delta BCK \equiv \Delta EFL$

In other words

Given two equal circles (as shown)

If the circumference BGC equals EHF, then line BC equals line EF

Proof

Take the centre (K,L) of the circles A and D and and draw the radii KB, KC, LE and LF

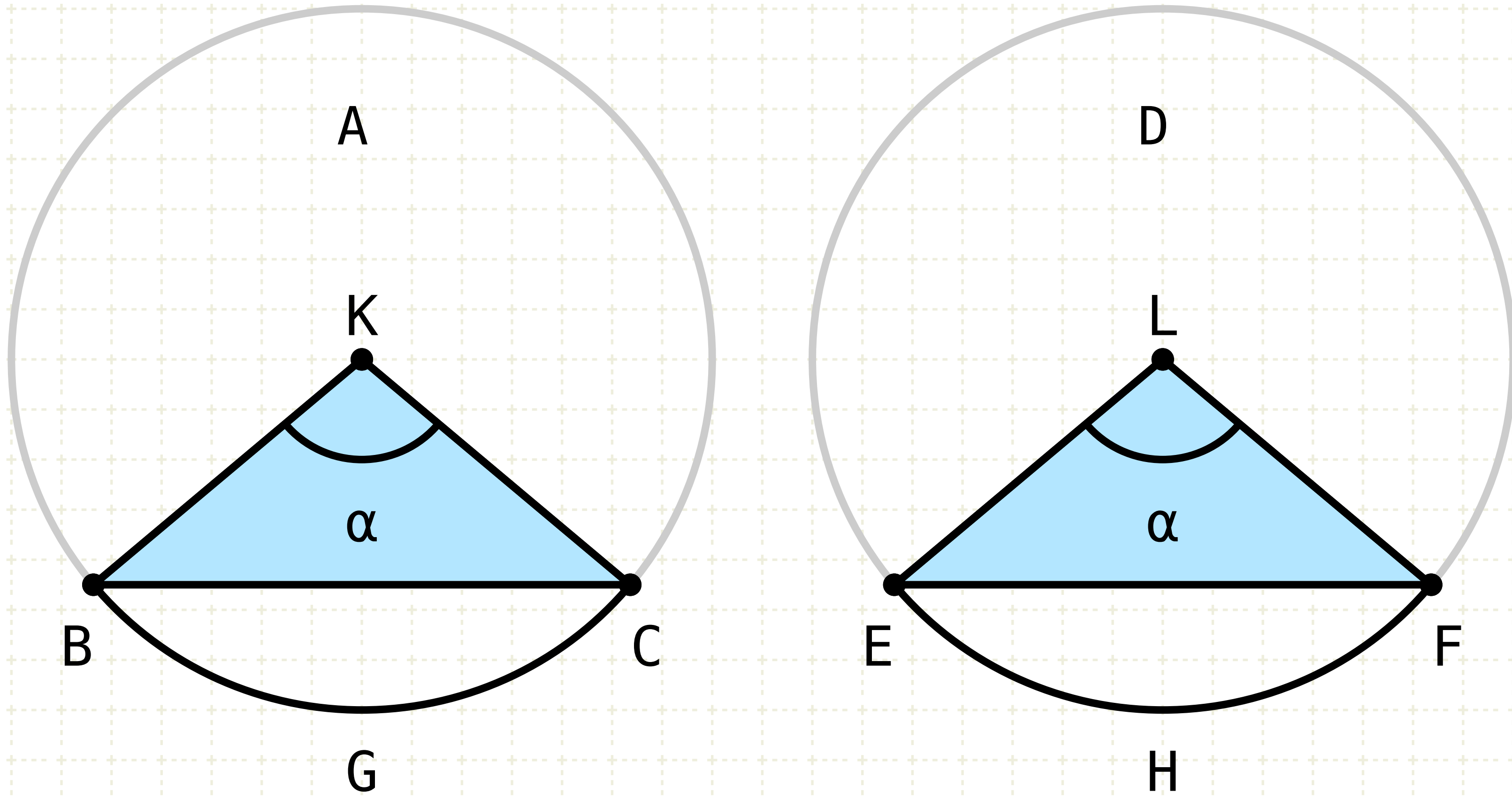
Since the circumferences BGC and EHF are equal, then the angles from the centre are also equal (III·27)

Since KB, KC, LE, LF are all radii of equal circles, they are all equal

Since each triangle has two lines equal to two lines respectively, with an equal angle between (side-angle-side), then the triangles are equal in all respects (I·4)

Proposition 29 of Book III

In equal circles equal circumferences are subtended by equal straight lines.



