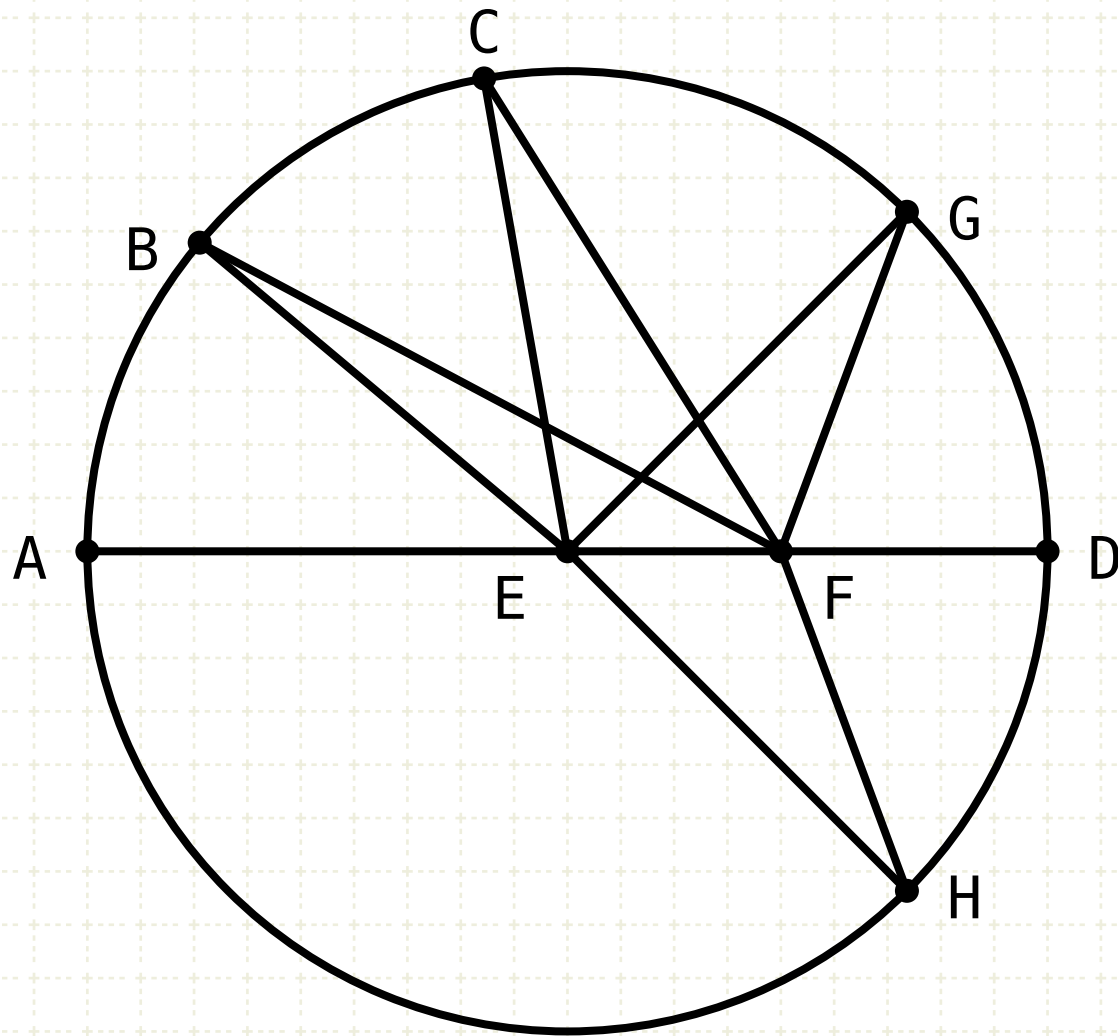


# Euclid's Elements

## 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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2	In a given circle to inscribe a triangle equiangular with a given triangle	12	About a given circle to circumscribe an equilateral and equiangular pentagon
3	About a given circle to circumscribe a triangle equiangular with a given triangle	13	In a given pentagon, which is equilateral and equiangular, to inscribe a circle
4	In a given triangle, to inscribe a circle	14	About a given pentagon, which is equilateral and equiangular, to circumscribe a circle
5	About a given triangle to circumscribe a circle	15	In a given circle to inscribe an equilateral and equiangular hexagon
6	In a given circle to inscribe a square	16	In a given circle to inscribe a fifteen angled figure which shall be both equilateral and equiangular
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8	In a given square, to inscribe a circle		
9	About a given square, to circumscribe a circle		
10	To construct an isosceles triangle having each of the angles at the base double of the remaining one		



