

Development of Surfaces



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Introduction

Assume that the object is hollow and made-up of a thin sheet. Cut open it from one side and unfold the sheet completely. Then the **SHAPE OF THAT UNFOLDED SHEET** is called **DEVELOPMENT OF LATERAL SURFACES** of that object.

LATERAL SURFACE:

It is the surface over the entire solid **excluding** its top and base.

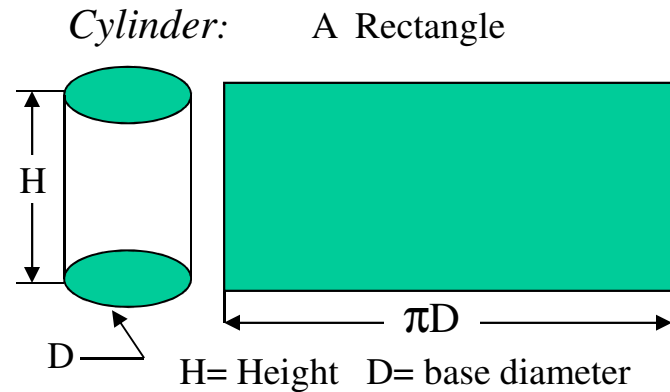
METHODS OF DEVELOPMENTS:

1. Parallel line developments (Cylinder, Prisms)
2. Radial line developments (Cone, Pyramids)

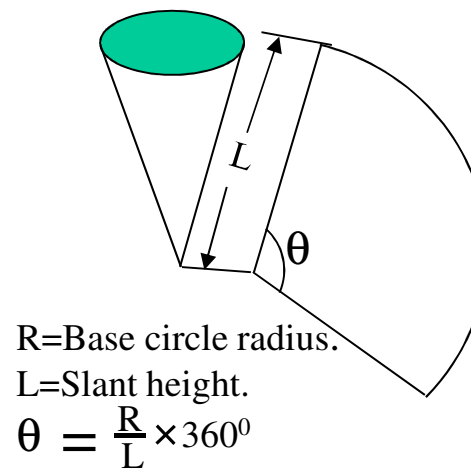
Important points

- I. Development drawings are different from PROJECTION drawings.
- II. The developed shapes shows only the AREA, means it is a 2-D drawing.
Hence, all dimensions must be TRUE dimensions.
- III. No edges are hidden as it is representing shape of an un-folded sheet, And hence **NO DOTTED LINES** are **PRESENT** in development Drawings.

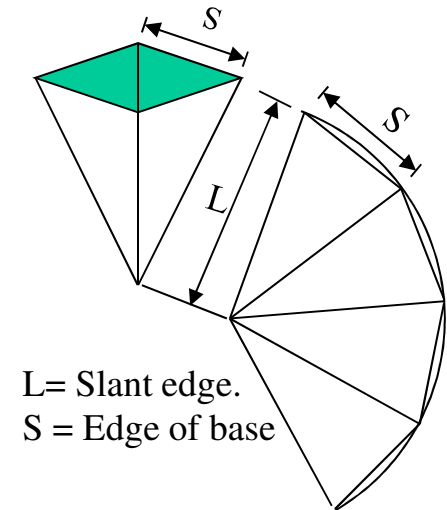
Typical lateral surfaces



Cone: (Sector of circle)

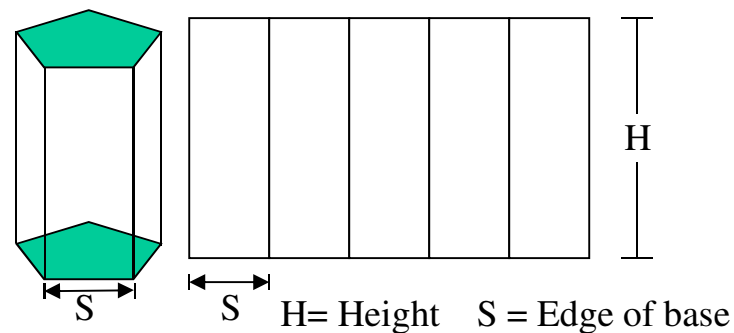


Pyramids: (No. of triangles)