⊙A = ⊙D
↺BGC = ↺EHF
∠BKC = ∠ELF
KB = KC = LE = LF
ΔBCK ≡ ΔEFL
BC = EF

In other words

Given two equal circles (as shown)

If the circumference BGC equals EHF, then line BC equals line EF

Proof

Take the centre (K,L) of the circles A and D and and draw the radii KB, KC, LE and LF

Since the circumferences BGC and EHF are equal, then the angles from the centre are also equal (III·27)

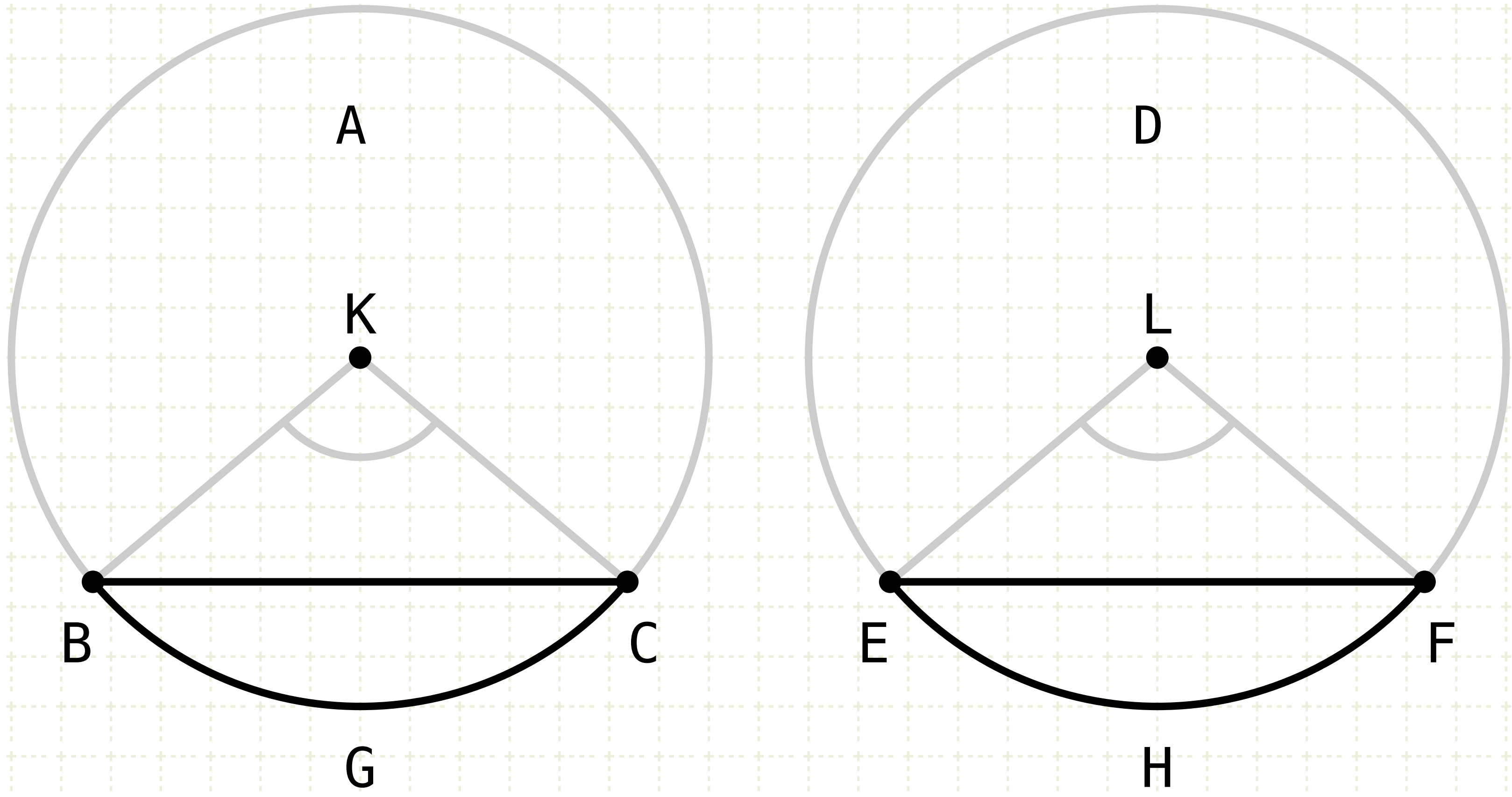
Since KB, KC, LE, LF are all radii of equal circles, they are all equal

Since each triangle has two lines equal to two lines respectively, with an equal angle between (side-angle-side), then the triangles are equal in all respects (I·4)

Therefore the base BC equals EF

Proposition 29 of Book III

In equal circles equal circumferences are subtended by equal straight lines.



⊙A = ⊙D
↺BGC = ↺EHF
∠BKC = ∠ELF
KB = KC = LE = LF
ΔBCK ≡ ΔEFL
BC = EF

In other words

Given two equal circles (as shown)

If the circumference BGC equals EHF, then line BC equals line EF

Proof

Take the centre (K,L) of the circles A and D and and draw the radii KB, KC, LE and LF

Since the circumferences BGC and EHF are equal, then the angles from the centre are also equal (III·27)

Since KB, KC, LE, LF are all radii of equal circles, they are all equal

Since each triangle has two lines equal to two lines respectively, with an equal angle between (side-angle-side), then the triangles are equal in all respects (I·4)

Therefore the base BC equals EF

Youtube Videos

https://www.youtube.com/c/SandyBultena