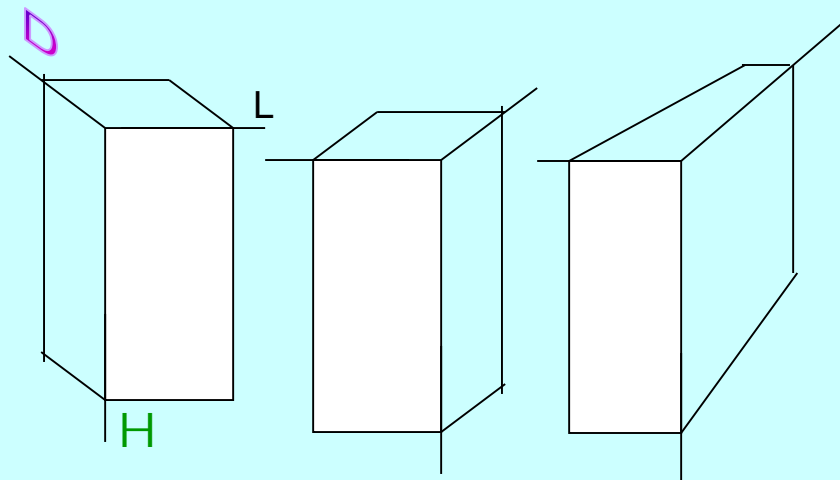


ISOMETRIC DRAWING

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.

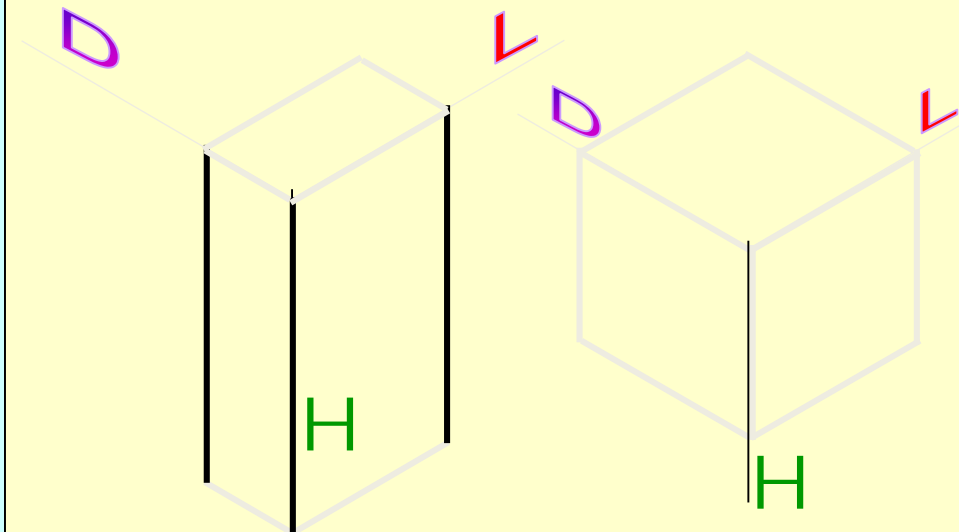
3-D DRAWINGS CAN BE DRAWN IN NUMEROUS WAYS AS SHOWN BELOW. ALL THESE DRAWINGS MAY BE CALLED 3-DIMENSIONAL DRAWINGS, OR PHOTOGRAPHIC OR PICTORIAL DRAWINGS. HERE NO SPECIFIC RELATION AMONG H, L & D AXES IS MAINTAINED.



TYPICAL CONDITION.

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

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 EQUAL INCLINATION AMONG H, L & D AXES. EACH IS 120° 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

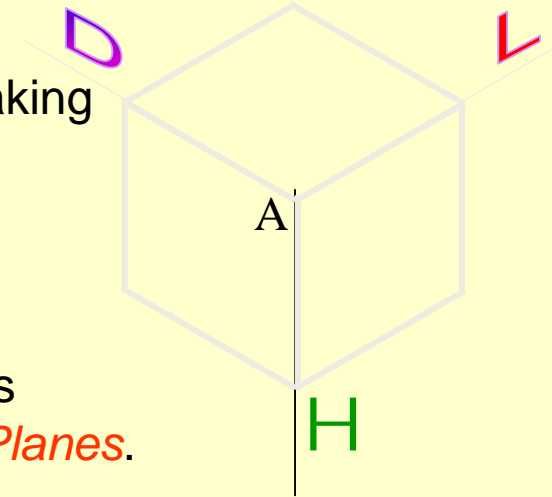
SOME IMPORTANT TERMS:

ISOMETRIC AXES, LINES AND PLANE

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

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

The planes representing the faces 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.

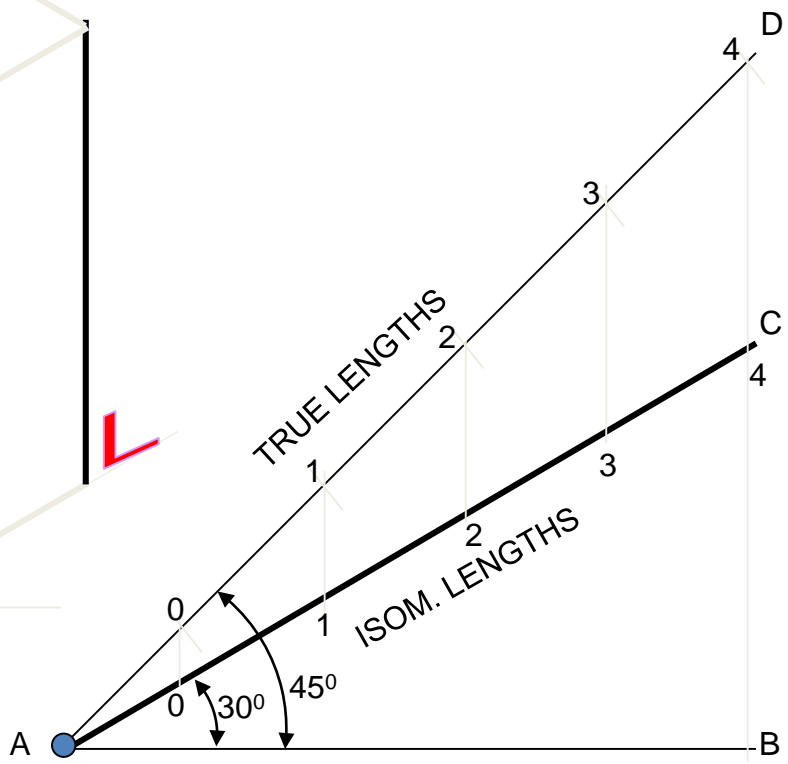
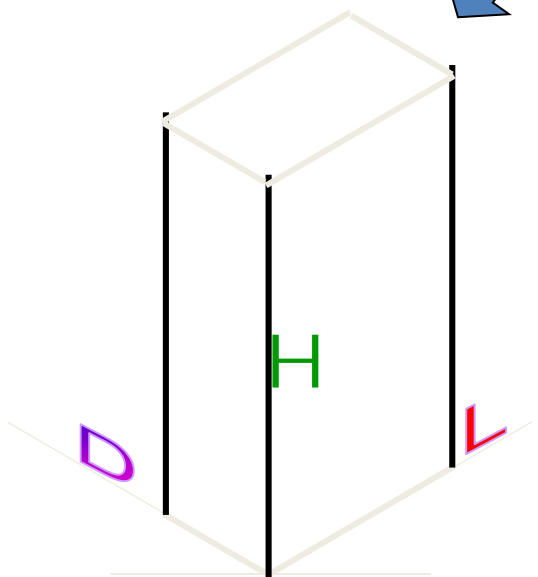
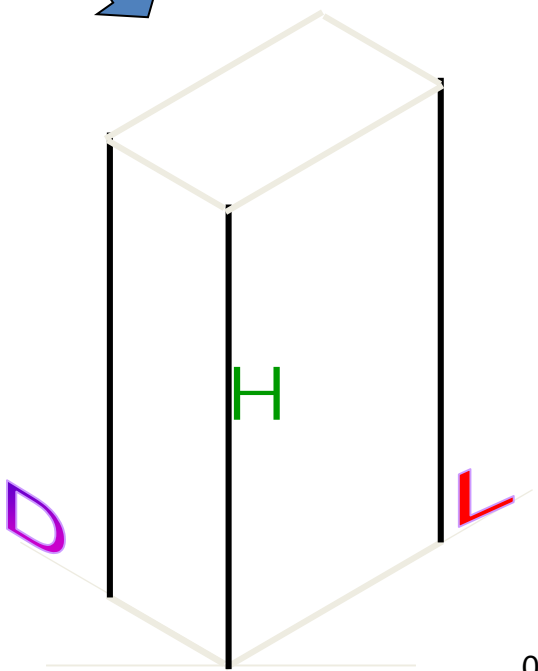
This reduction is 0.815 or $9/11$ (approx.) It forms a reducing scale which is used to draw isometric drawings and is called *Isometric scale*.

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° and 45° 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.