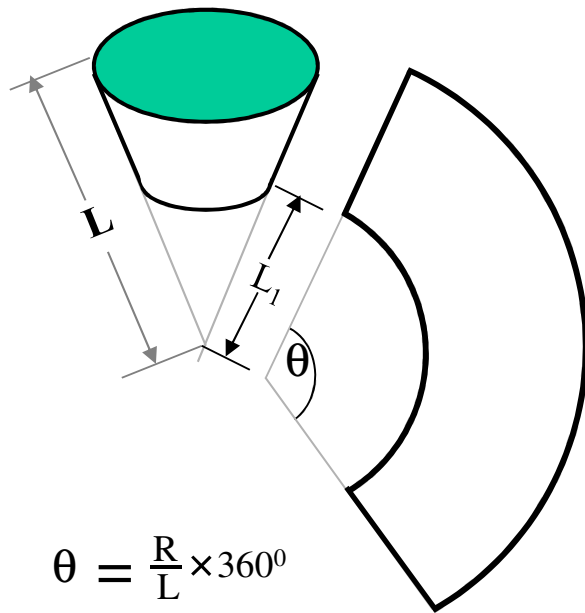
Prisms

No. of Rectangles



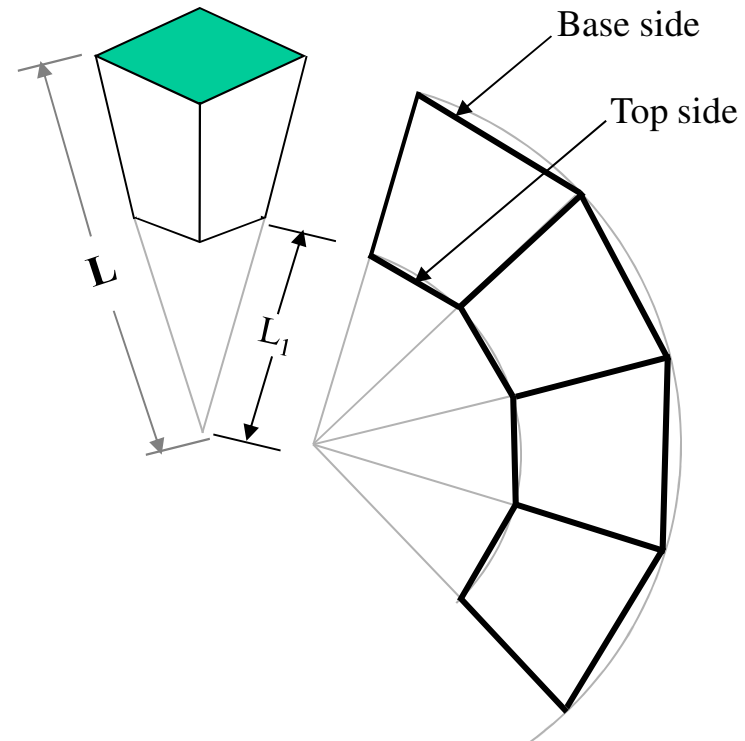
Frustums Surface Development

DEVELOPMENT OF
FRUSTUM OF CONE



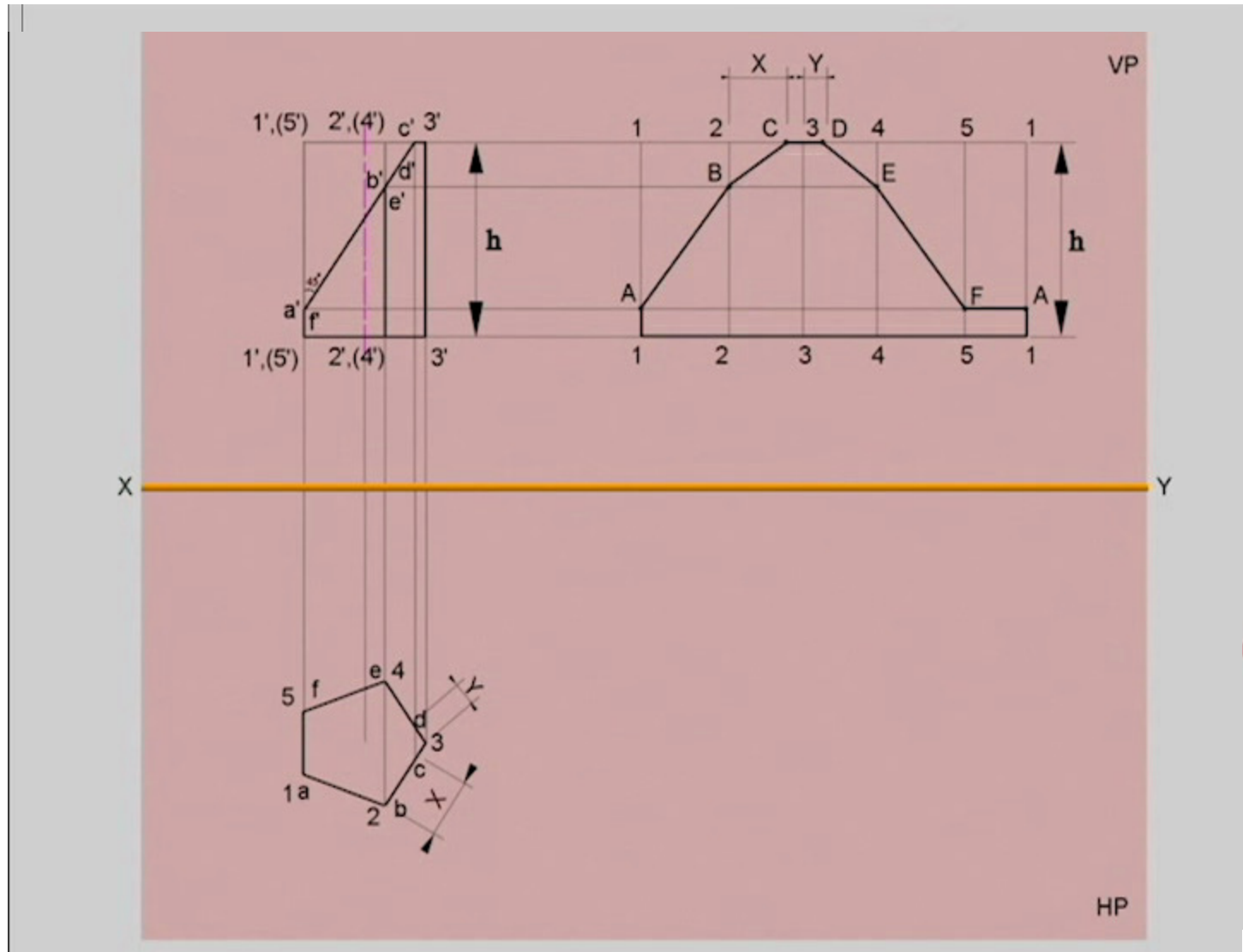
R= Base circle radius of cone
L= Slant height of cone
 L_1 = Slant height of cut part.

