MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

Department of Mechanical and Manufacturing Engineering

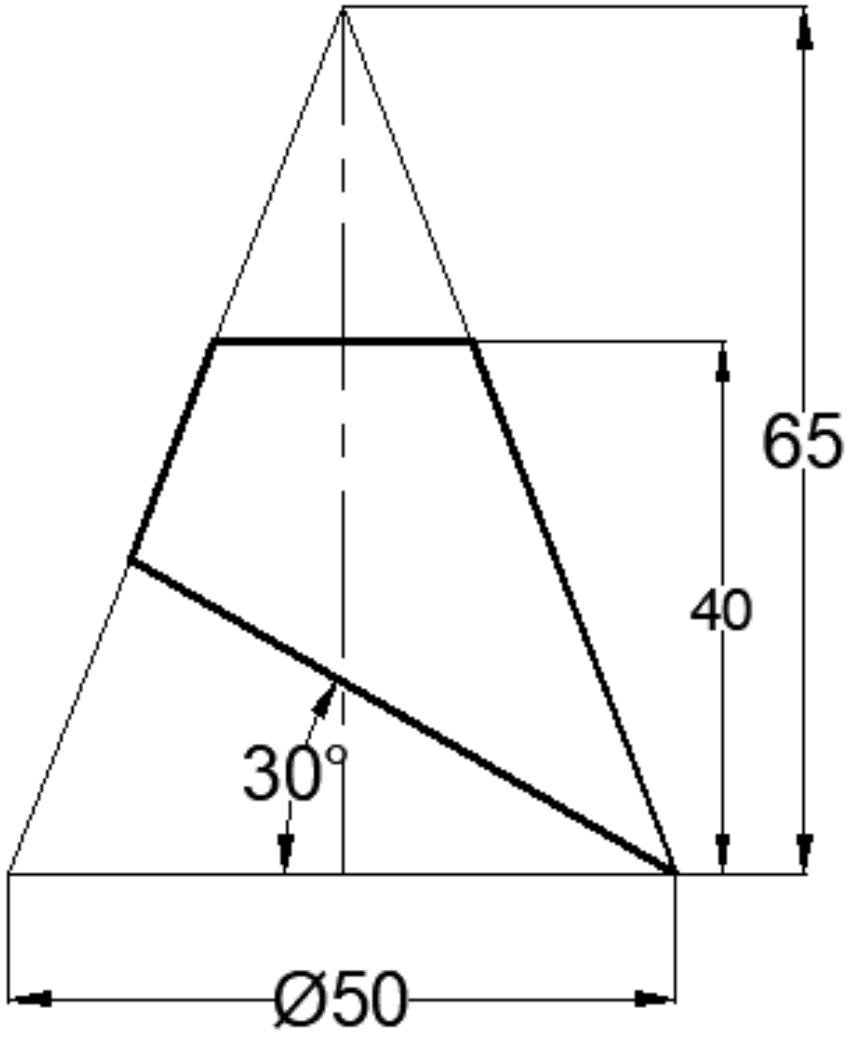
ENGINEERING GRAPHICS - II

CLASS 4: DEVELOPMENT OF SURFACES

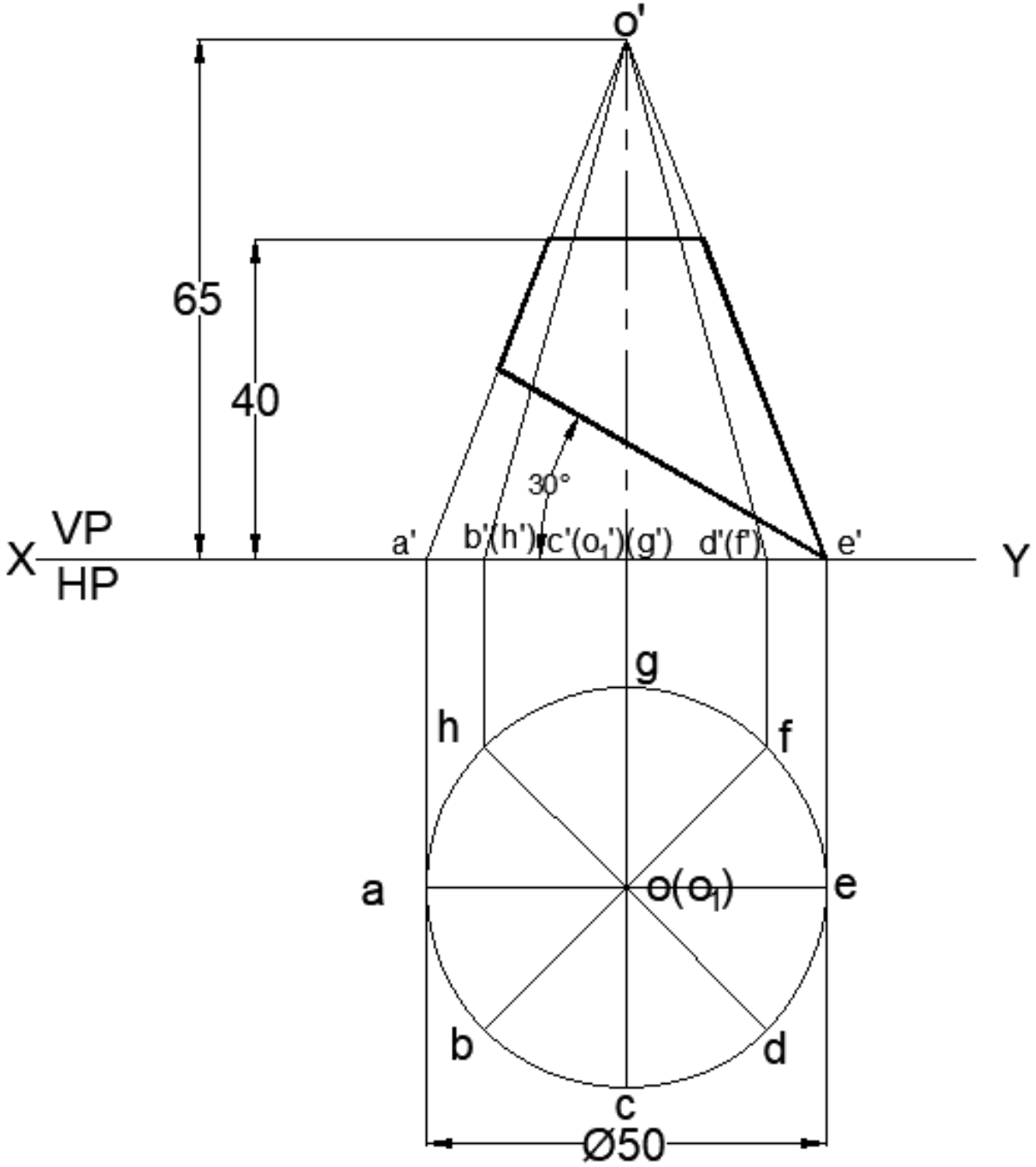
(SHEET 4)

QUESTION BANK: DEVELOPMENT OF SURFACES PROBLEM 5

A cone with base diameter 50mm and axis length 65mm are cut in a way whose front view is shown in fig. D-3. Draw the development of the lateral surface of the retained part of the cone.