ISOMETRIC OF PLANE FIGURES

SHAPE

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

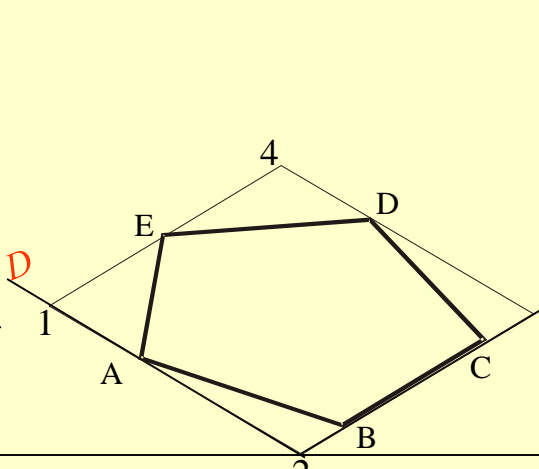
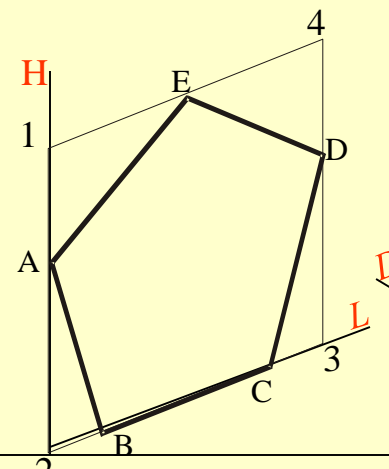
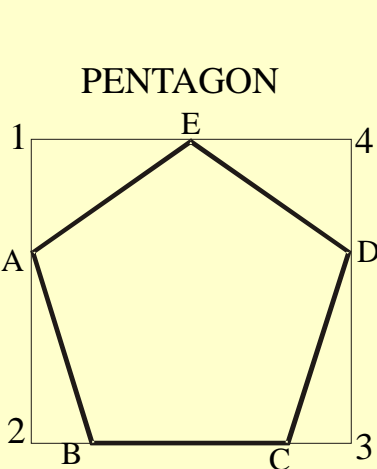
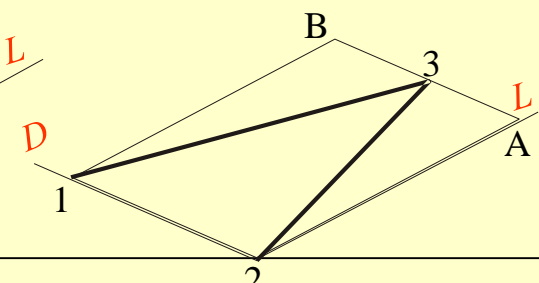
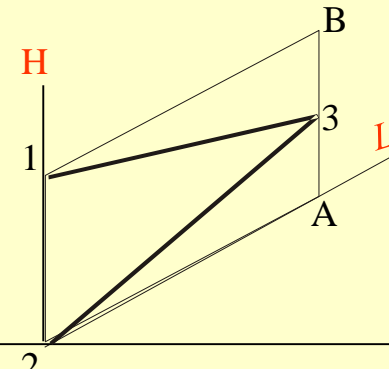
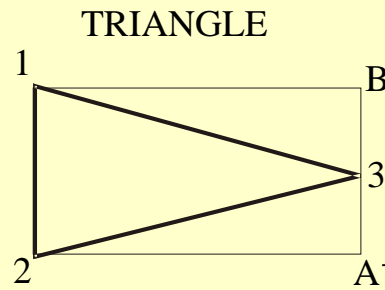
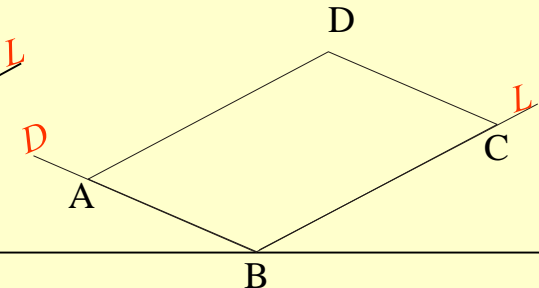
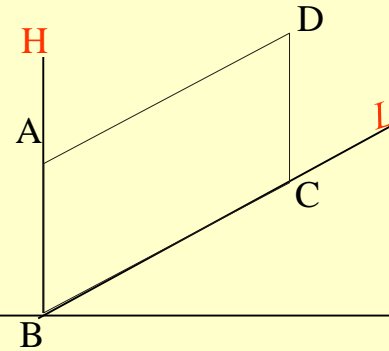
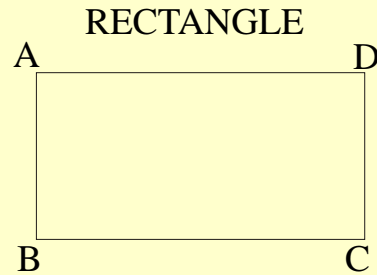
AS THESE ALL ARE 2-D FIGURES WE REQUIRE ONLY TWO ISOMETRIC AXES.

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

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

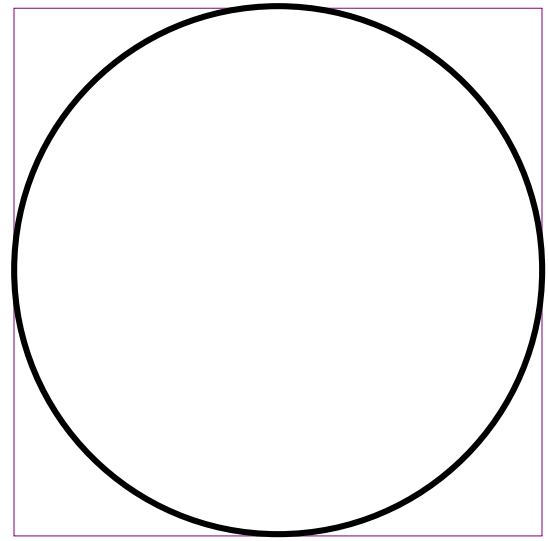
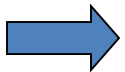
Shapes containing Inclined lines should be enclosed in a rectangle as shown.

Then first draw isom. of that rectangle and then inscribe that shape as it is.

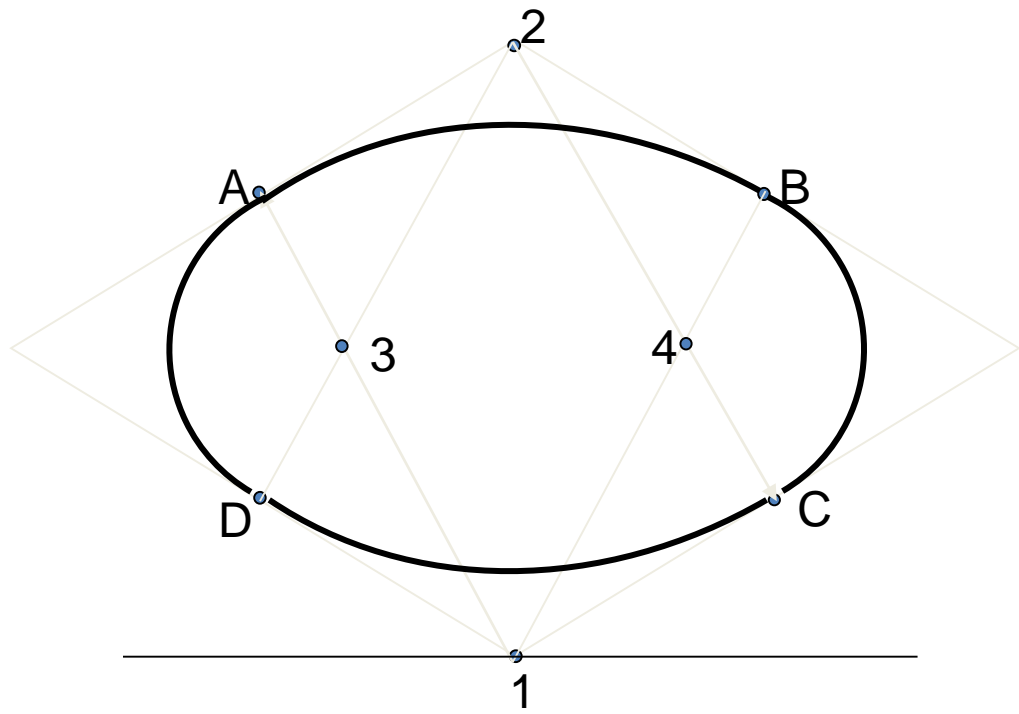


STUDY ILLUSTRATIONS

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

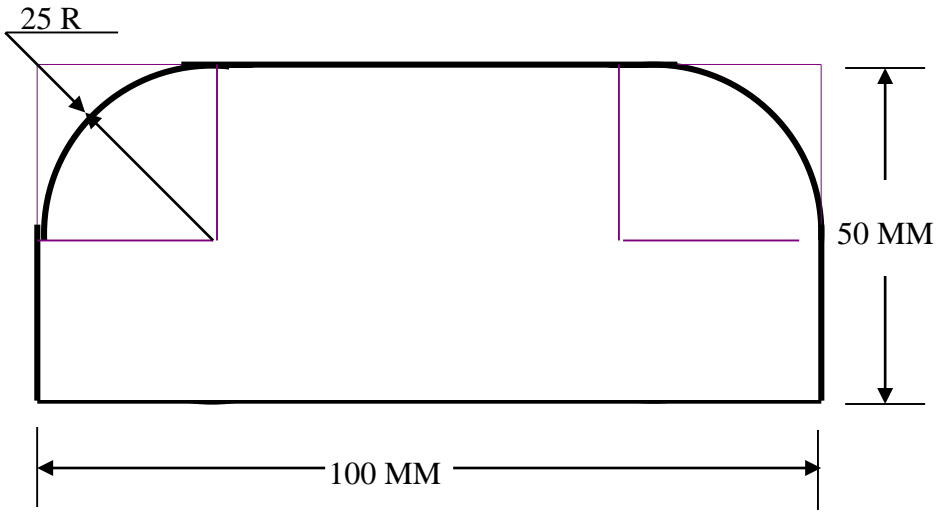


FIRST ENCLOSE IT IN A SQUARE.
IT'S ISOMETRIC IS A RHOMBUS WITH D & L AXES FOR TOP VIEW.
THEN USE H & L AXES FOR ISOMETRIC WHEN IT IS FRONT VIEW.
FOR CONSTRUCTION USE RHOMBUS METHOD SHOWN HERE. STUDY IT.



