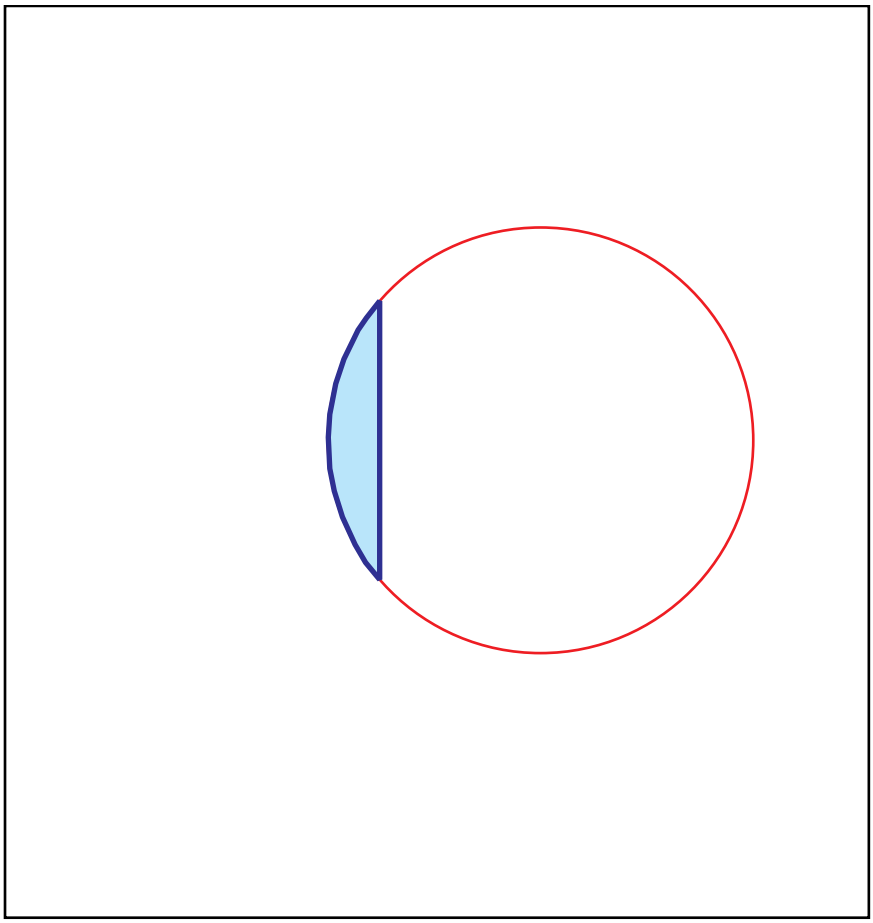
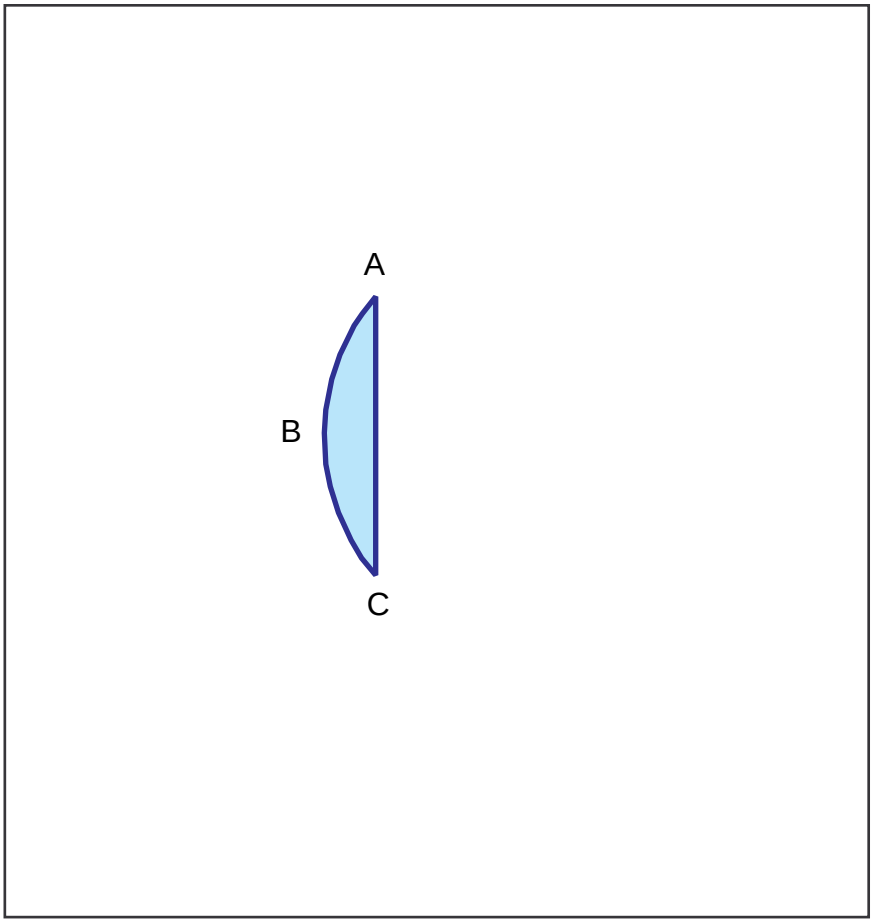
Construction 19: Book III, Proposition 25

Given a segment of a circle, to describe the complete circle of which it is a segment.