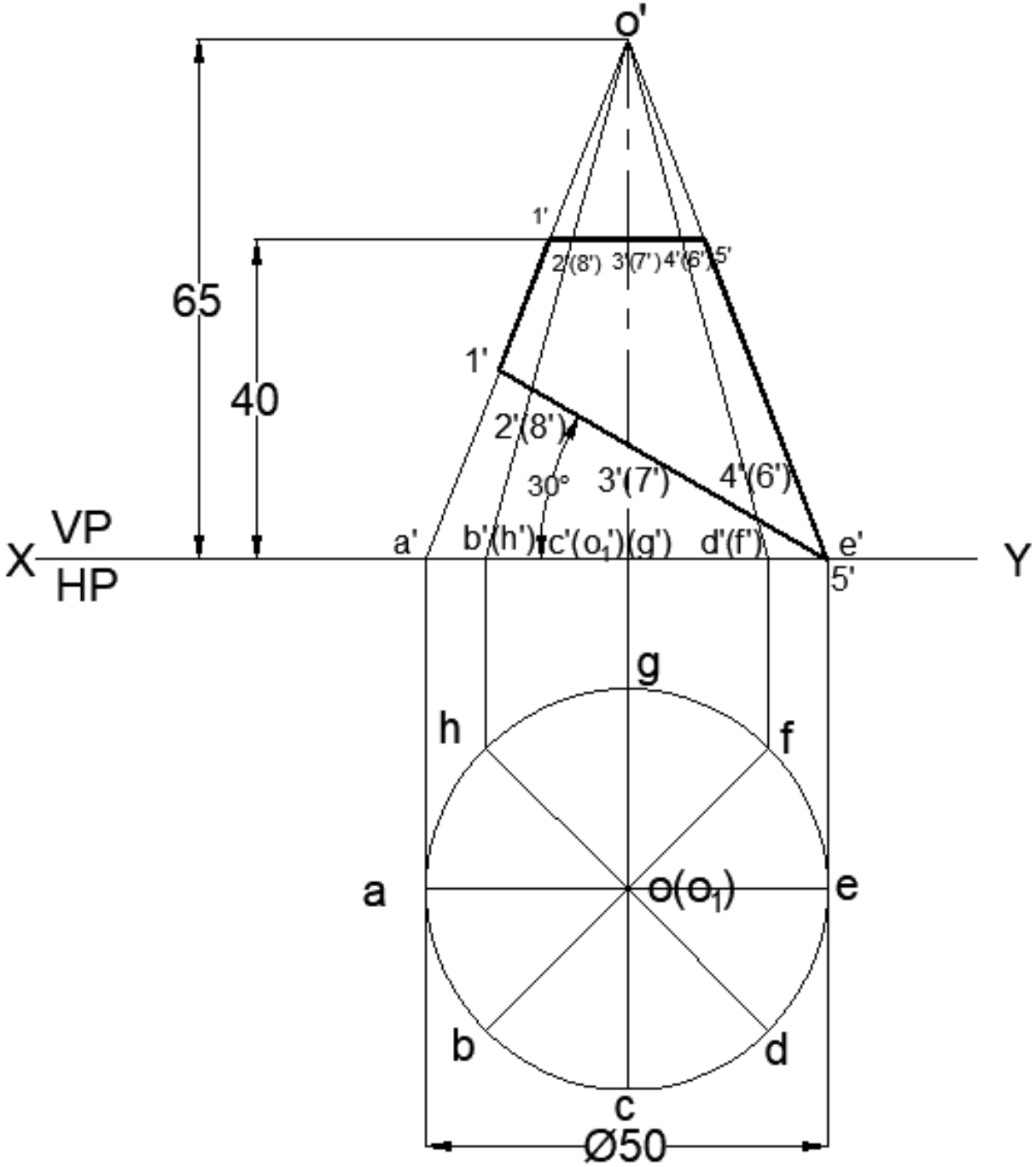


D-3



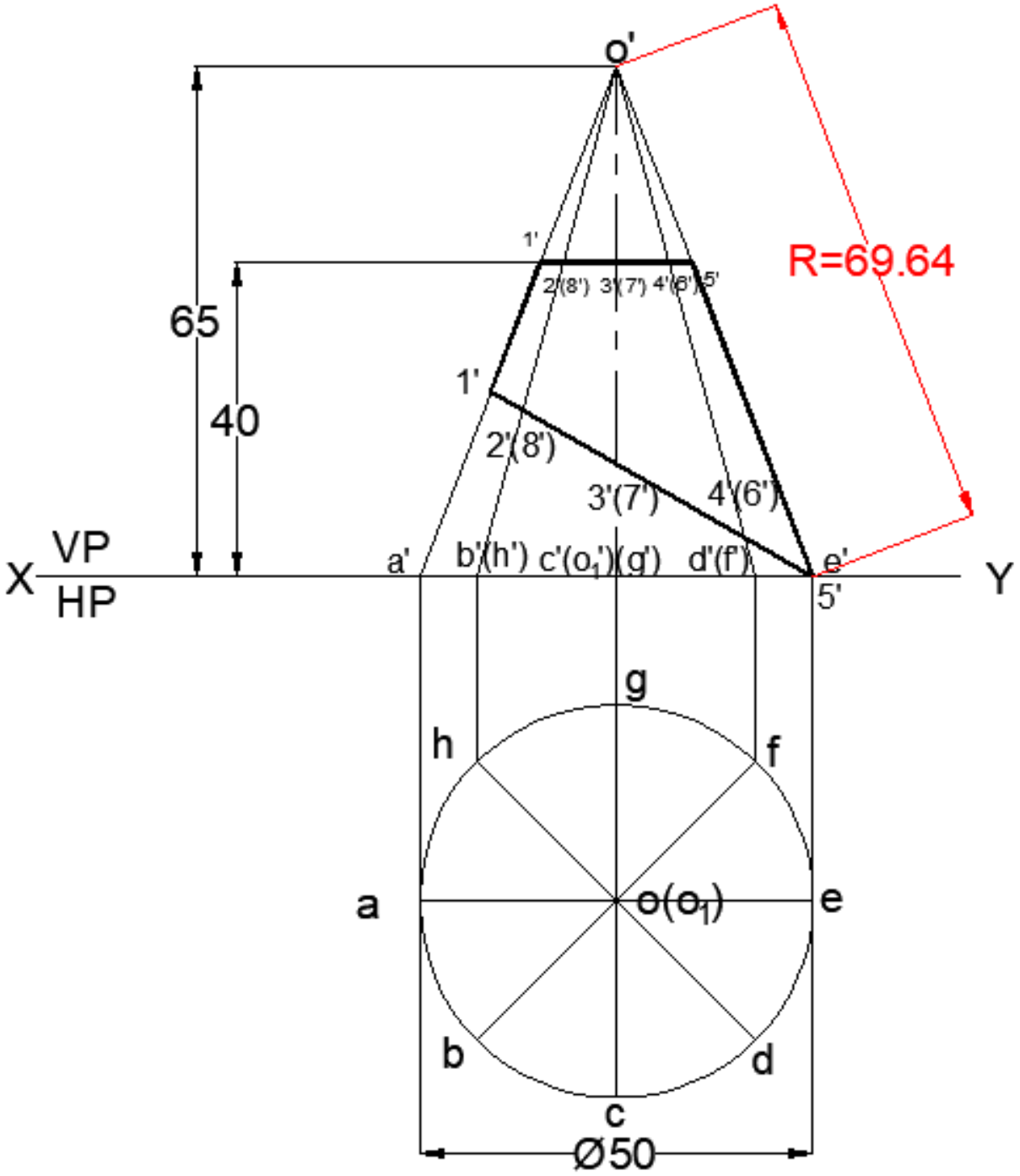
Steps Involved

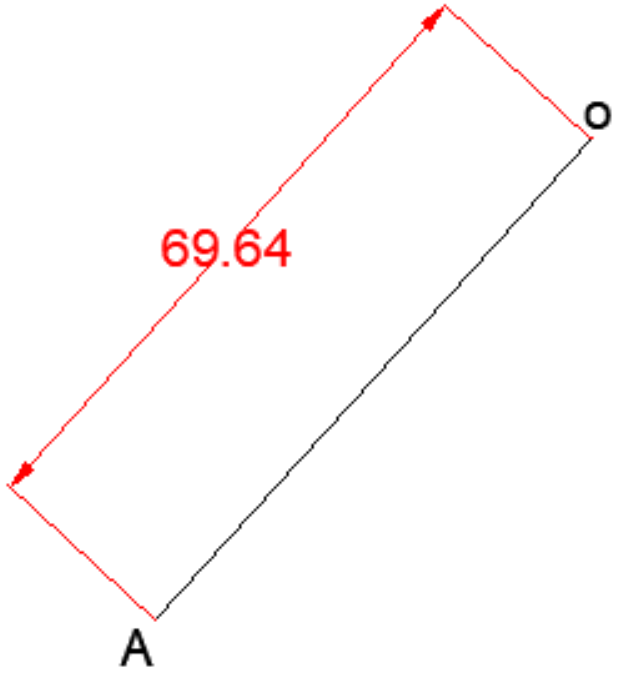
- Draw the front & top views of the given solid



Steps Involved

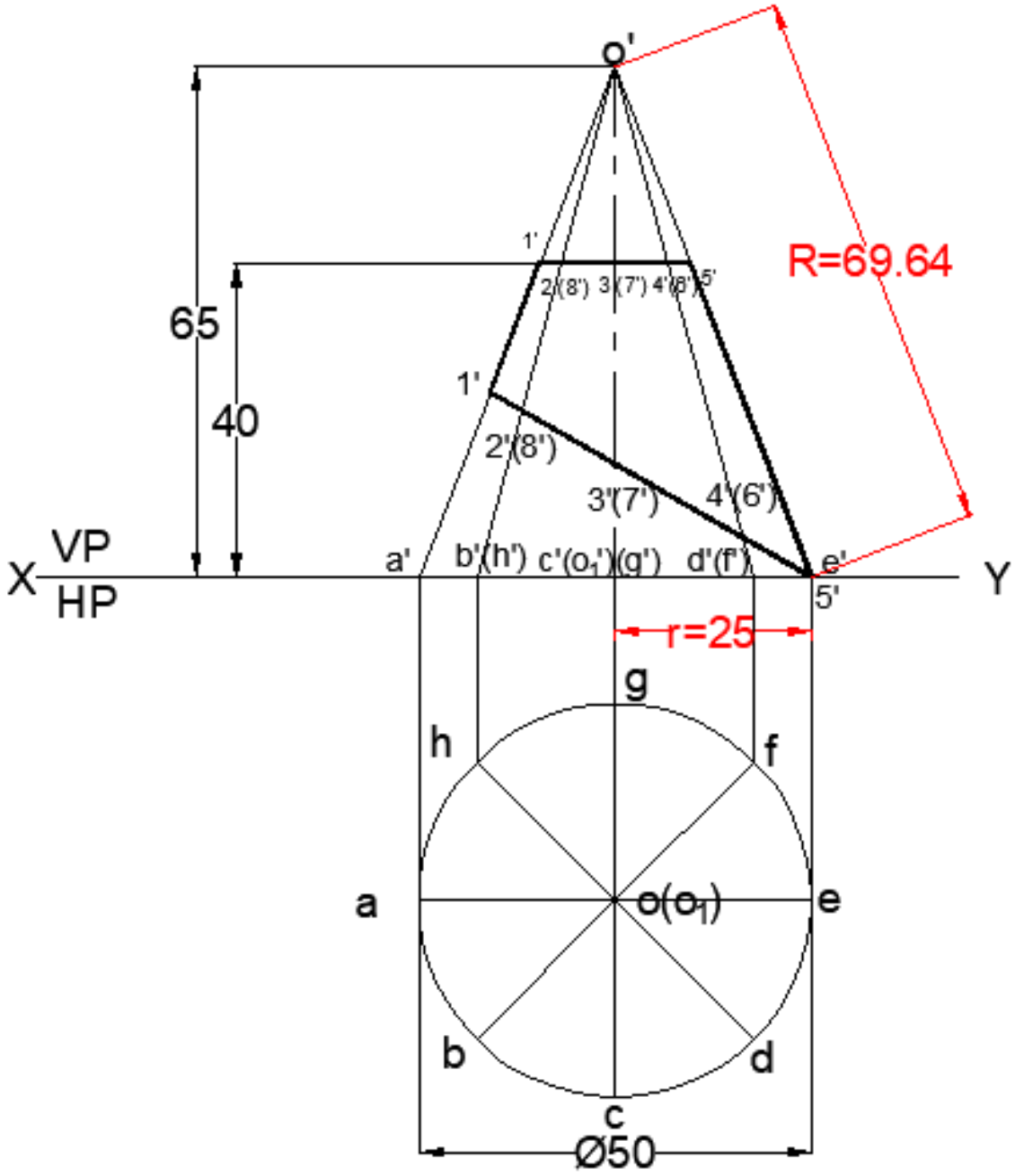
- Complete the preliminary steps (marking the cutting points)