STUDY ILLUSTRATIONS

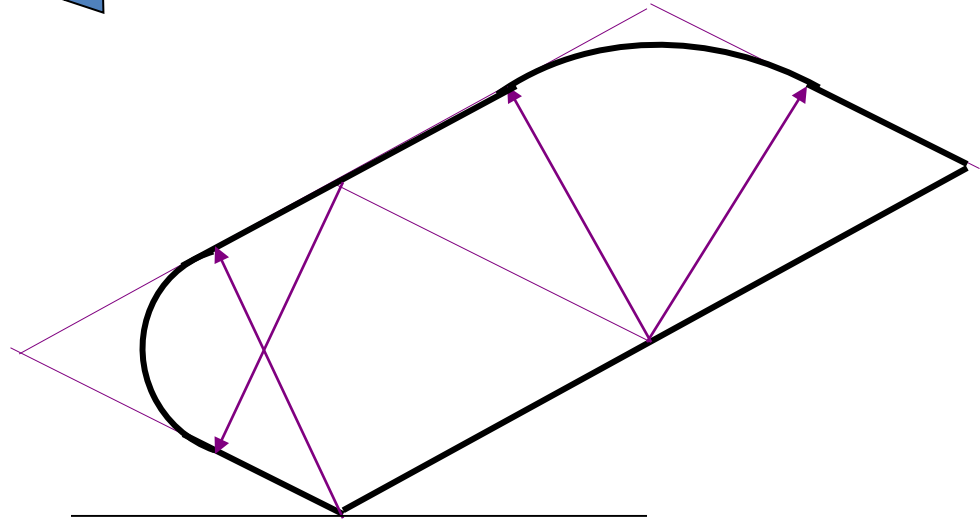
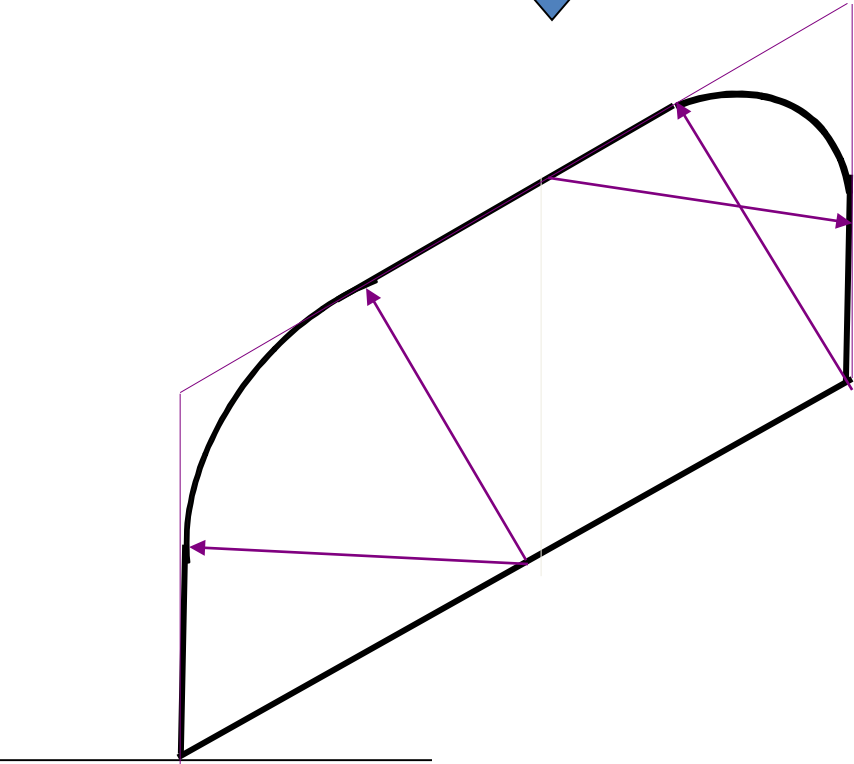
DRAW ISOMETRIC VIEW OF THE FIGURE SHOWN WITH DIMENSIONS (ON RIGHT SIDE) CONSIDERING IT FIRST AS F.V. AND THEN T.V.



IF FRONT VIEW



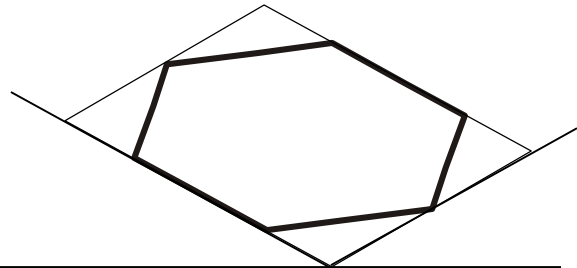
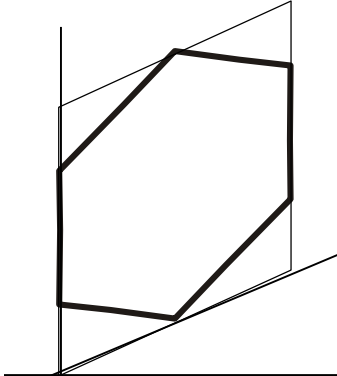
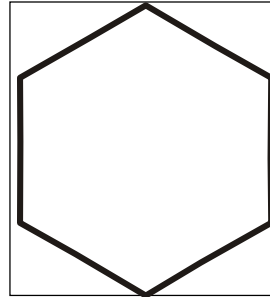
IF TOP VIEW



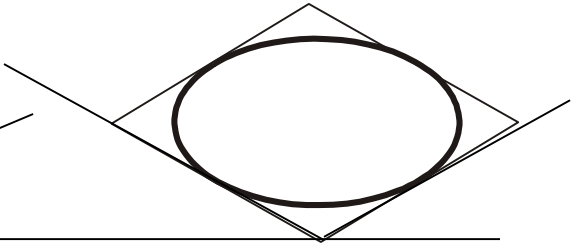
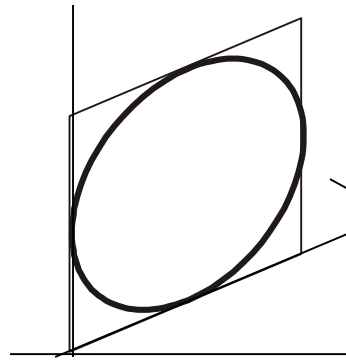
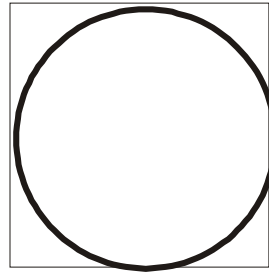
ISOMETRIC OF PLANE FIGURES

SHAPE	IF F.V.	IF T.V.
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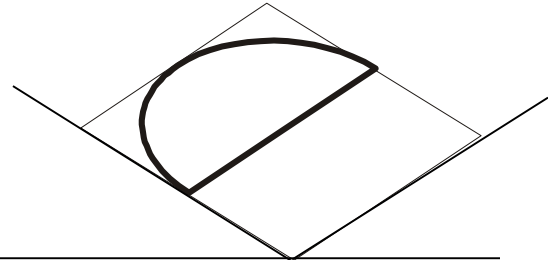
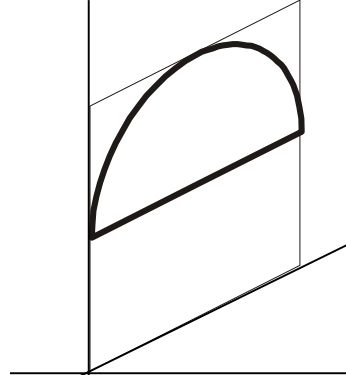
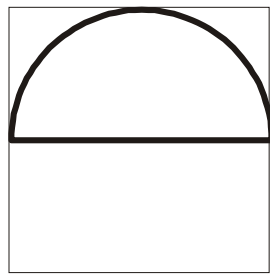
HEXAGON



CIRCLE



SEMI CIRCLE



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 Rhombus of sides equal to Diameter of circle always. (Ref. topic ENGG. CURVES.

For Isometric of
Circle/Semicircle
use Rhombus method.

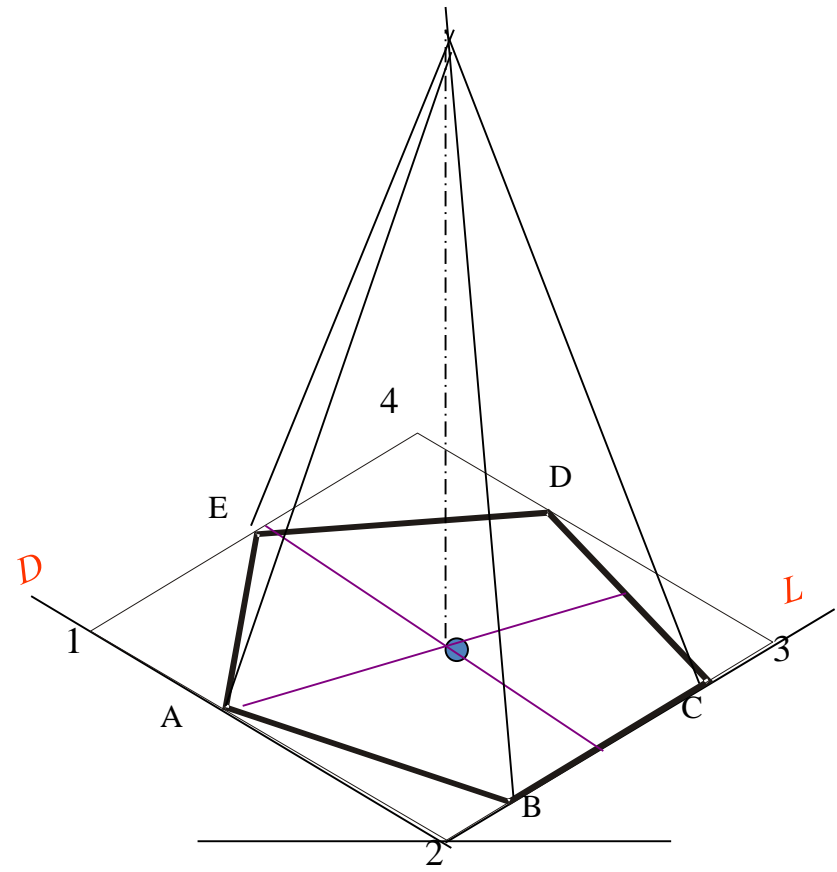
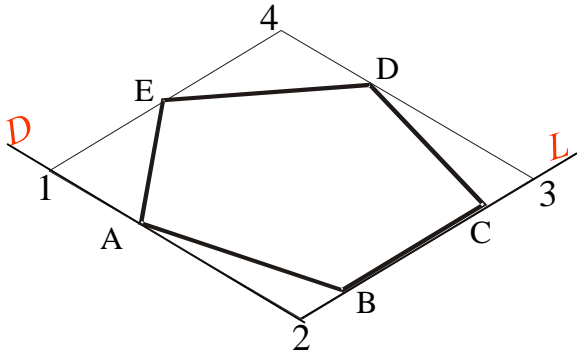
Construct it of sides equal
to diameter of circle always.
(Ref. Previous two pages.)

