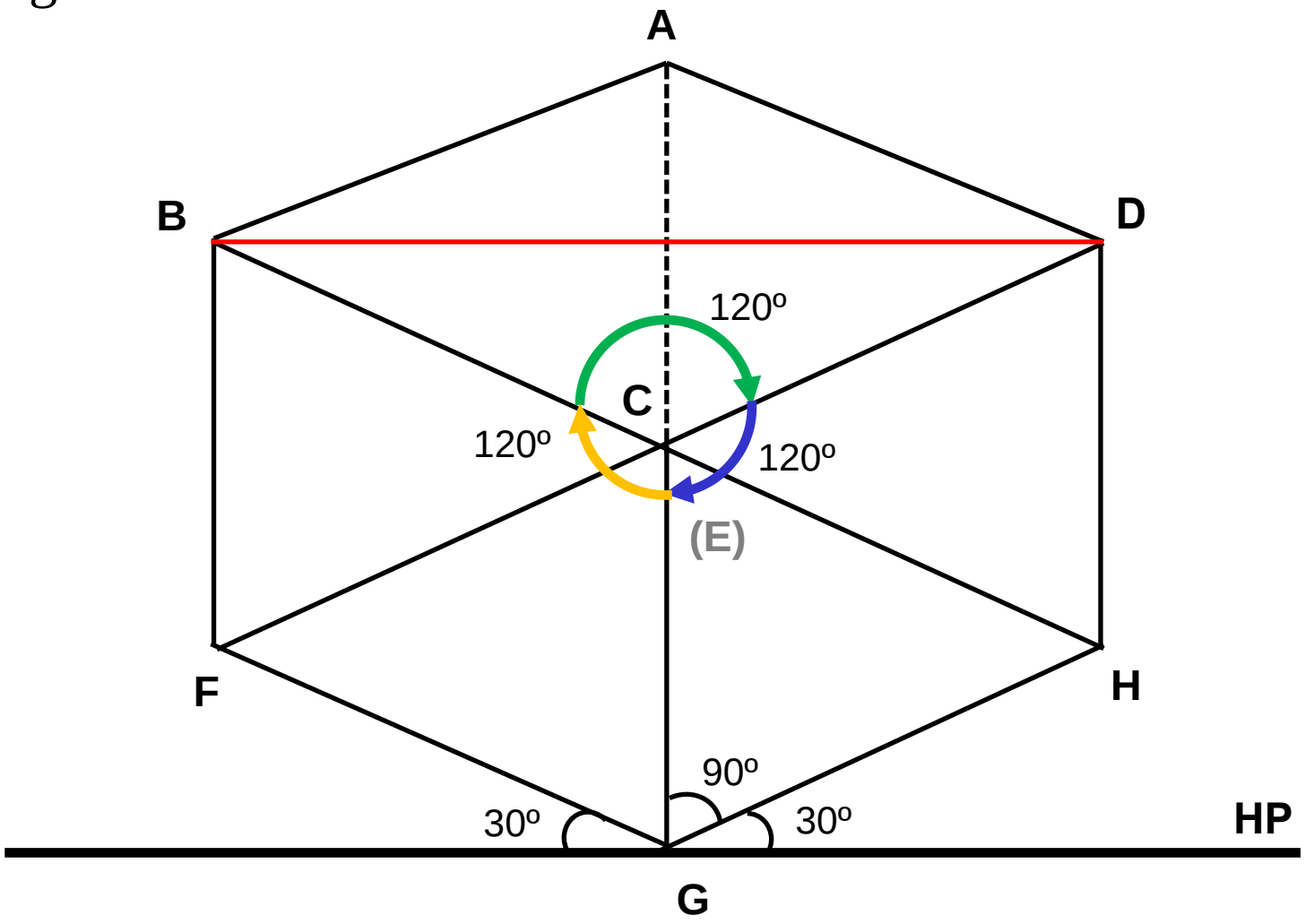
Isometric Views and Projections

Department of Mechanical Engineering
Indian Institute of Technology Madras, Chennai

Introduction

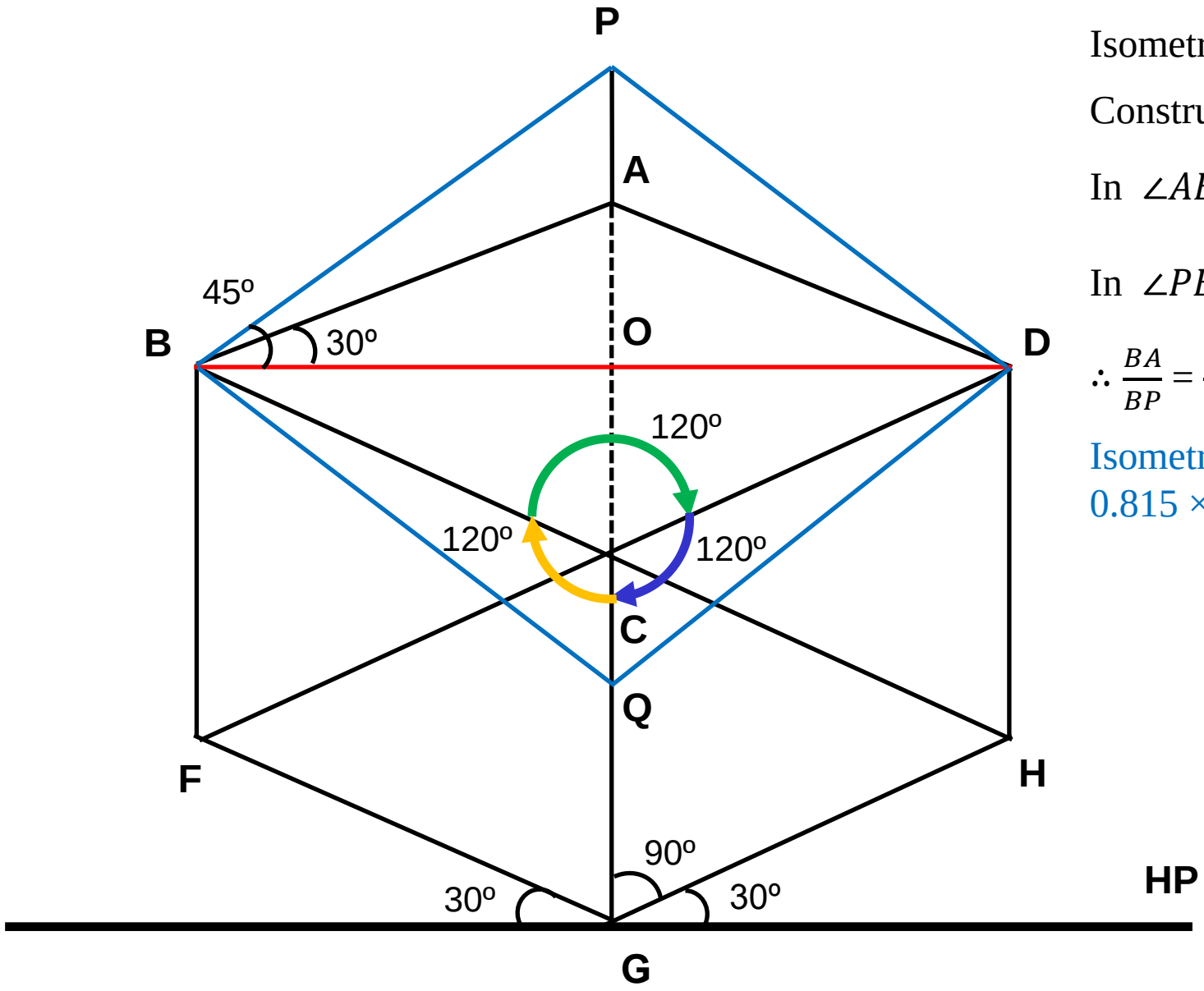
- Isometric projection of a cube (ABCDEFGH) resting on its edge G on HP.