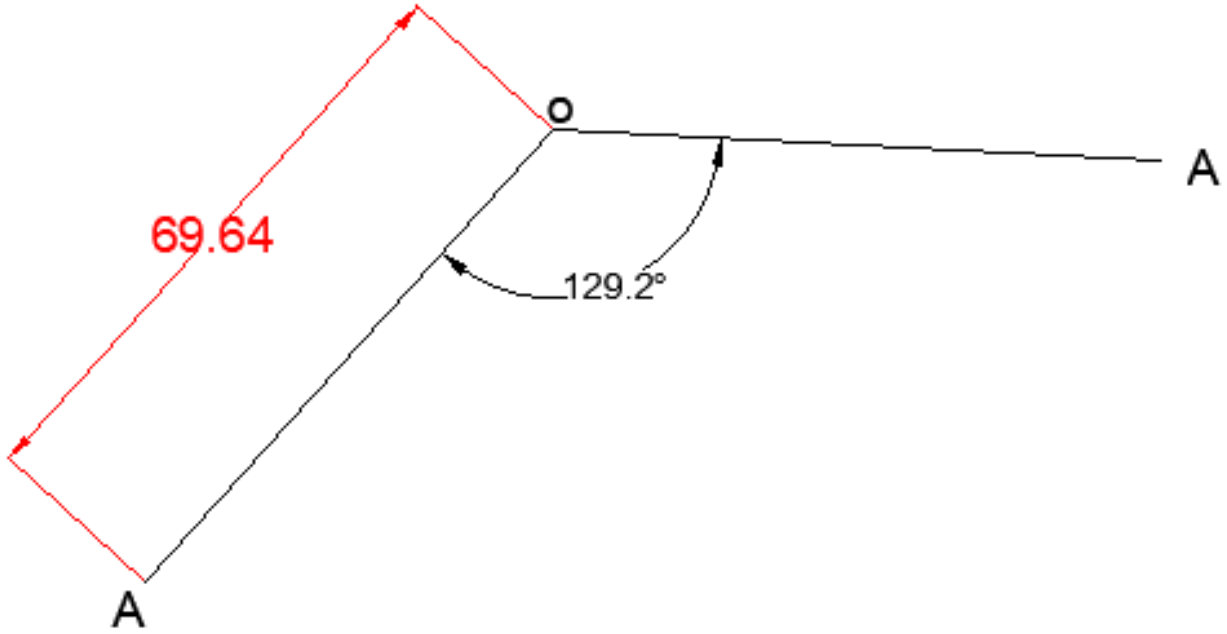




Steps Involved (Radial Line Method)