STUDY
ILLUSTRATIONS

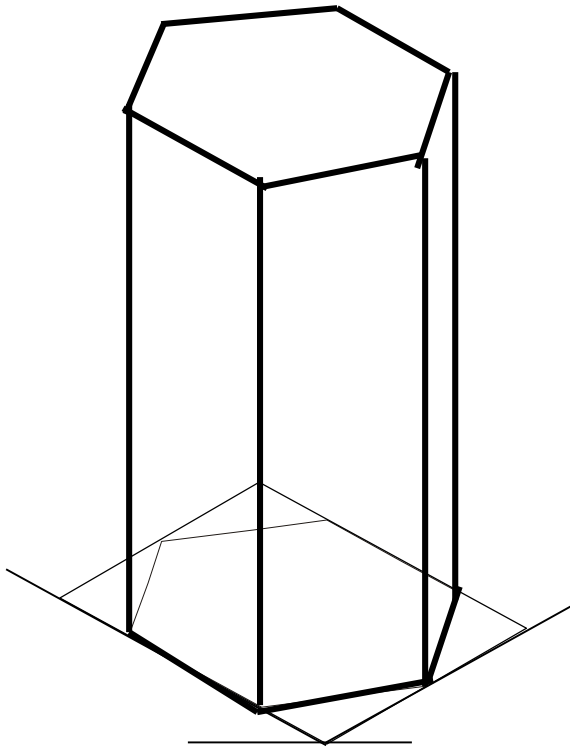
ISOMETRIC VIEW OF
PENTAGONAL PYRAMID
STANDING ON H.P.

(Height is added from center of pentagon)

ISOMETRIC VIEW OF BASE OF
PENTAGONAL PYRAMID
STANDING ON H.P.

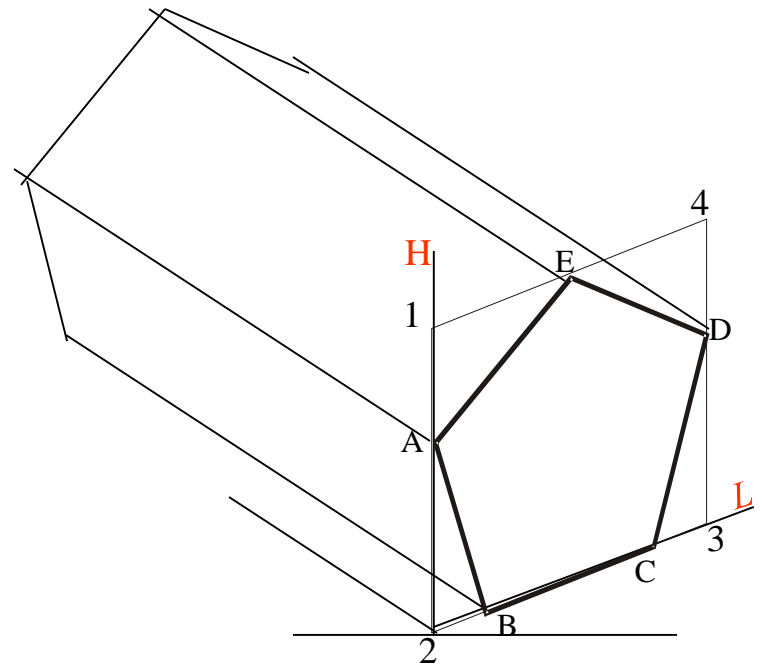


STUDY
ILLUSTRATIONS



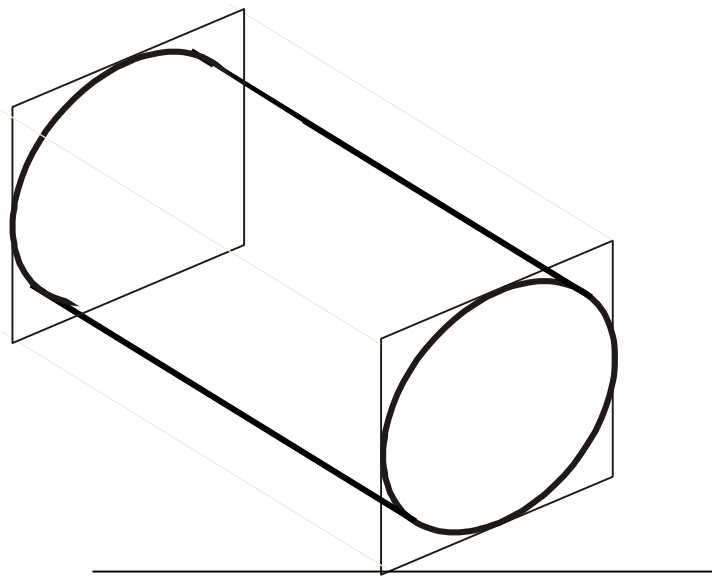
ISOMETRIC VIEW OF
HEXAGONAL PRISM
STANDING ON H.P.

ISOMETRIC VIEW OF
PENTAGONAL PRISM
LYING ON H.P.

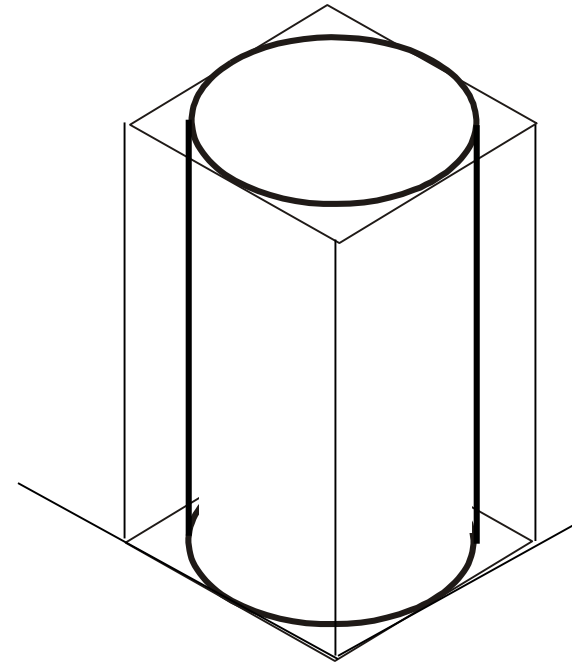


**STUDY
ILLUSTRATIONS**

CYLINDER STANDING ON H.P.

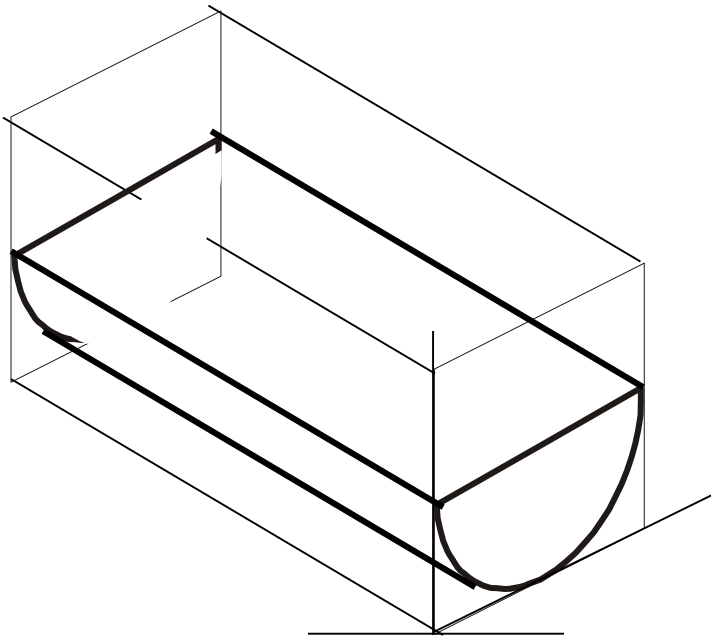


CYLINDER LYING ON H.P.

