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Title of Chapter : **Isometric Projection**

Contents: Introduction to isometric projection, oblique projection and perspective projection. Draw the isometric projection from the given orthographic views

Unit Objectives

To visualize three dimensional engineering objects and shall be able to draw their isometric views

Unit outcomes: On completion the students will be able to :

Apply the visualization skill to draw a simple isometric projection from given orthographic views precisely using drawing equipment

Outcome Mapping: Mapping of PEO,PO, CO, PSO

Books :

Text books used

T1: Bhatt, N. D. and Panchal, V. M., (2016), "Engineering Drawing", Charotar Publication, Anand, India

T2: Jolhe, D. A., (2015), "Engineering Drawing with introduction to AutoCAD", Tata McGraw Hill, New Delhi

Reference Books Used

R1: Cencil Jensen et.al, "Engineering drawing and design", seventh edition

R2: R. K. Dhavan, "Engineering drawing"

R3: T Jeyapoovan, "Engineering drawing and graphics using AutoCAD", Third edition

Point of Syllabus

Introduction to isometric projection, oblique projection and perspective projection. Draw the isometric projection from the given orthographic views

ISOMETRIC DRAWING

IT IS A TYPE OF PICTORIAL PROJECTION IN WHICH ALL THREE DIMENSIONS OF AN OBJECT ARE SHOWN IN ONE VIEW AND IF REQUIRED, THEIR ACTUAL SIZES CAN BE MEASURED DIRECTLY FROM IT.

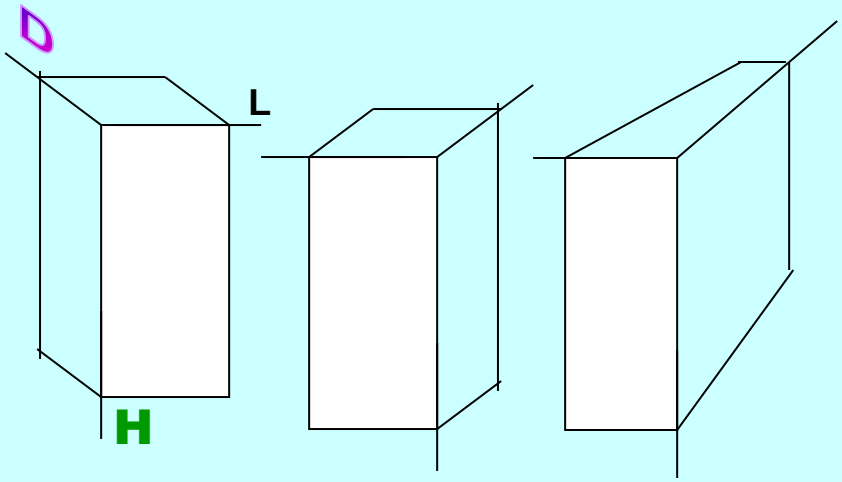
TYPICAL CONDITION.

IN THIS 3-D DRAWING OF AN OBJECT, ALL THREE DIMENSIONAL AXES ARE MENTAINED AT EQUAL INCLINATIONS WITH EACH OTHER.(120^0)

3-D DRAWINGS CAN BE DRAWN IN NUMEROUS WAYS AS SHOWN BELOW. ALL THESE DRAWINGS MAY BE CALLED

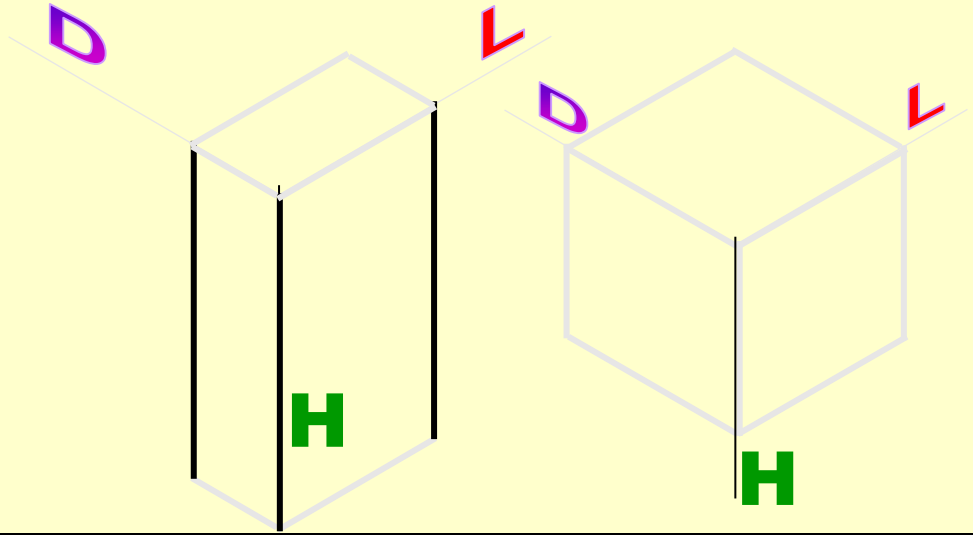
3-DIMENSIONAL DRAWINGS,
OR PHOTOGRAPHIC
OR PICTORIAL DRAWINGS.

HERE NO SPECIFIC RELATION AMONG H, L & D AXES IS MENTAINED.



NOW OBSERVE BELOW GIVEN DRAWINGS. ONE CAN NOTE SPECIFIC INCLINATION AMONG H, L & D AXES.
ISO MEANS SAME, SIMILAR OR EQUAL.

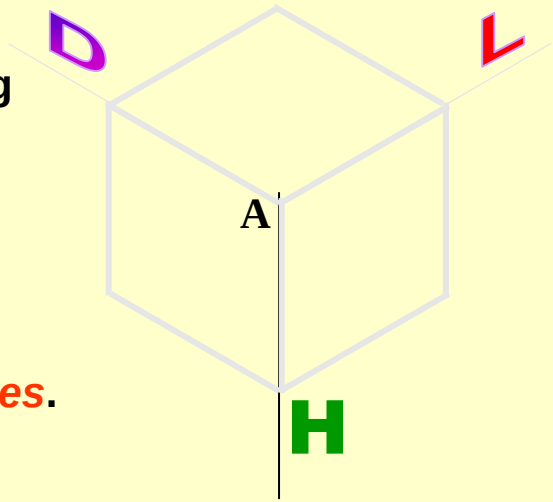
HERE ONE CAN FIND EDUAL INCLINATION AMONG H, L & D AXES. EACH IS 120^0 INCLINED WITH OTHER TWO. HENCE IT IS CALLED ISOMETRIC DRAWING



PURPOSE OF ISOMETRIC DRAWING IS TO UNDERSTAND OVERALL SHAPE, SIZE & APPEARANCE OF AN OBJECT PRIOR TO IT'S PRODUCTION.

SOME IMPORTANT TERMS:

ISOMETRIC AXES, LINES AND PLANES:



The three lines AL, AD and AH, meeting at point A and making 120^0 angles with each other are termed *Isometric Axes.*

The lines parallel to these axes are called *Isometric Lines*.

The planes representing the faces of of the cube as well as other planes parallel to these planes are called *Isometric Planes*.

ISOMETRIC SCALE:

When one holds the object in such a way that all three dimensions are visible then in the process all dimensions become proportionally inclined to observer's eye sight and hence appear apparent in lengths.

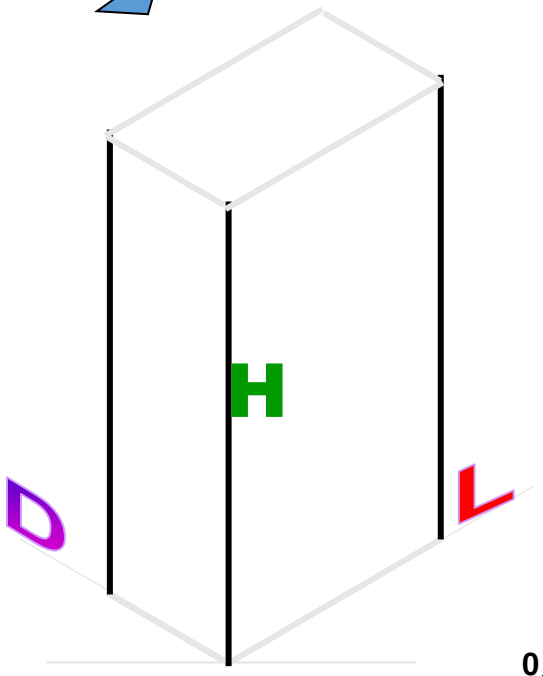
This reduction is 0.815 or 9 / 11 (approx.) It forms a reducing scale which Is used to draw isometric drawings and is called *Isometric scale.*

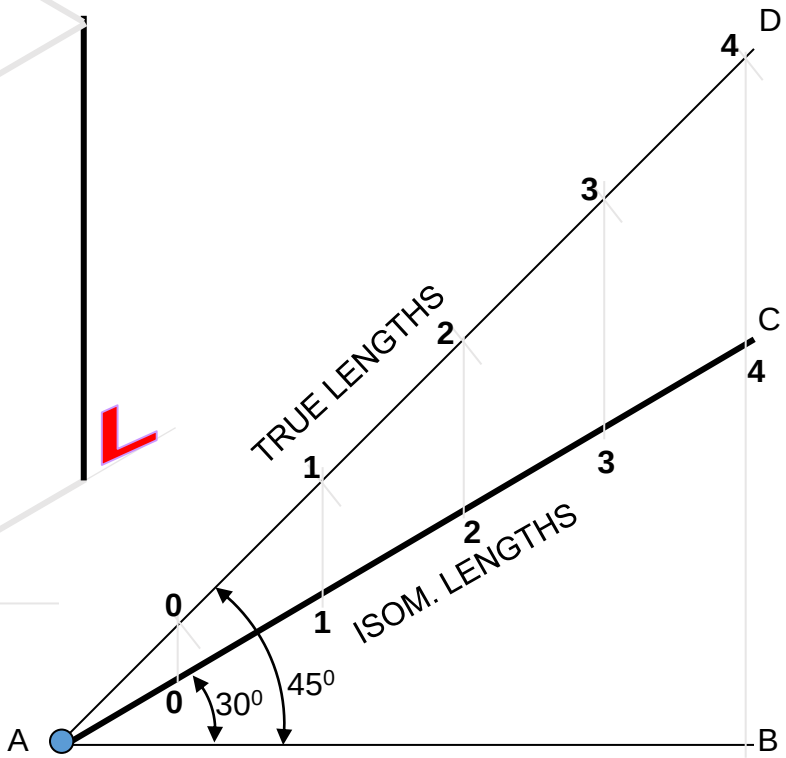
In practice, while drawing isometric projection, it is necessary to convert true lengths into isometric lengths for measuring and marking the sizes. This is conveniently done by constructing an isometric scale as described on next page.

TYPES OF ISOMETRIC DRAWINGS

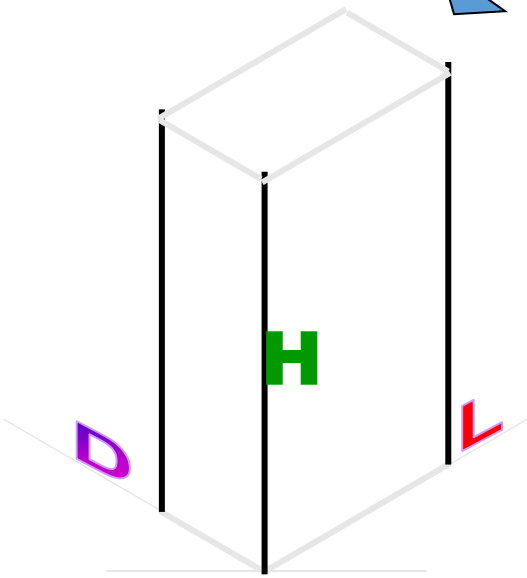
ISOMETRIC VIEW
Drawn by using True scale
(True dimensions)

ISOMETRIC PROJECTION
Drawn by using Isometric scale
(Reduced dimensions)





Isometric scale [Line AC]
required for Isometric Projection



CONSTRUCTION OF ISOM.SCALE.
From point A, with line AB draw 30^0 and 45^0 inclined lines AC & AD resp on AD. Mark divisions of true length and from each division-point draw vertical lines upto AC line.
The divisions thus obtained on AC give lengths on isometric scale.

1

ISOMETRIC OF PLANE FIGURES

AS THESE ALL ARE 2-D FIGURES WE REQUIRE ONLY TWO ISOMETRIC AXES.