- Draw R length as shown at any convenient space





$$R = \sqrt{65^2 + 25^2} = 69.64$$

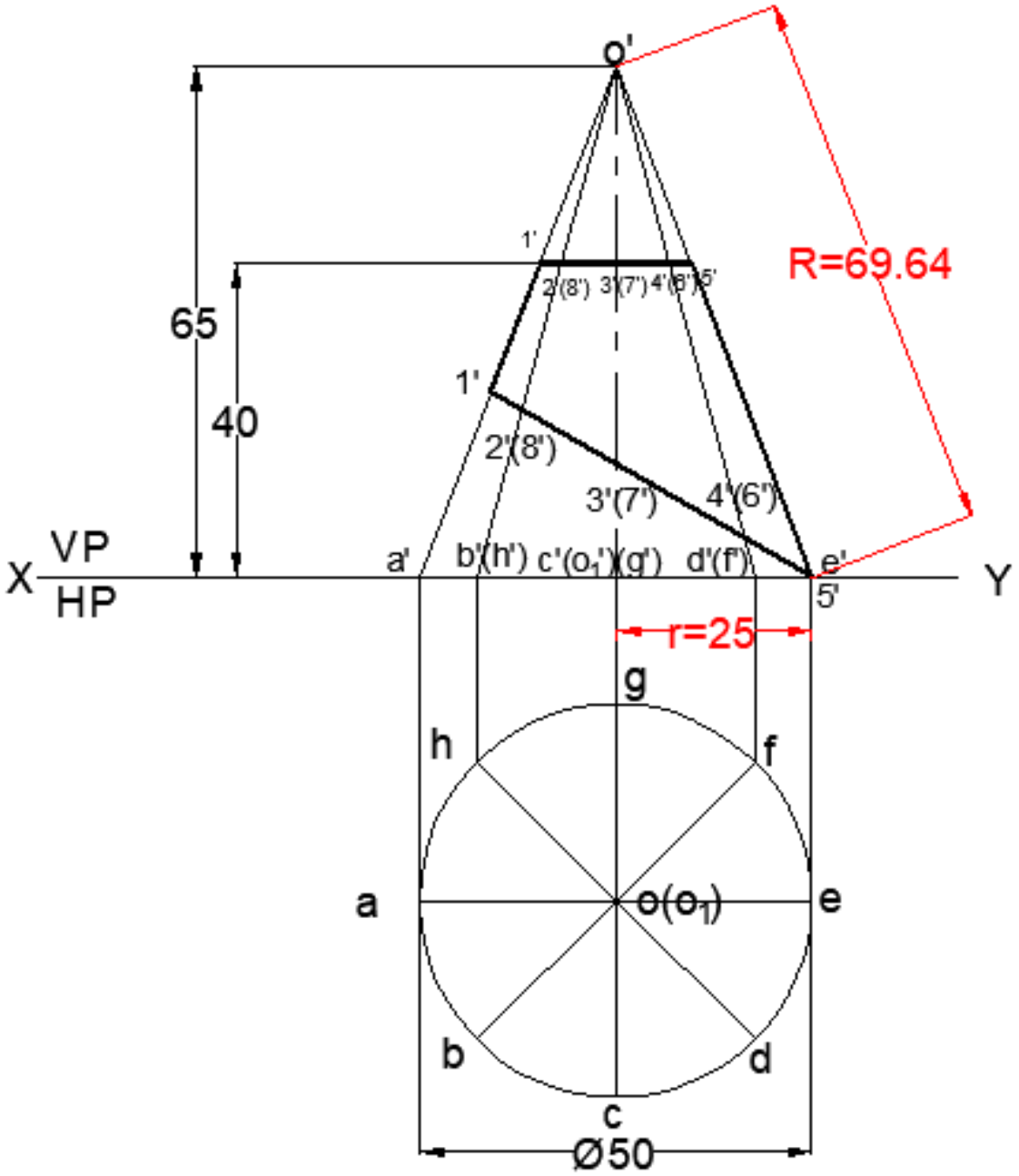
$$\theta = \frac{r}{R} \times 360$$

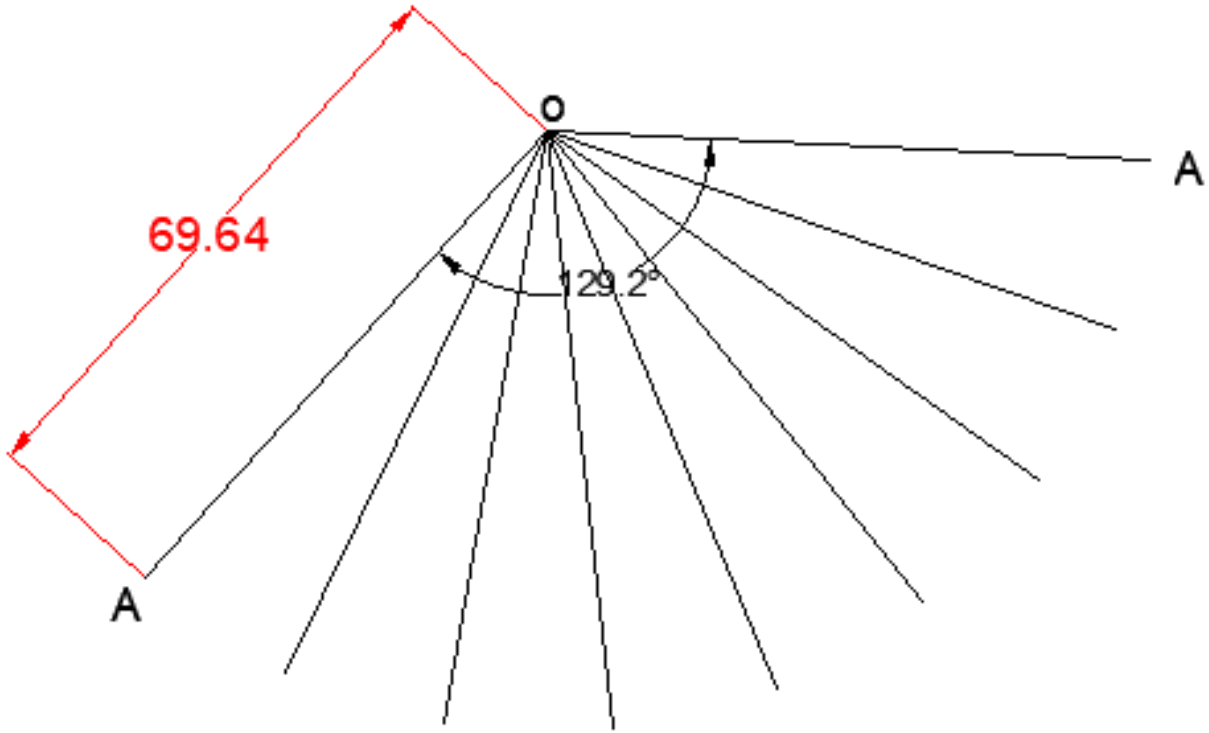
$$\theta = \frac{25}{69.64} \times 360$$

$$\theta = 129.2°$$

Steps Involved (Radial Line Method)

- Do the calculation as shown to find the included sector angle





$$R = \sqrt{65^2 + 25^2} = 69.64$$

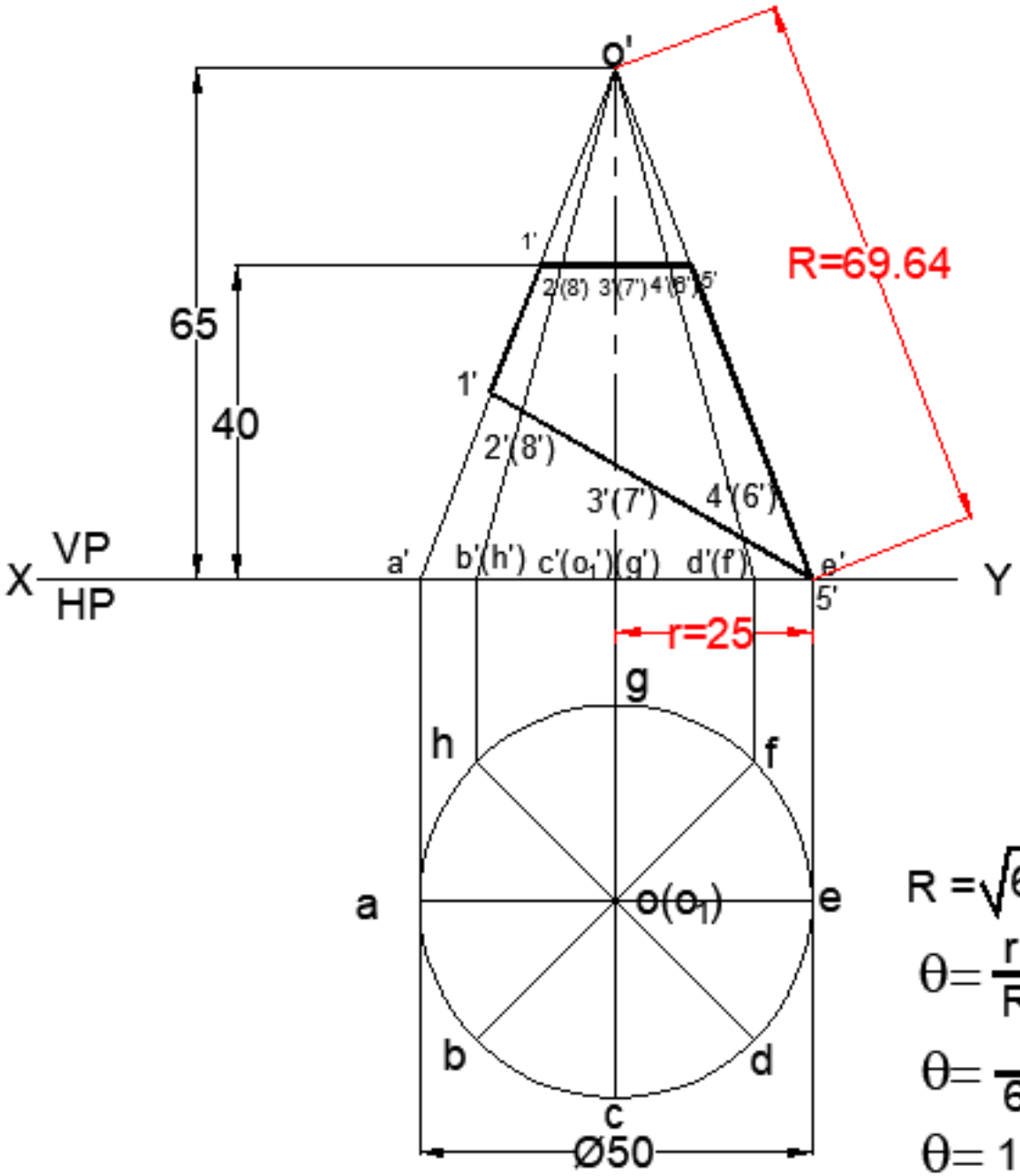
$$\theta = \frac{r}{R} \times 360$$

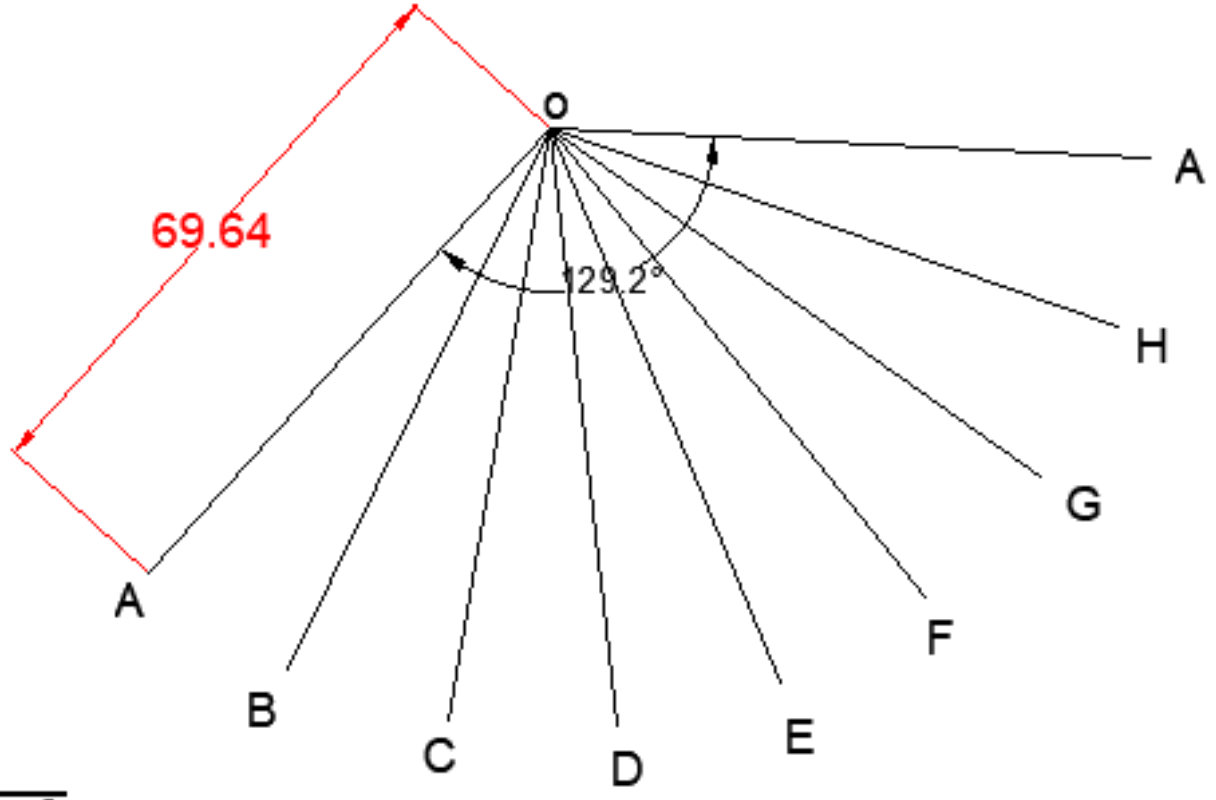
$$\theta = \frac{25}{69.64} \times 360$$

$$\theta = 129.2°$$

Steps Involved (Radial Line Method)