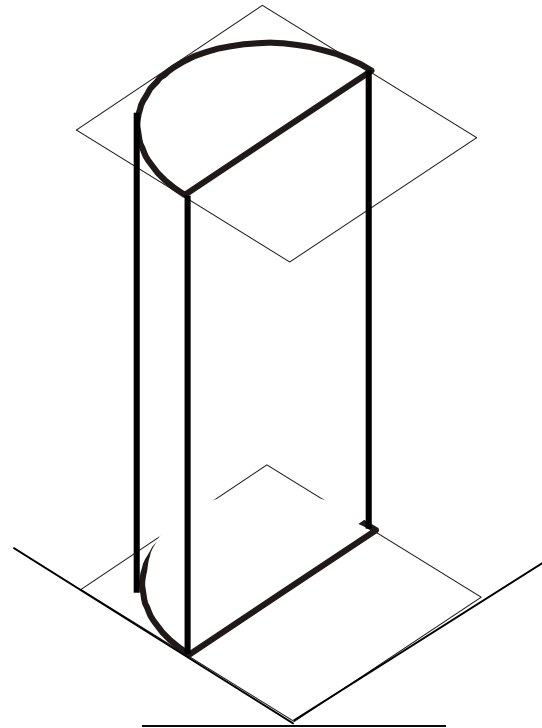


**STUDY
ILLUSTRATIONS**

**HALF CYLINDER
STANDING ON H.P.
(ON IT'S SEMICIRCULAR BASE)**

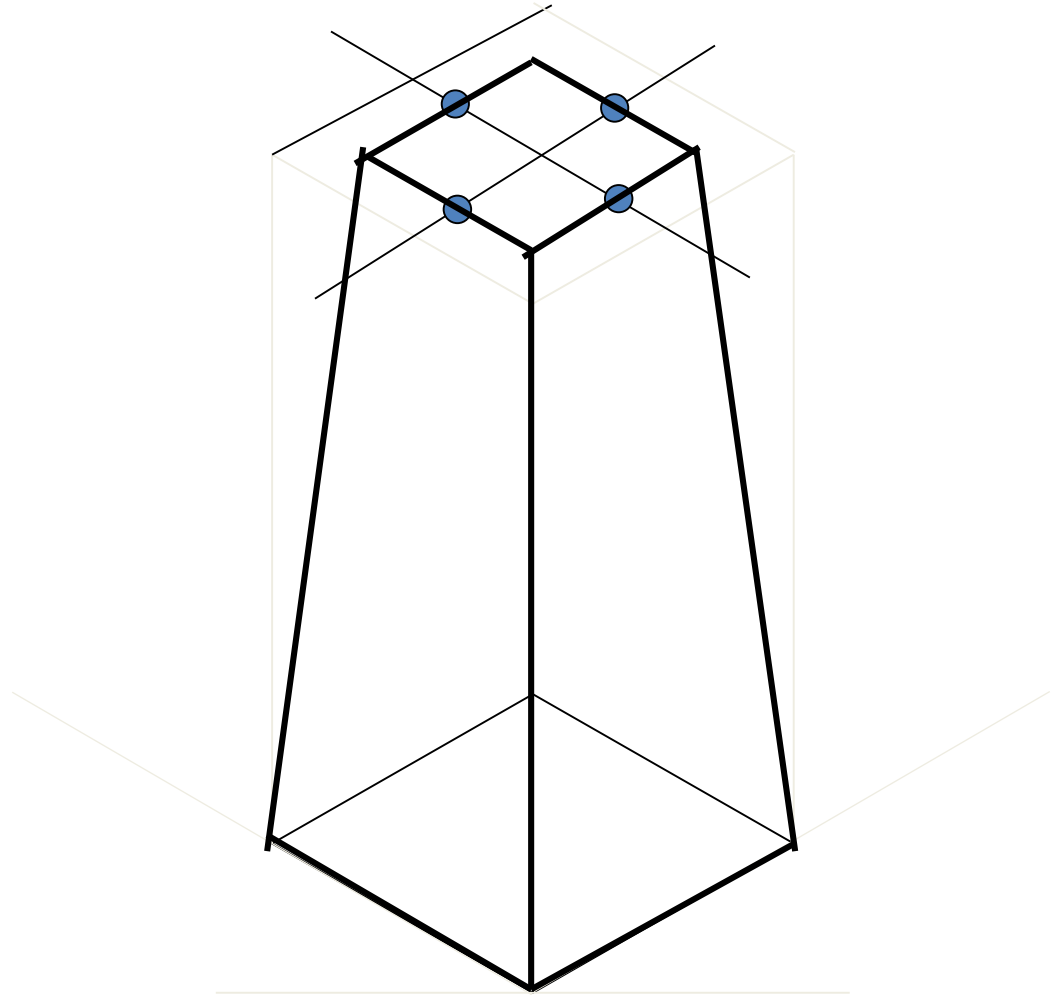
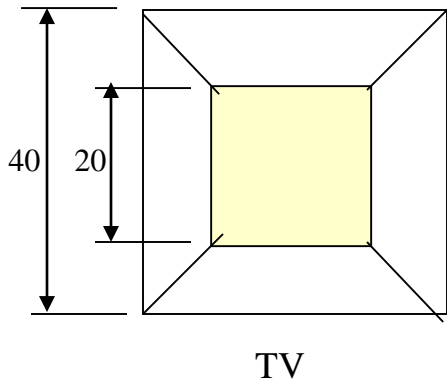
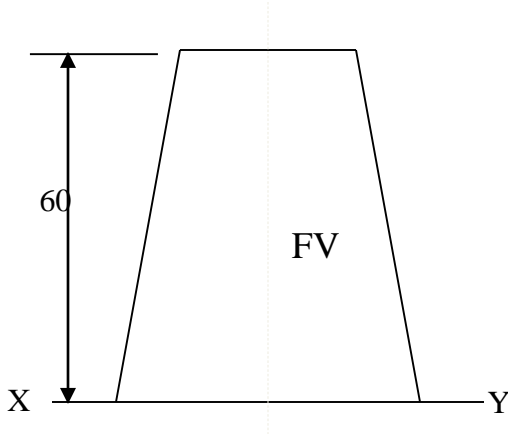


**HALF CYLINDER
LYING ON H.P.
(with flat face // to H.P.)**



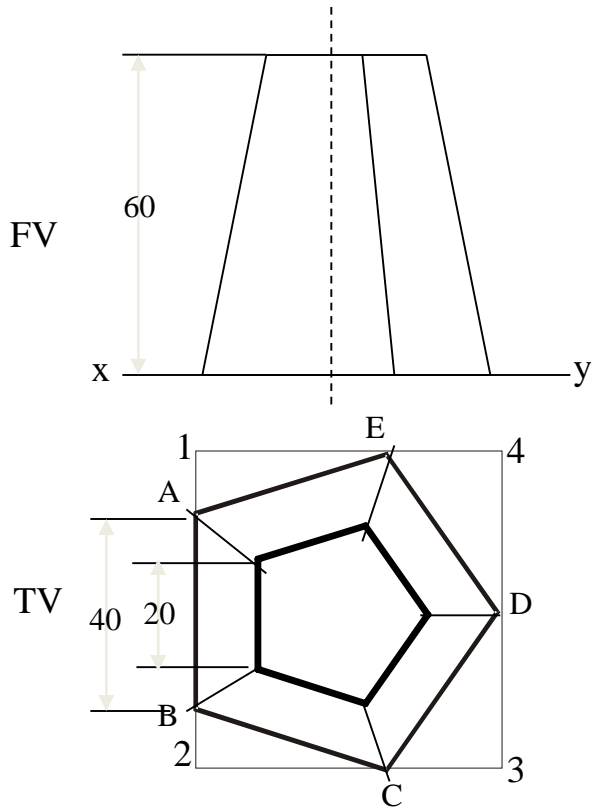
STUDY ILLUSTRATIONS

**ISOMETRIC VIEW OF
A FRUSTUM OF SQUARE PYRAMID
STANDING ON H.P. ON IT'S LARGER BASE.**



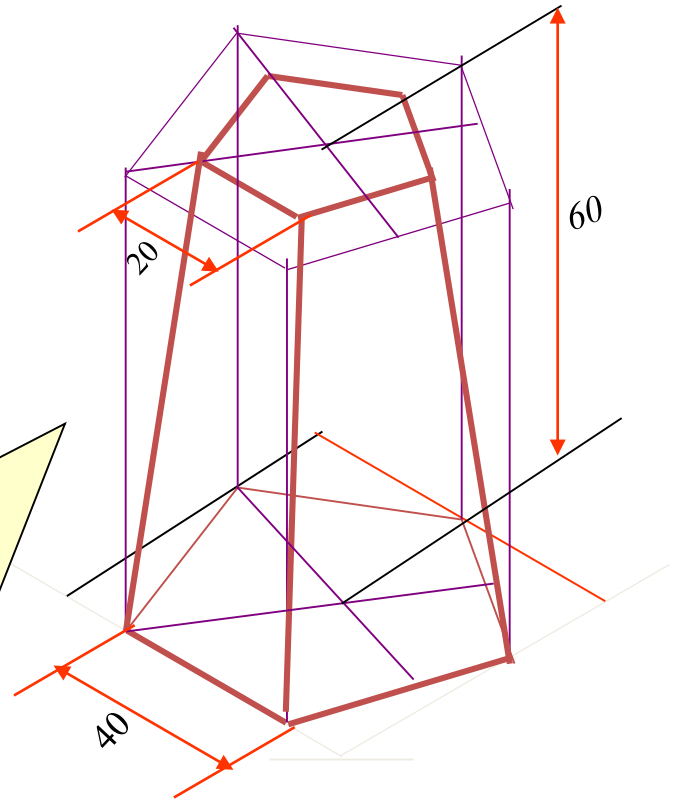
STUDY ILLUSTRATION

PROJECTIONS OF FRUSTOM OF PENTAGONAL PYRAMID ARE GIVEN.
DRAW IT'S ISOMETRIC VIEW.