DEVELOPMENT OF
FRUSTUM OF SQUARE PYRAMID

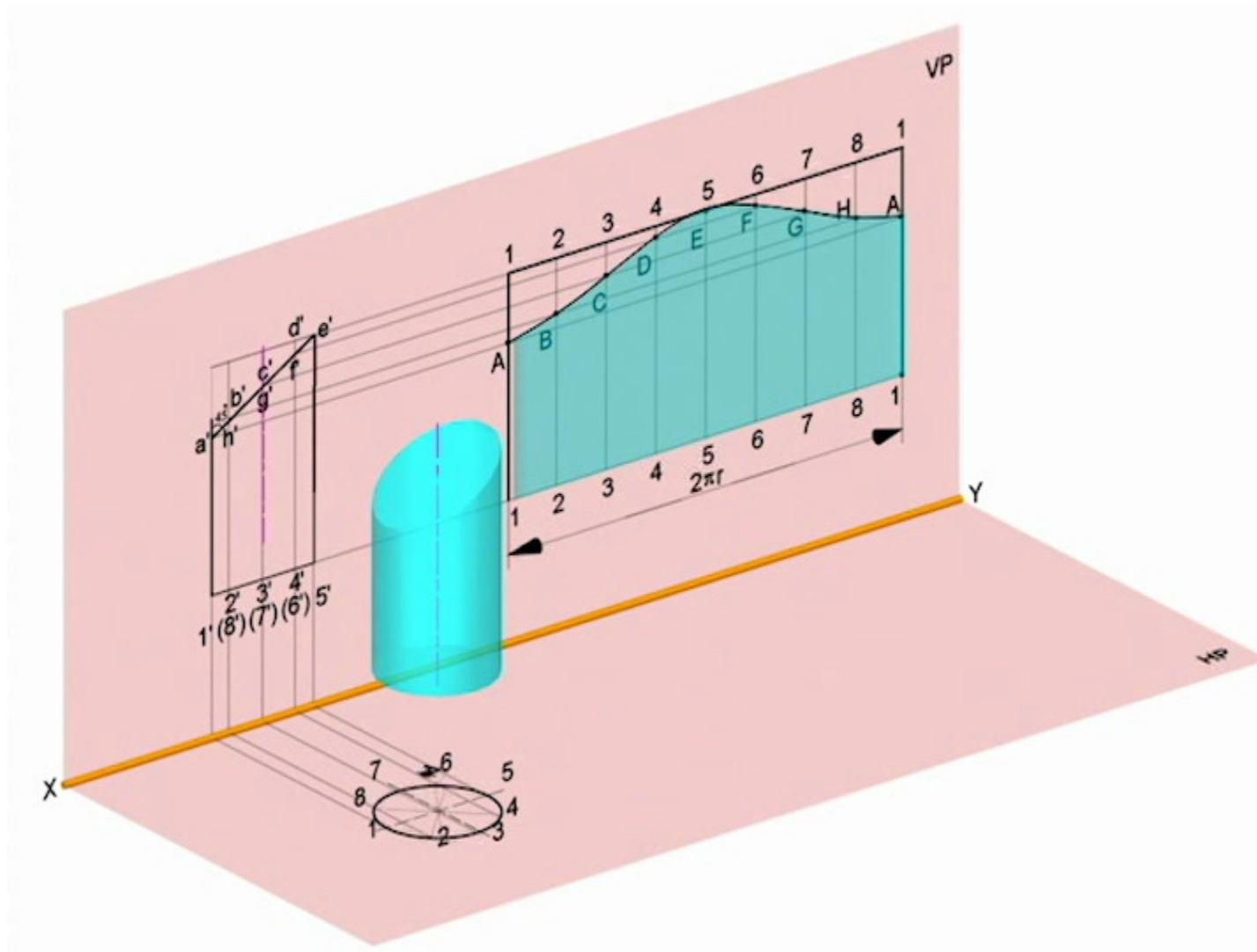


L= Slant edge of pyramid
 L_1 = Slant edge of cut part.

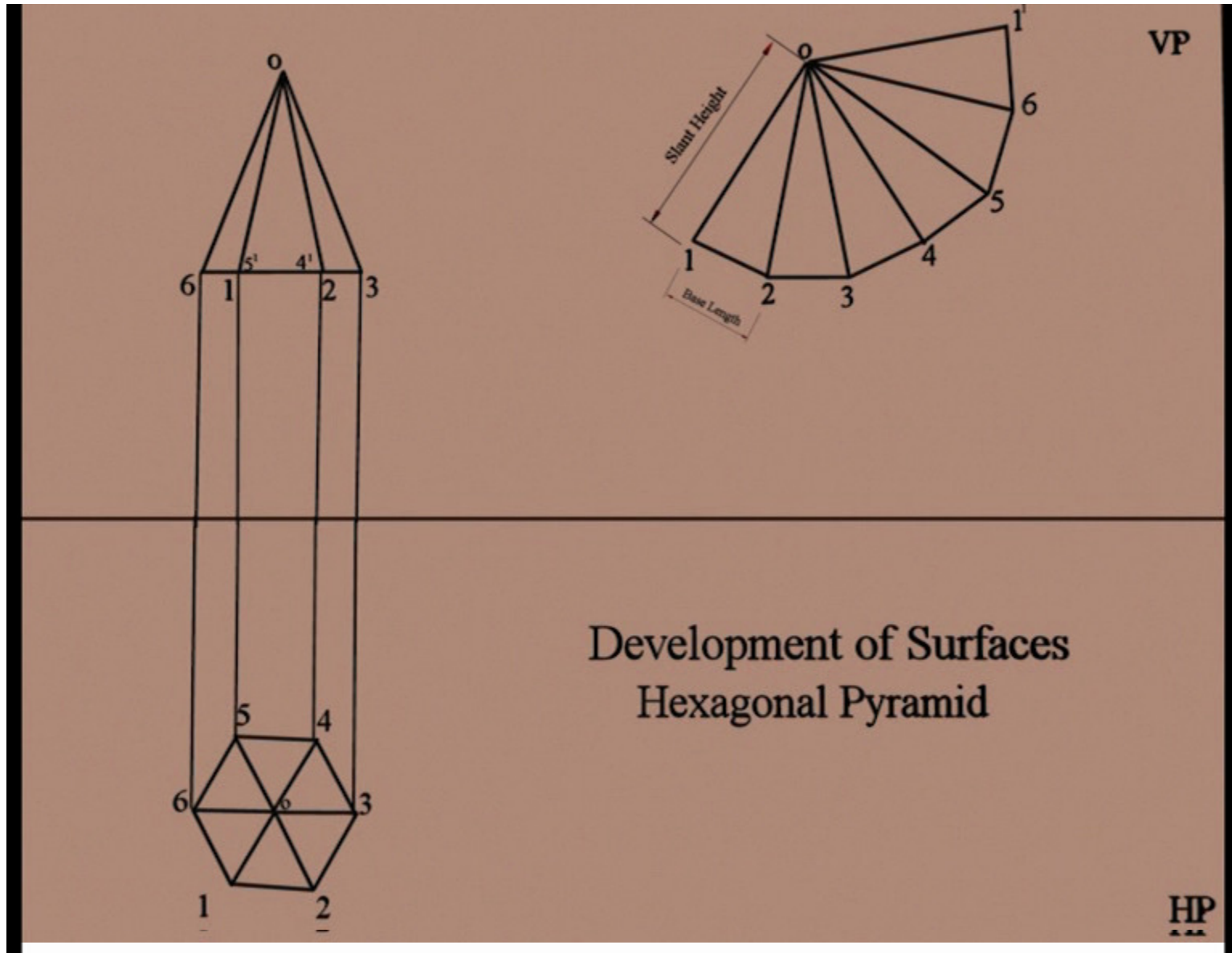
Example 1 (Section of Prism)



