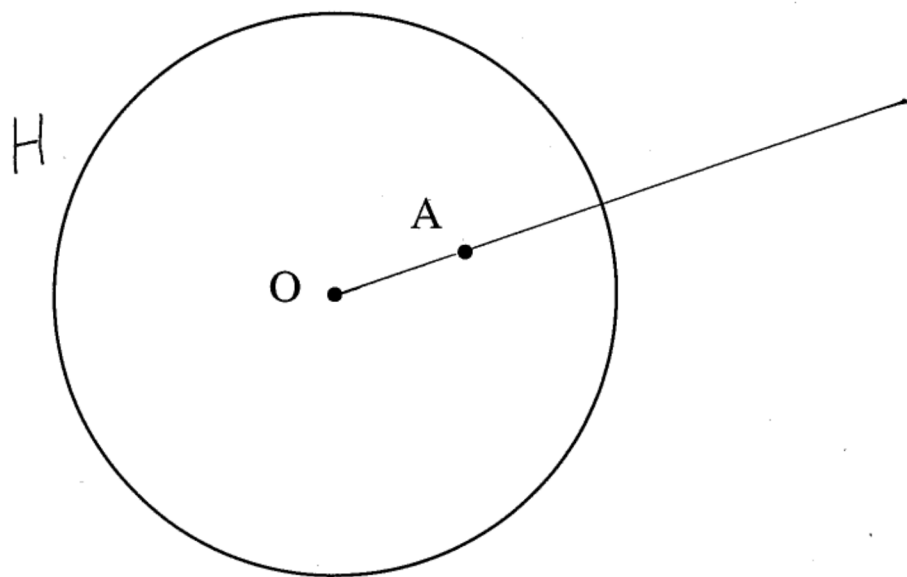


# Hyperbolic Lines through A

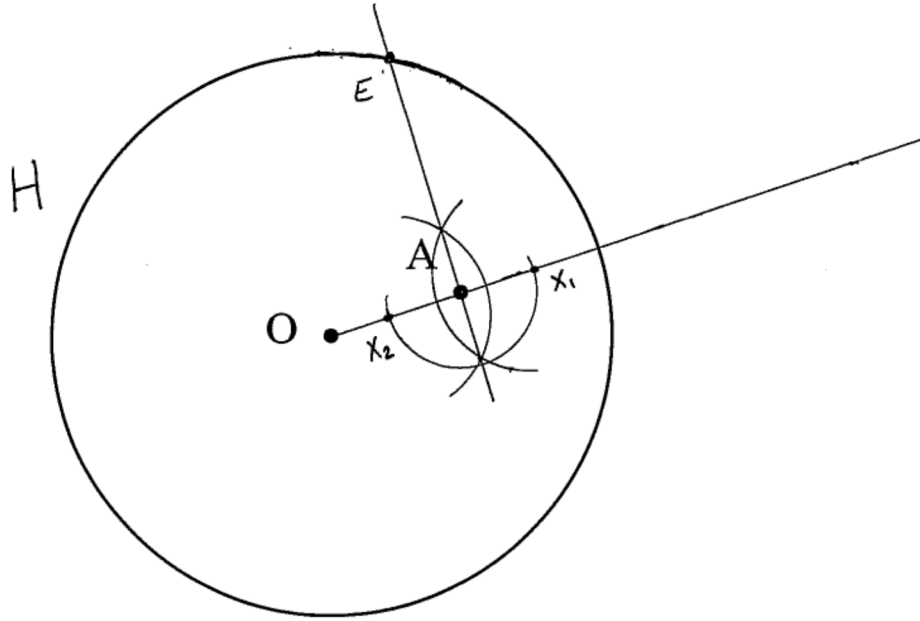


Step 1:

Draw the line  $OA$ .

Extend this line  
beyond the circle  $H$ .

# Hyperbolic Lines through A



Step 2:

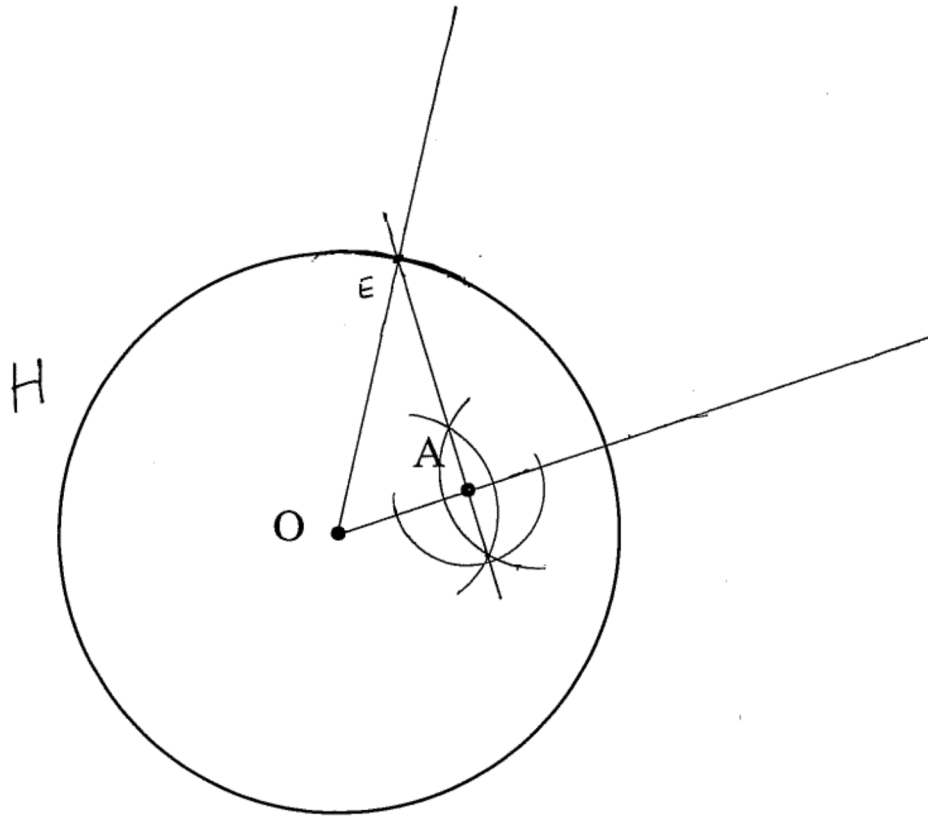
Construct the line that is perpendicular to  $OA$  at  $A$ .

- Construct a circle centered at  $A$  to find points  $X_1$  and  $X_2$ .
- Find the perpendicular bisector of  $X_1$  and  $X_2$ .

This line meets the circle  $H$  at point  $E$ .

Note: There are two choices for the point  $E$ , one above  $OA$  and one below. Either point is valid.

# Hyperbolic Lines through A

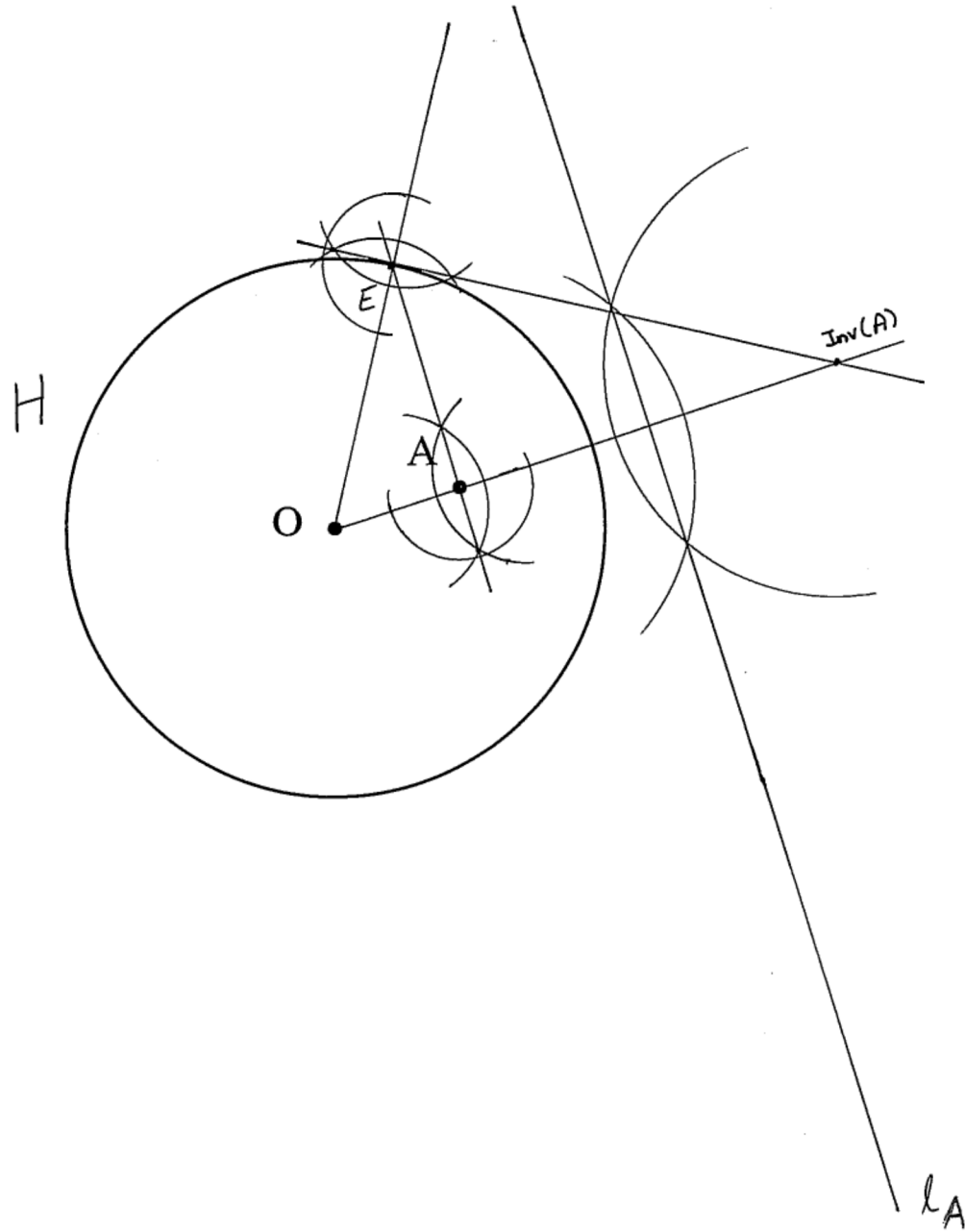


Step 3

Draw the line OE.  
Extend this line  
beyond the circle H.