- Carry out angular bisection to get 8 sectors





$$R = \sqrt{65^2 + 25^2} = 69.64$$

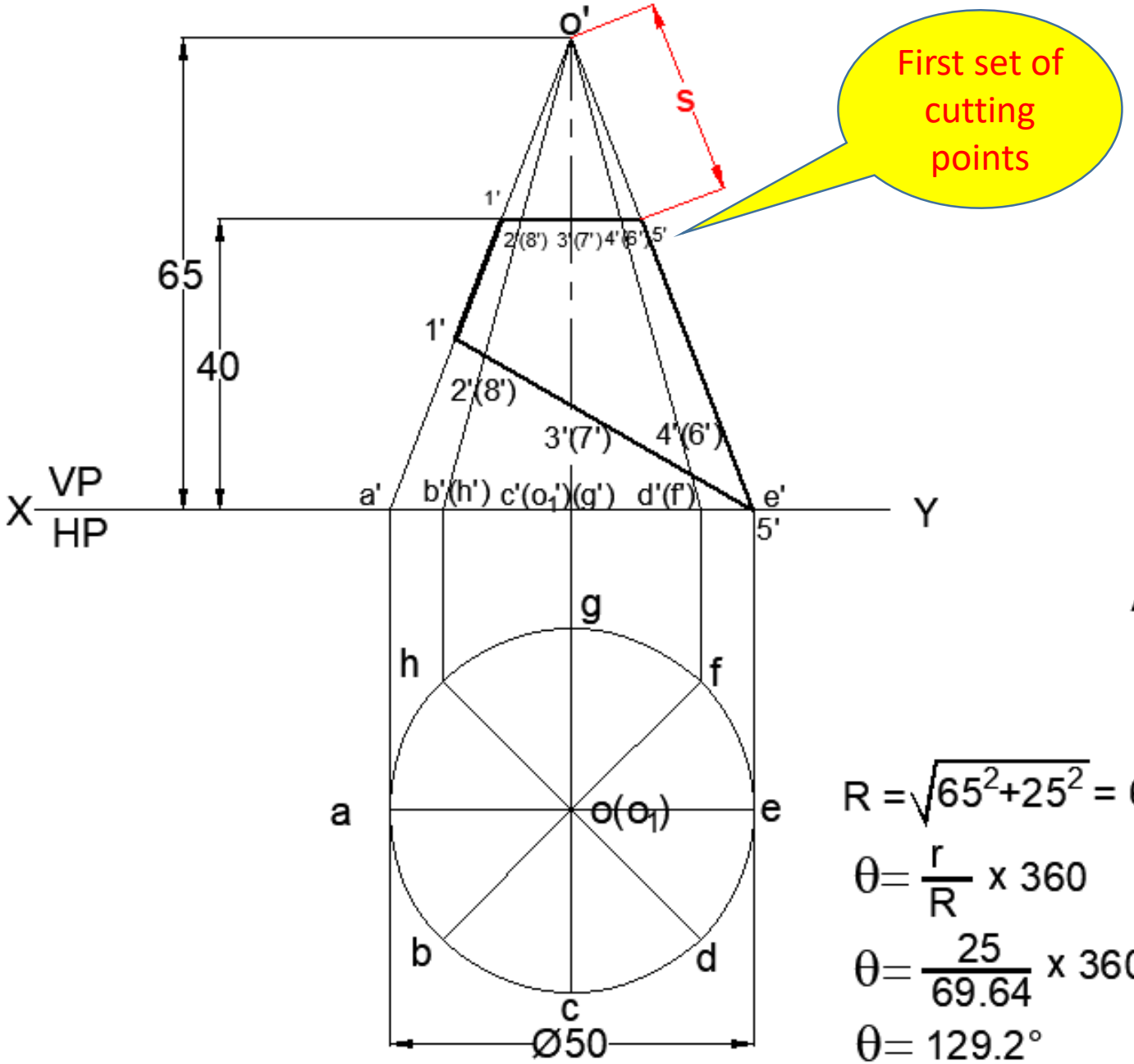
$$\theta = \frac{r}{R} \times 360$$

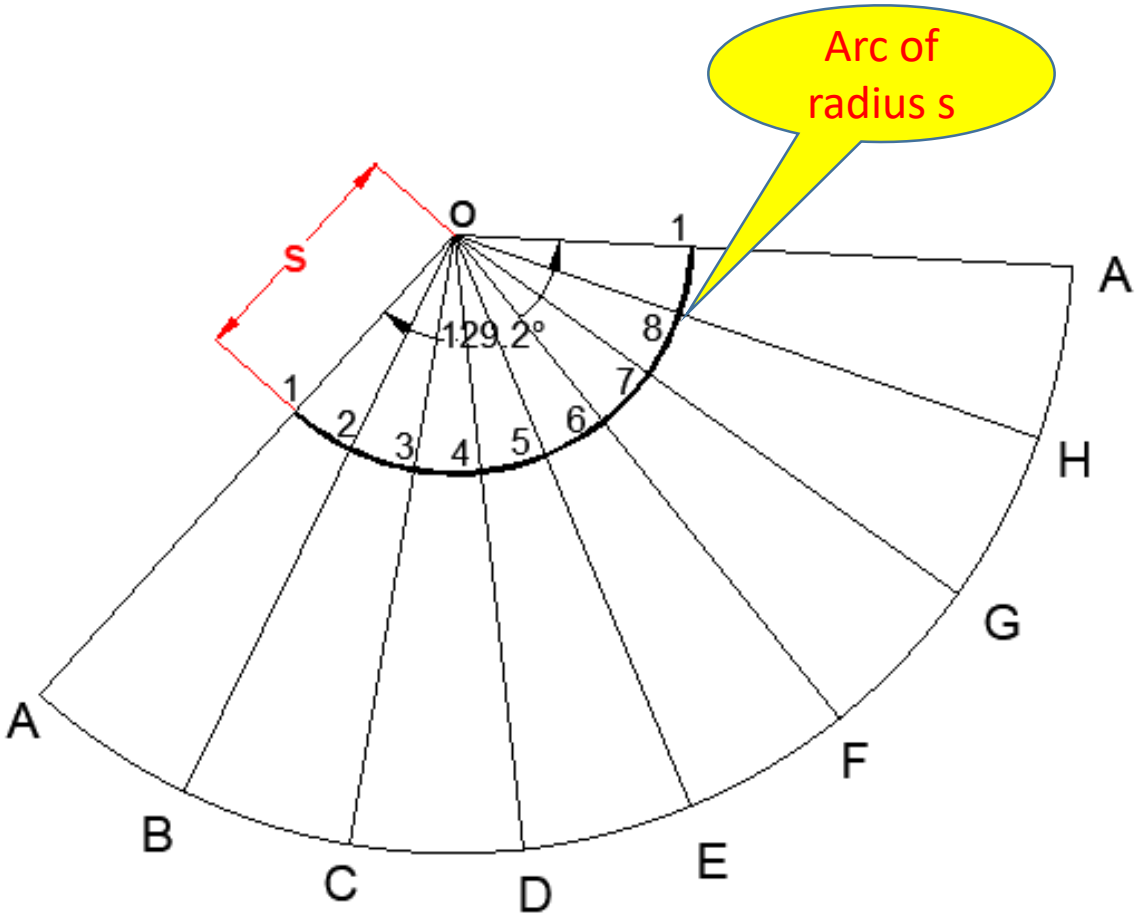
$$\theta = \frac{25}{69.64} \times 360$$

$$\theta = 129.2°$$

Steps Involved (Radial Line Method)