Introduction

- Isometric projection of a cube (ABCDEFGH) resting on its edge G on HP.
- Edges CB, CD and CG: equally inclined to VP (therefore, equally foreshortened).
- Diagonal BD parallel to VP, therefore true length.
- Isometric lines: Parallel to the 3 axes
- Isometric planes: Seen as rhombus
- Angles between the 3 axes: 120º
- Vertical lines vs. horizontal lines

Introduction



Isometric Scale:

Construct square PBQD.

In $\angle ABO, \frac{BA}{BO} = \frac{1}{\cos 30°} = \frac{2}{\sqrt{3}}$

In $\angle PBO, \frac{BP}{BO} = \frac{1}{\cos 45°} = \frac{\sqrt{2}}{1}$

$\therefore \frac{BA}{BP} = \frac{\sqrt{2}}{\sqrt{3}} = 0.815$

Isometric length (BA) = 0.815 × True length (BP)

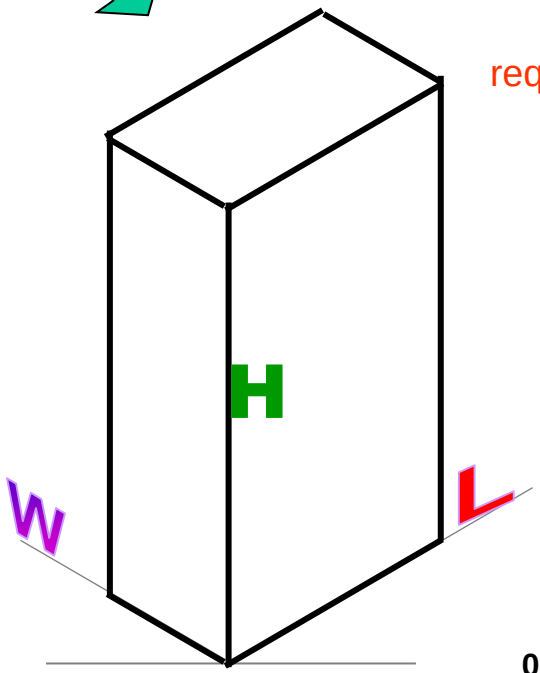
Introduction

- Isometric projection of a cube (ABCDEFGH) resting on its edge G on HP.
- Edges CB, CD and CG: equally inclined to VP (therefore, equally foreshortened).
- Diagonal BD parallel to VP, therefore true length.
- Isometric lines: Parallel to the 3 axes
- Isometric planes: Seen as rhombus
- Angles between the 3 axes: 120º
- Vertical lines vs. horizontal lines
- Isometric scale: Isometric length = 0.815 × True length
- Isometric projection ~ 22.5% smaller than isometric view.