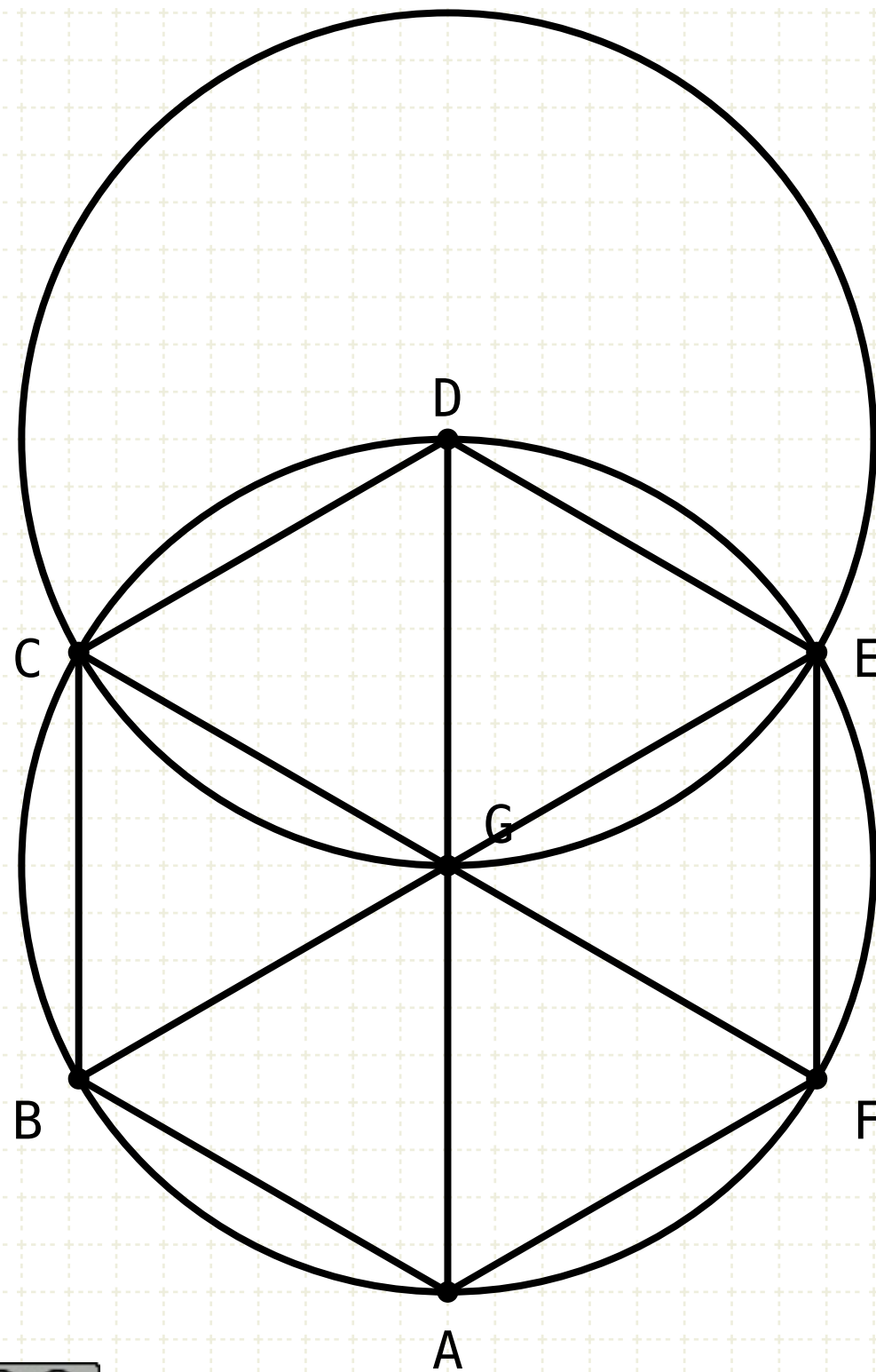
# Proposition 1 of Book IV

Into a given circle to fit a straight line equal to a given straight line which is not greater than the diameter of the circle.



# Euclid's Elements

## Book IV



Philosophy (nature) is written in that great book which ever is before our eyes -- I mean the universe -- but we cannot understand it if we do not first learn the language and grasp the symbols in which it is written. The book is written in mathematical language, and the symbols are triangles, circles and other geometrical figures, without whose help it is impossible to comprehend a single word of it - without which one wanders in vain through a dark labyrinth.

**Galileo Galilei**



# Proposition 1 of Book IV

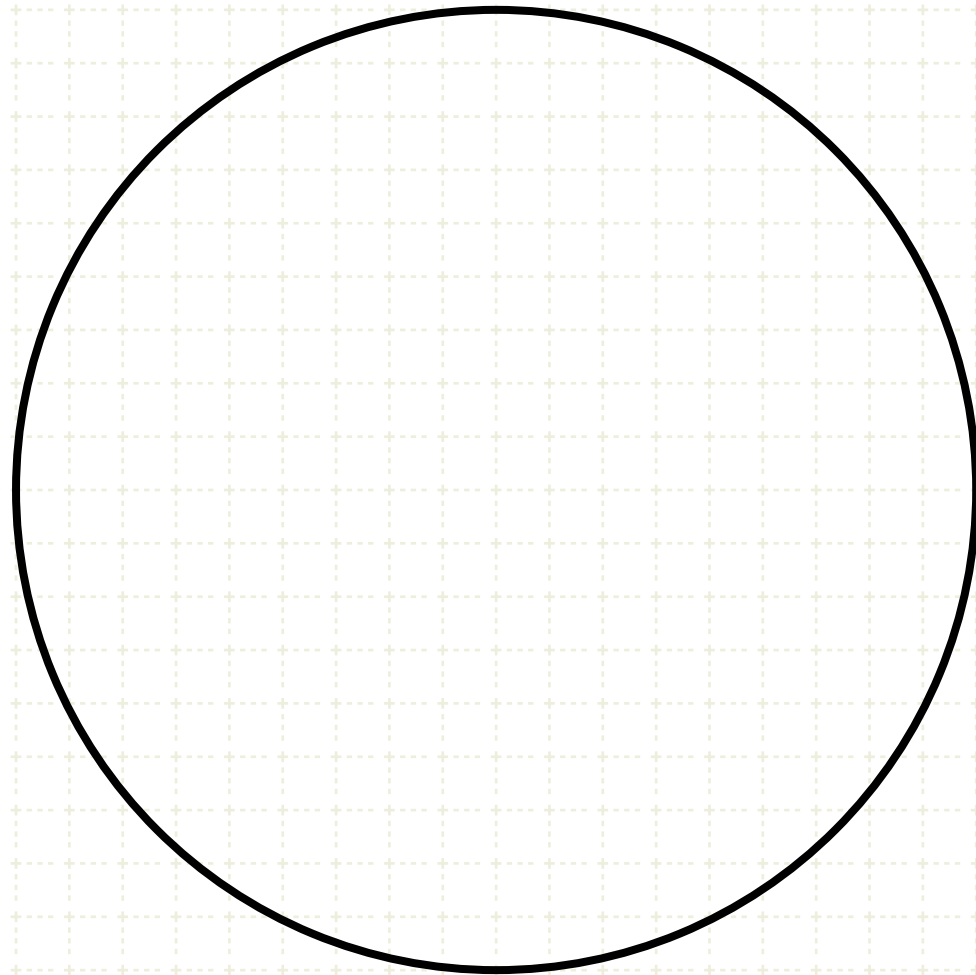
Into a given circle to fit a straight line equal to a given straight line which is not greater than the diameter of the circle.