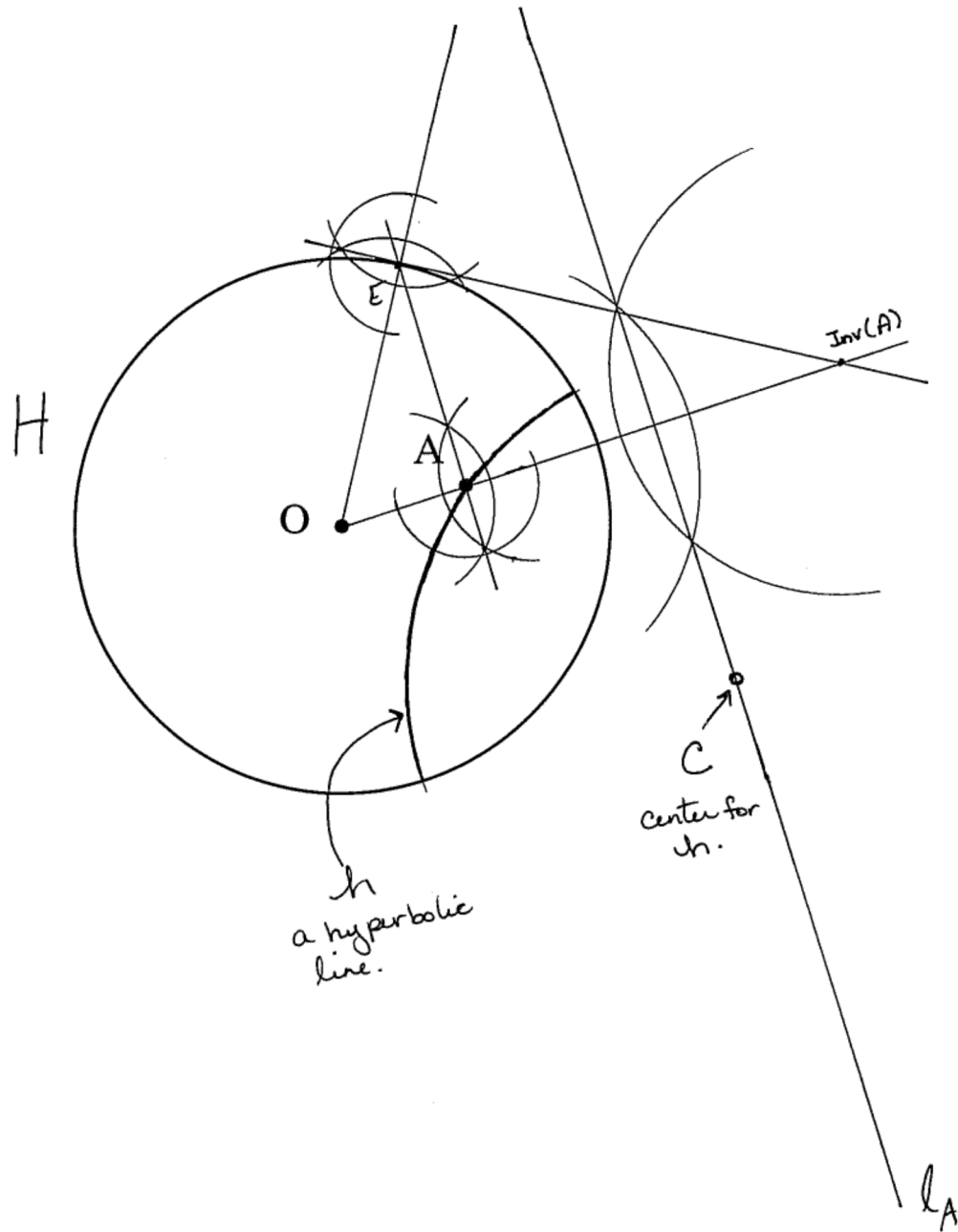
# Hyperbolic Lines through A



step 5:

Find the perpendicular bisector of  $A$  and  $Inv(A)$ . This line is the center line for  $A$ ,  $l_A$ .

# Hyperbolic Lines through A



Interpretation of the center line for  $A$ :

- If you choose a point on  $l_A$  (for example  $C$ ) and draw a circle centered at  $C$  that passes through the point  $A$ , then the portion of that circle that is inside  $H$  is a hyperbolic line (in this case,  $h$ ).
- Every hyperbolic line that passes through  $A$  is either the diameter through  $A$ , or it is a circle (portion) whose center is on  $l_A$ .