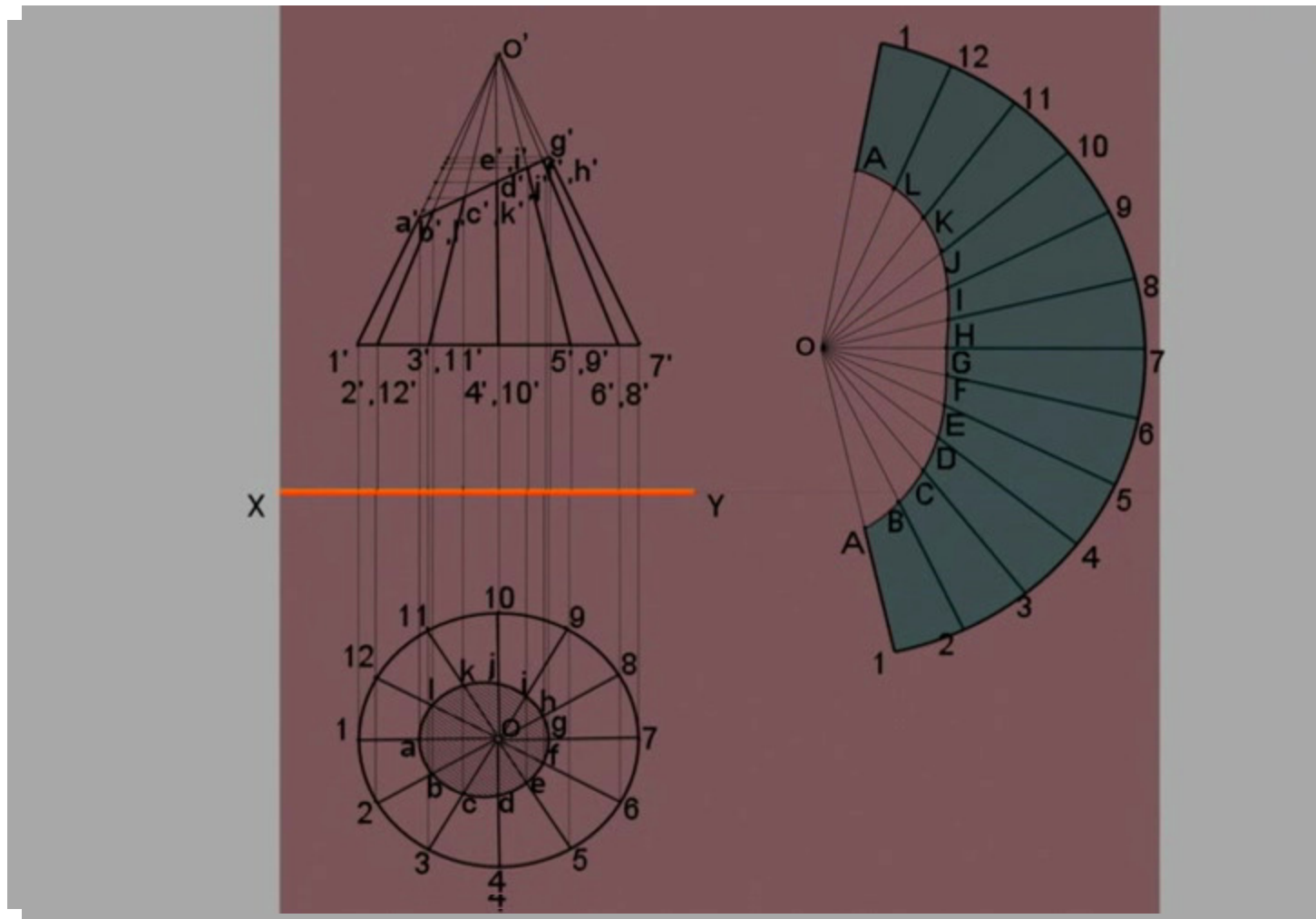
Example 2 (Section of Cylinder)



Example 3 (Pyramid)

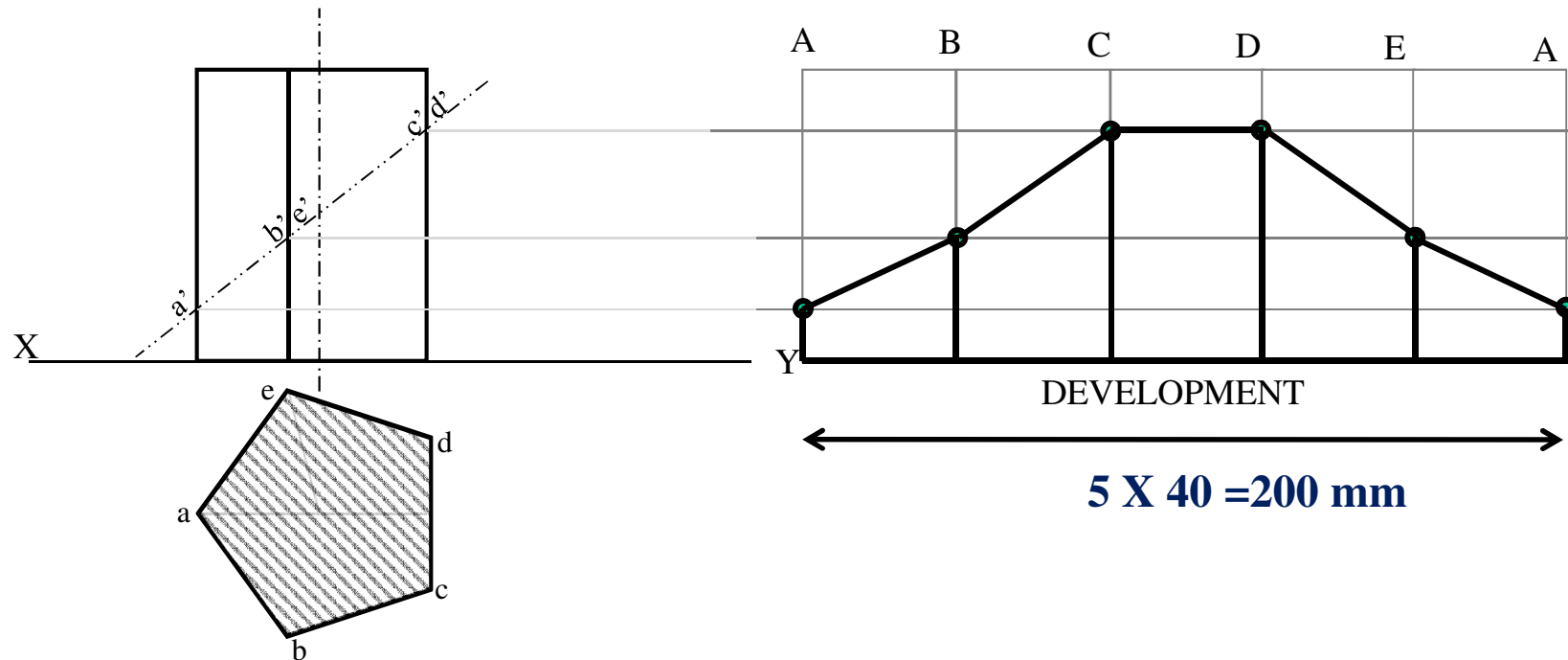


Example 4 (Section of Cone)