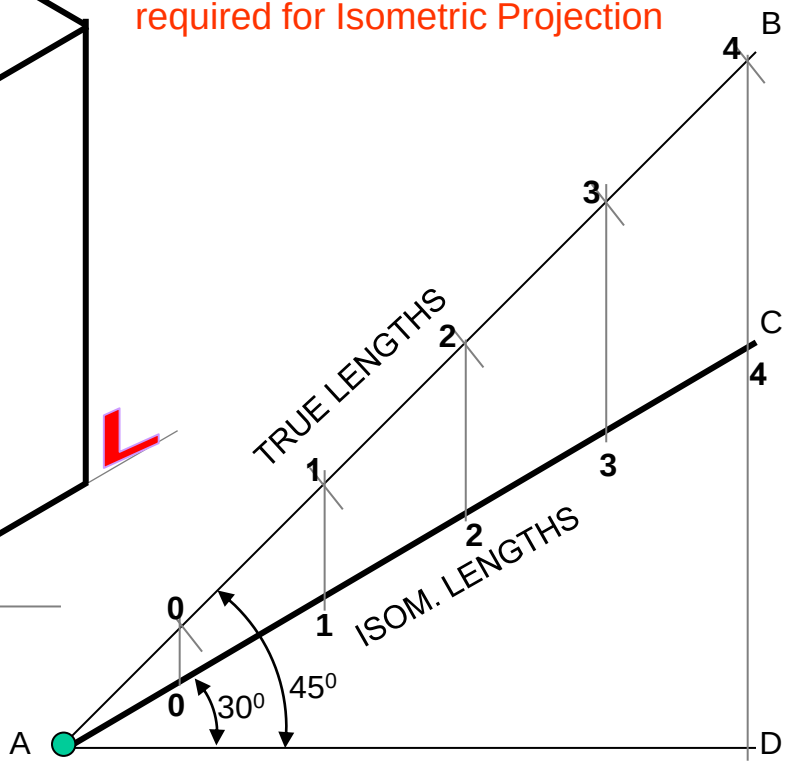
Type of Isometric Drawings

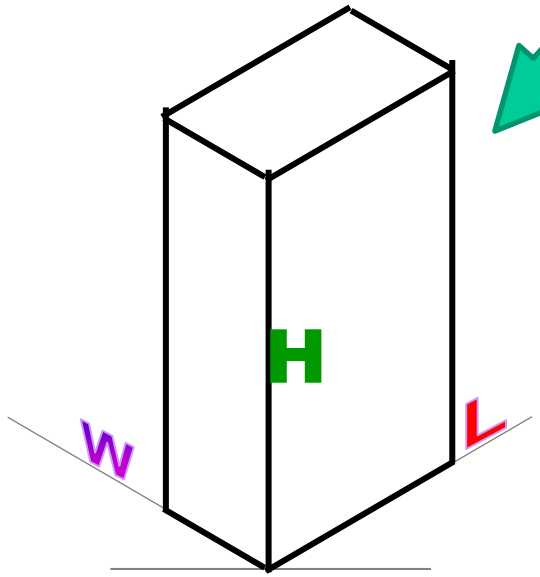
ISOMETRIC VIEW
Drawn by using True scale
(**True dimensions**)

ISOMETRIC PROJECTION
Drawn by using Isometric scale
(**Reduced dimensions**)



Isometric scale [Line AC]
required for Isometric Projection





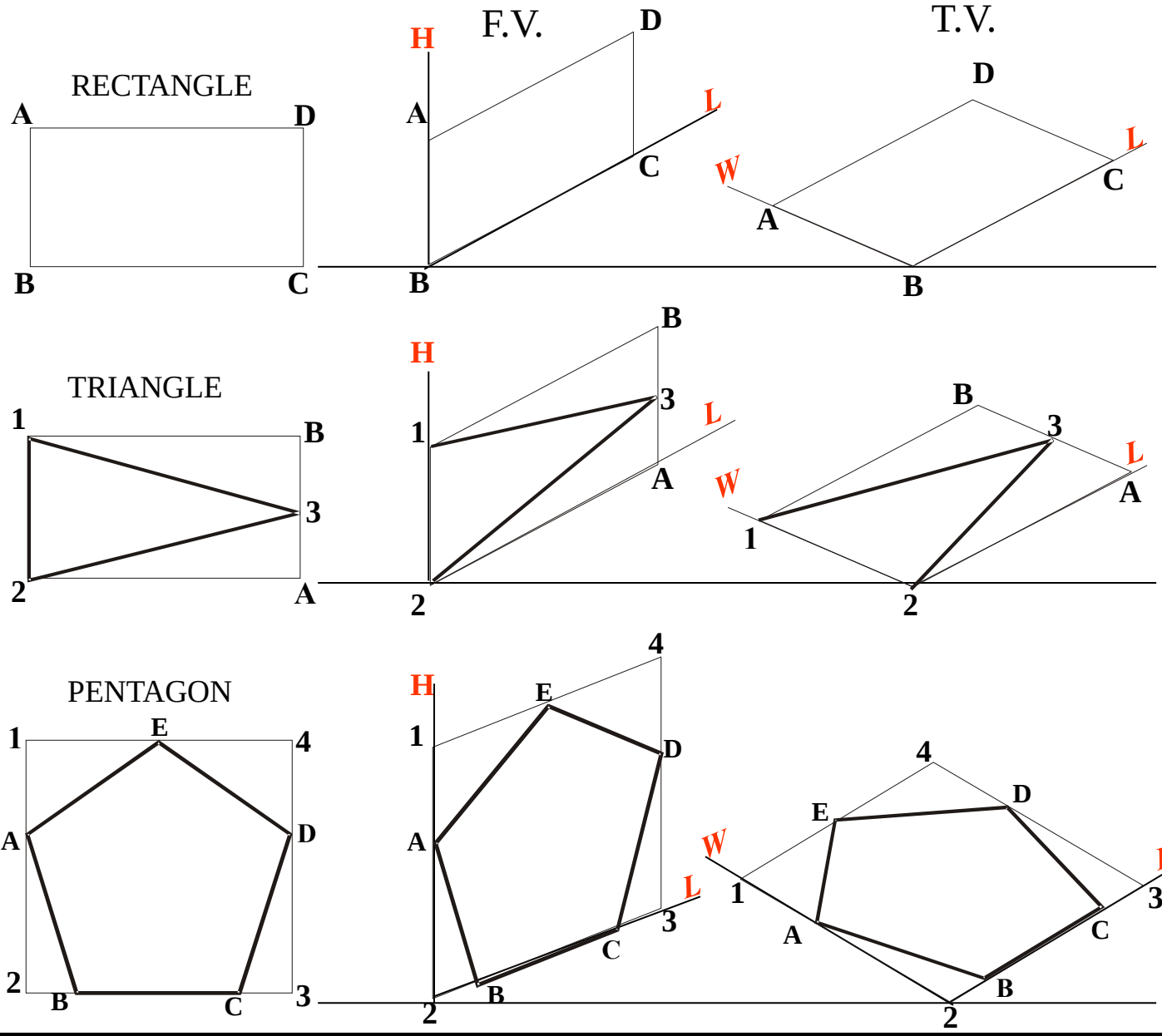
Methods of drawing non-isometric lines

1. Box Method: The object is assumed to be enclosed in a rectangular box. Initially, the box is drawn in isometric and then the ends of the lines are drawn from the reference of the outline of the box.