- Name all the generators/sectors





$$R = \sqrt{65^2+25^2} = 69.64$$

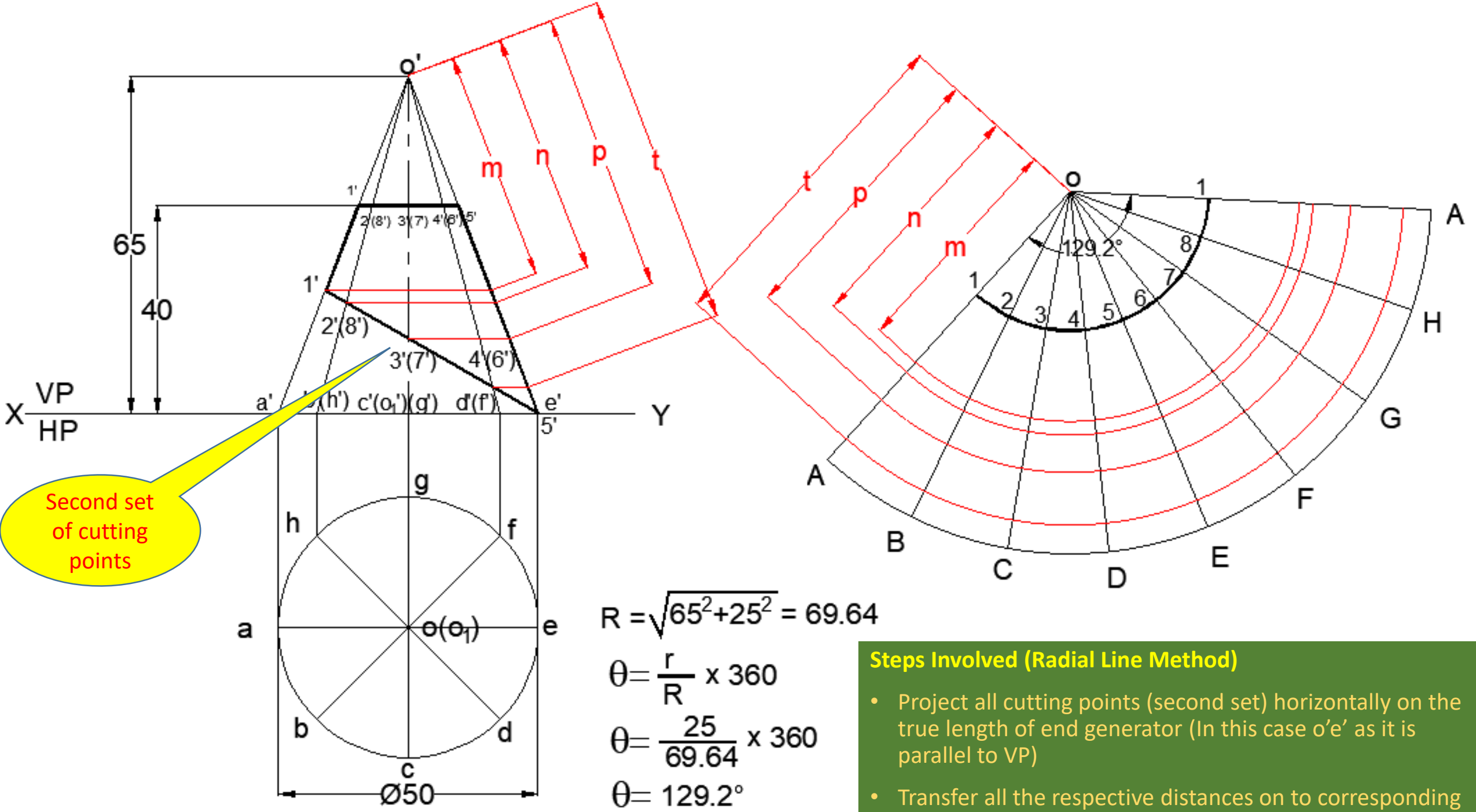
$$\theta = \frac{r}{R} \times 360$$

$$\theta = \frac{25}{69.64} \times 360$$

$$\theta = 129.2°$$

Steps Involved (Radial Line Method)

- Project all cutting points (first set) horizontally on the true length of end generator (In this case o'e' as it is parallel to VP) and it turns out to be same (s)
- Transfer all distances suitably as shown



$$R = \sqrt{65^2+25^2} = 69.64$$

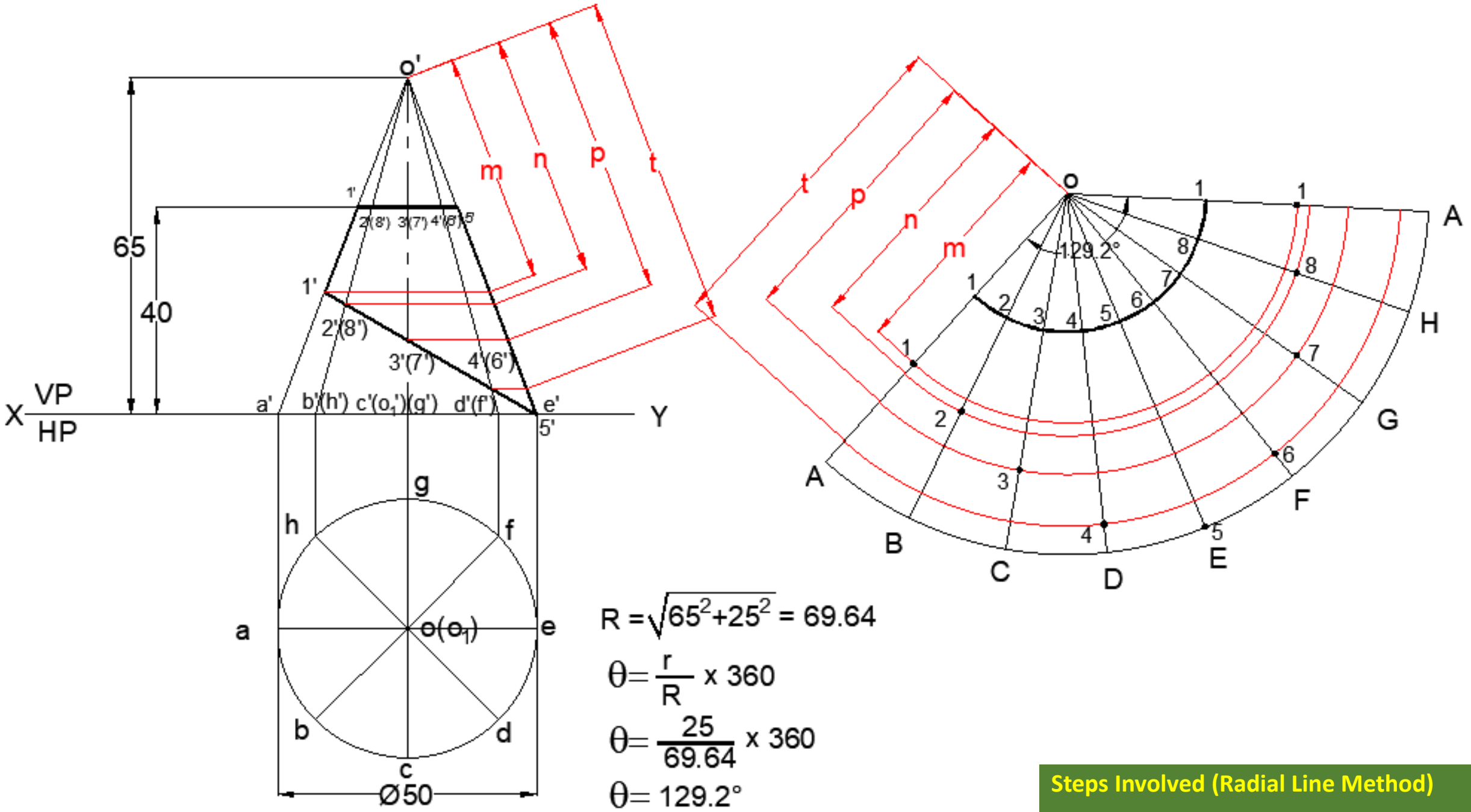
$$\theta = \frac{r}{R} \times 360$$

$$\theta = \frac{25}{69.64} \times 360$$

$$\theta = 129.2°$$

Steps Involved (Radial Line Method)

- Project all cutting points (second set) horizontally on the true length of end generator (In this case o'e' as it is parallel to VP)
- Transfer all the respective distances on to corresponding generators