# Proposition 1 of Book IV

Into a given circle to fit a straight line equal to a given straight line which is not greater than the diameter of the circle.

D



## In other words

Given a circle and a straight line D,

where D is less than the diameter of the circle

draw another line, with the same length as D, in the circle such that the two ends touch the circumference of the circle

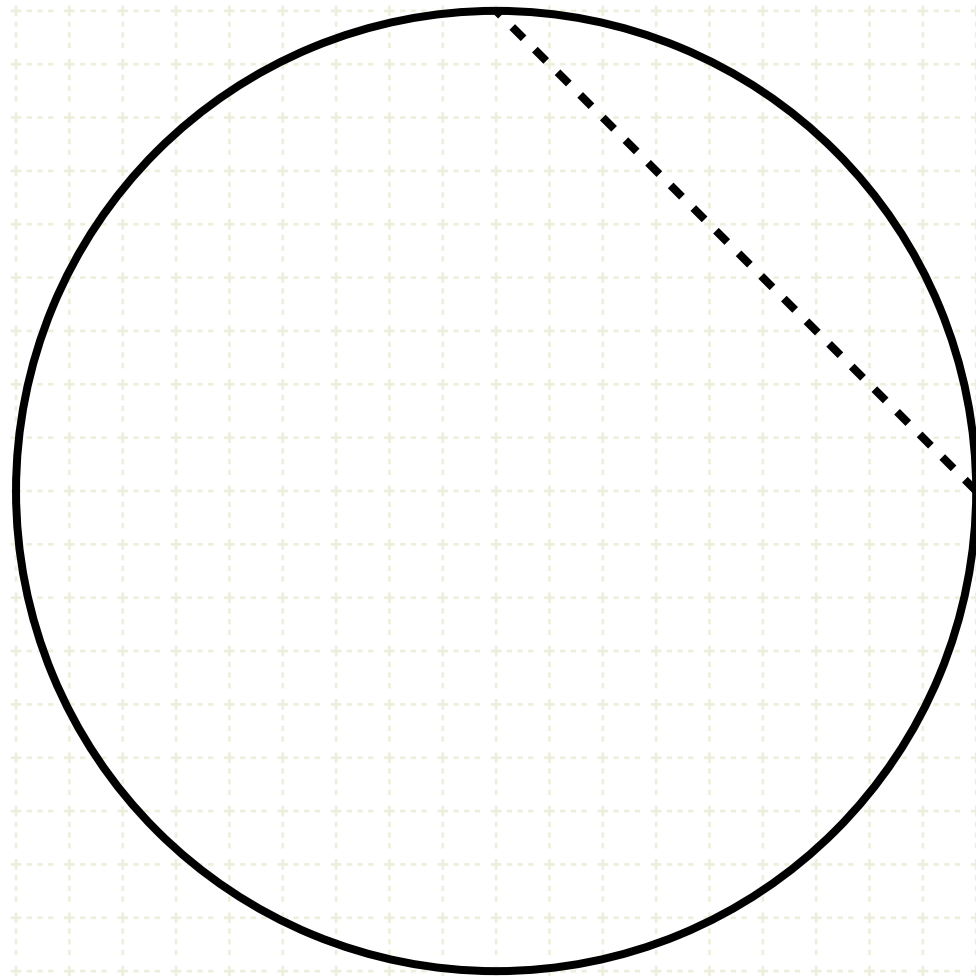




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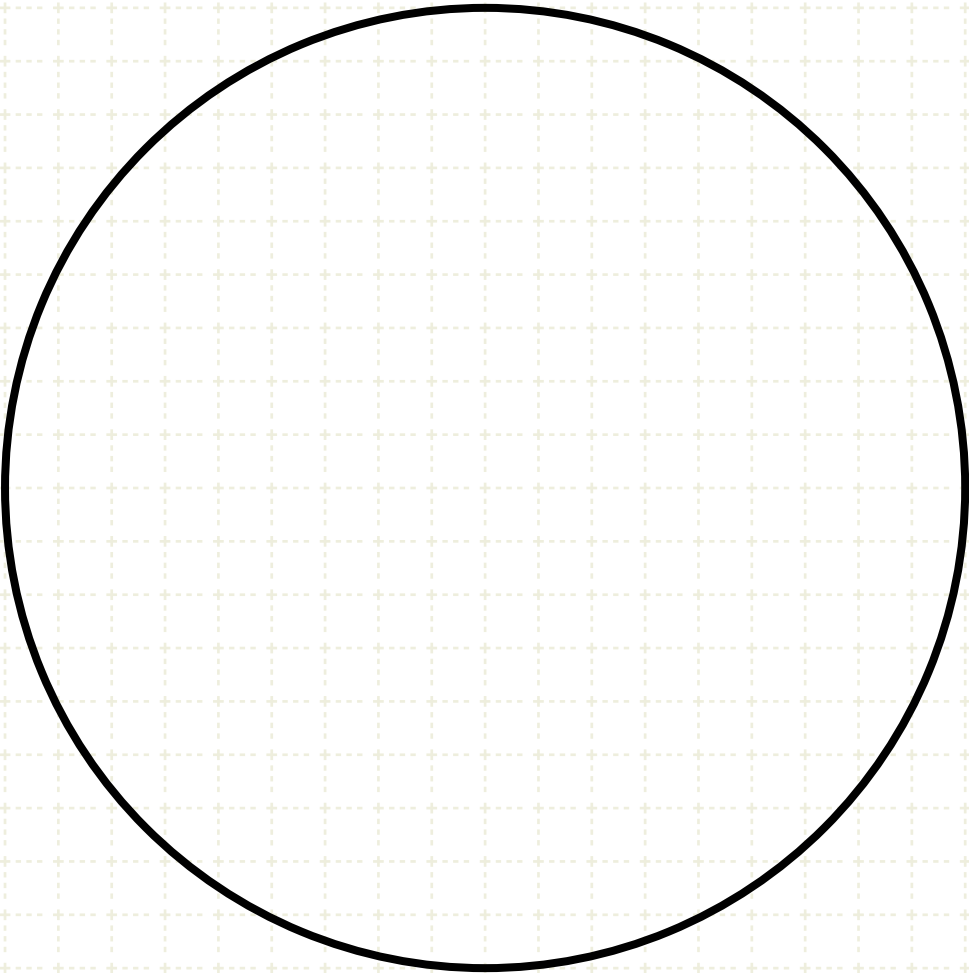
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Into a given circle to fit a straight line equal to a given straight line which is not greater than the diameter of the circle.