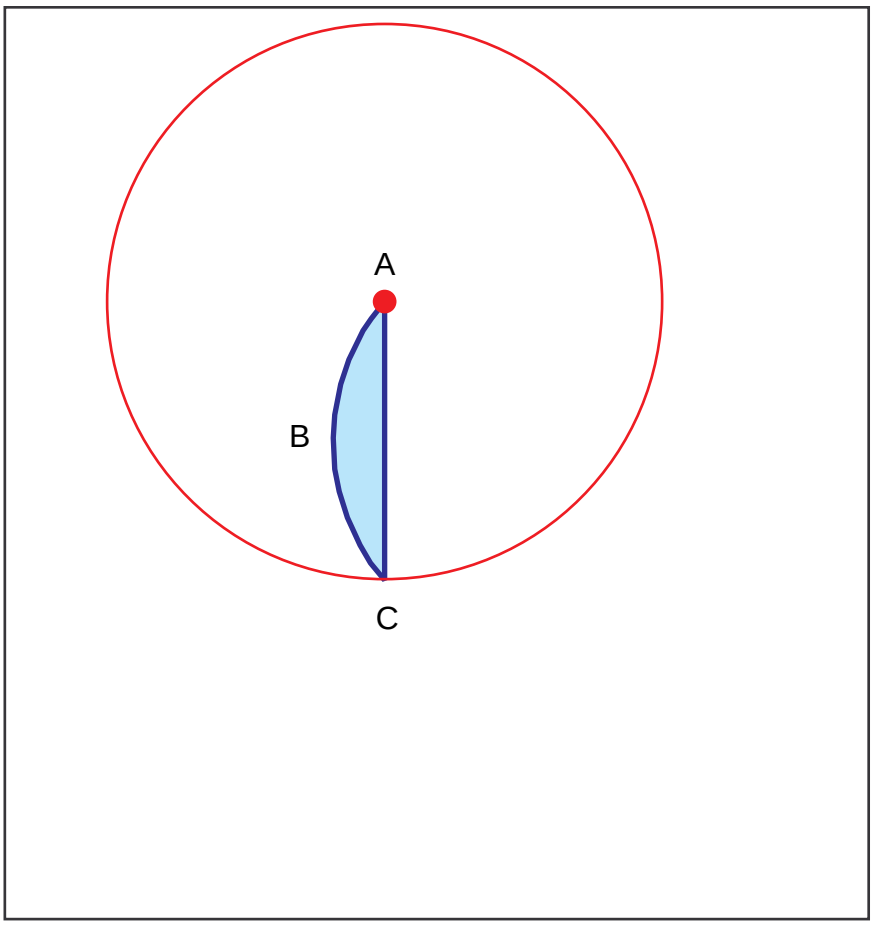


III.25:3. Let ABC be the given segment of a circle; (the point B is not precisely located yet.)