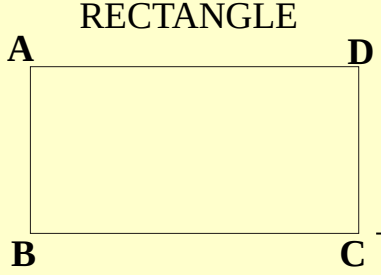
IF THE FIGURE IS FRONT VIEW, H & L AXES ARE REQUIRED.

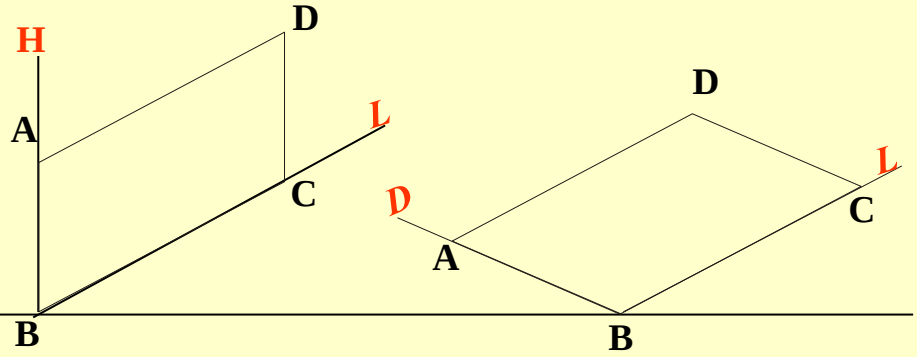
IF THE FIGURE IS TOP VIEW, D & L AXES ARE REQUIRED.

Shapes containing Inclined lines should be enclosed in a rectangle as shown. Then first draw isom. of that rectangle and then inscribe that shape as it is.

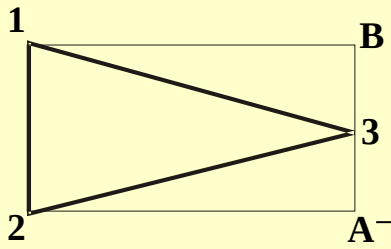
SHAPE	Isometric view if the Shape is F.V. or T.V.

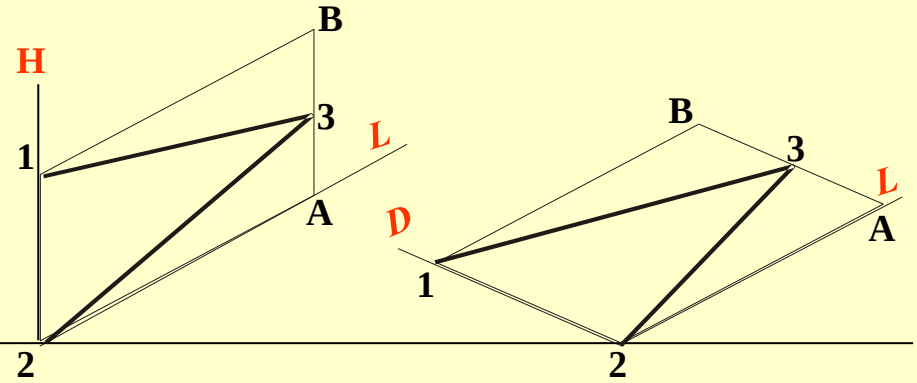
RECTANGLE



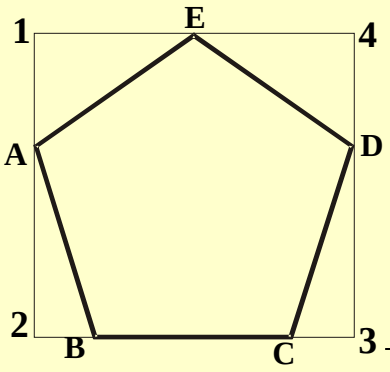


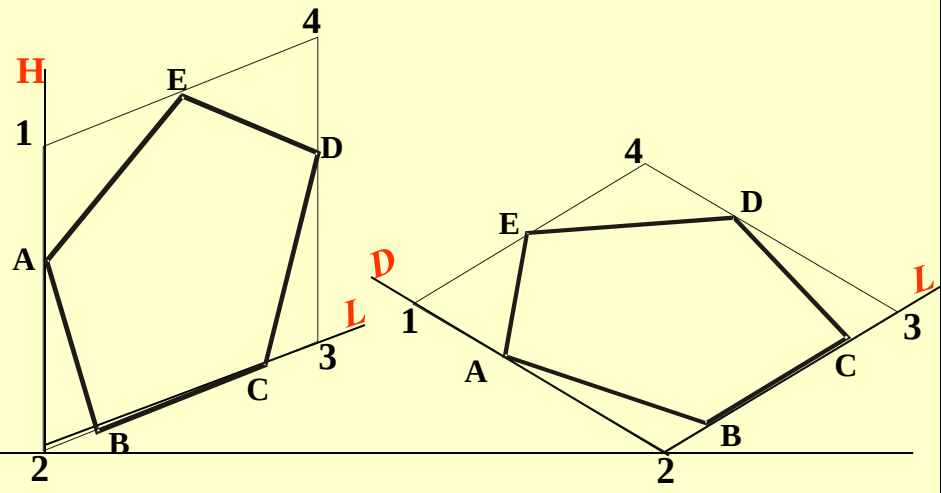
TRIANGLE



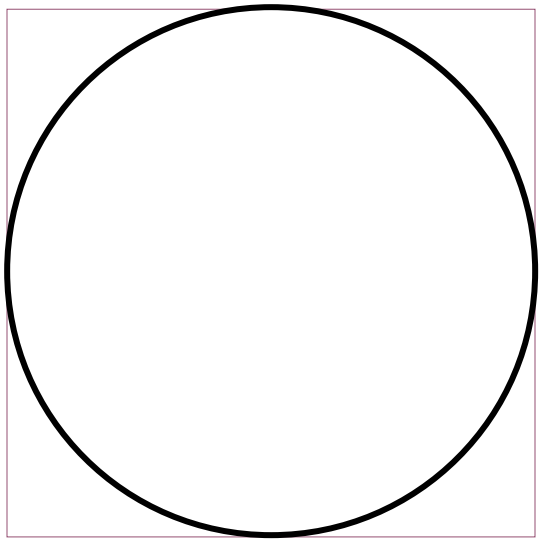


PENTAGON

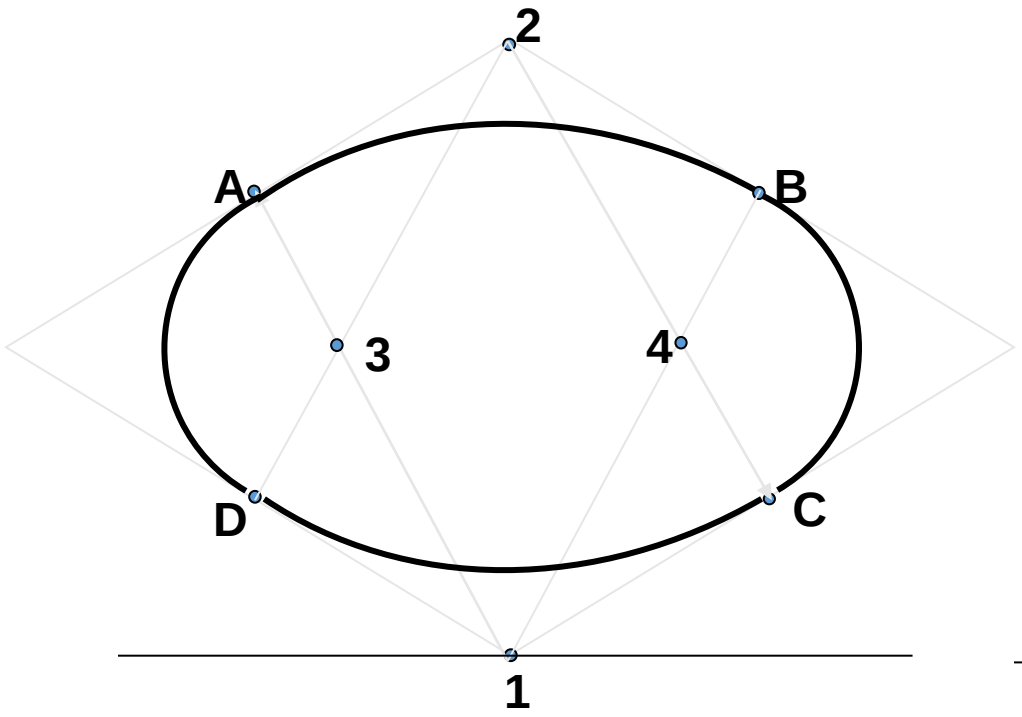


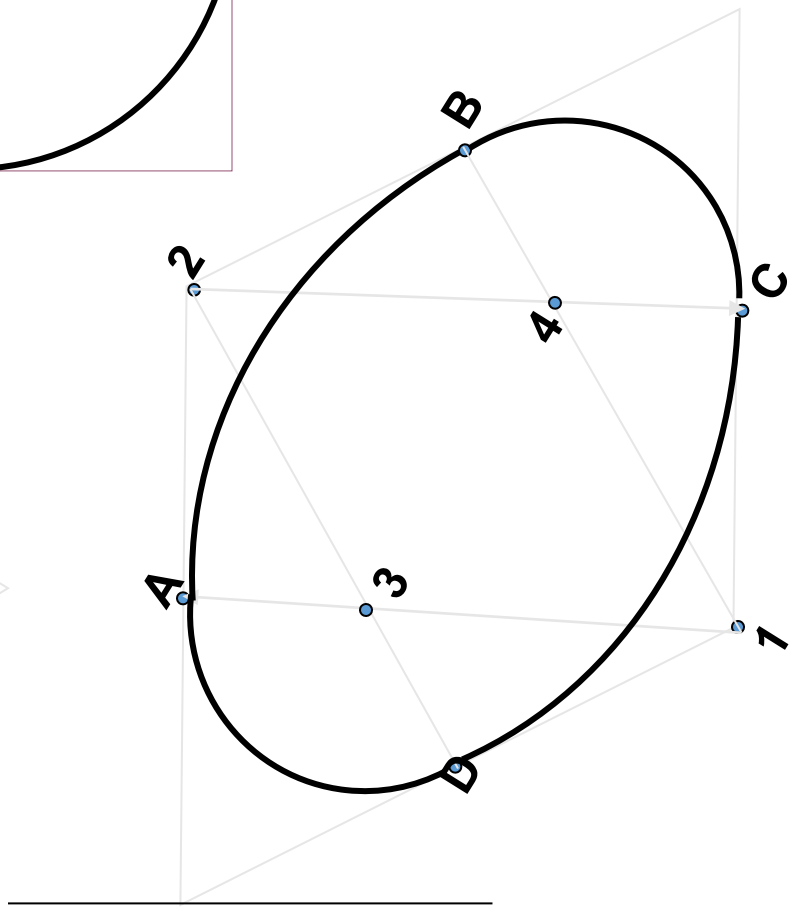


DRAW ISOMETRIC VIEW OF A CIRCLE IF IT IS A TV OR FV.



FIRST ENCLOSE IT IN A SQUARE.
IT'S ISOMETRIC IS A RHOMBUS WITH D & L AXES FOR TOP VIEW.
THEN USE H & L AXES FOR ISOMETRIC WHEN IT IS FRONT VIEW.
FOR CONSTRUCTION USE RHOMBUS METHOD SHOWN HERE. STUDY IT.





ISOMETRIC OF PLANE FIGURES

AS THESE ALL ARE 2-D FIGURES WE REQUIRE ONLY TWO ISOMETRIC AXES.

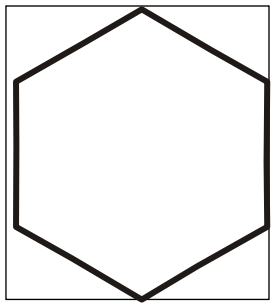
IF THE FIGURE IS FRONT VIEW, H & L AXES ARE REQUIRED.