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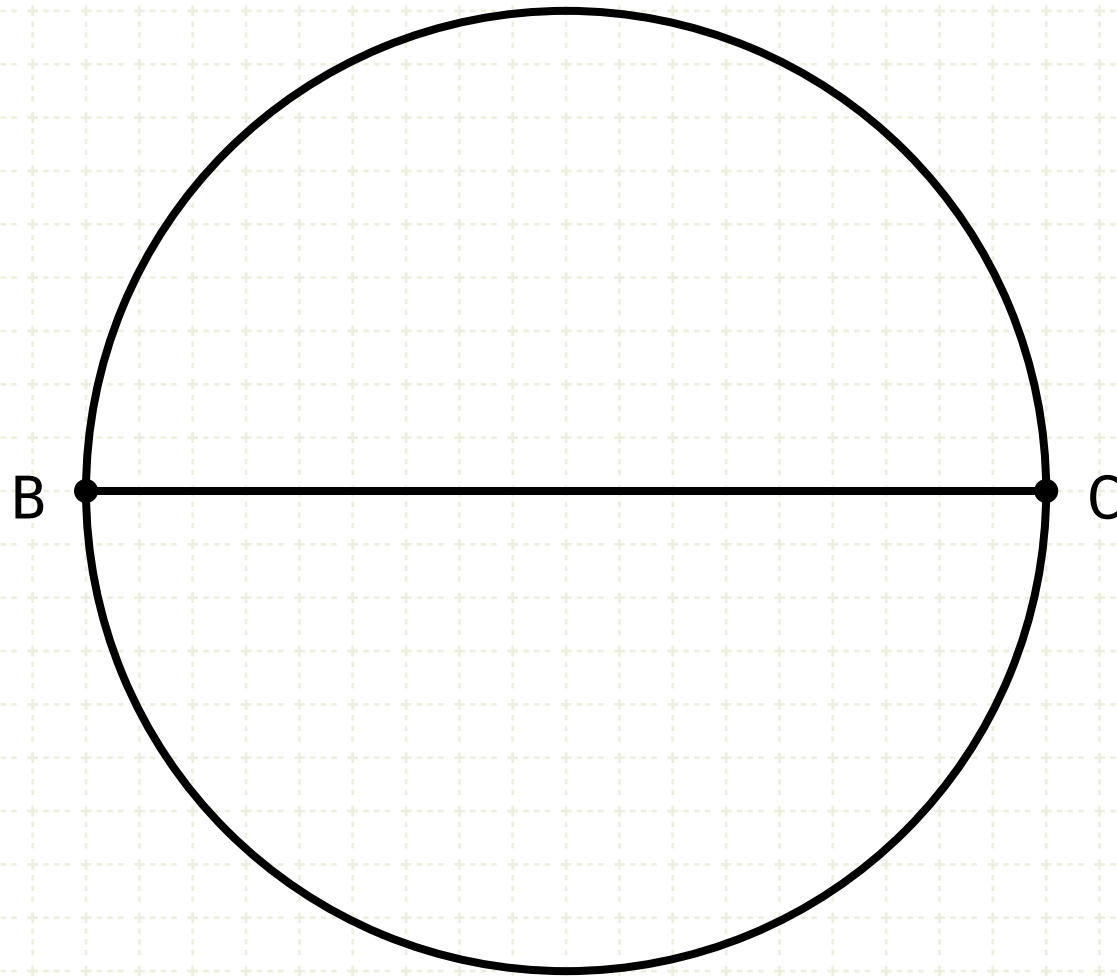
## Construction





# Proposition 1 of Book IV

Into a given circle to fit a straight line equal to a given straight line which is not greater than the diameter of the circle.