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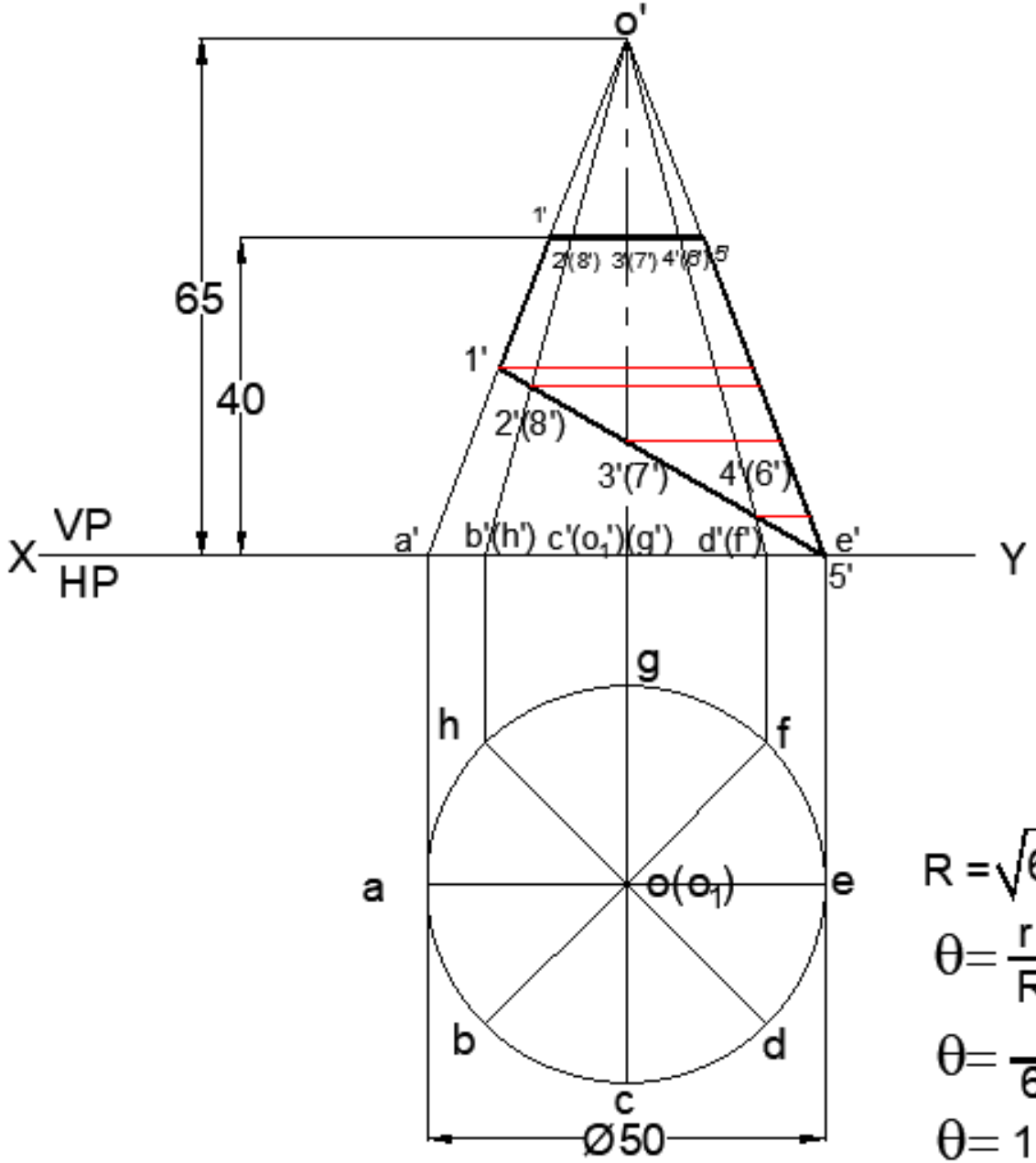
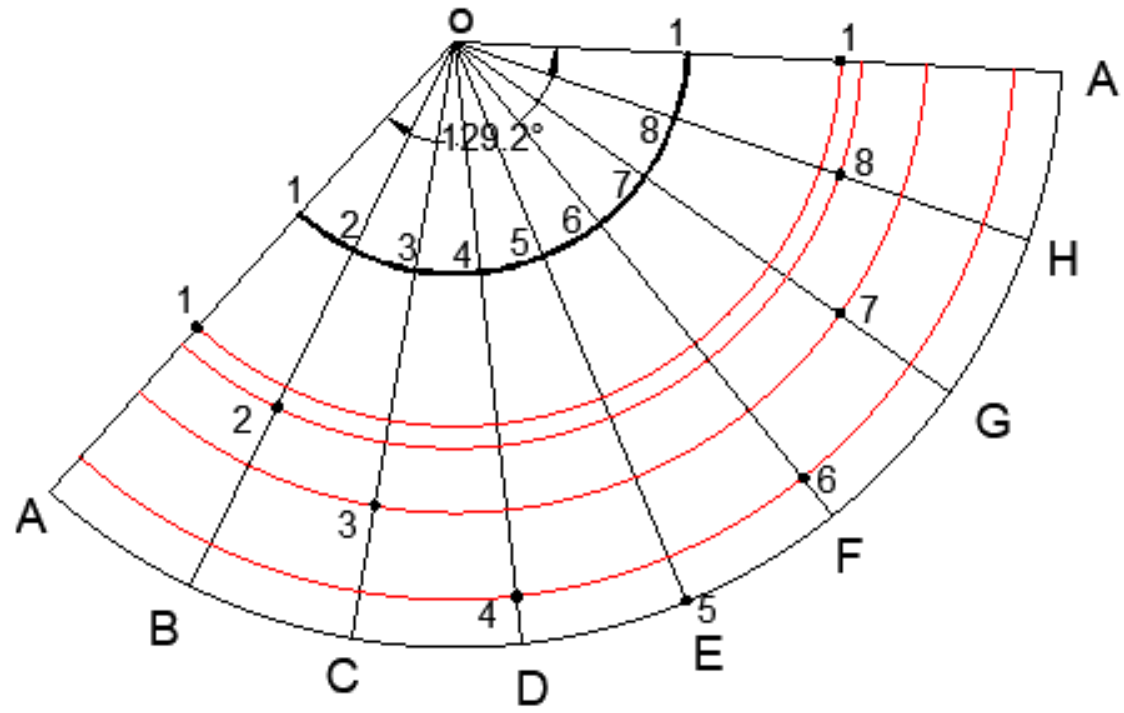
$$\theta = \frac{25}{69.64} \times 360$$

$$\theta = 129.2°$$

Steps Involved (Radial Line Method)

- Mark all the points suitably as shown





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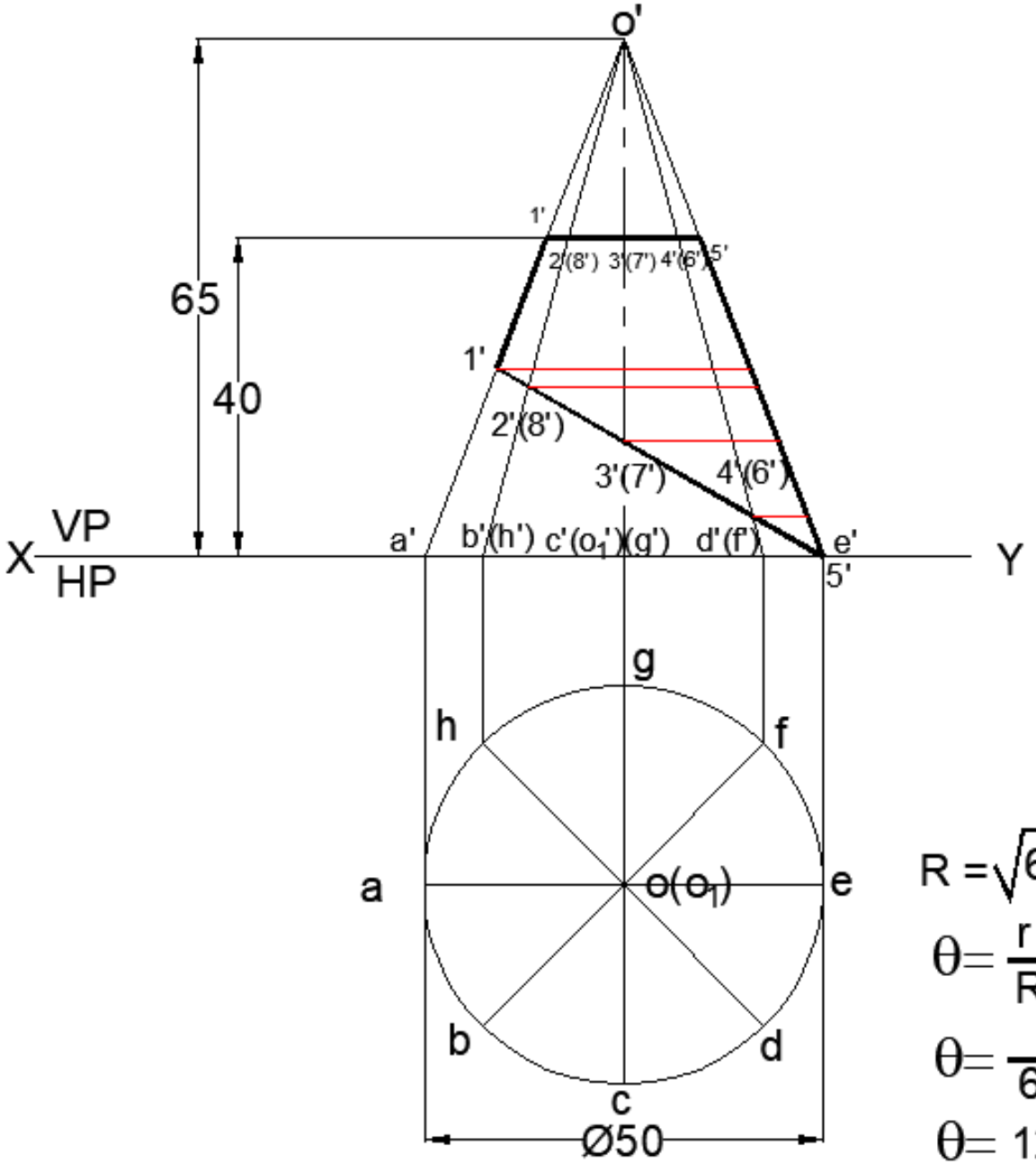