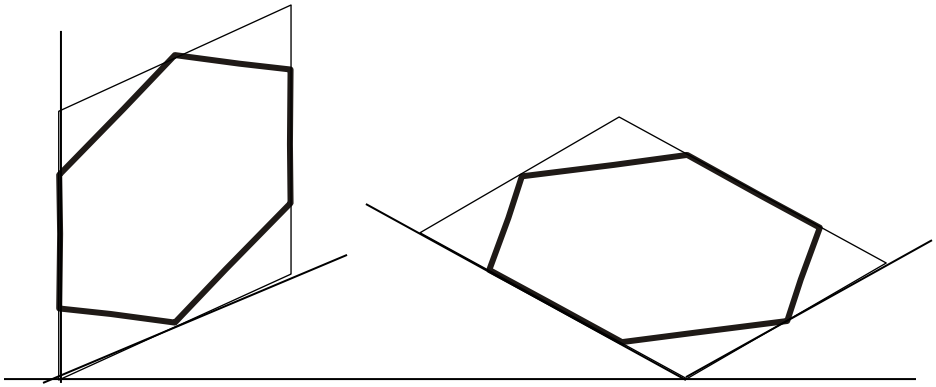
IF THE FIGURE IS TOP VIEW, D & L AXES ARE REQUIRED.

For Isometric of Circle/Semicircle use Rhombus method. Construct it of sides equal to diameter of circle always. (Ref. Previous two pages.)

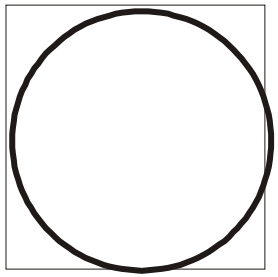
SHAPE	IF F.V.	IF T.V.

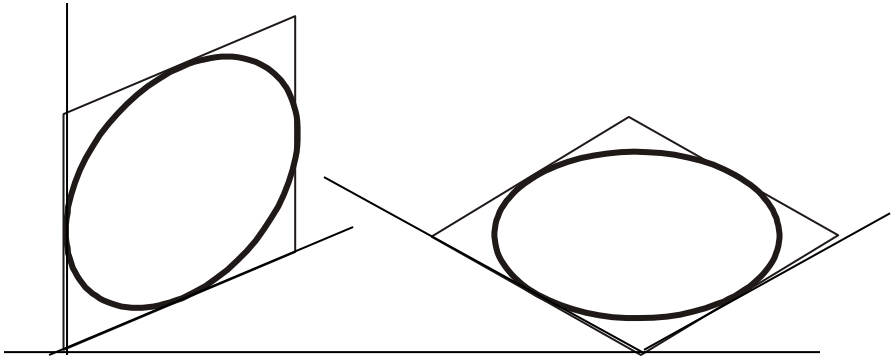
HEXAGON





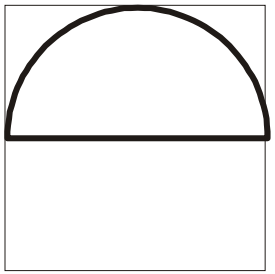
CIRCLE

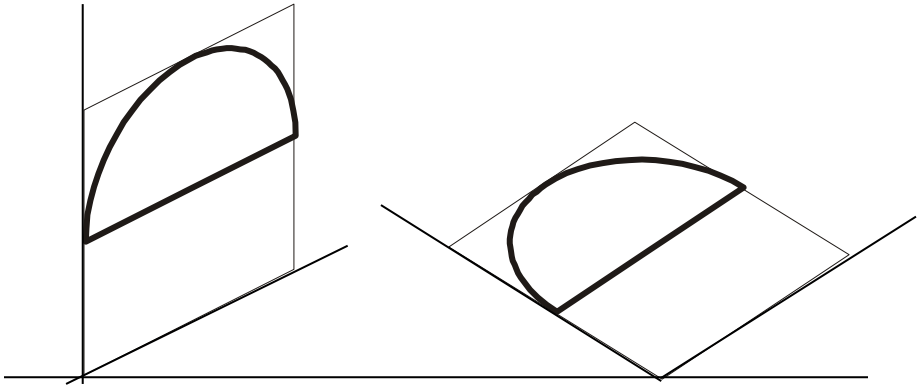


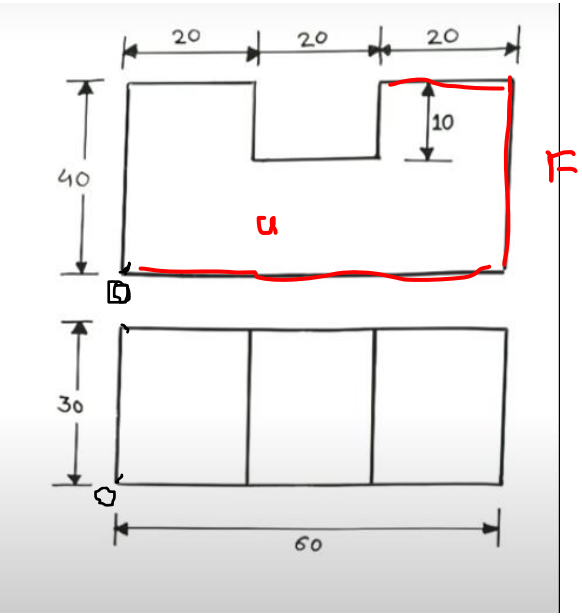


For Isometric of Circle/Semicircle use Rhombus method. Construct Rhombus of sides equal to Diameter of circle always. (Ref. topic ENGG. CURVES.)