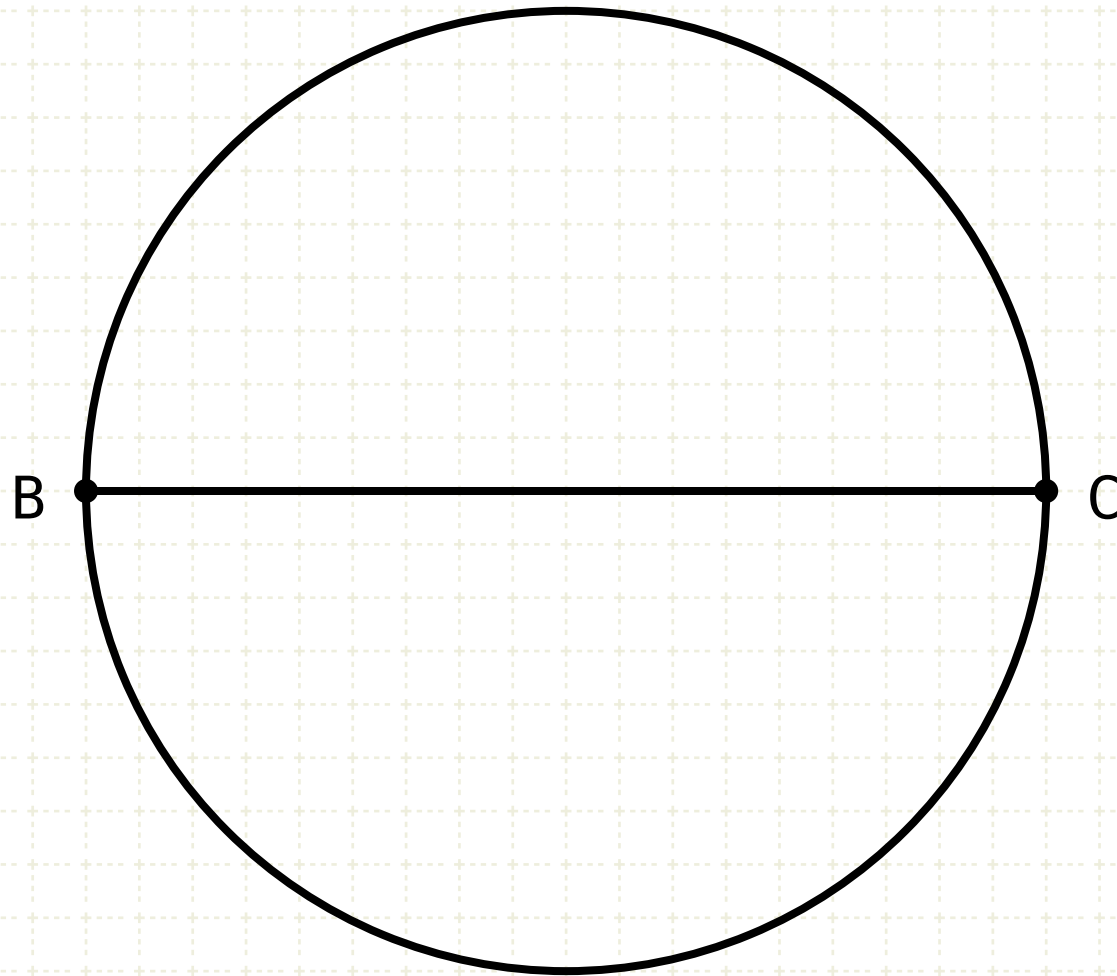
## Construction

Draw the diameter of the circle BC (III·1)



# Proposition 1 of Book IV

Into a given circle to fit a straight line equal to a given straight line which is not greater than the diameter of the circle.



## Construction

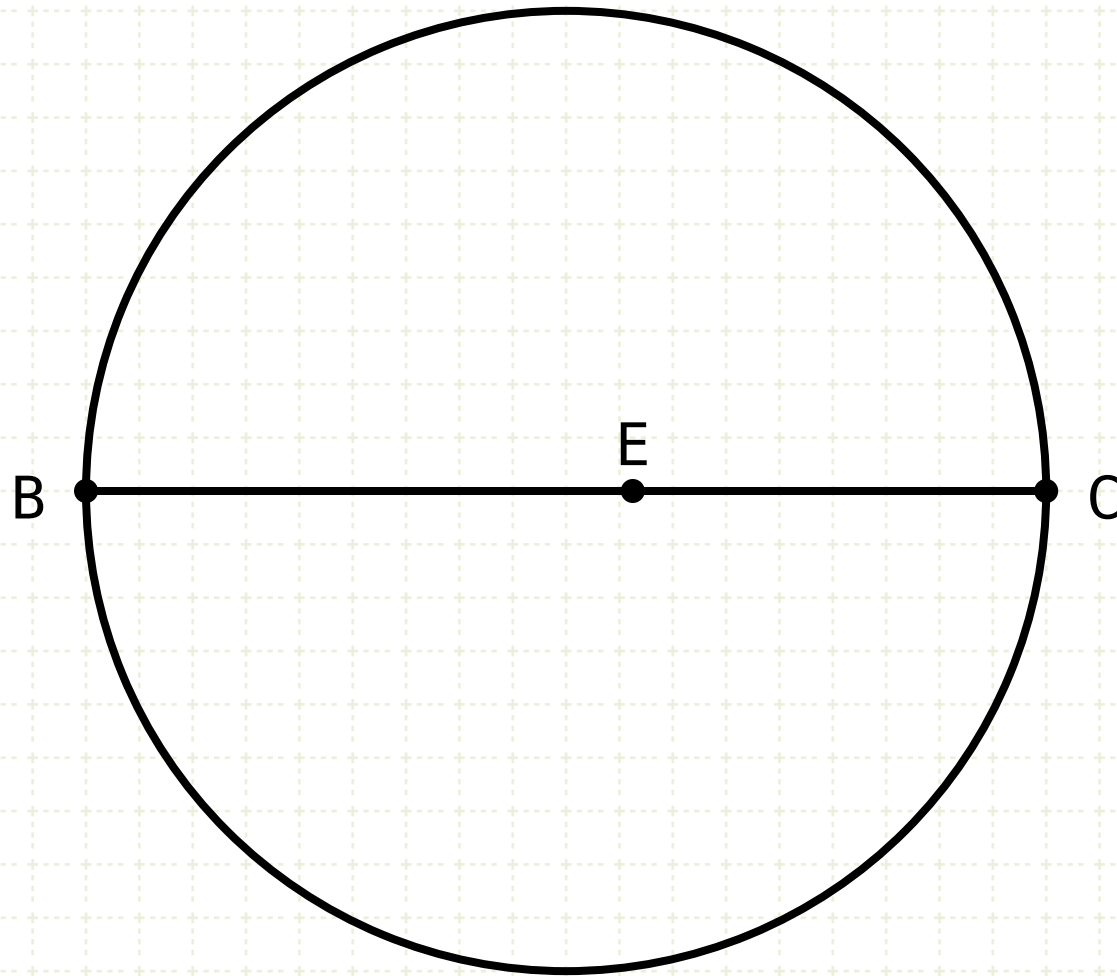
Draw the diameter of the circle BC (III·1)

If BC equals D in length, then we are done



# Proposition 1 of Book IV

Into a given circle to fit a straight line equal to a given straight line which is not greater than the diameter of the circle.