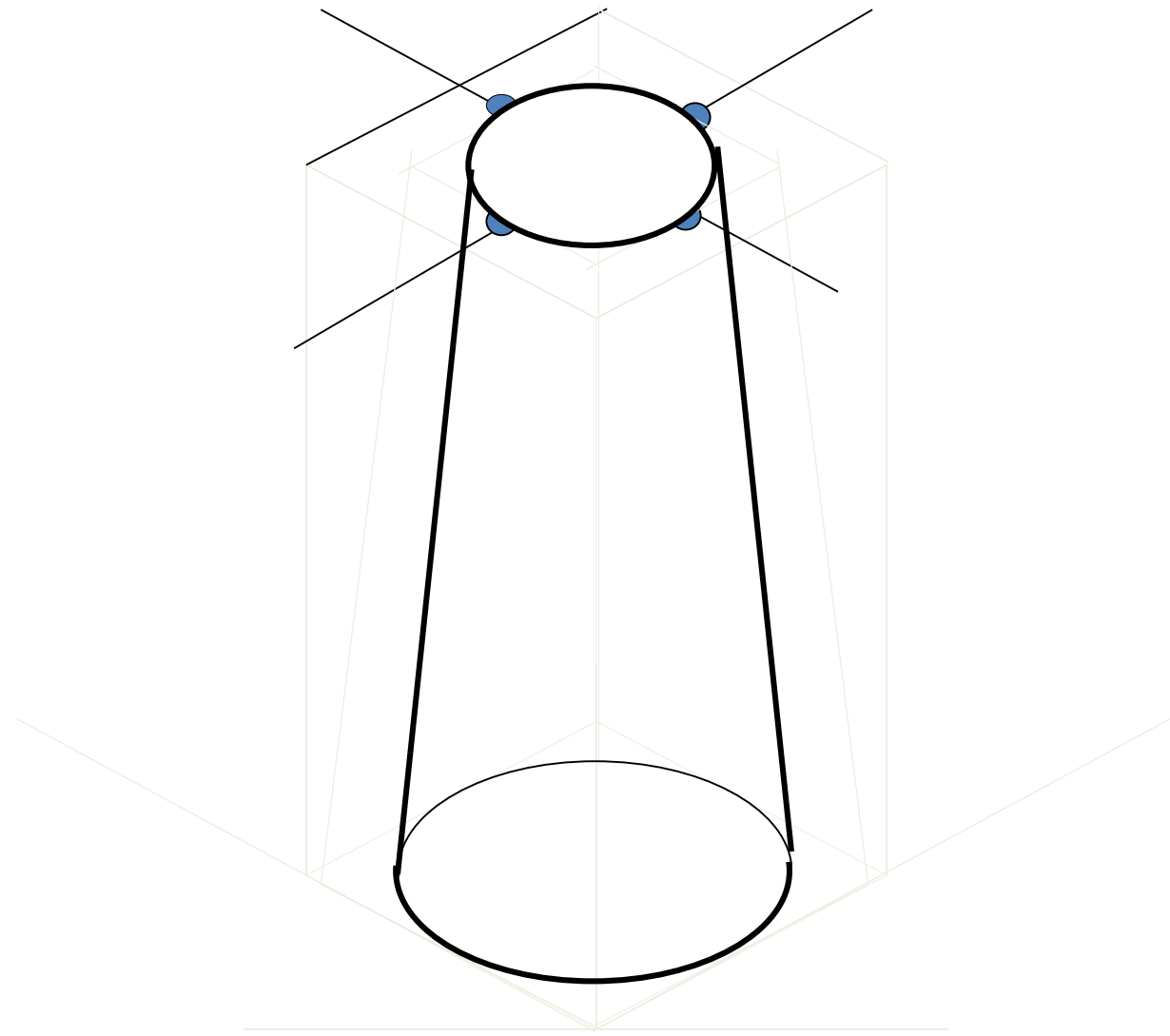
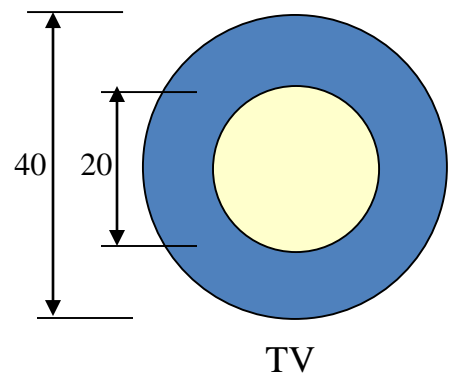
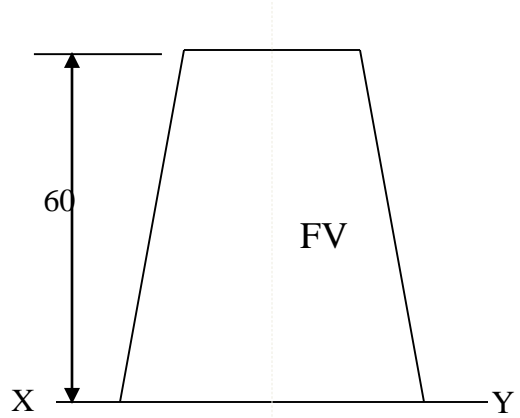
SOLUTION STEPS:
FIRST DRAW ISOMETRIC OF IT'S BASE.
THEN DRAWSAME SHAPE AS TOP, 60 MM ABOVE THE BASE PENTAGON CENTER.
THEN REDUCE THE TOP TO 20 MM SIDES AND JOIN WITH THE PROPER BASE CORNERS.