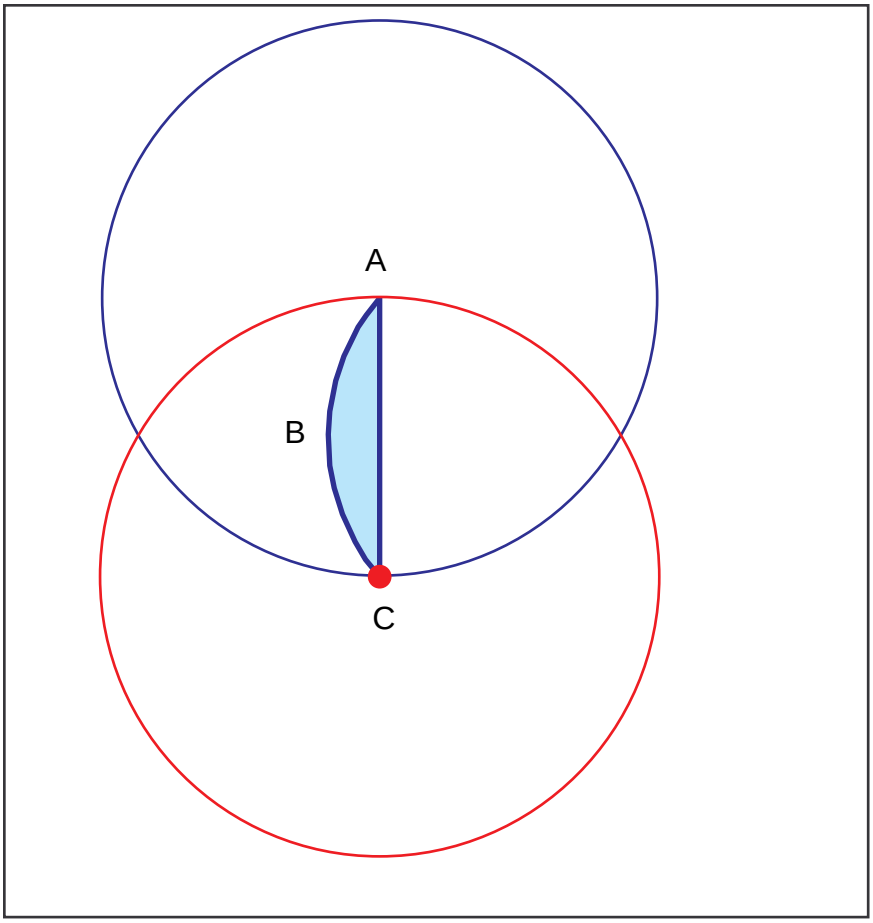


III.25:6. For let AC be bisected at D, ([I.10])

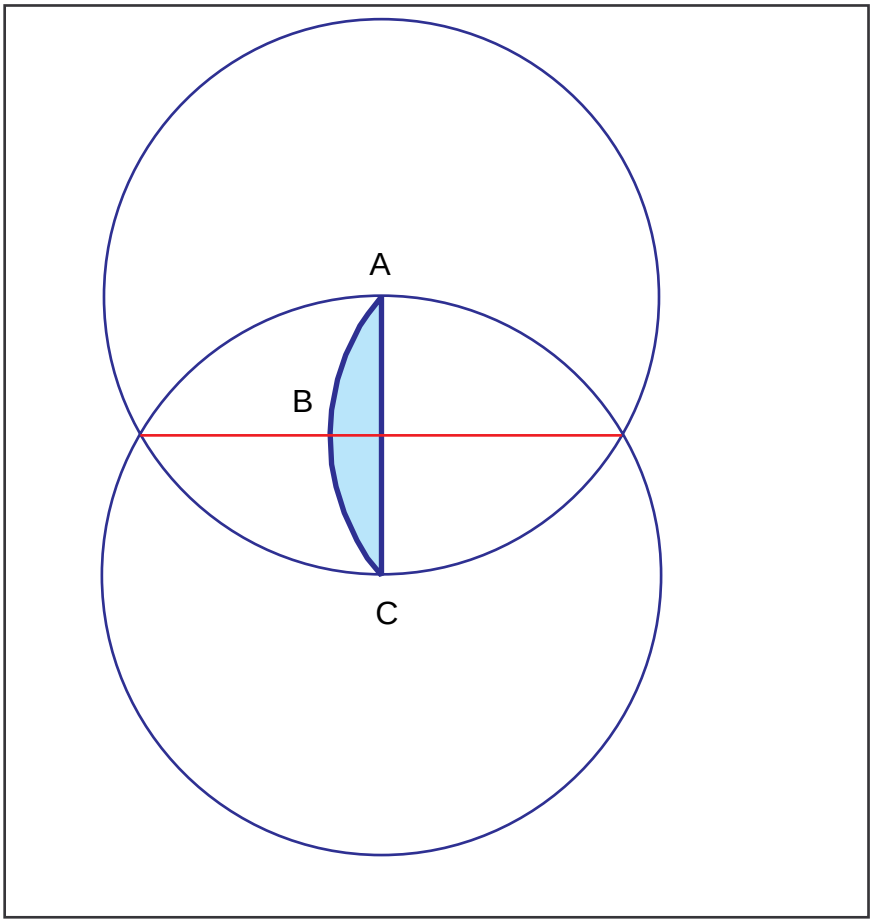
Follow C#5B
Swing AC around A.



Swing CA around C.