## Construction

Draw the diameter of the circle BC (III·1)

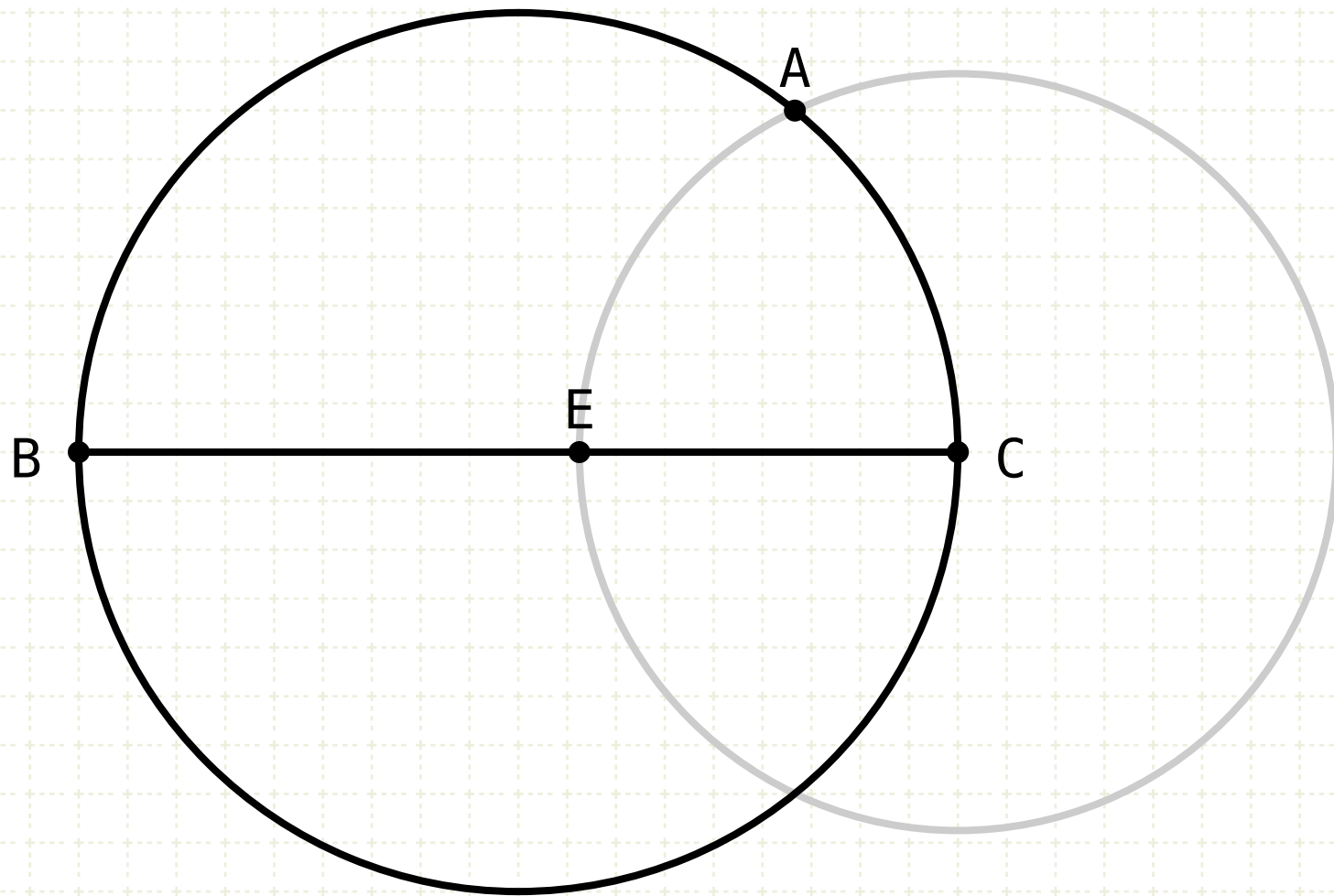
If BC equals D in length, then we are done

If BC is less than D, construct a line CE such that it is equal to D (I·2)



# Proposition 1 of Book IV

Into a given circle to fit a straight line equal to a given straight line which is not greater than the diameter of the circle.