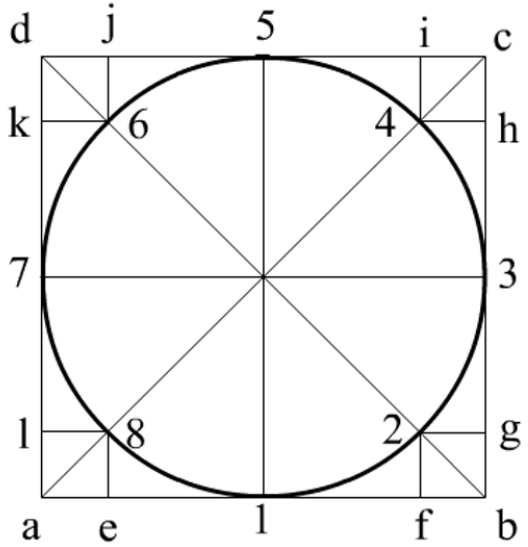
2. Co-ordinate or Offset Method: Neither the lines, nor their ends lie in the isometric plane. Perpendiculars are dropped from each end of the edge to a horizontal or vertical reference plane. The points at which the perpendiculars meet the plane, are located by drawing co-ordinates or offsets to the edges of the plane.

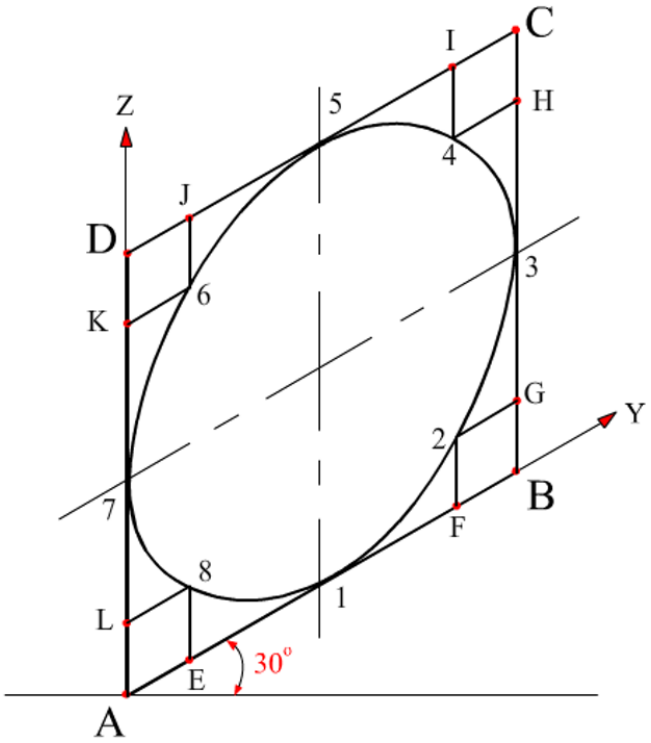
Isometric (Plane figure) in F.V. and T.V.

Box Method:
First draw the isometric of enclosing rectangle and then inscribe the shape as it is.



Offset Method (Circle)