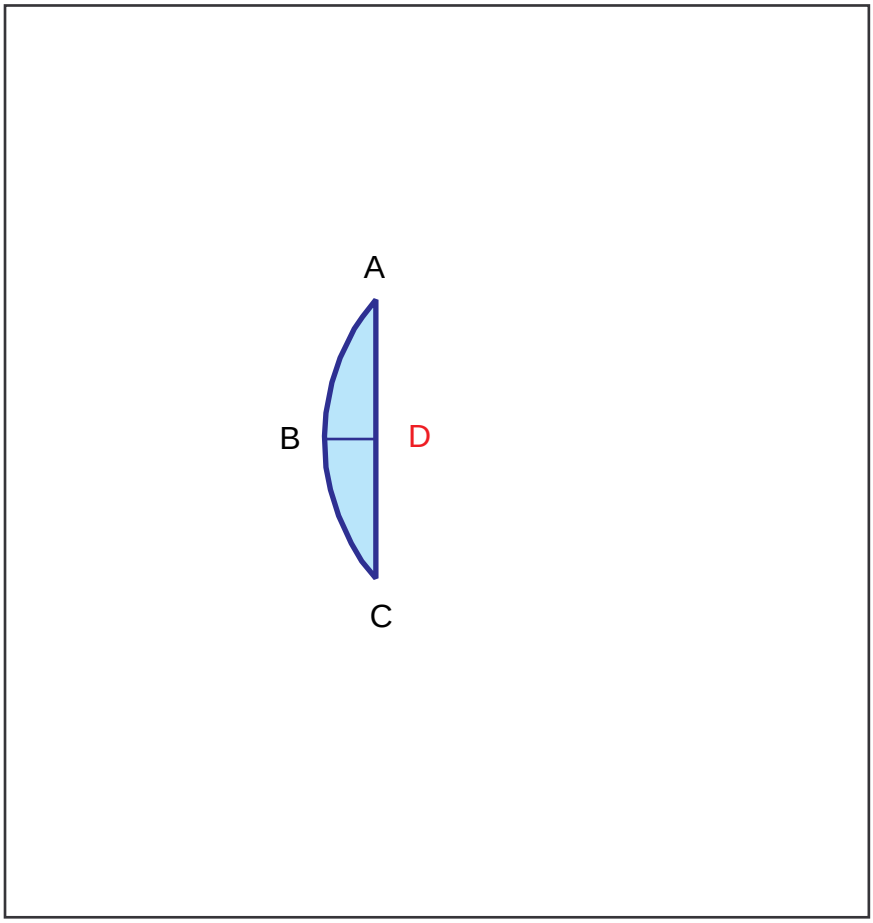
Connect the crossings.



Locate the point D on AC.

Cleanup.
RETURN to III.25 at line 6.
III.25:6. let DB be drawn from the point D at right angles to AC,

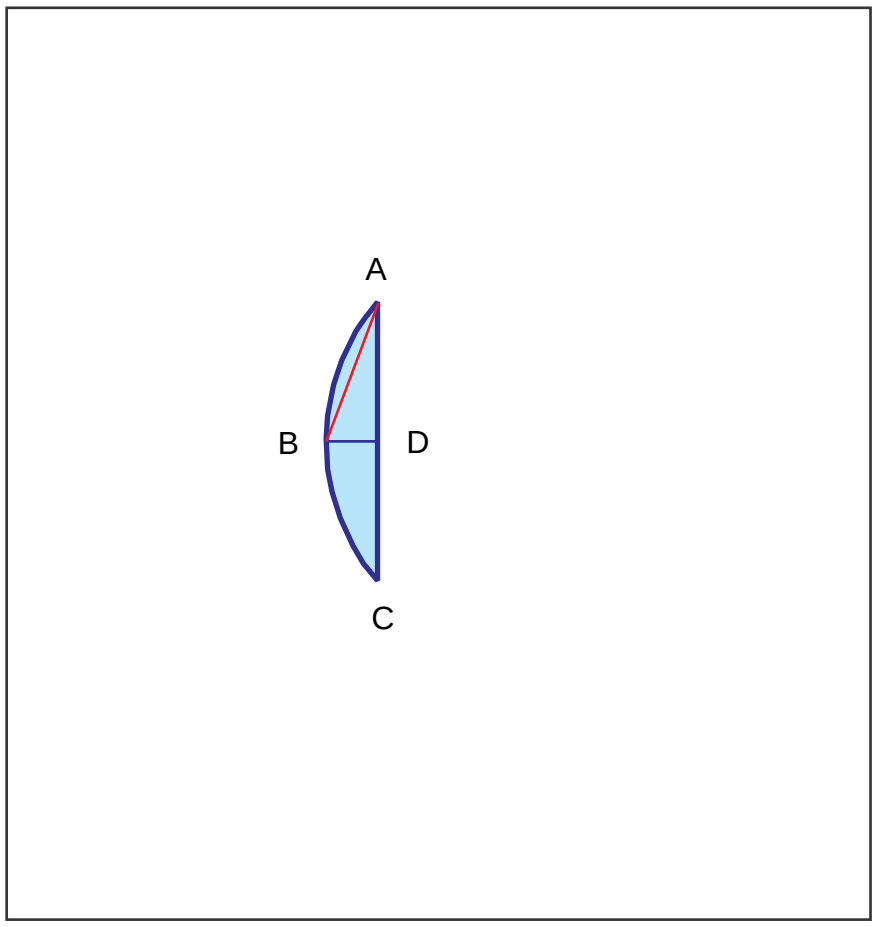
This might refer to I.11. However, we have this line in step 3 above, so we keep the segment BD. This locates the point B.