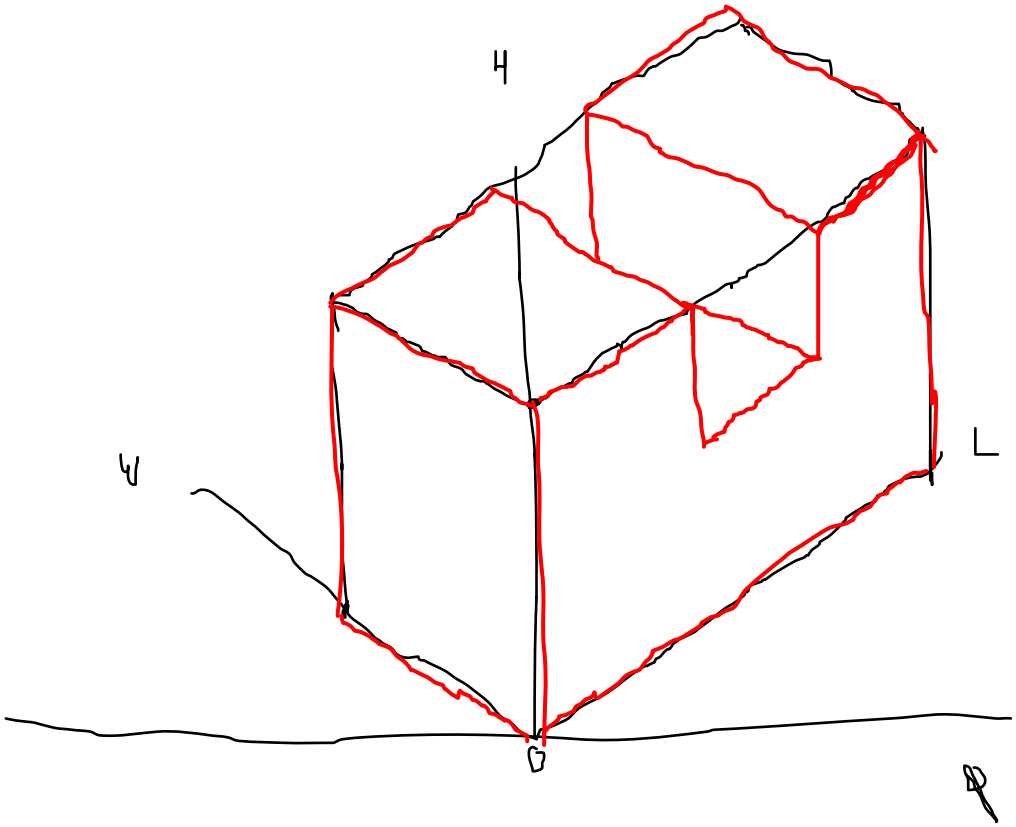
SEMI CIRCLE

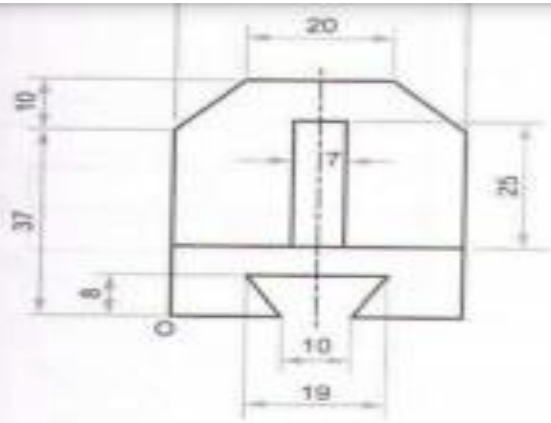




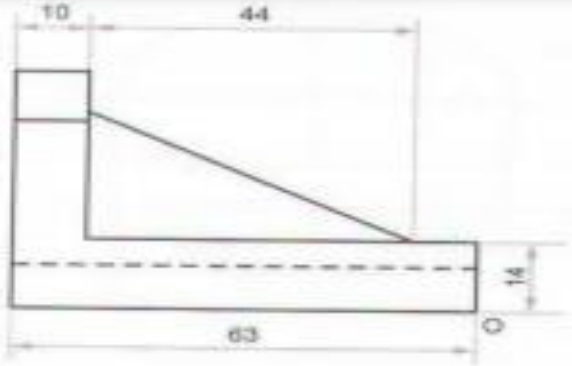


Draw isometric view from given orthographic views



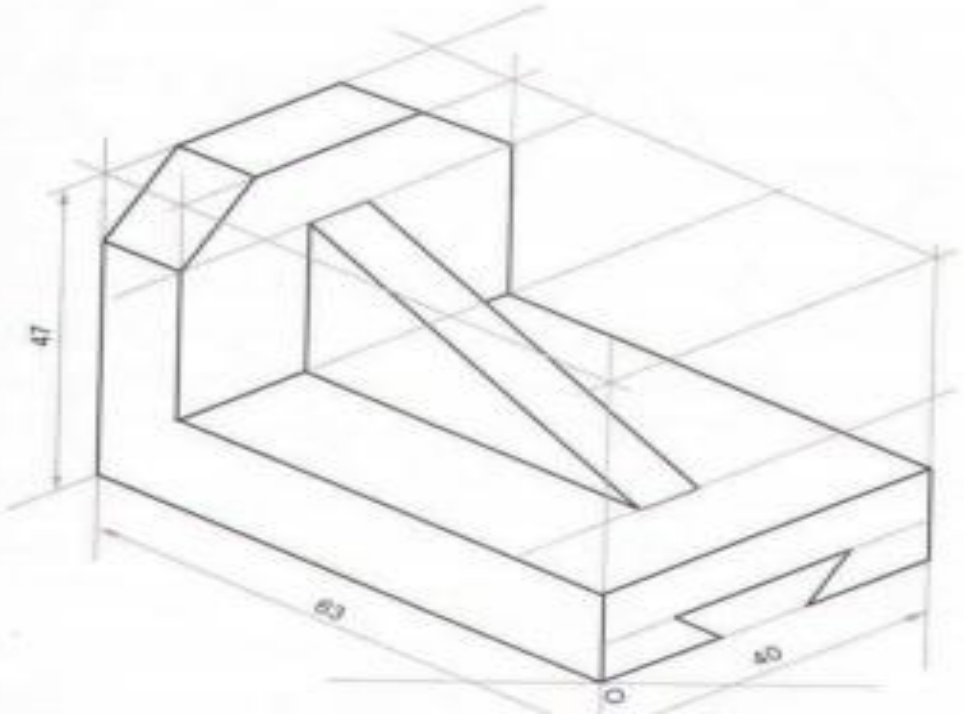


RHSV

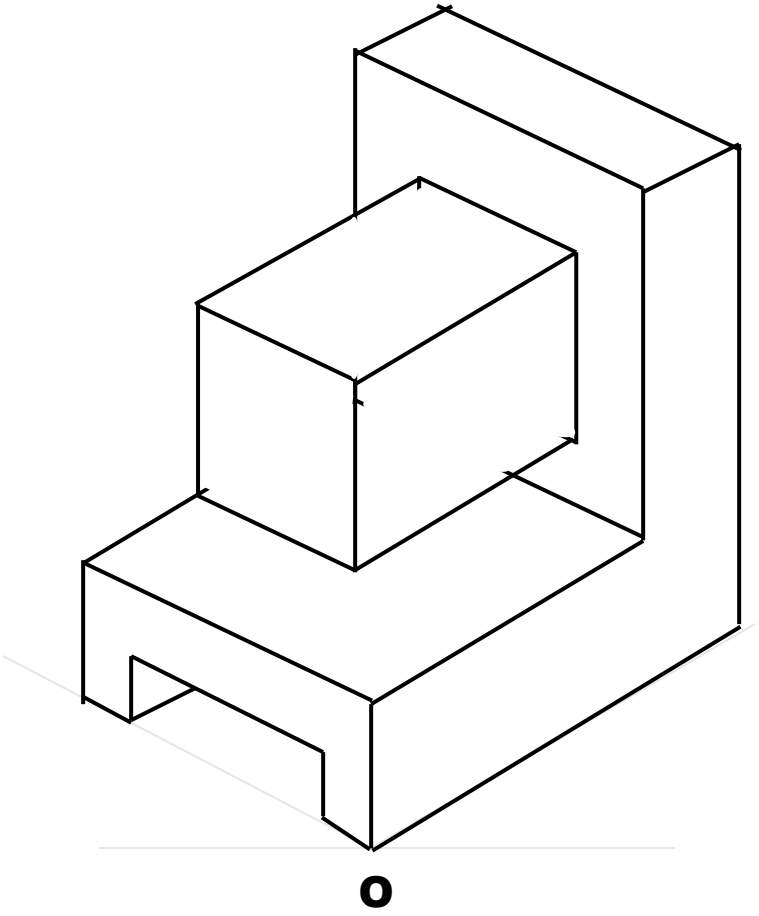


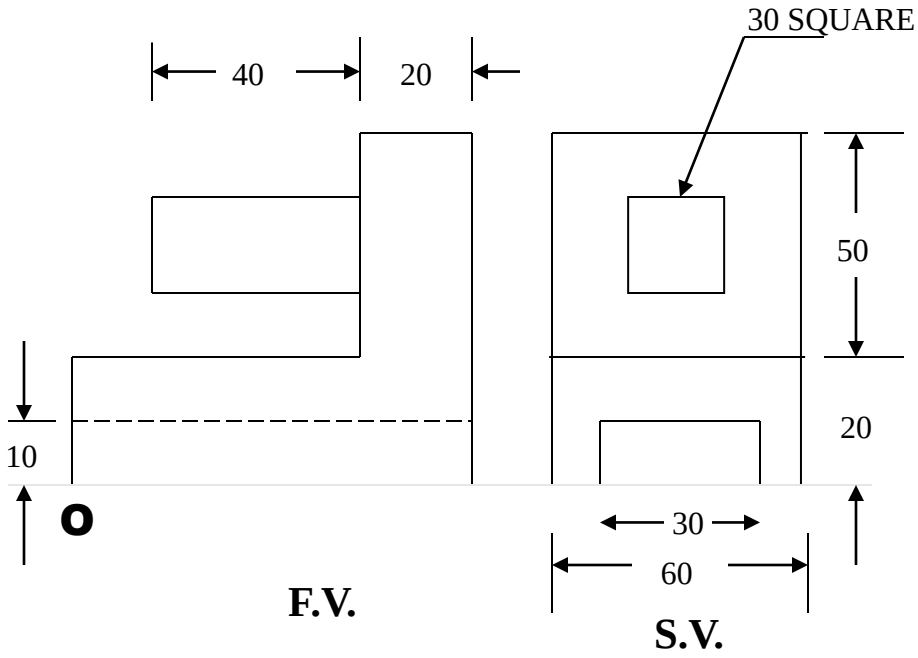
FV

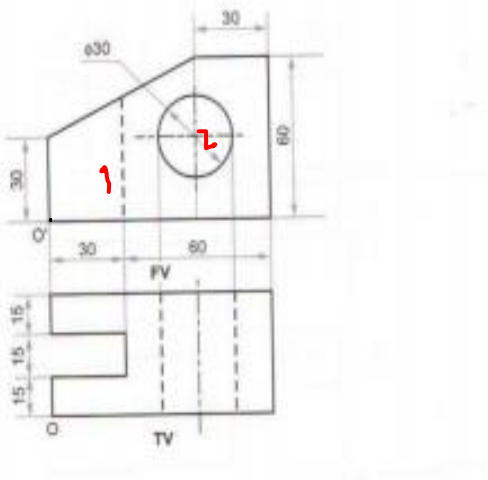
lution :



F.V. and S.V.of an object are given.
Draw it's isometric view.