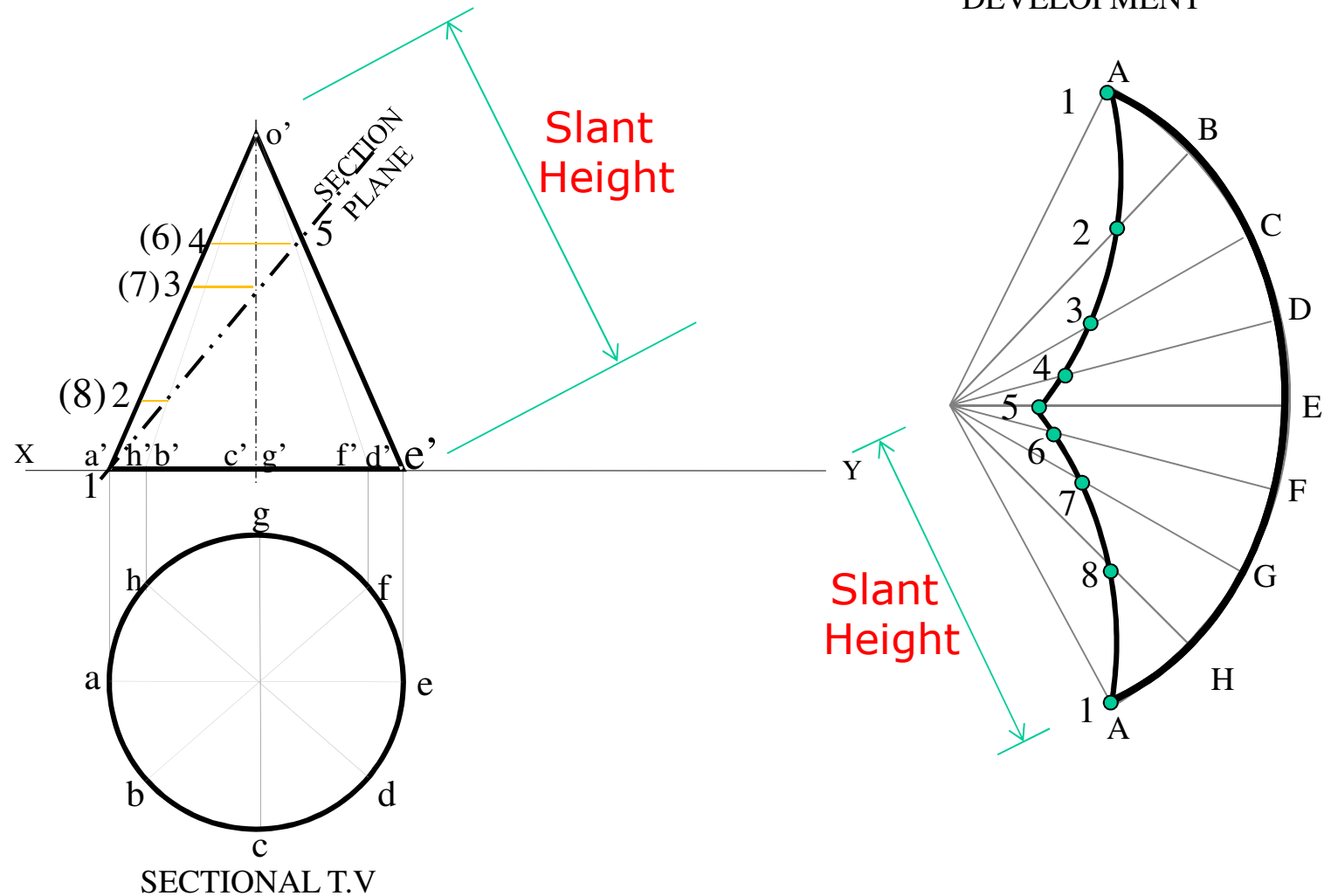
Example 5

A pentagonal prism, 40 mm base side & 70 mm axis is standing on HP on its base with one side of the base perpendicular to VP. It is cut by a section plane inclined at 45° to the HP, through mid point of axis. Draw Development of surface of remaining solid.