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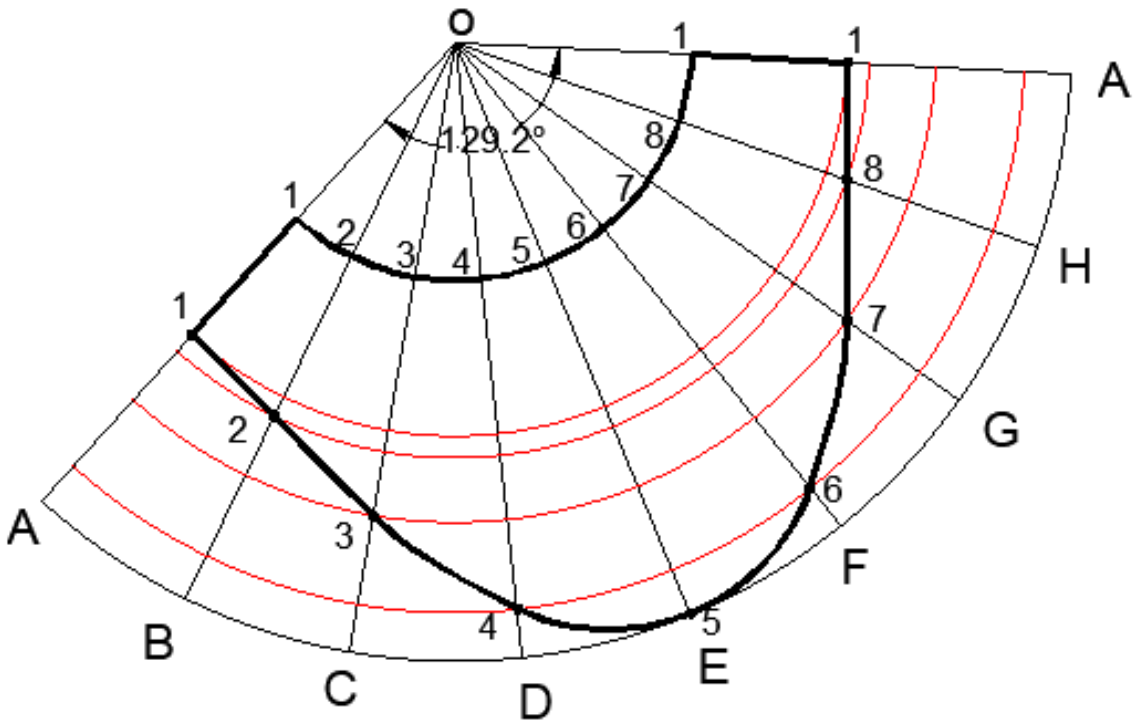


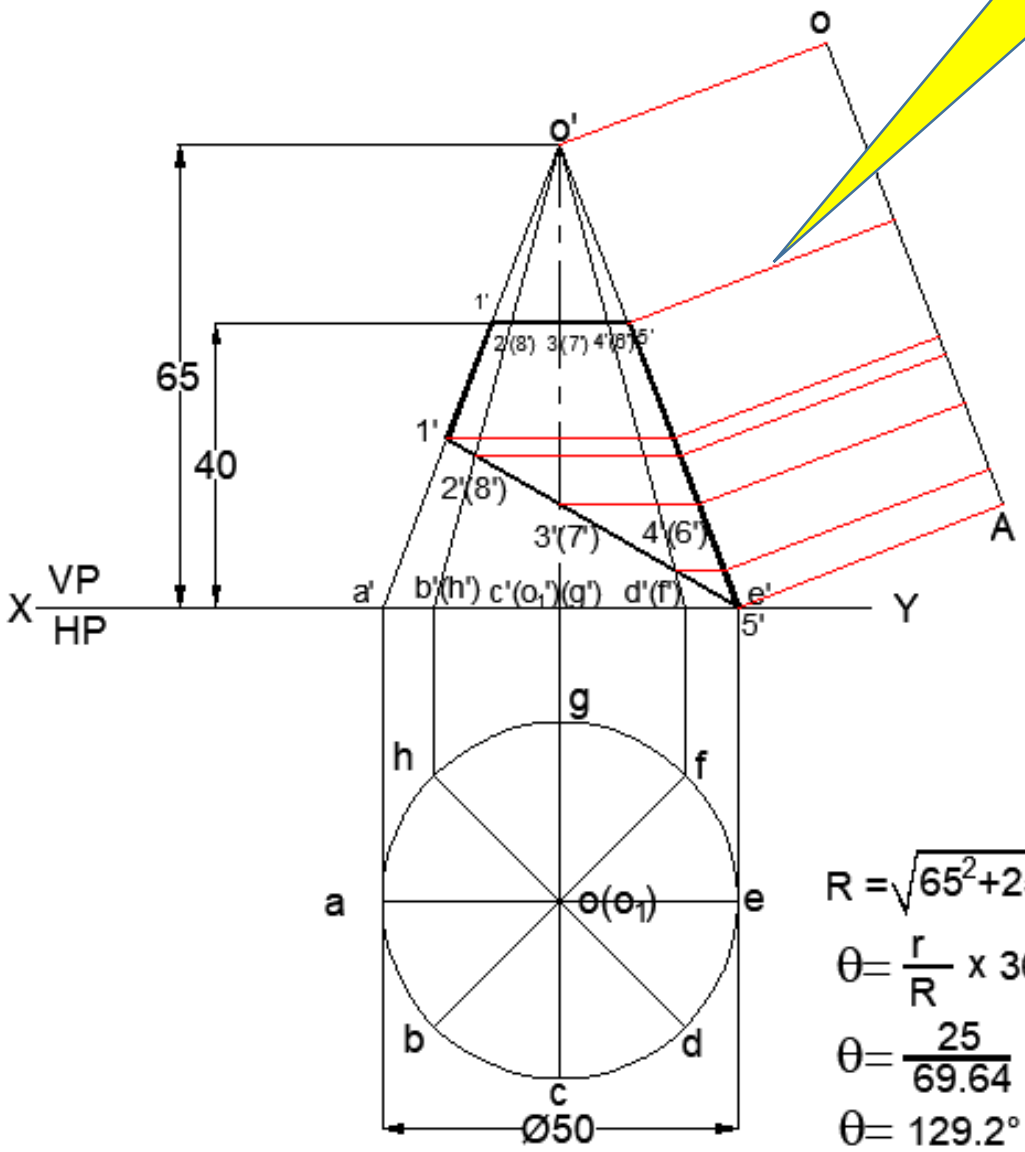
DEVELOPMENT OF THE CUT CONE

Steps Involved (Radial Line Method)

- Join all points with smooth curve and straight lines suitably

ALTERNATIVE APPROACH

Perpendiculars



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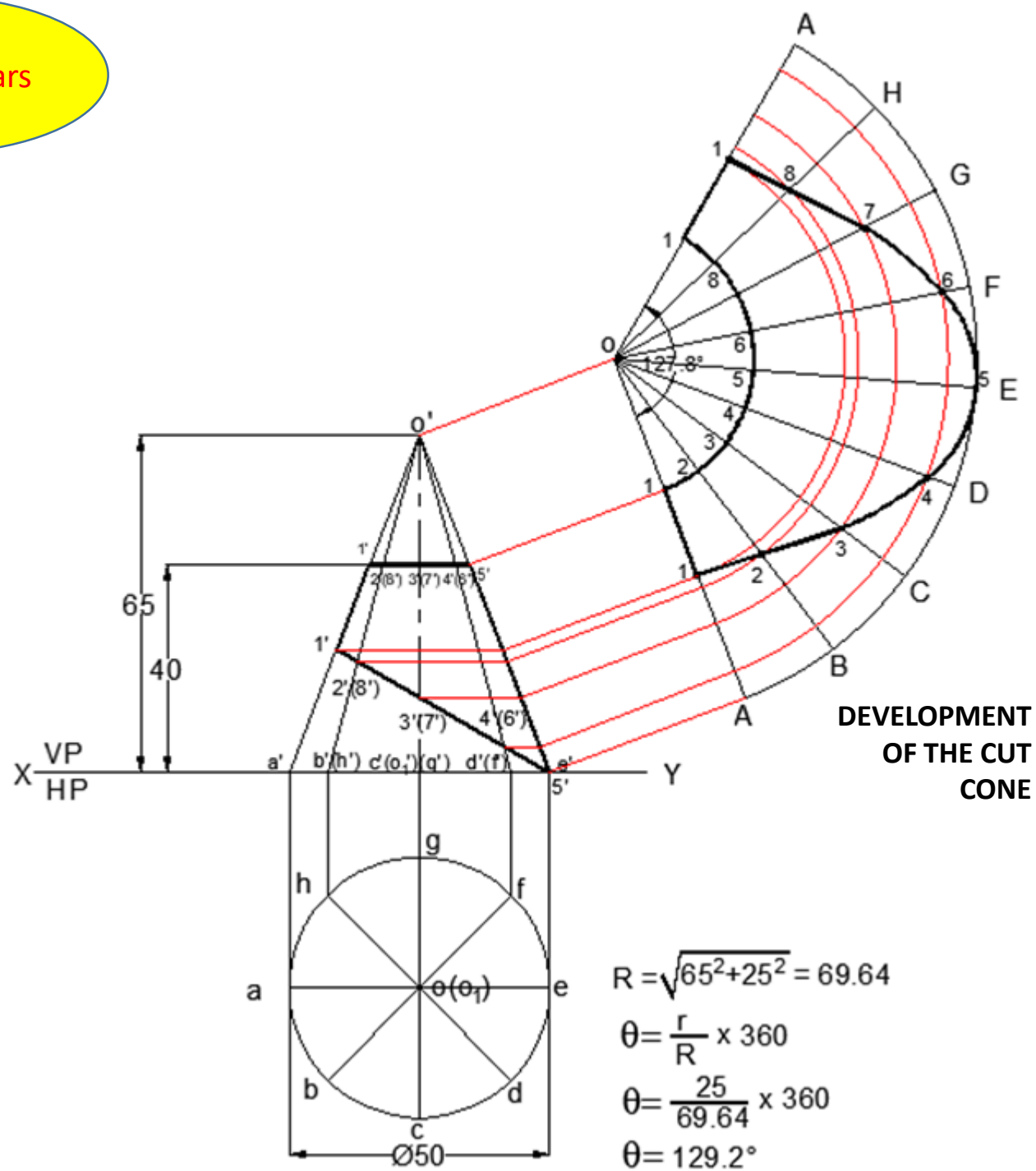

DEVELOPMENT OF THE CUT CONE

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