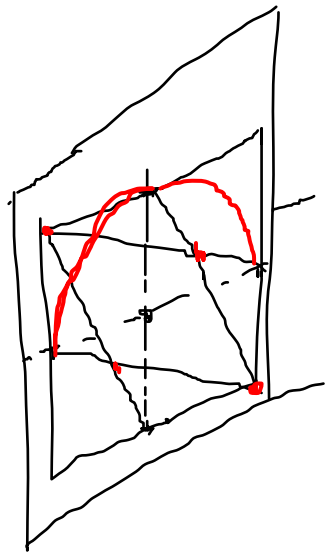


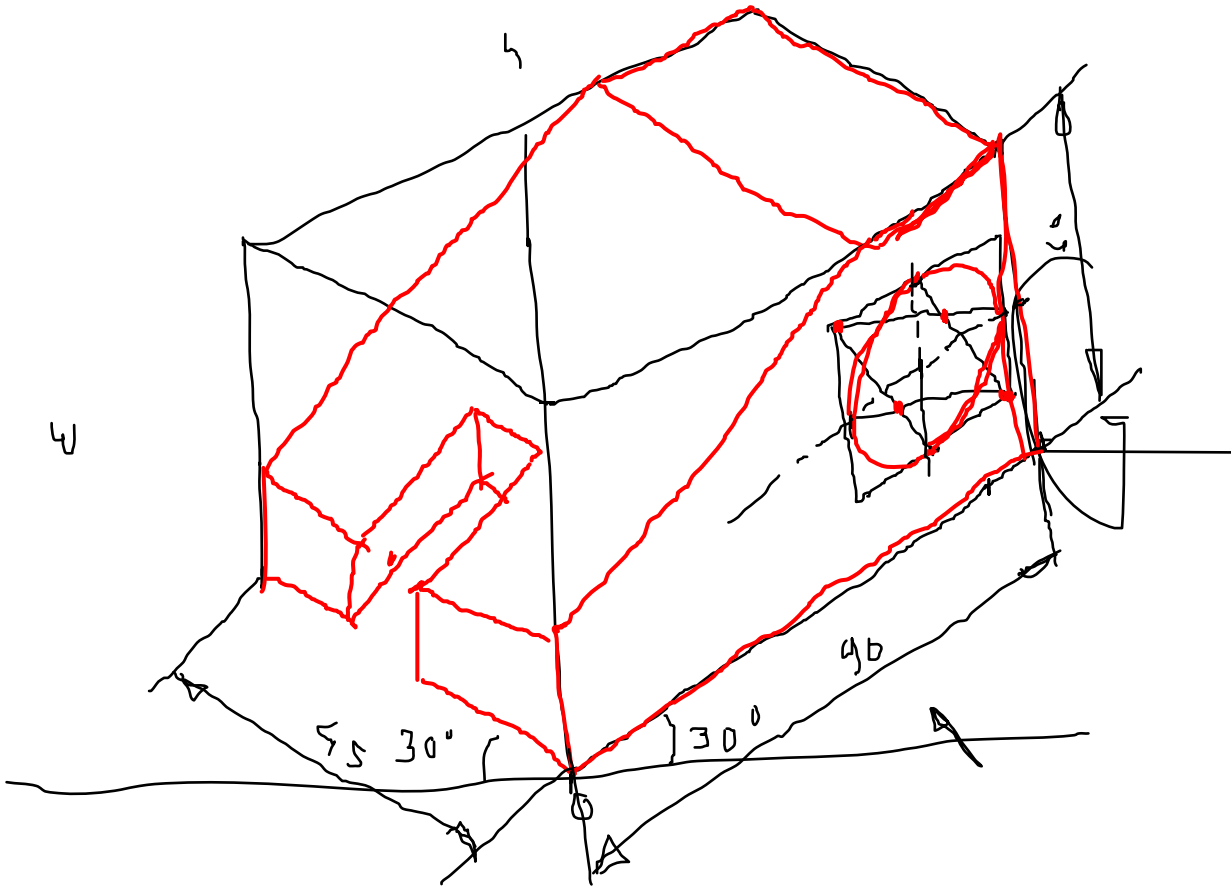
60

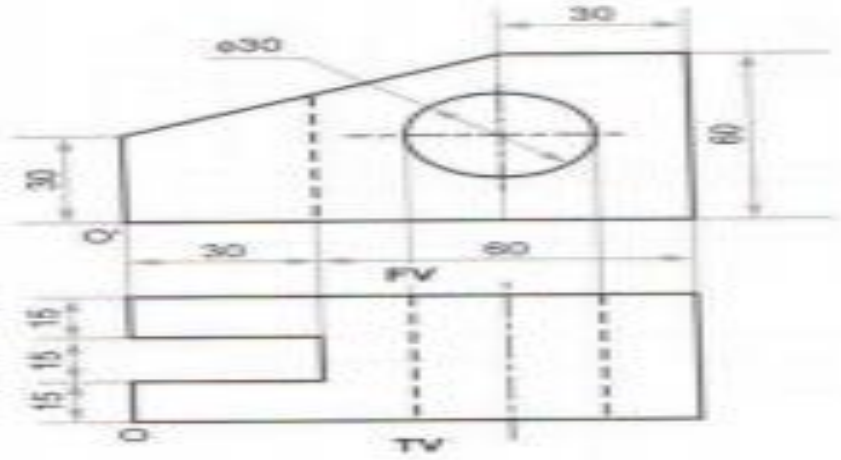
L = 90

H = 60

W = 45



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60
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O
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FV
15
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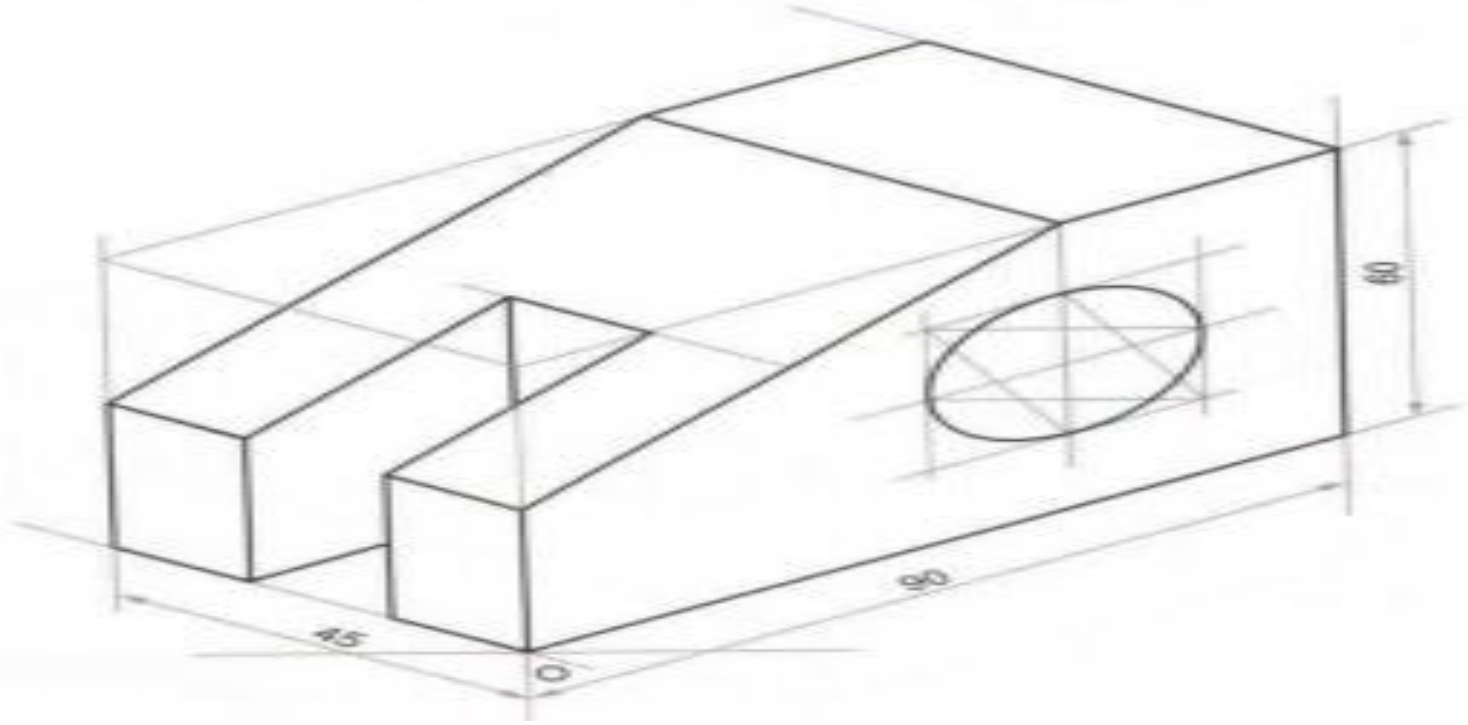
O
TV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90
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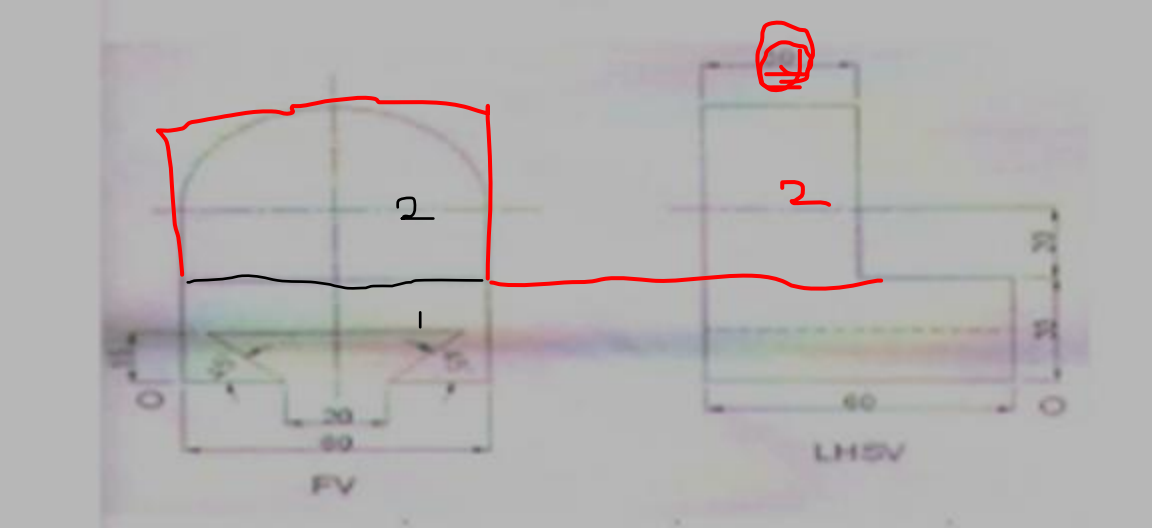
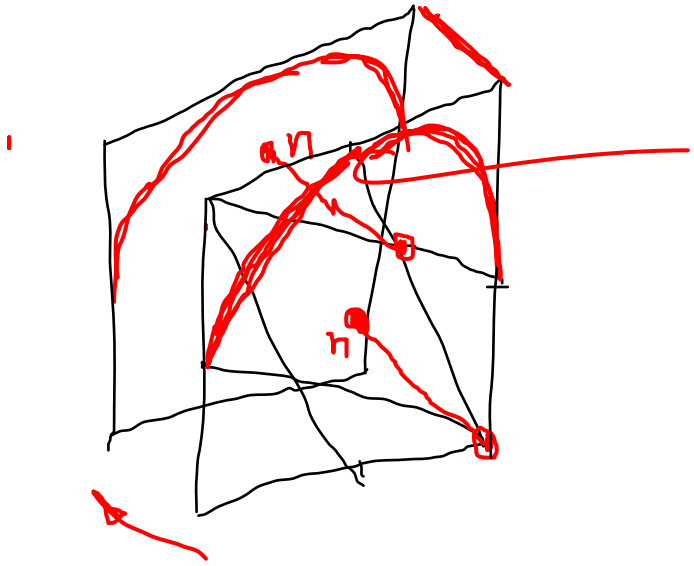
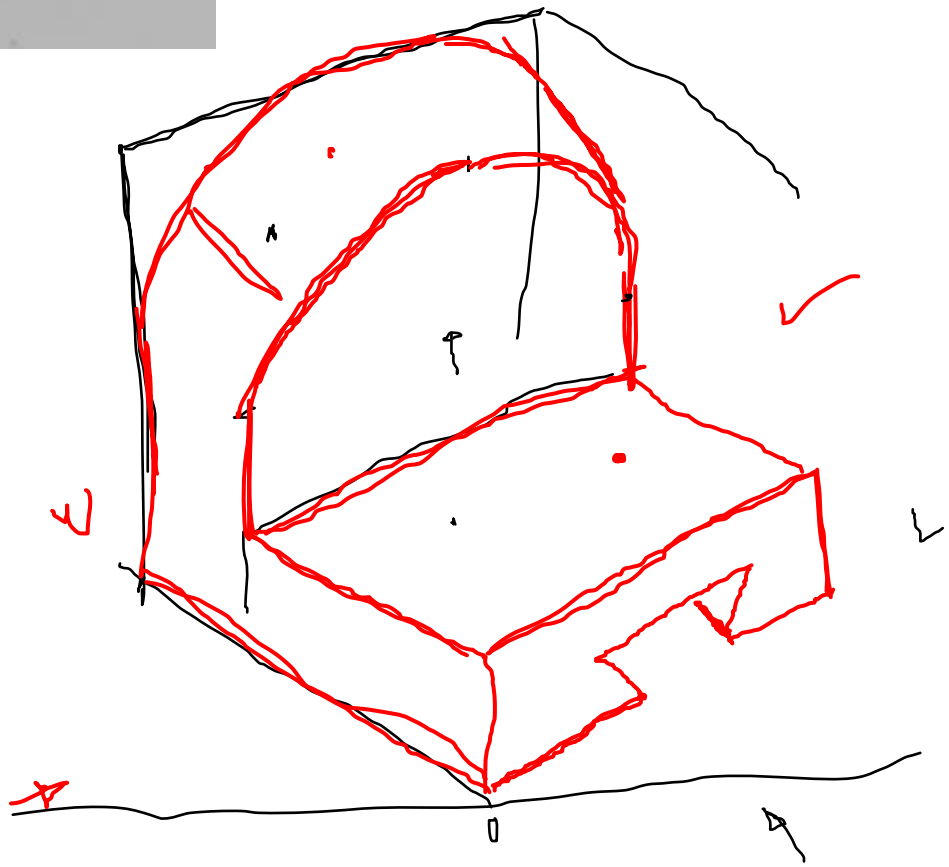
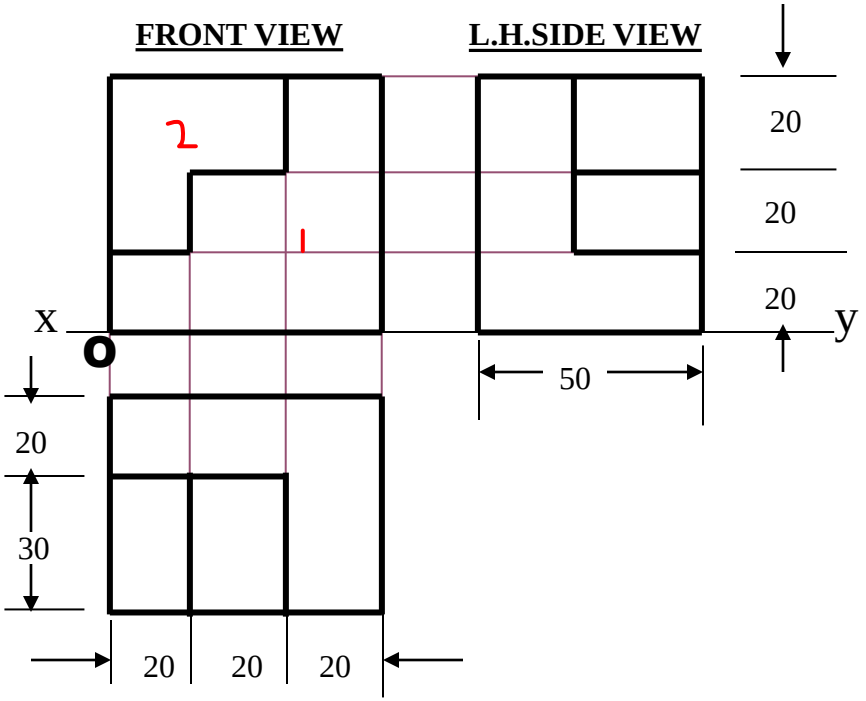

2
1
2
FV
LHSV

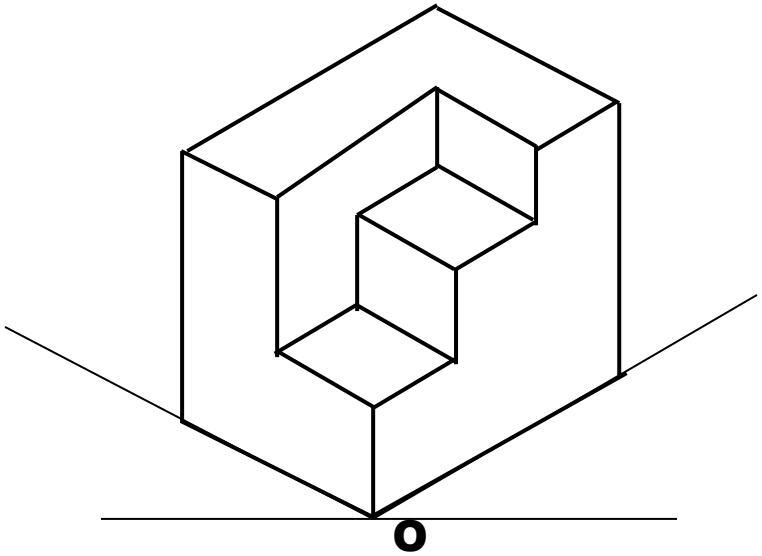




F.V. & T.V. and S.V.of an object are given. Draw it's isometric view.

ORTHOGRAPHIC PROJECTIONS





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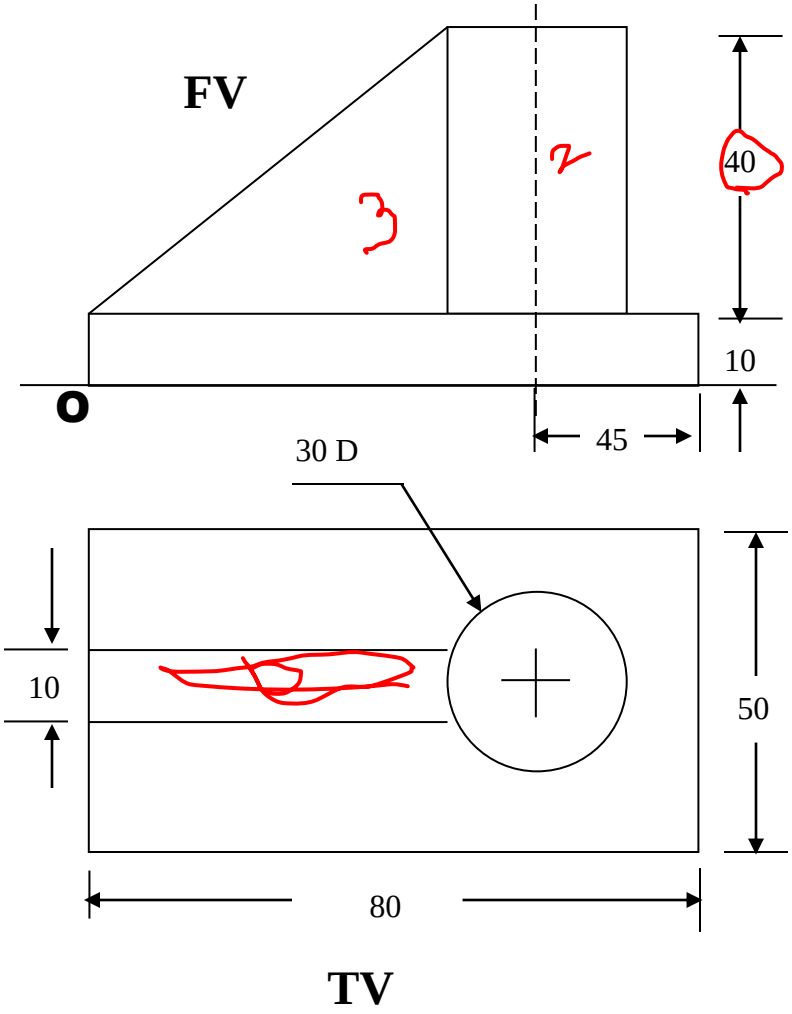