ISOMETRIC VIEW OF FRUSTOM OF PENTAGONAL PYRAMID



STUDY ILLUSTRATIONS

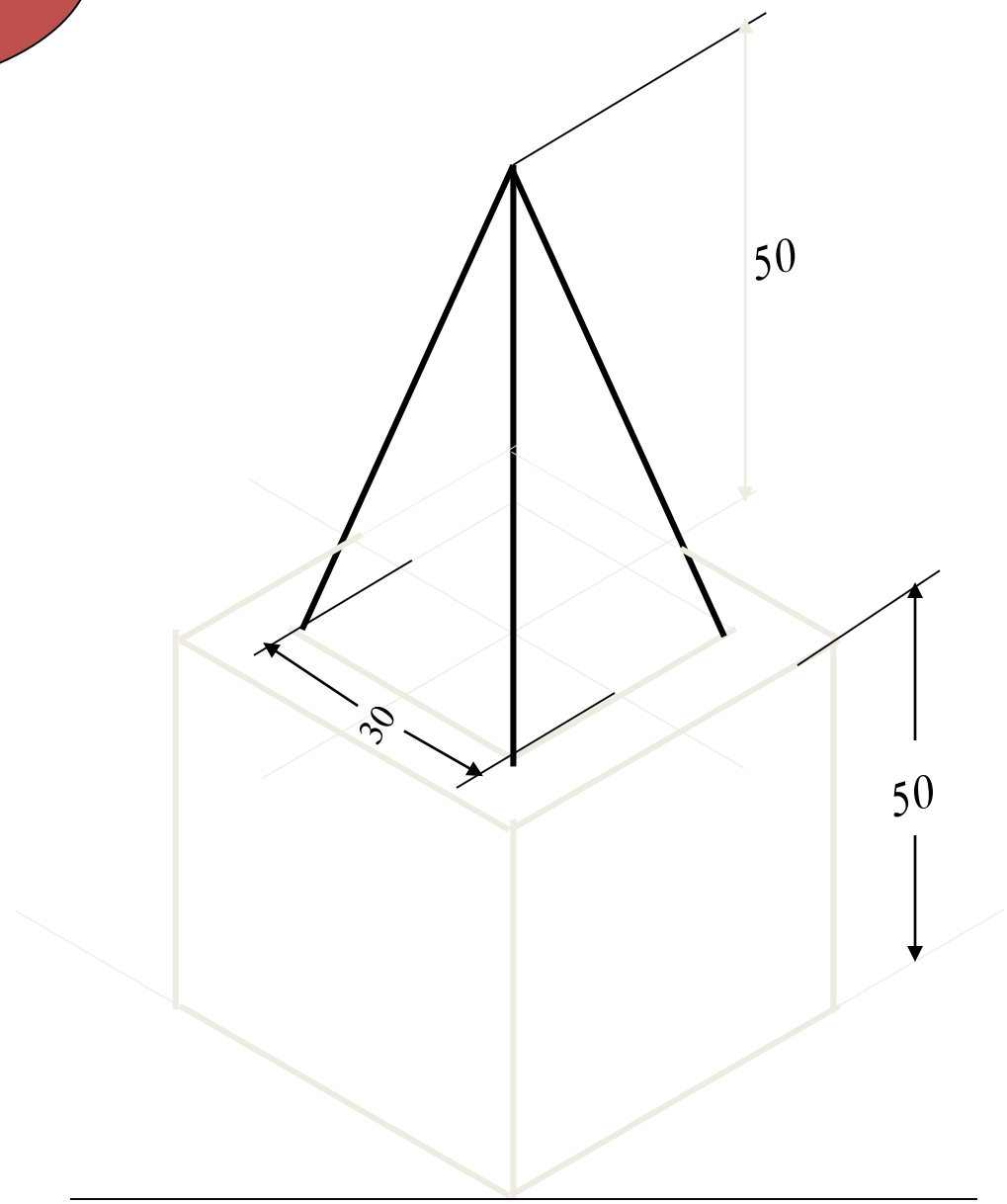
**ISOMETRIC VIEW OF
A FRUSTUM OF CONE
STANDING ON H.P. ON IT'S LARGER BASE.**





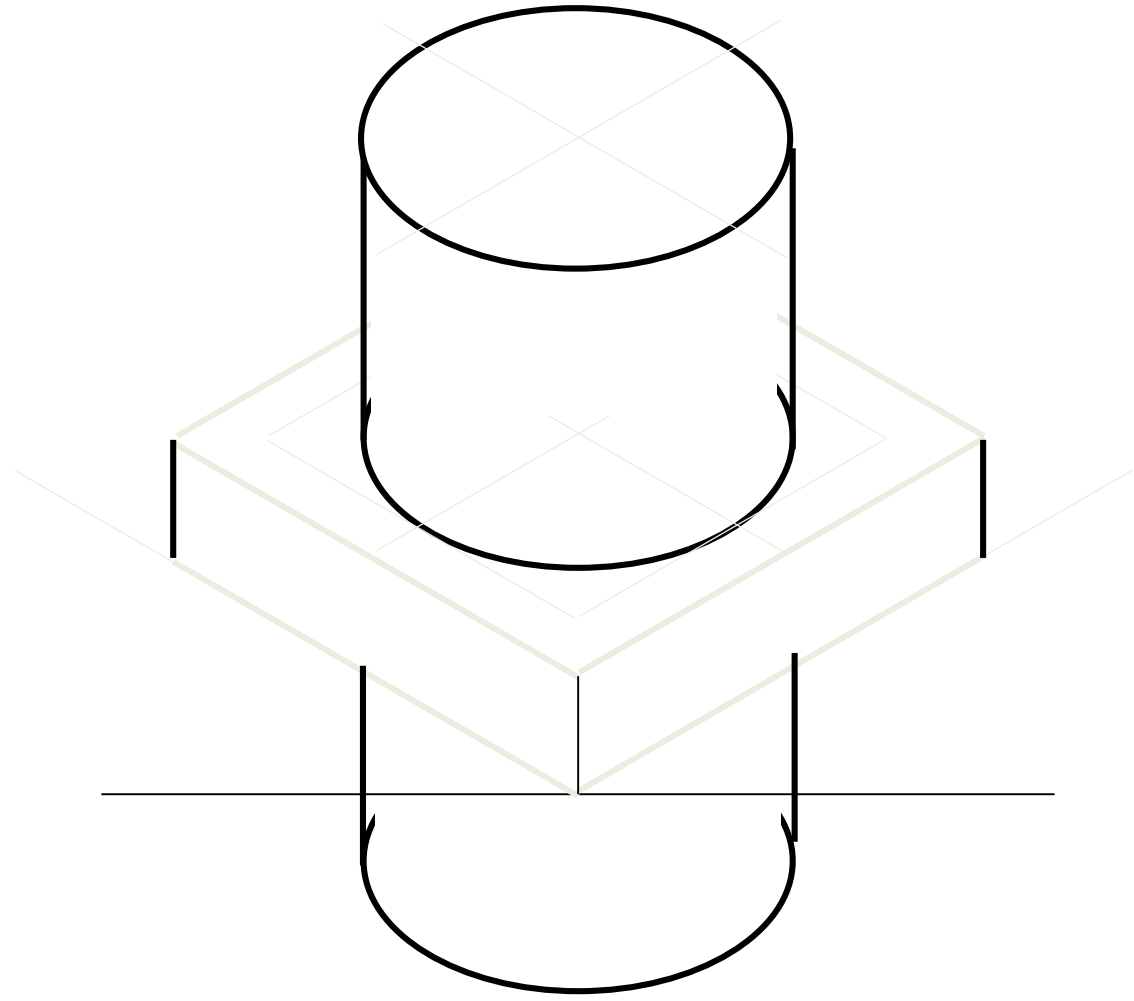
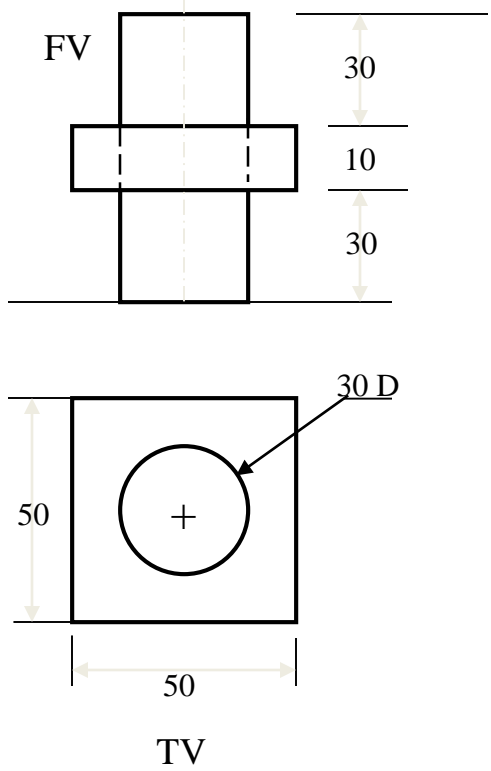
STUDY ILLUSTRATIONS

PROBLEM: A SQUARE PYRAMID OF 30 MM BASE SIDES AND 50 MM LONG AXIS, IS CENTRALLY PLACED ON THE TOP OF A CUBE OF 50 MM LONG EDGES. DRAW ISOMETRIC VIEW OF THE PAIR.



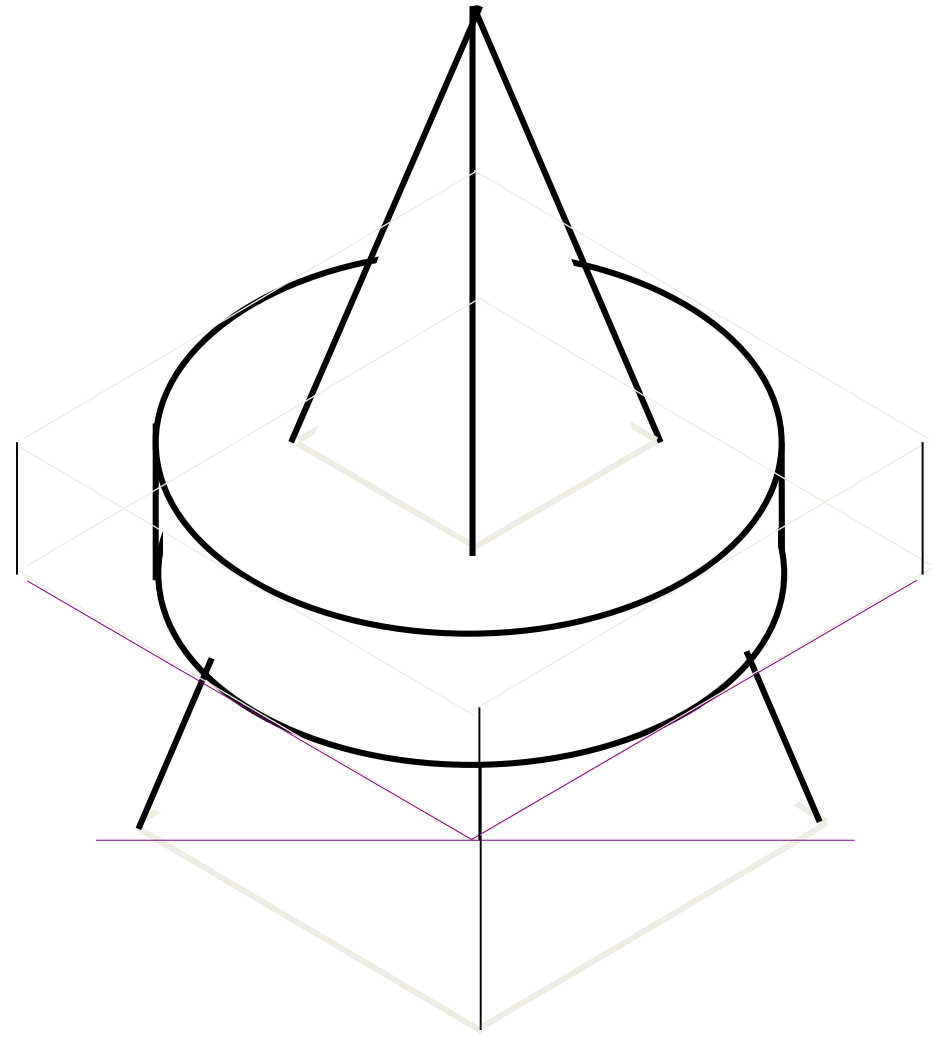
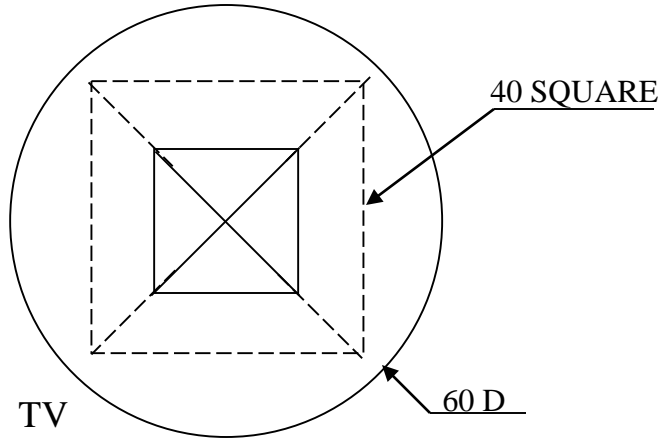
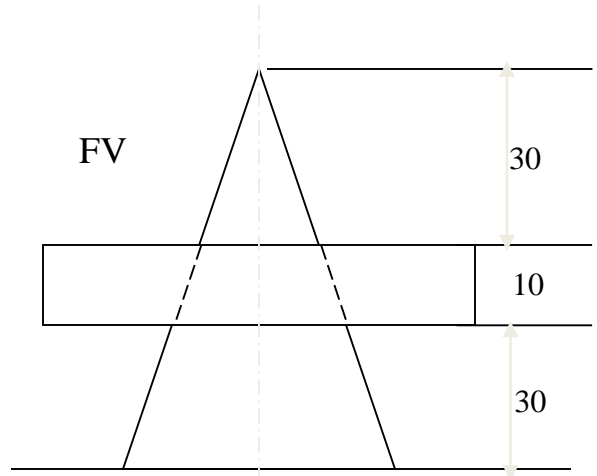
STUDY ILLUSTRATIONS

PROBLEM:
A SQUARE PLATE IS PIERCED THROUGH CENTRALLY BY A CYLINDER WHICH COMES OUT EQUALLY FROM BOTH FACES OF PLATE. IT'S FV & TV ARE SHOWN. DRAW ISOMETRIC VIEW.