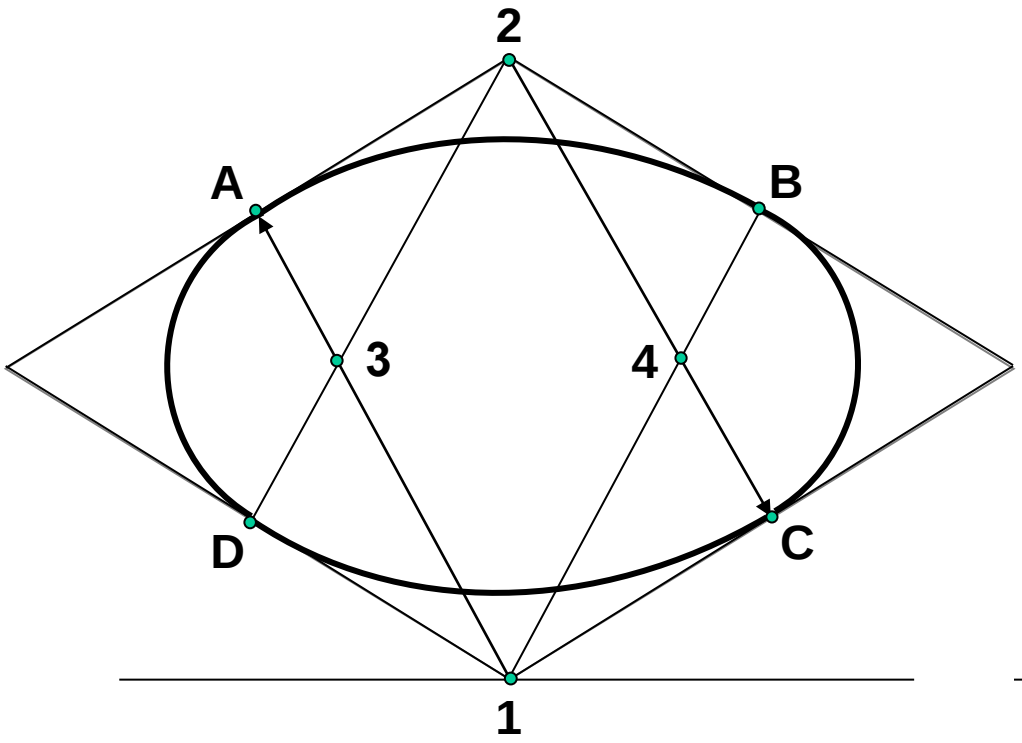




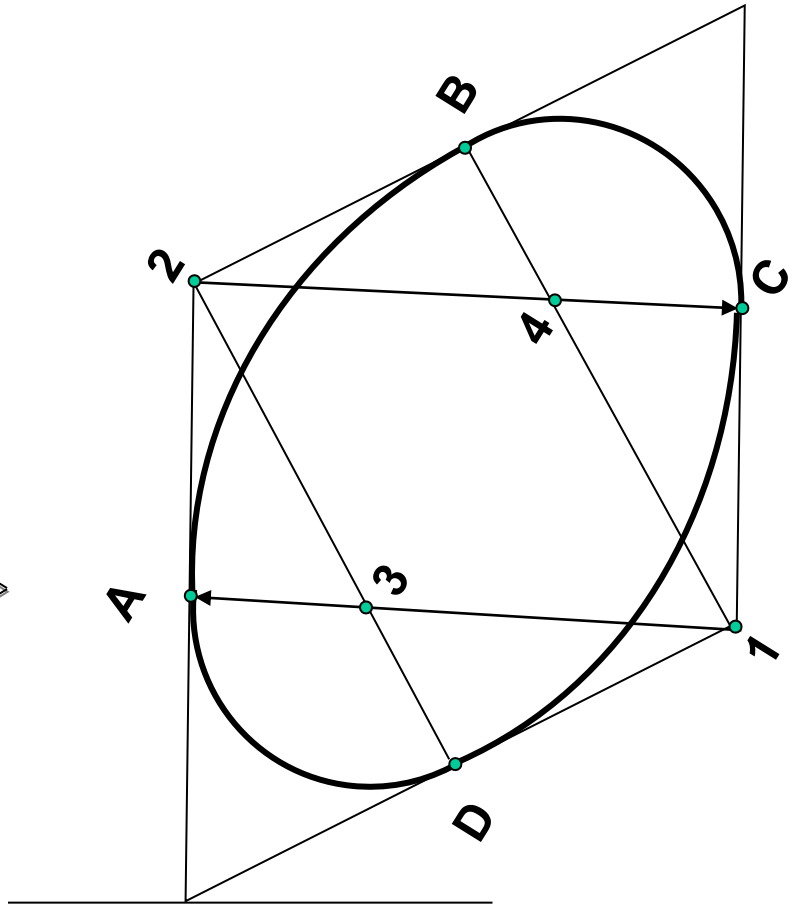
Circle

Four Center Method (Circle)

If Top View

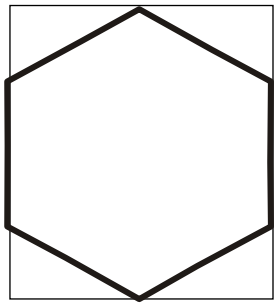


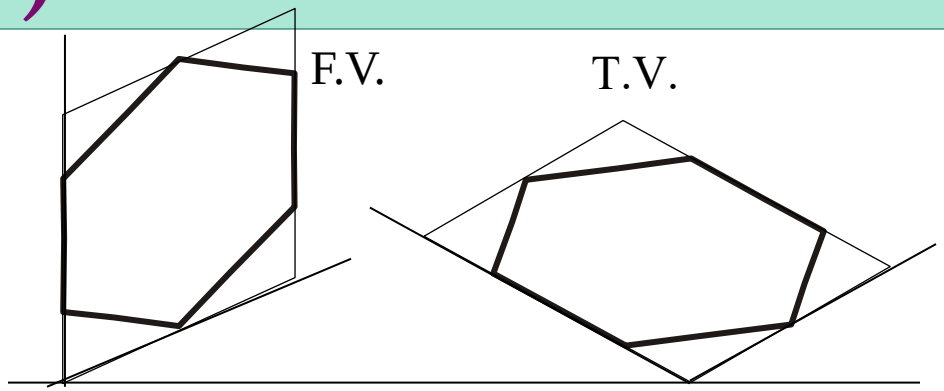
If Front View



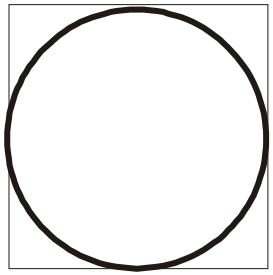
Isometric (Plane figure) in F.V. and T.V.

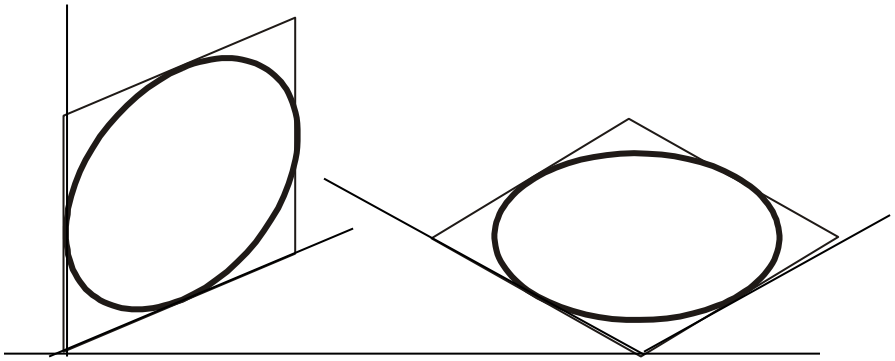
HEXAGON





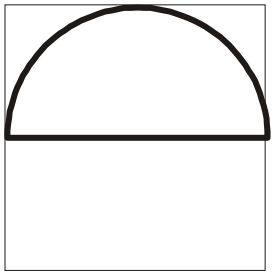
CIRCLE

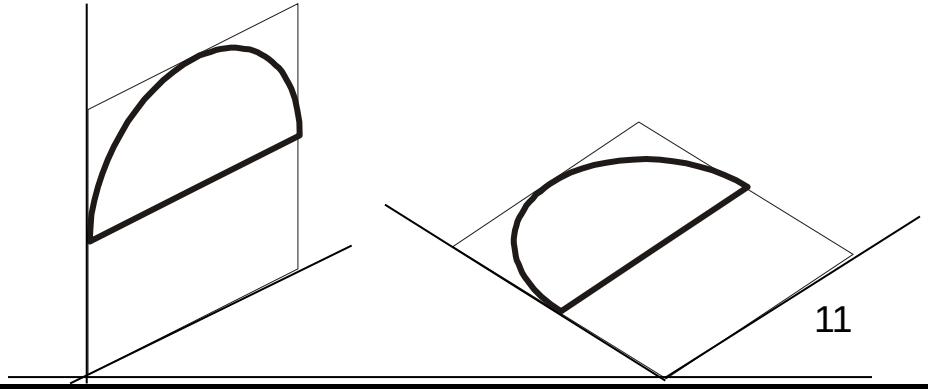




For Isometric of Circle/Semicircle use Offset/ four-center method.