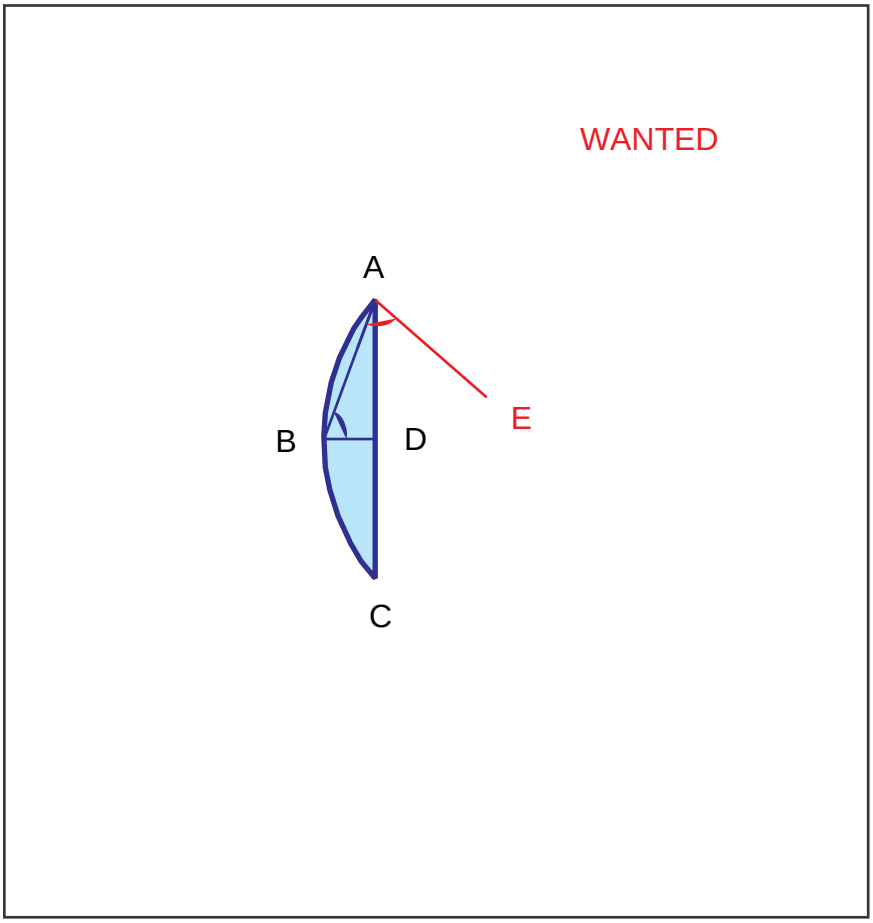
III.25:7. and let AB be joined;

III.25:8. The angle ABD is then greater than, equal to, or less than the angle BAD.

First let it be greater;
(We will consider this case only, as shown.)



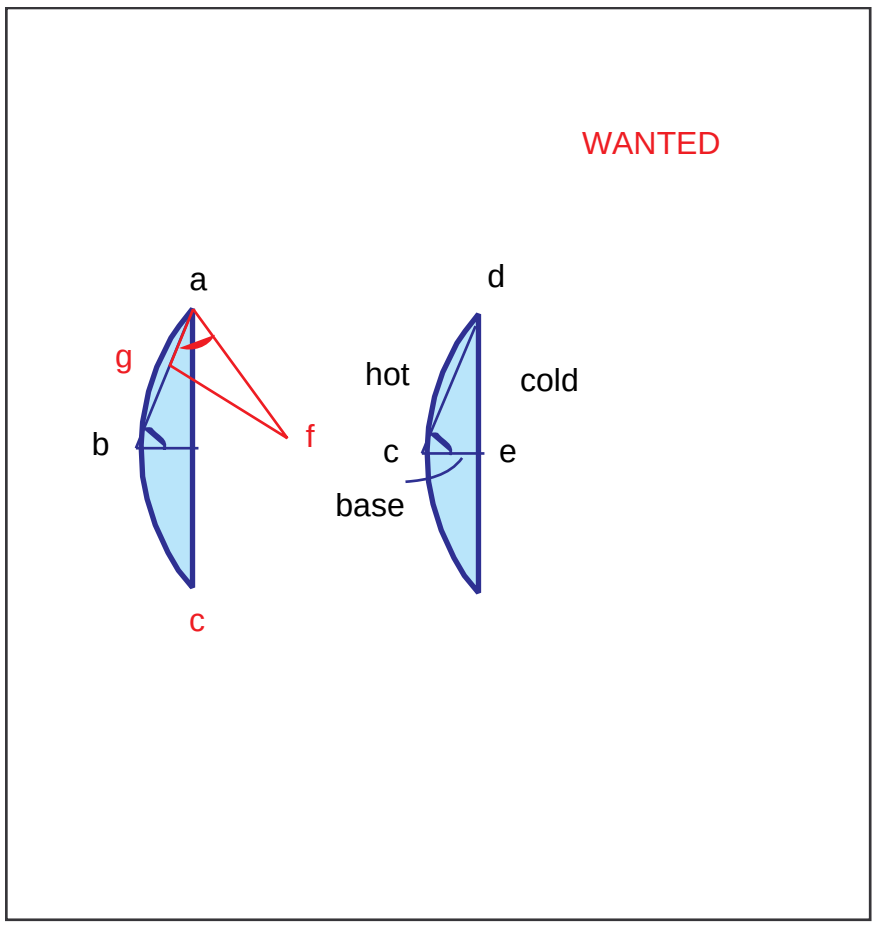
III.25:11. and on the straight line BA, and at the point A on it, let the angle BAE be constructed equal to the angle ABD; ([I.23])