## Construction

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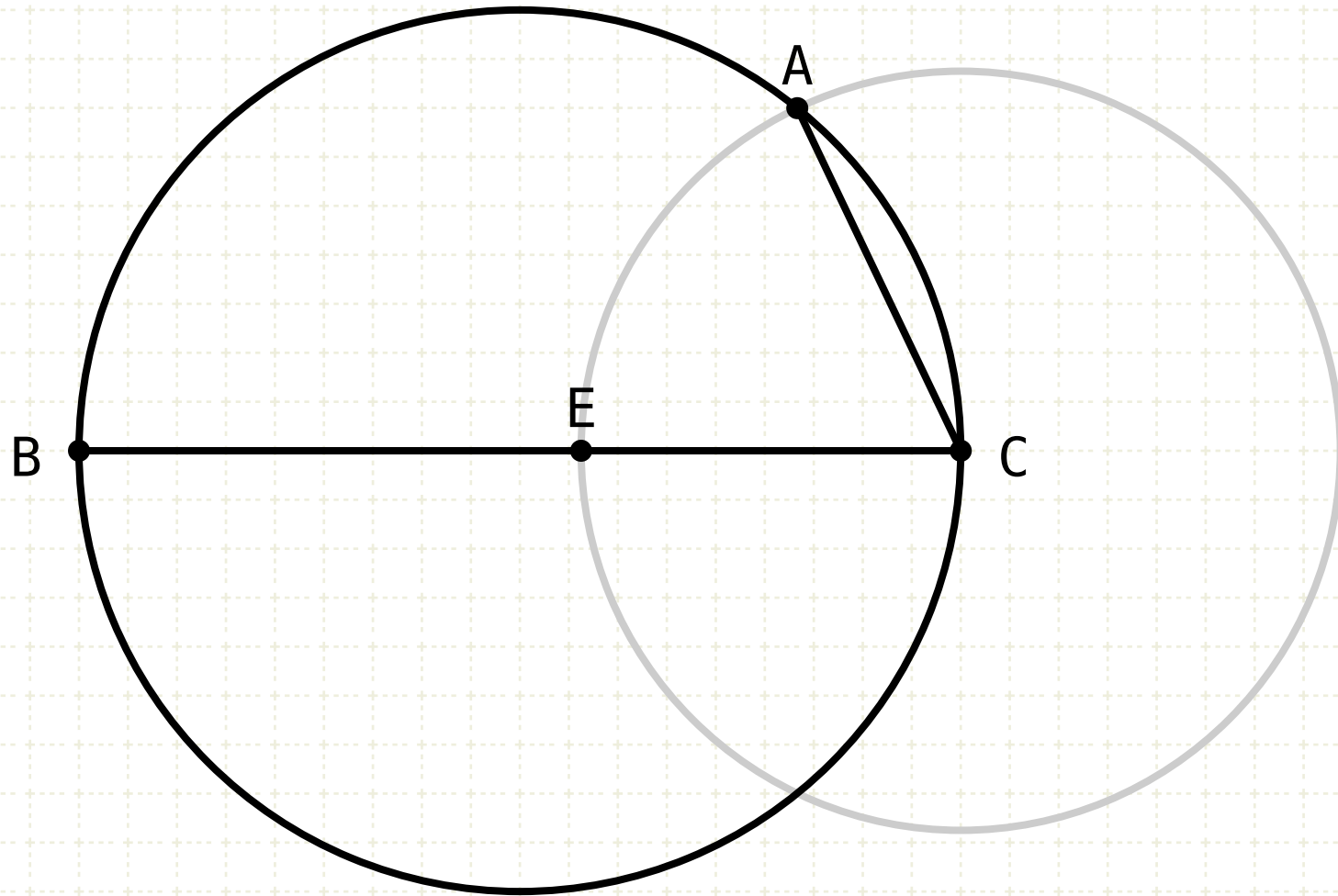
If BC is less than D, construct a line CE such that it is equal to D (I·2)

Draw another circle where C is the centre, with a radius CE

Label the intersection A

# Proposition 1 of Book IV

Into a given circle to fit a straight line equal to a given straight line which is not greater than the diameter of the circle.



## Construction

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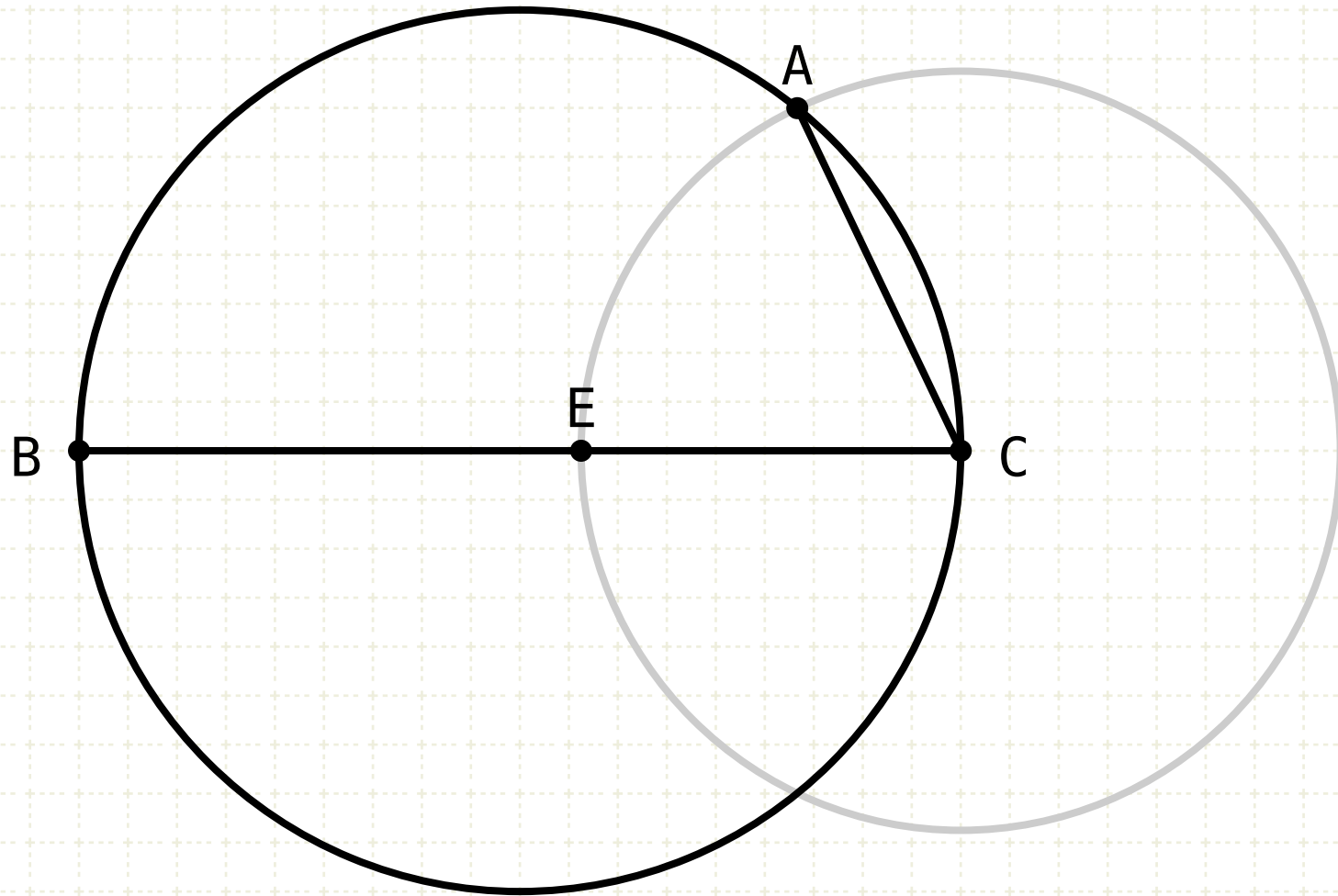
Label the intersection A