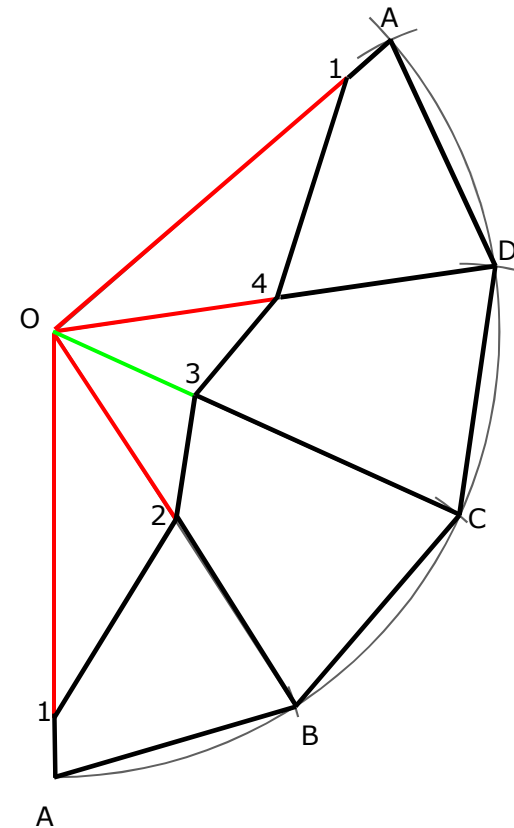
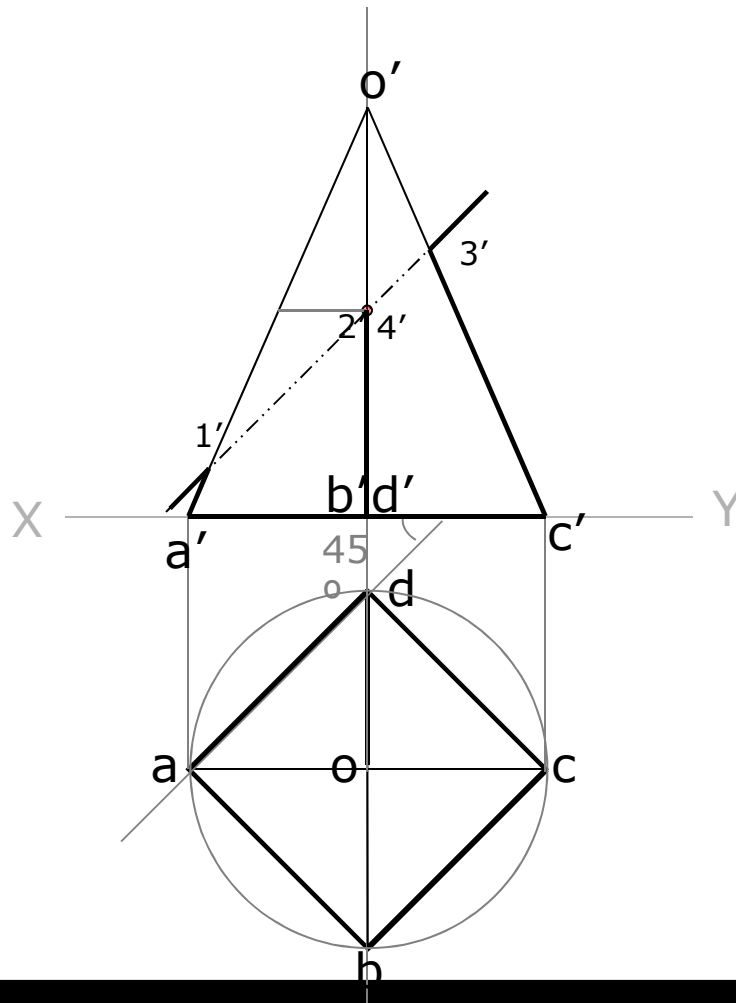
Example 6

A cone, 50 mm base diameter and 70 mm axis is standing on its base on Hp. It cut by a section plane 45° inclined to Hp through base end of end generator. Development of surfaces of remaining solid.



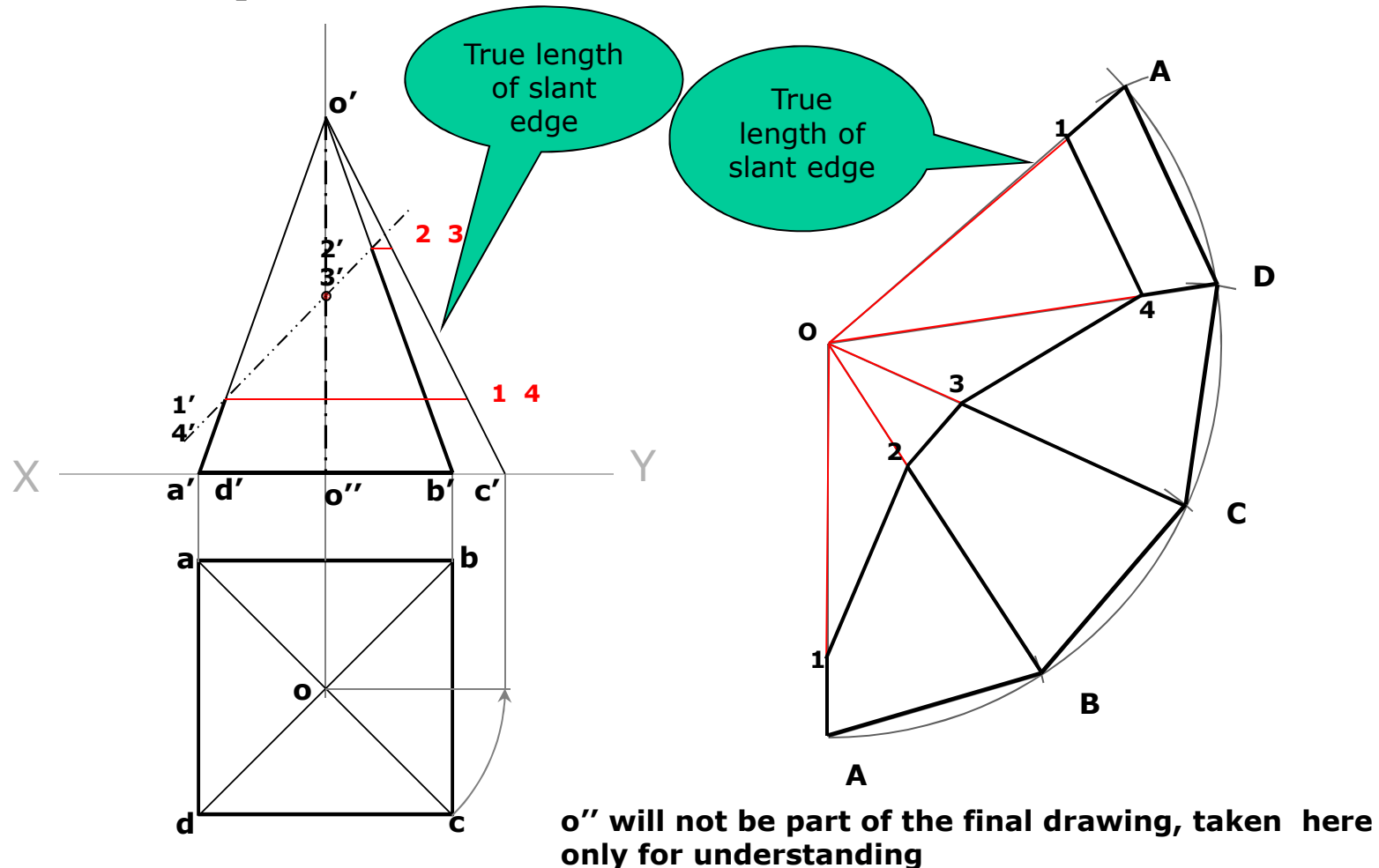
Example 7

A square pyramid, base 40 mm side and axis 65 mm long, has its base on the HP and all the edges of the base equally inclined to the VP. It is cut by a section plane, perpendicular to the VP, inclined at 45° to the HP and bisecting the axis. Develop its surface.