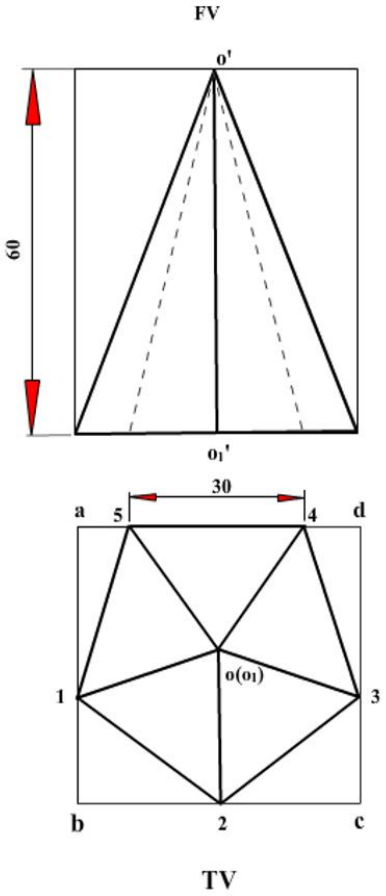
SEMI CIRCLE



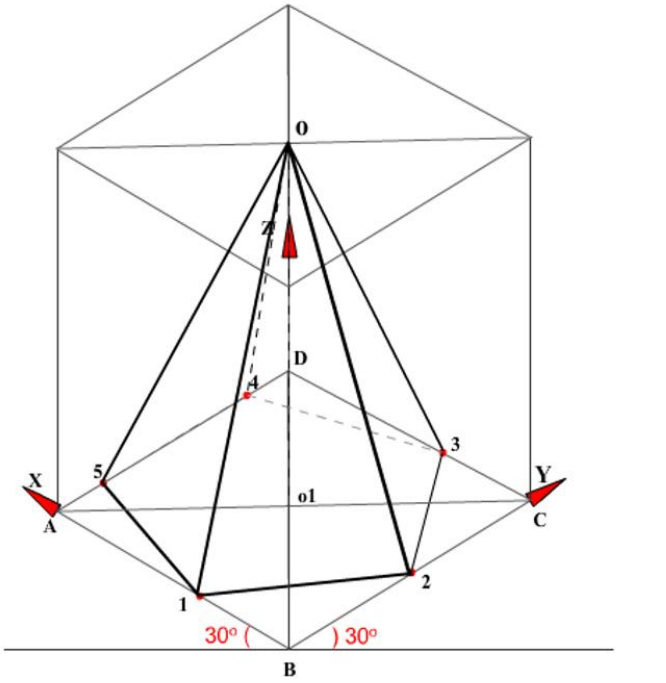


Solid Object (Pentagonal Pyramid)

Box Method



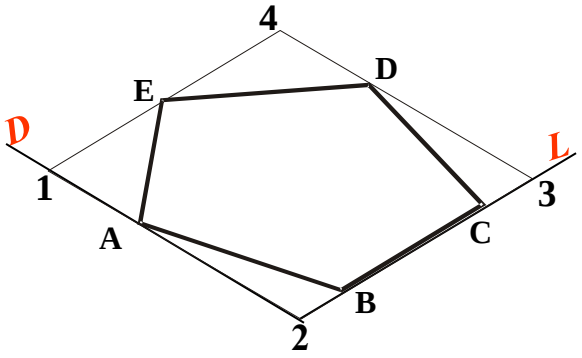
TV

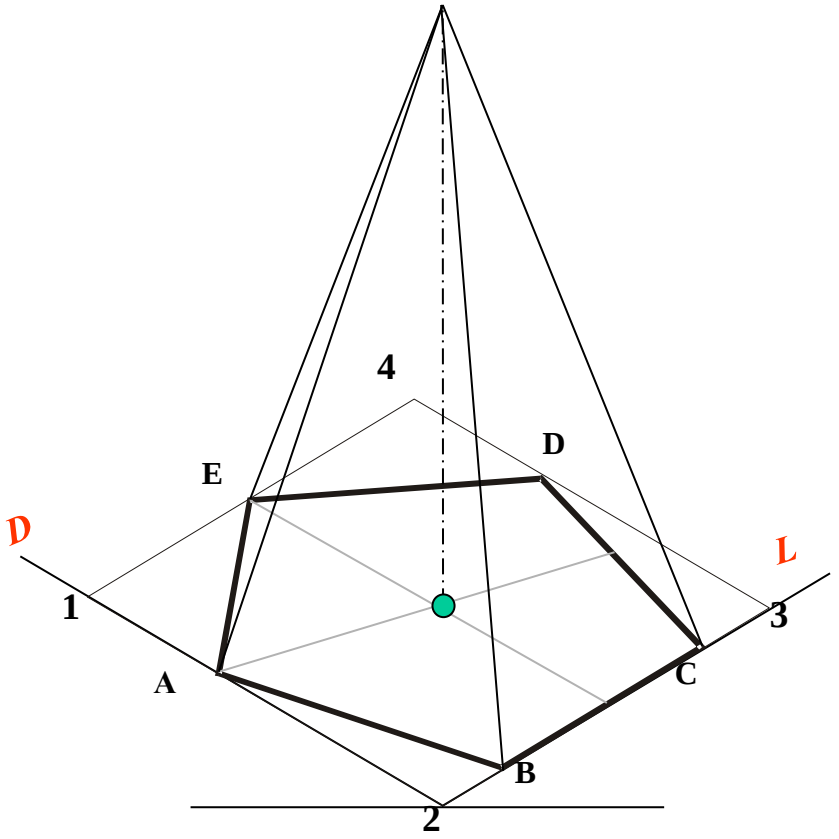


ISOMETRIC VIEW OF PENTAGONAL PYRAMID

Solid Object (Pentagonal Pyramid)