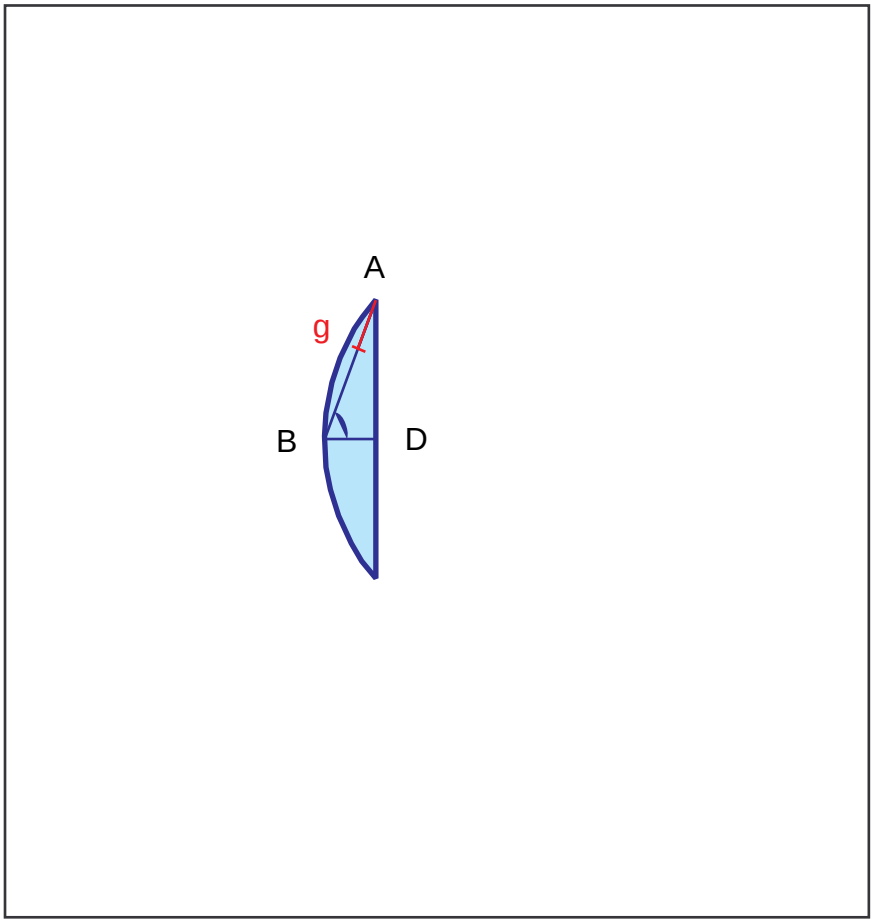
GOSUB I.23.
Duplicate the figure.
Relabel.

I.23:11. and out of the three straight lines which are equal to the three straight lines cd, de, ce let the triangle afg be constructed in such a way that cd is equal to af, ce to ag, and further de to fg. [I.22]

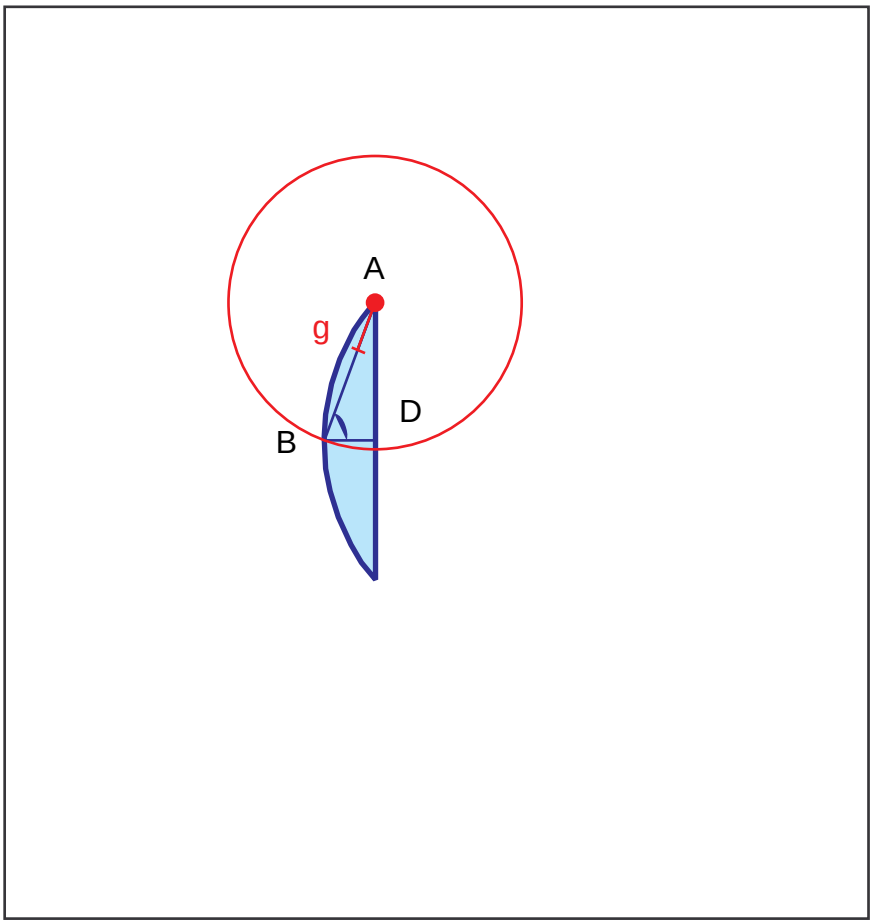
That is, we are to move the triangle cde so the base ce moves onto the target line ab, with the hot end c moving to the hot end a, in the terminology of C#8P - I.22P, the Proclus Variation. We will carry this out with the labels of the figure above.