Draw the line AC. It is equal to line D



# Proposition 1 of Book IV

Into a given circle to fit a straight line equal to a given straight line which is not greater than the diameter of the circle.



## Construction

Draw the diameter of the circle BC (III·1)

If BC equals D in length, then we are done

If BC is less than D, construct a line CE such that it is equal to D (I·2)

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Draw the line AC. It is equal to line D

## Proof

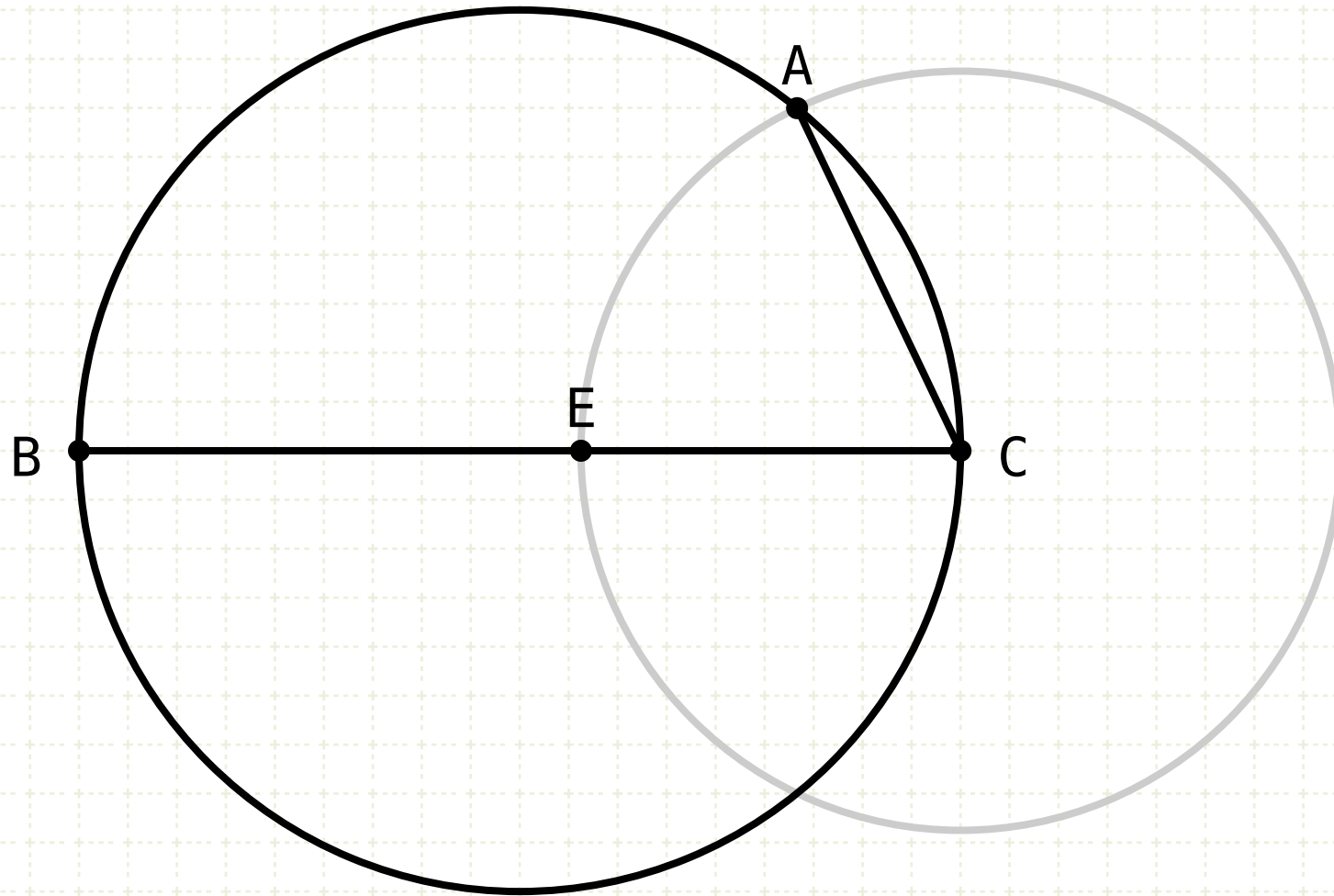




# Proposition 1 of Book IV

Into a given circle to fit a straight line equal to a given straight line which is not greater than the diameter of the circle.

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## Construction

Draw the diameter of the circle BC (III·1)

If BC equals D in length, then we are done

If BC is less than D, construct a line CE such that it is equal to D (I·2)

Draw another circle where C is the centre, with a radius CE

Label the intersection A

Draw the line AC. It is equal to line D

## Proof

By construction, CE equals D

CE equals AC since they are both radii of the same circle

Hence, AC equals D

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