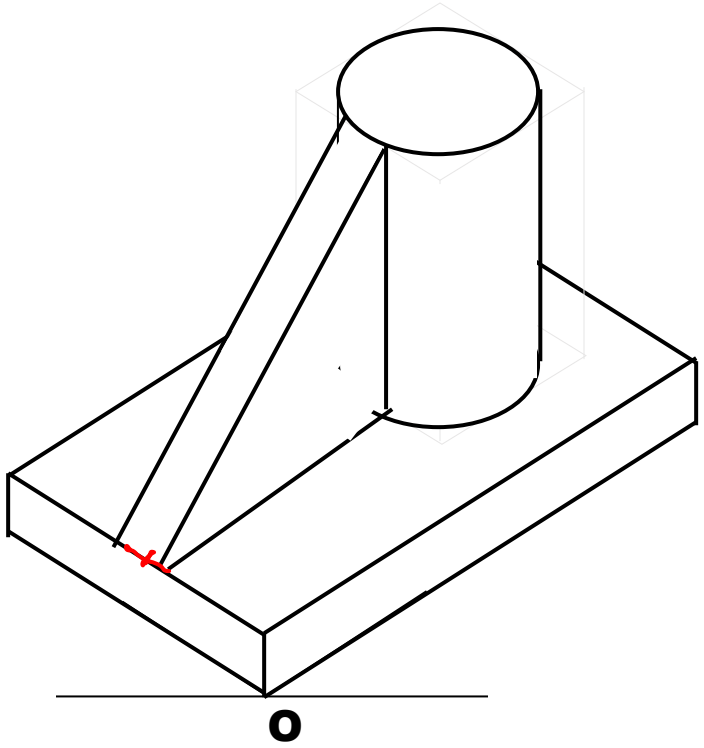

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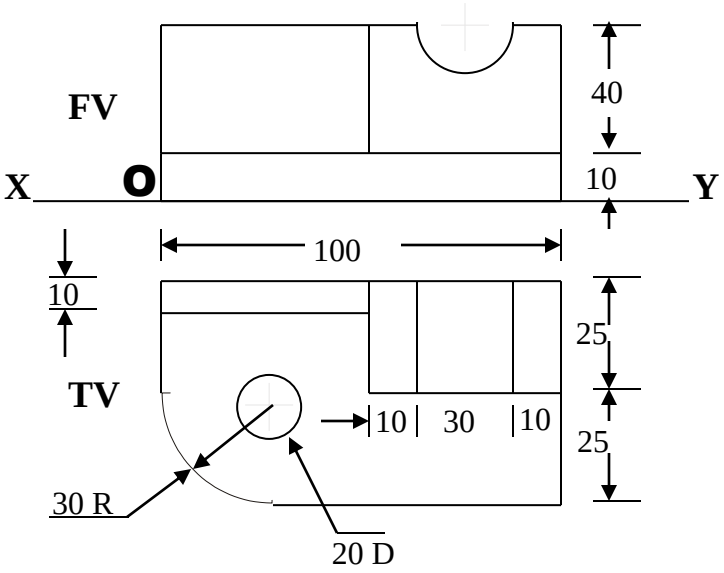

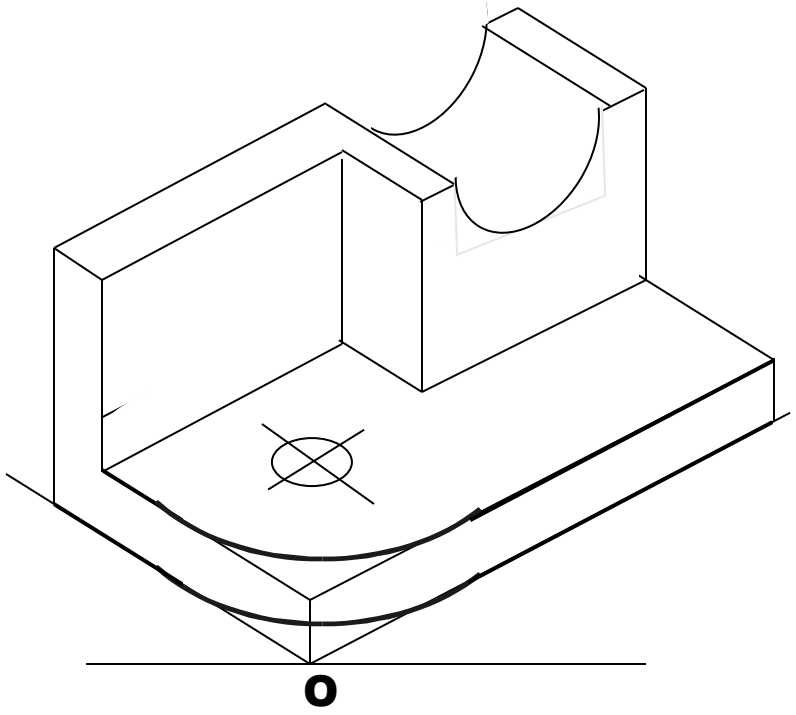

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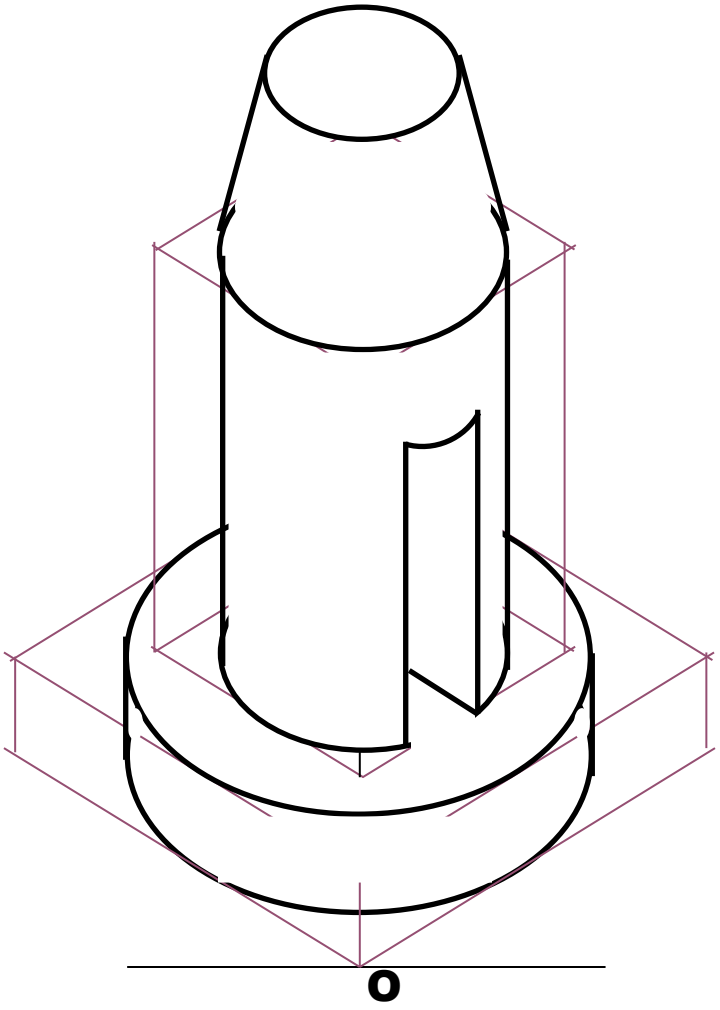