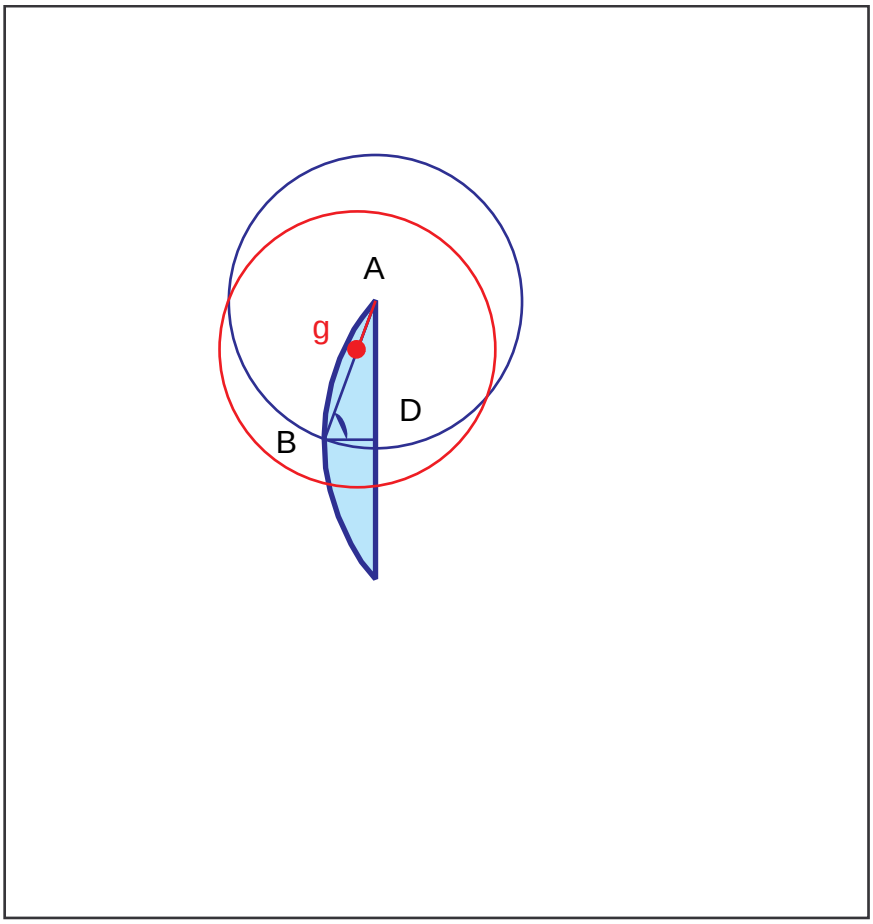
GOSUB I.22P. Move the base, BD, to AB at A, locating g.