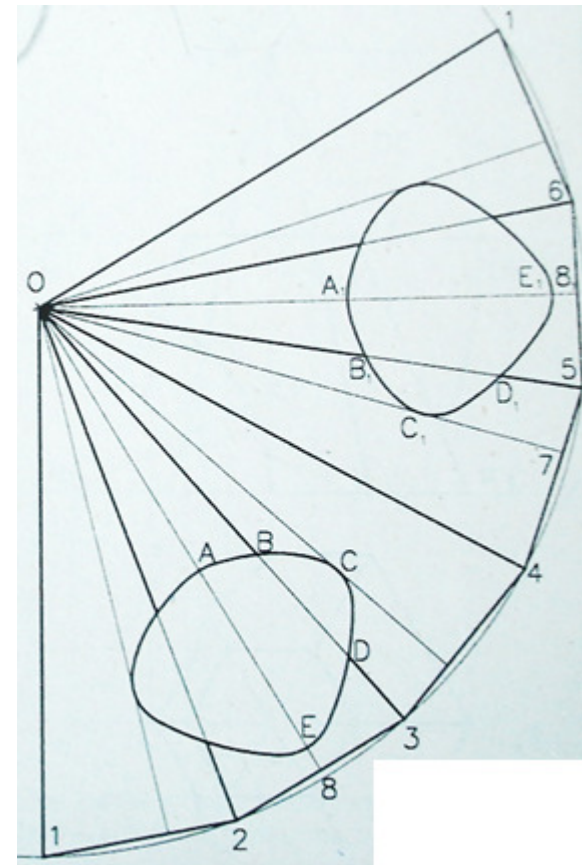
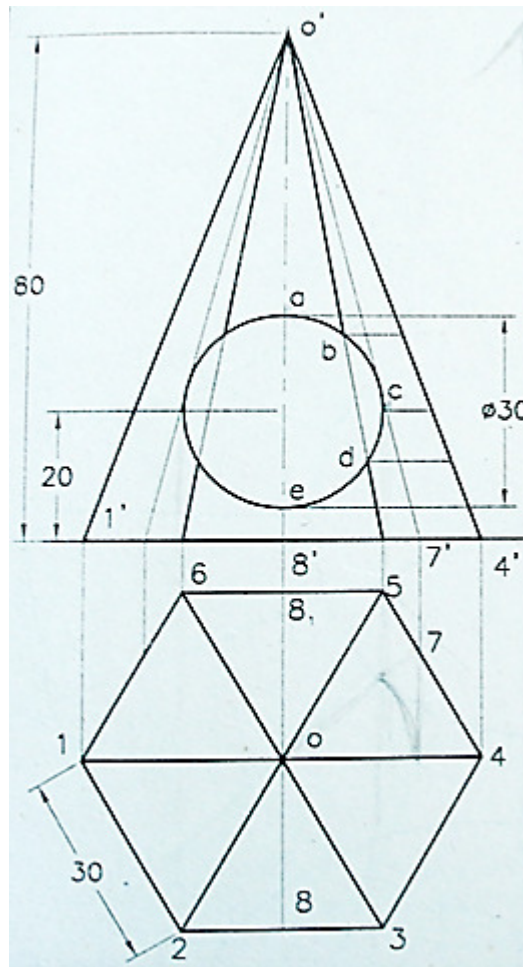
Example 8

A square pyramid, base 40 mm side and axis 65 mm long, has its base on the HP with two edges of the base perpendicular to the VP. It is cut by a section plane, perpendicular to the VP, inclined at 45° to the HP and bisecting the axis. Draw its sectional top view and true shape of the section. Also draw its development.