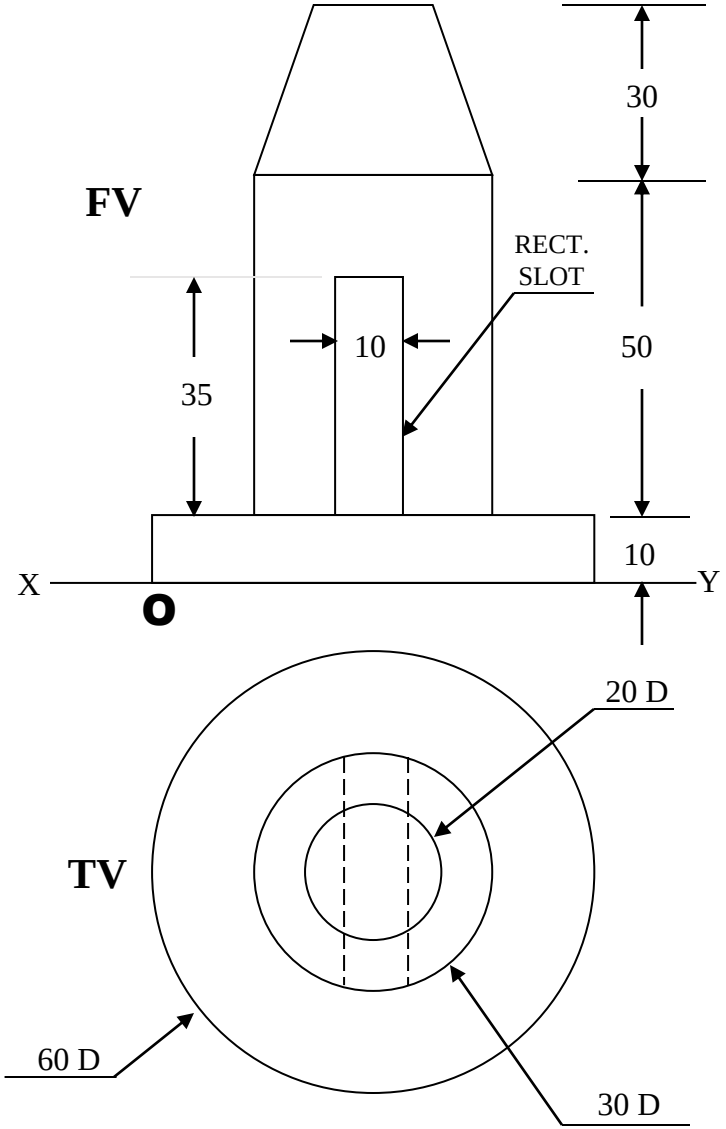

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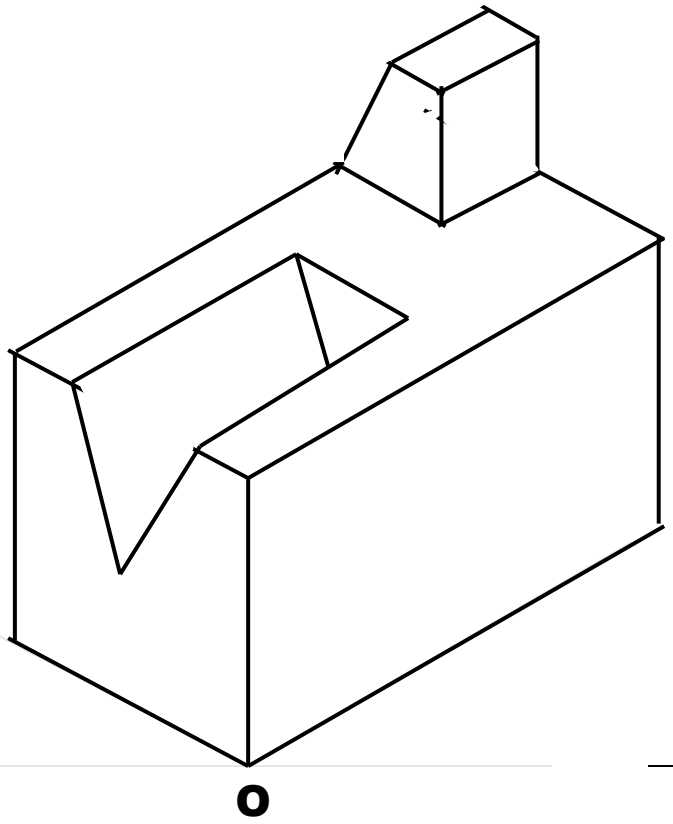
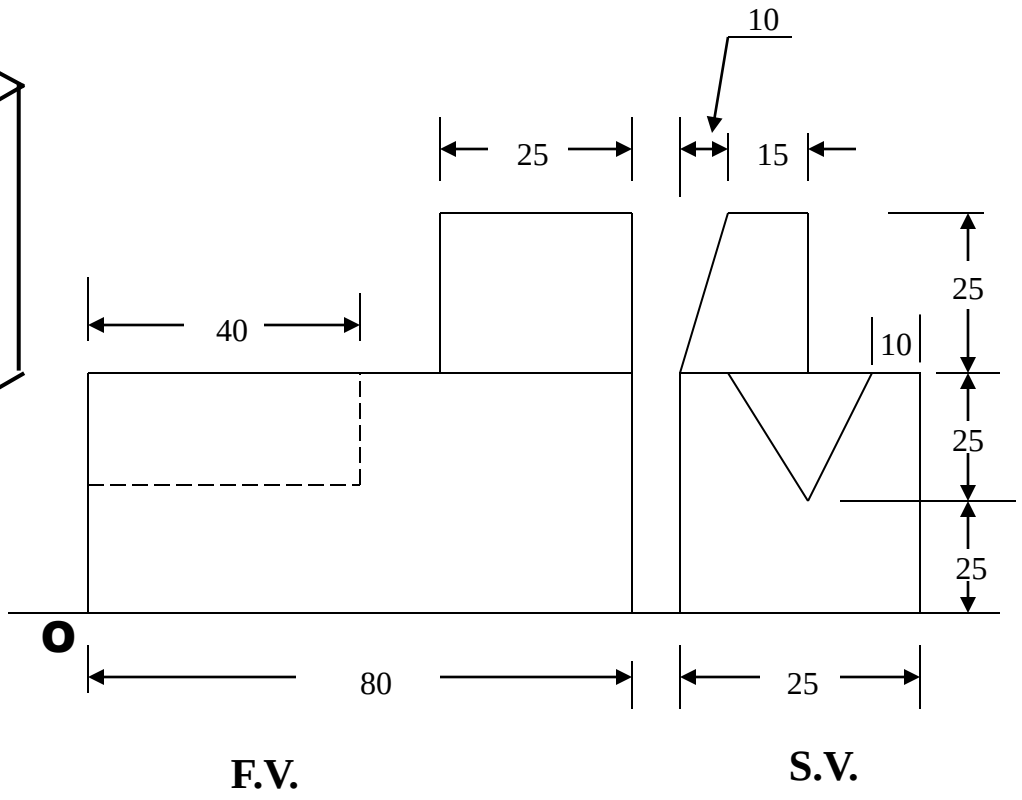
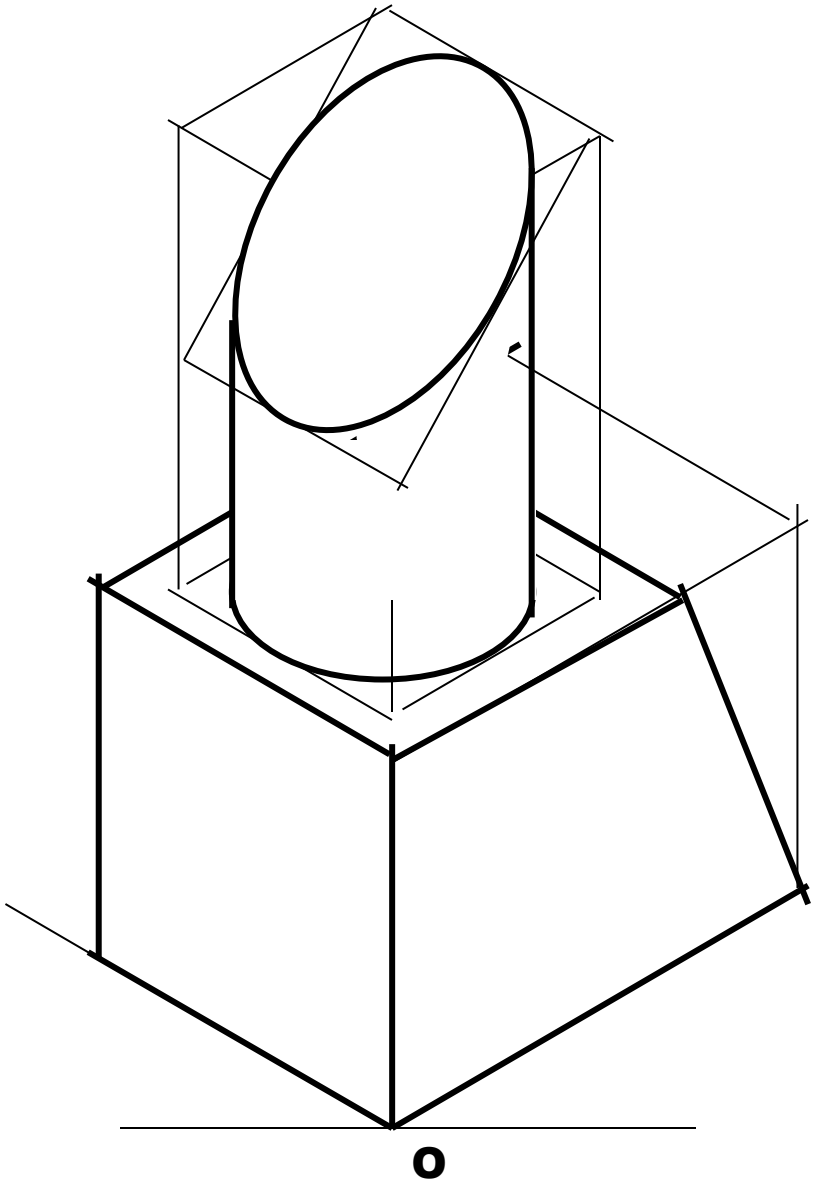
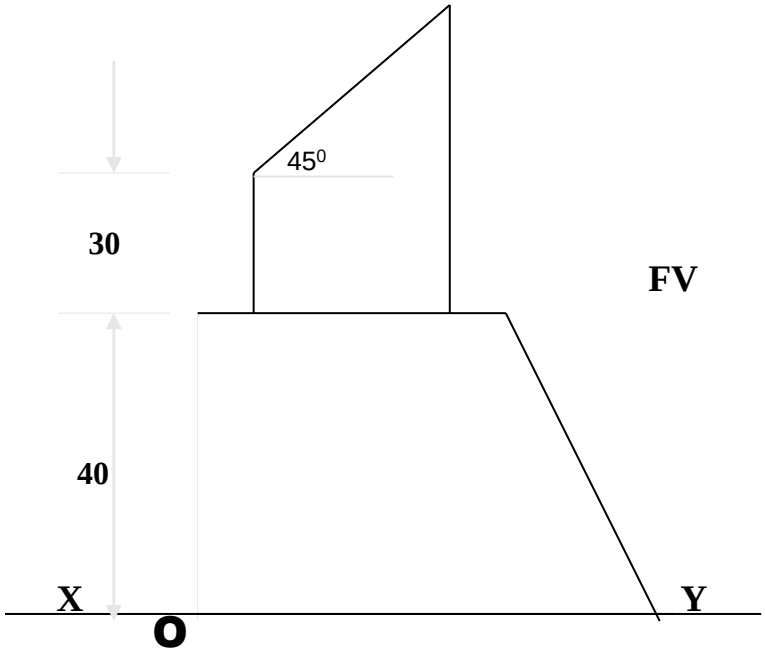


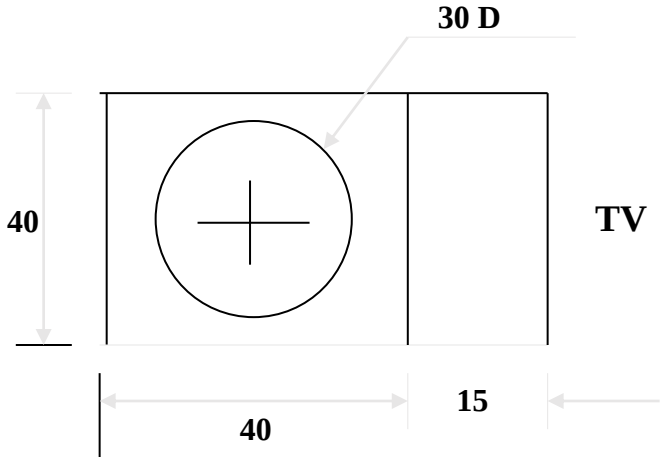


F.V. **S.V.**

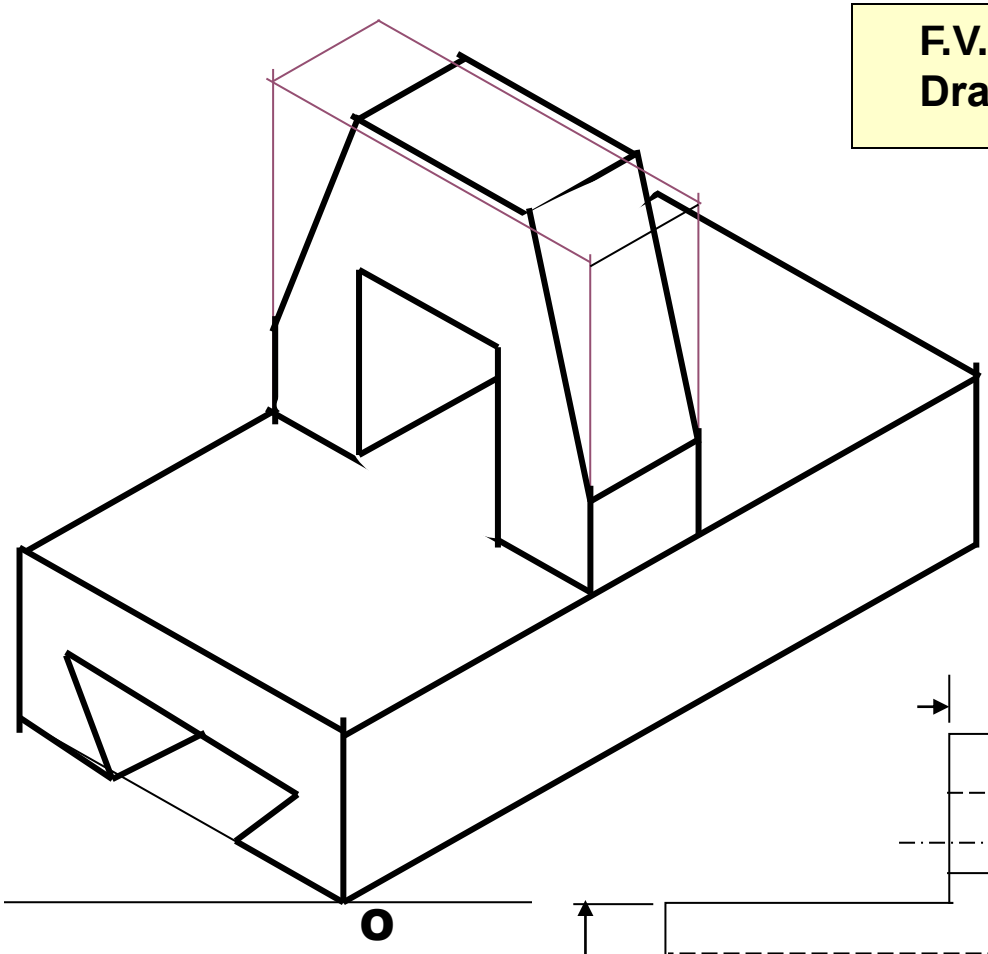
F.V. & T.V. of an object are given. Draw it's isometric view.