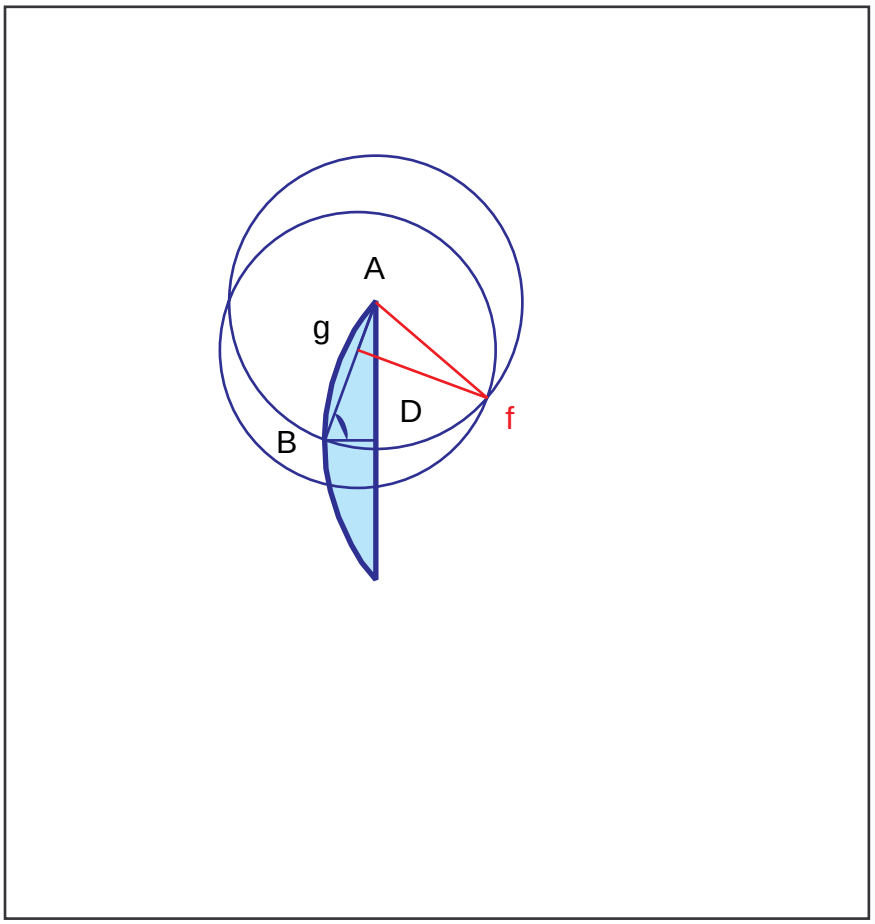
Swing the hot side, AB, around A.



Swing the cold side AD around g.



Connect the crossing point of the circles on the right side, f, to both ends of the base.

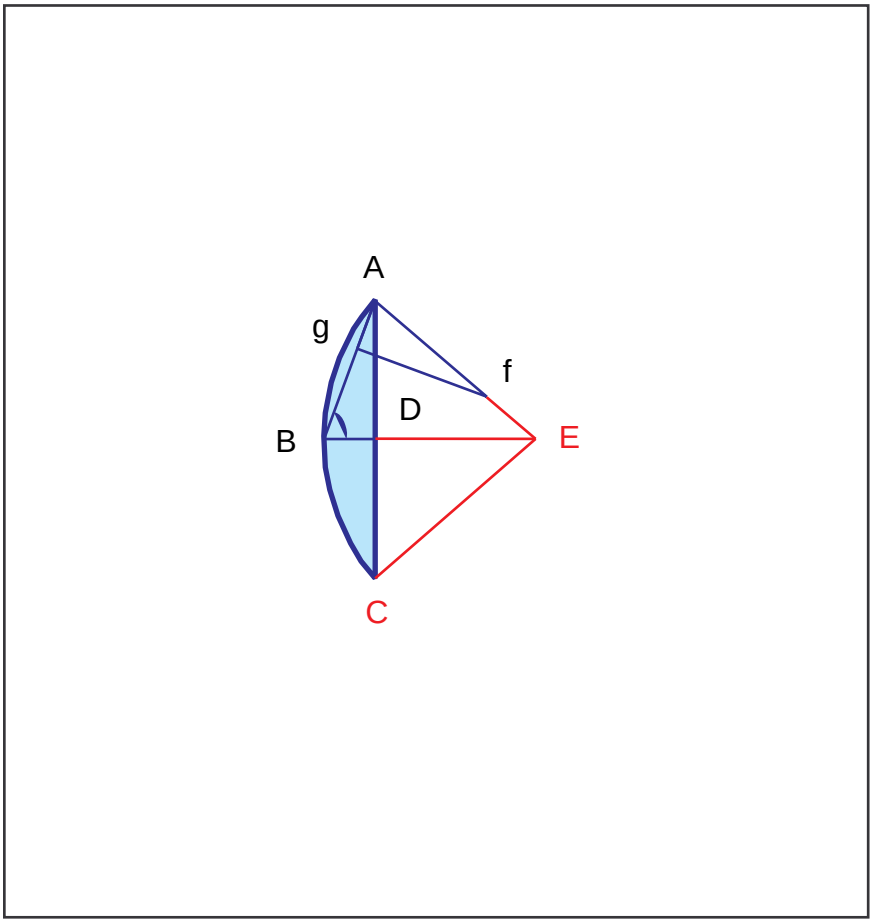


RETURN to I.23 at line 11.

RETURN to III.25 at line 11.
Cleanup.

Extend the line Af.

III.25:13. Let DB be drawn through to E, and let EC be joined.



III.25:30. Therefore the circle drawn with centre E and distance one of the straight lines AE, EB, EC will also pass through the remaining points and will have been completed.

Q.E.F.