Co-ordinate or Offset Method

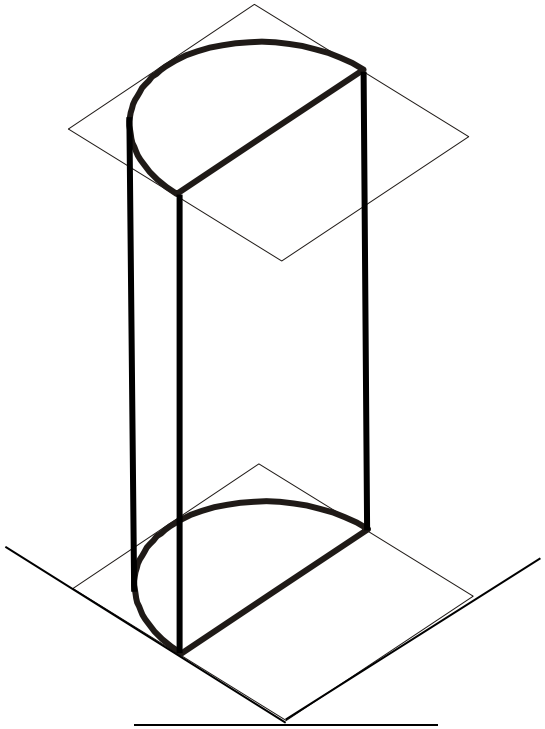


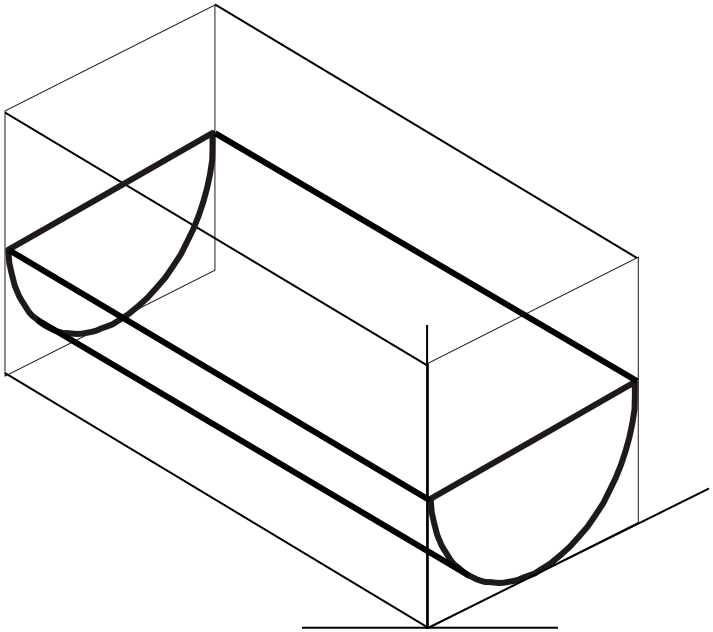


Solid Object (Half Cylinder)

STANDING ON H.P.

(On its Semicircular Base)

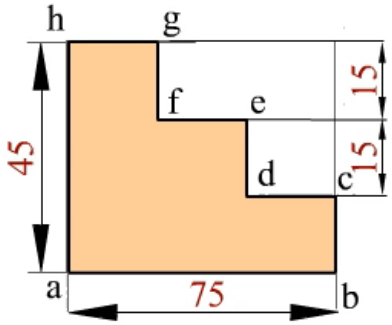




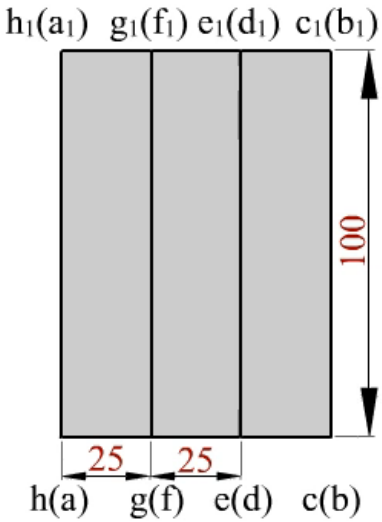
LYING ON H.P.

(With flat face || to H.P.)