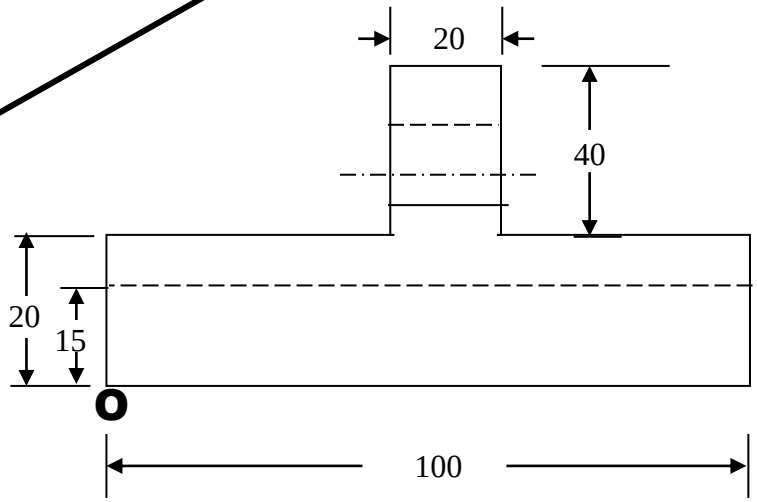


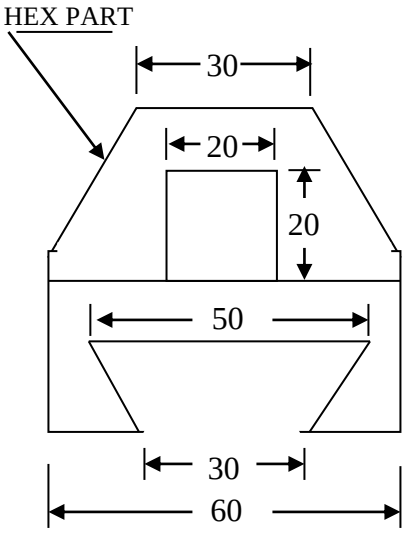




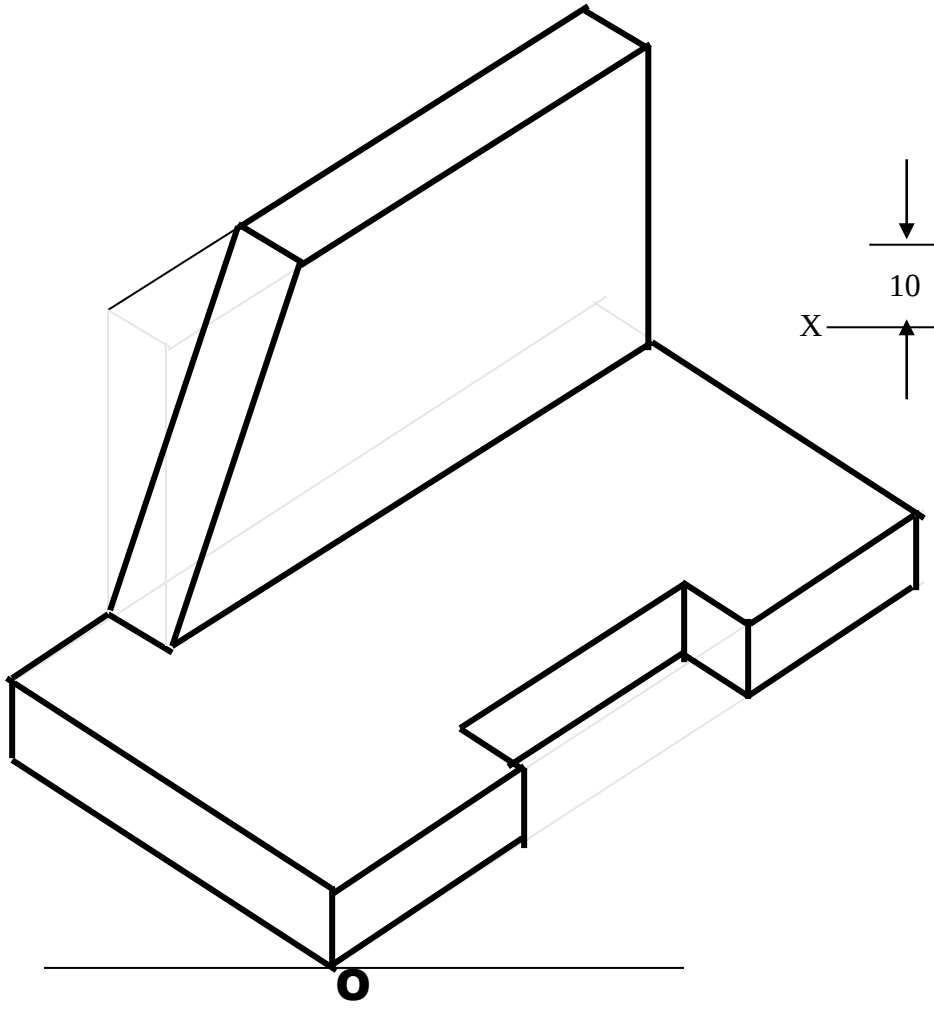
F.V. and S.V.of an object are given.
Draw it's isometric view.

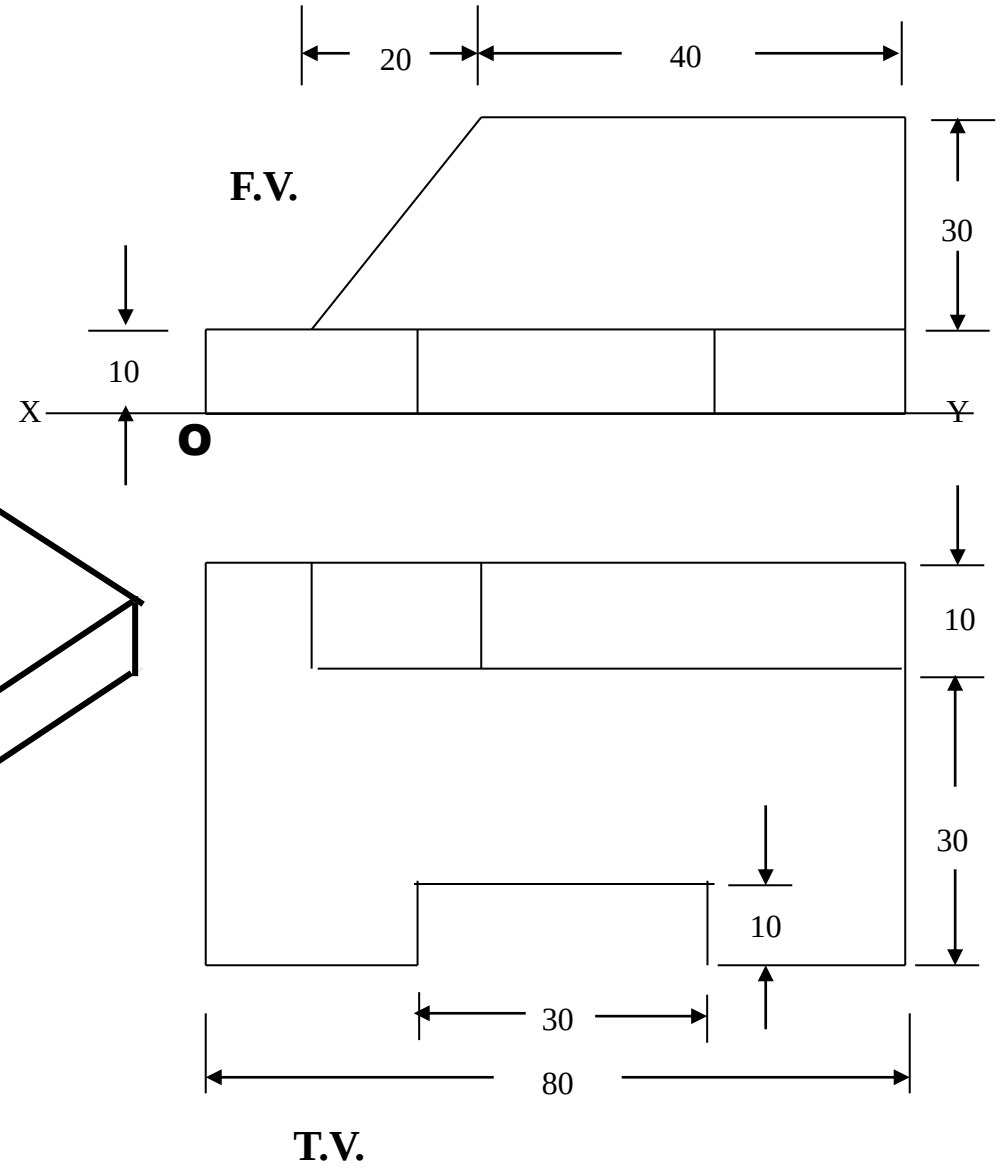




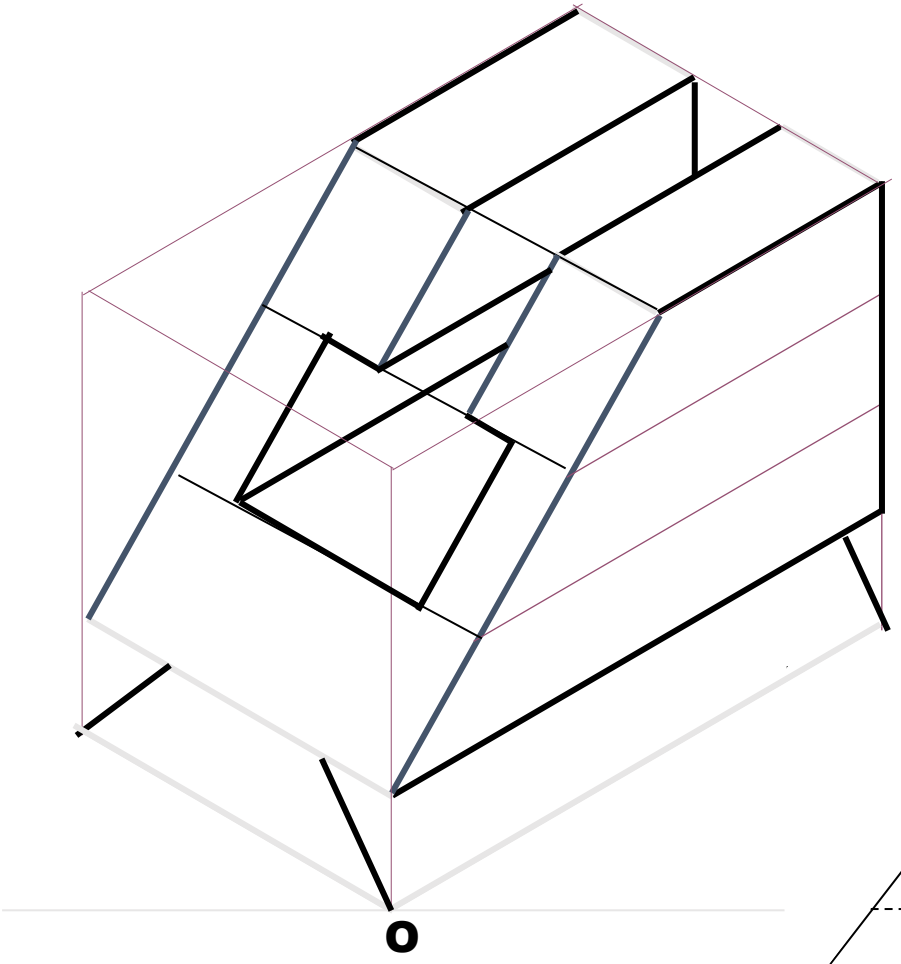


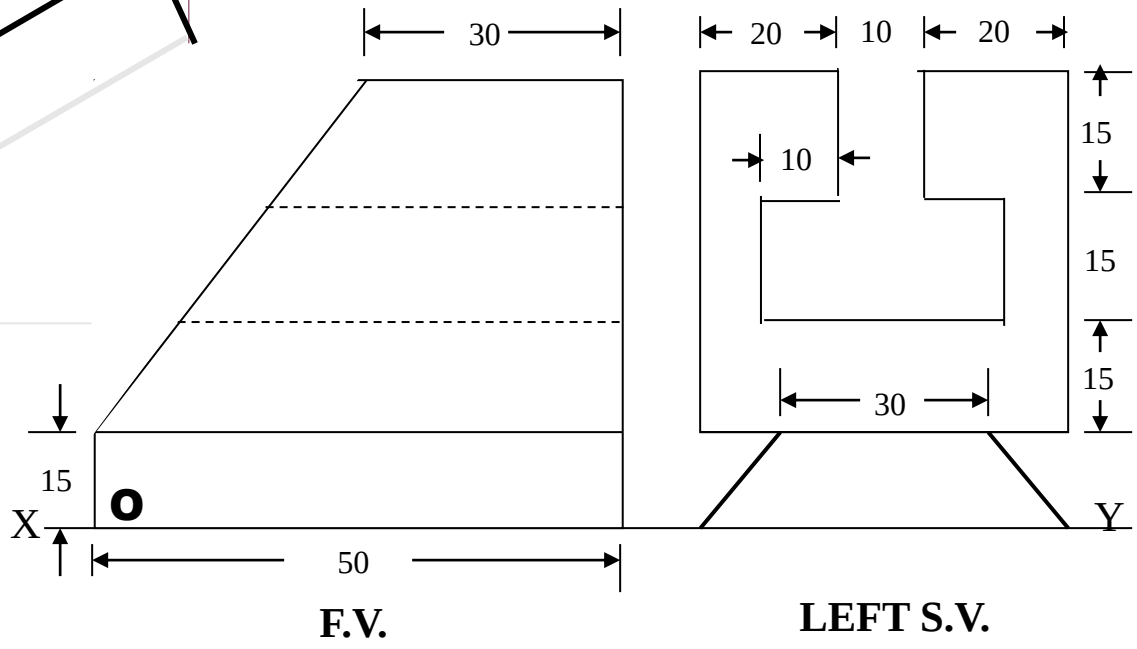
F.V. & T.V. of an object are given. Draw it's isometric view.





F.V. and S.V.of an object are given.
Draw it's isometric view.





Thank You