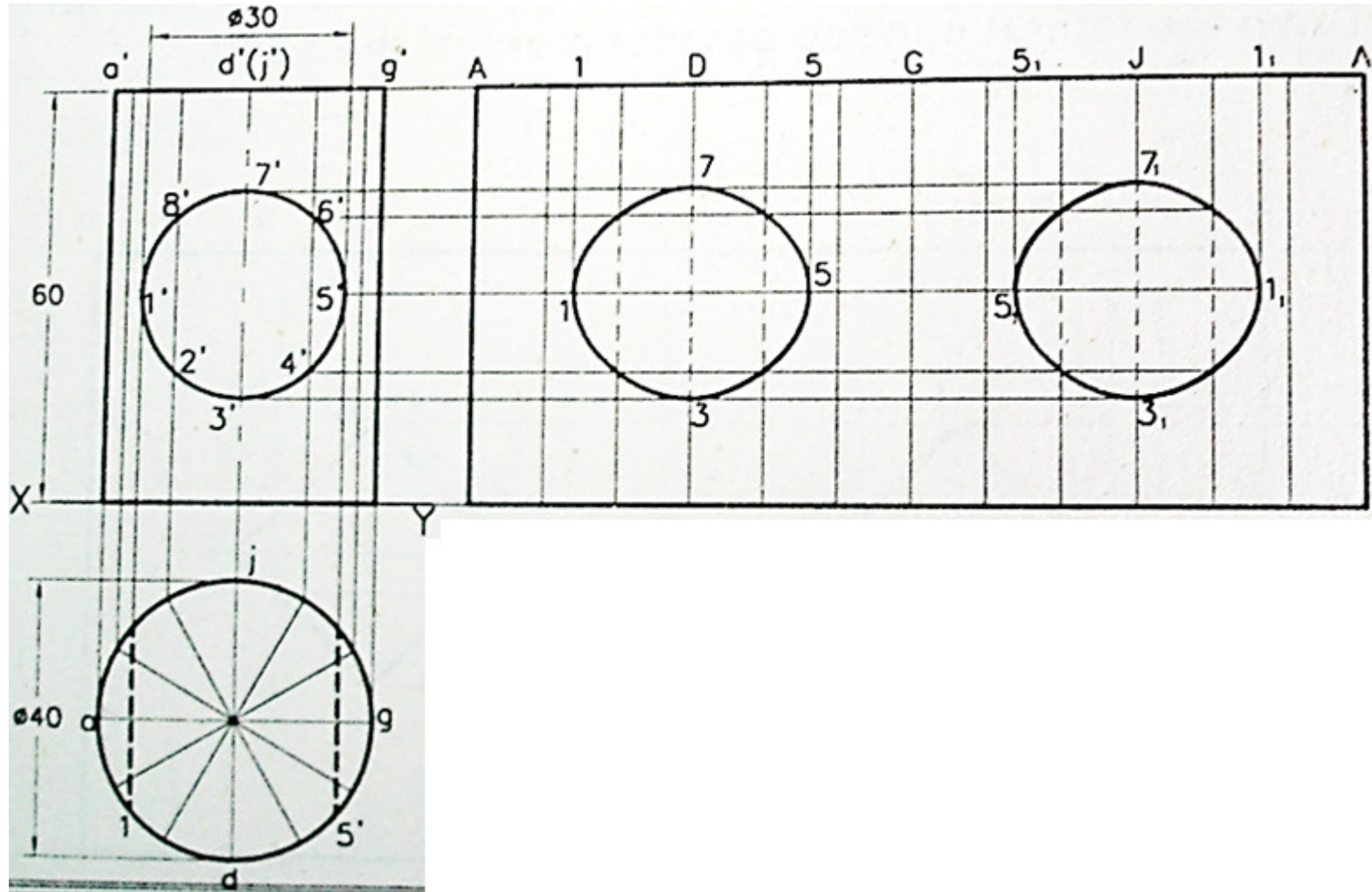
Example 9

A hexagonal pyramid side of base 30mm and height 80mm stands with the base on HP. A through circular hole of 30mm diameter is drilled through the pyramid such that the axis of hole is perpendicular to VP and intersects the axis of the pyramid 20mm above the base. Draw the development of the lateral surface of the pyramid showing the true shape of the holes formed on it.



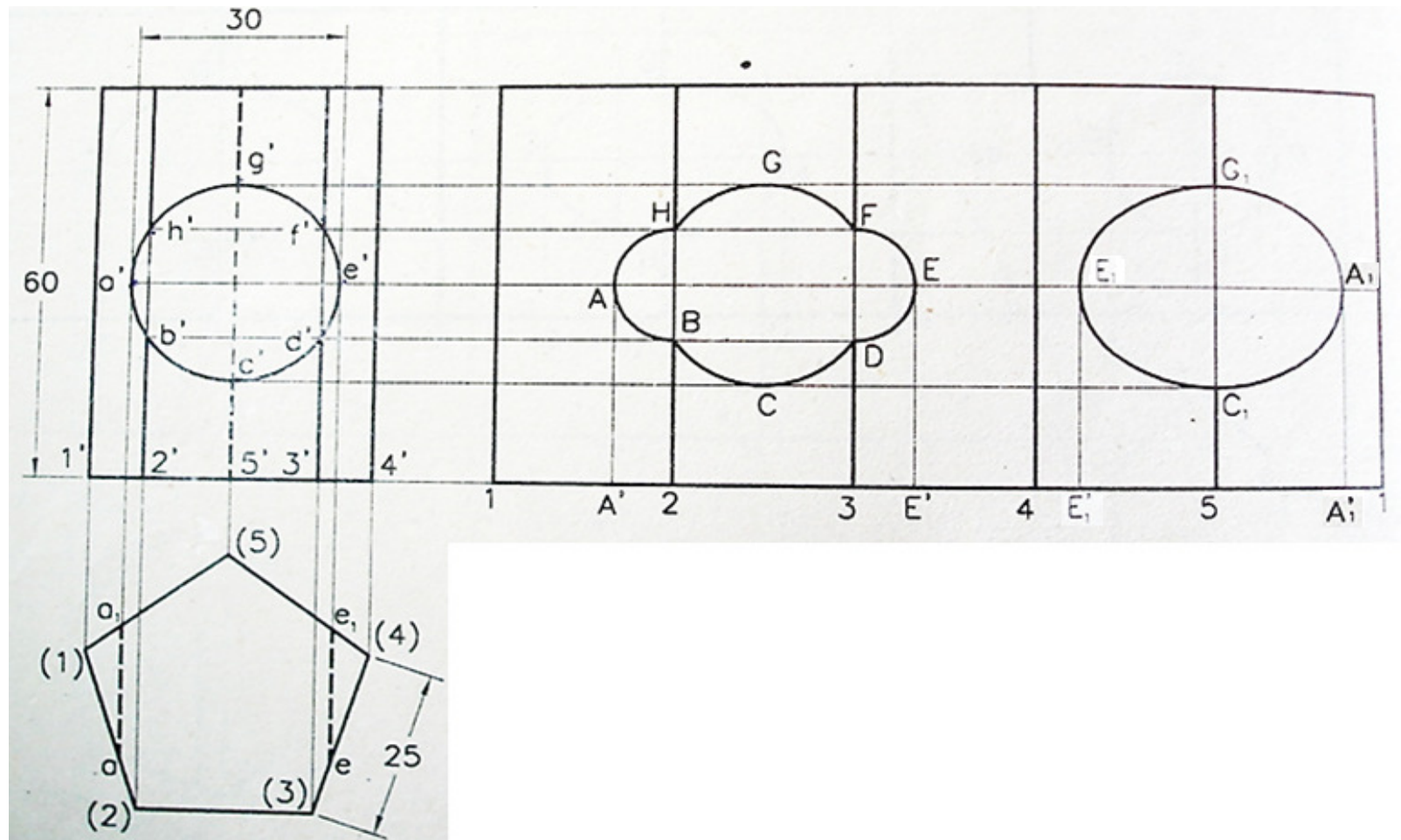
Example 10

A vertical cylinder of diameter 40mm and height 60mm is drilled by a hole of diameter 30mm such that the axis of the hole is perpendicular to VP (bisecting the axis of the cylinder) and parallel to HP. Draw the lateral surface development of the solid.



Example 11

Draw the development of a pentagonal prism of base side 25 mm and 60 mm height in which a circular hole of 30 mm dia. has been drilled (one side of the base is parallel to XY line). The axis of the prism and that of the hole cross each other at right angles and the axis of the hole is perpendicular to VP and bisects the prism axis.





Thank you