Step Problem

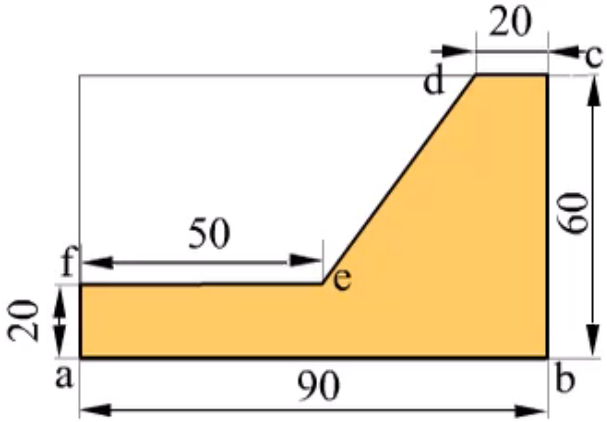


FV

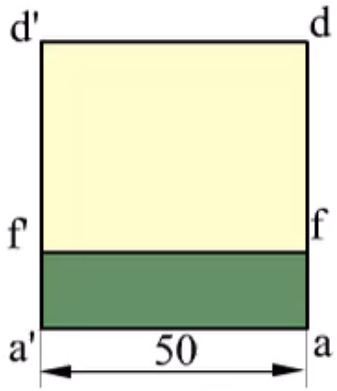


TV

Object 1

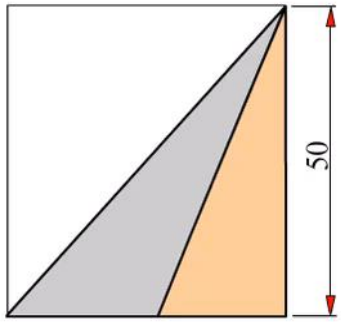


FV

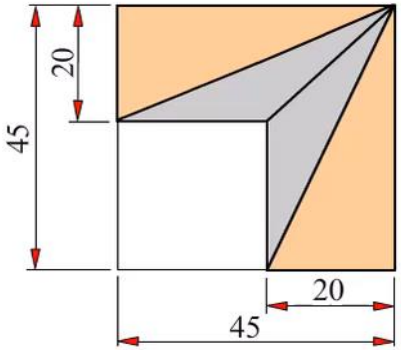


LSV

Object 2

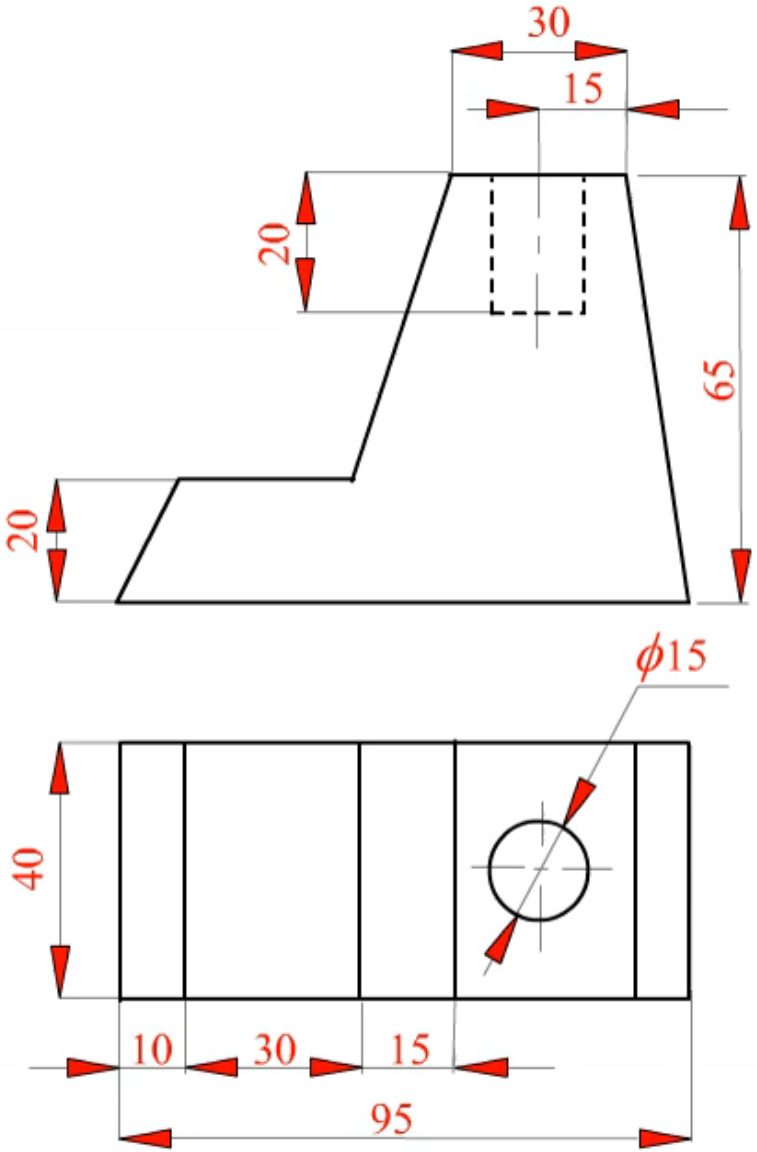


FV



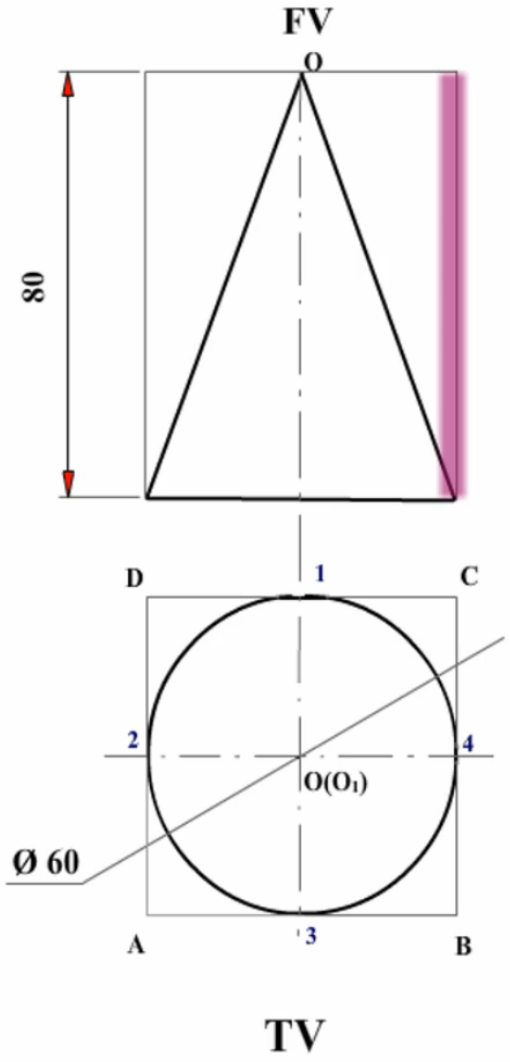
TV

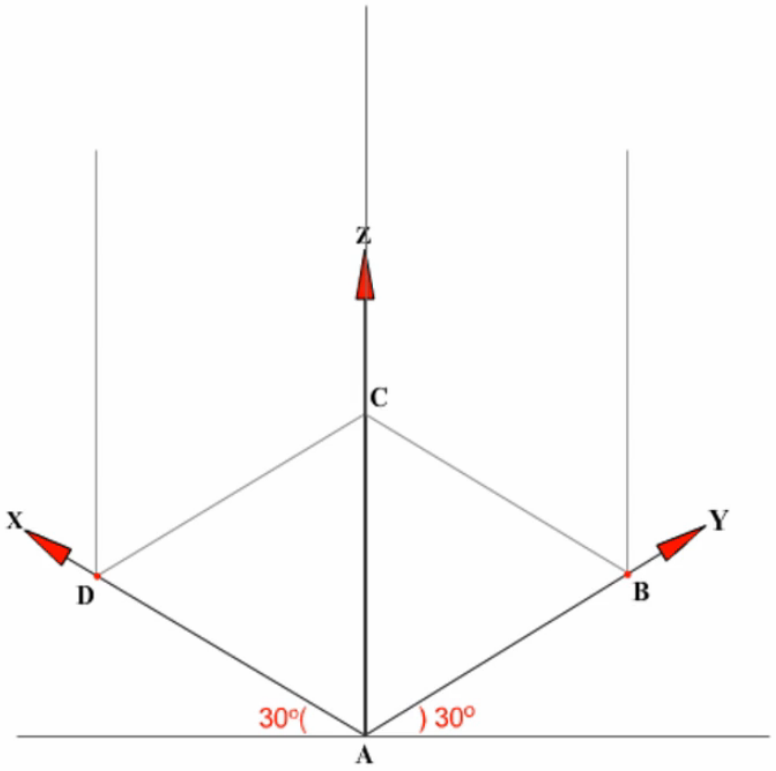
Object 3



ISOMETRIC VIEW

Cone Problem





ISOMETRIC VIEW OF CONE

Thank you