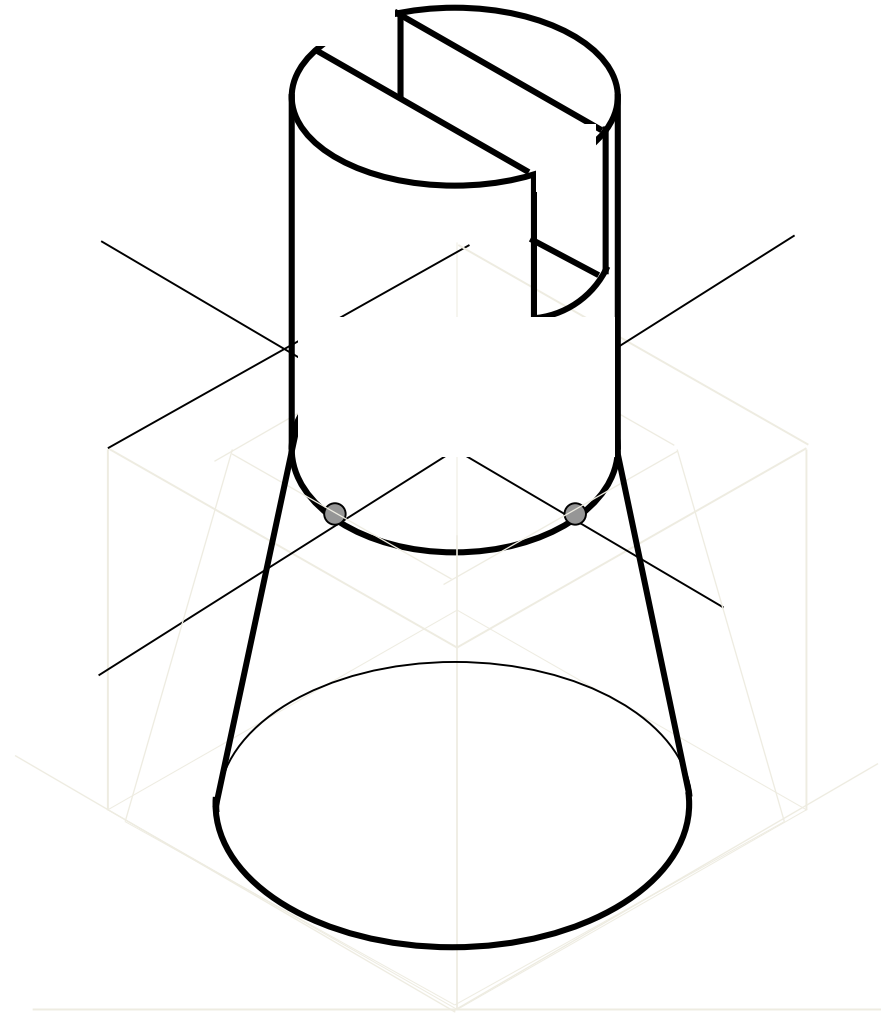
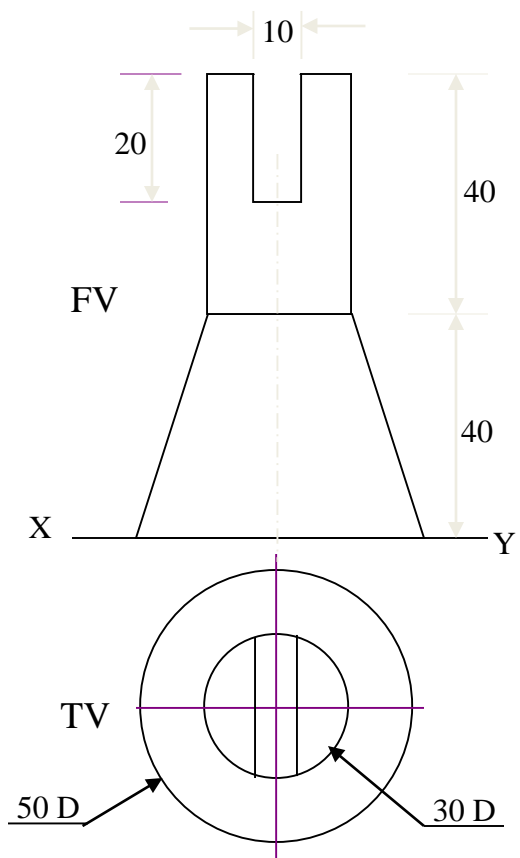
STUDY ILLUSTRATIONS

PROBLEM:
A CIRCULAR PLATE IS PIERCED THROUGH CENTRALLY BY A SQUARE PYRAMID WHICH COMES OUT EQUALLY FROM BOTH FACES OF PLATE. IT'S FV & TV ARE SHOWN. DRAW ISOMETRIC VIEW.

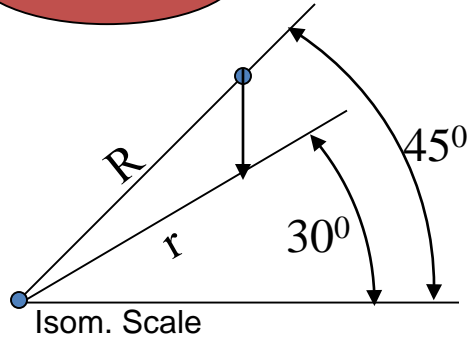


STUDY ILLUSTRATIONS

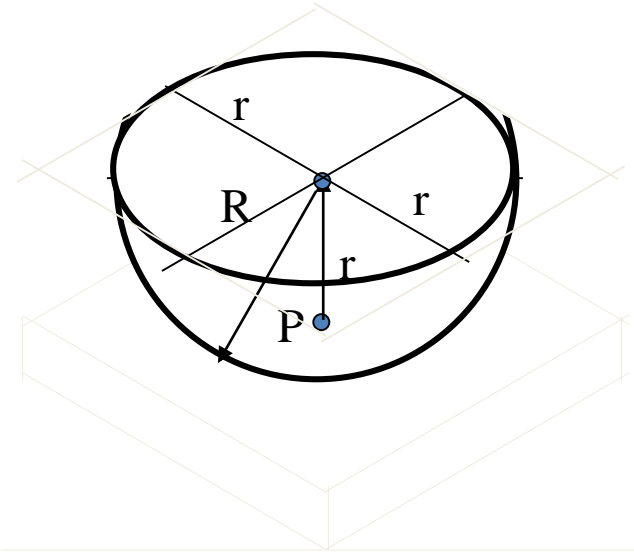
F.V. & T.V. of an object are given. Draw its isometric view.



ISOMETRIC PROJECTIONS OF SPHERE & HEMISPHERE

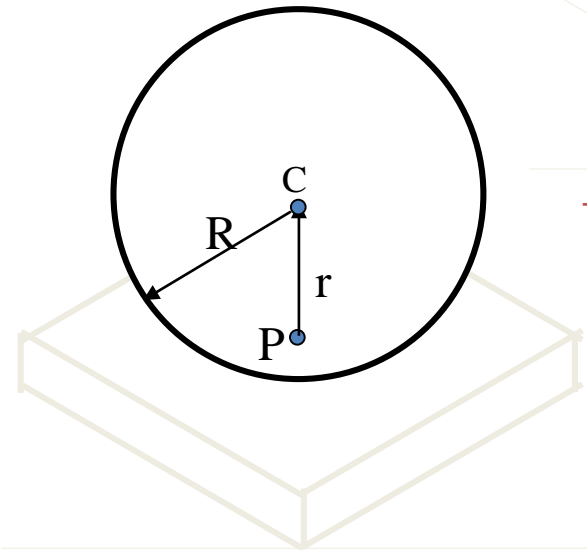
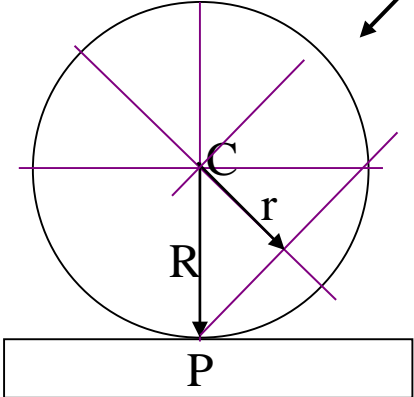


Iso-Direction



TO DRAW ISOMETRIC PROJECTION OF A HEMISPHERE

Adopt same procedure. Draw lower semicircle only. Then around 'C' construct Rhombus of Sides equal to Isometric Diameter. For this use iso-scale. Then construct ellipse in this Rhombus as usual And Complete Isometric-Projection of Hemi-sphere.



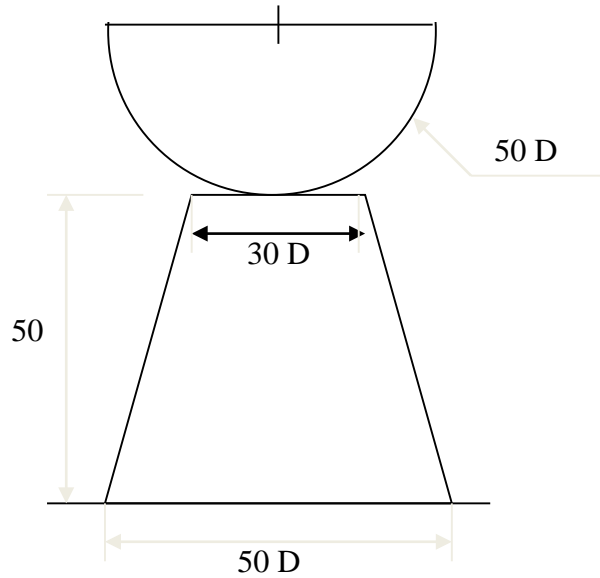
TO DRAW ISOMETRIC PROJECTION OF A SPHERE

1. FIRST DRAW ISOMETRIC OF SQUARE PLATE.
2. LOCATE IT'S CENTER. NAME IT P.
3. FROM P DRAW VERTICAL LINE UPWARD, LENGTH ' r mm' AND LOCATE CENTER OF SPHERE "C"
4. 'C' AS CENTER, WITH RADIUS 'R' DRAW CIRCLE.
THIS IS ISOMETRIC PROJECTION OF A SPHERE.

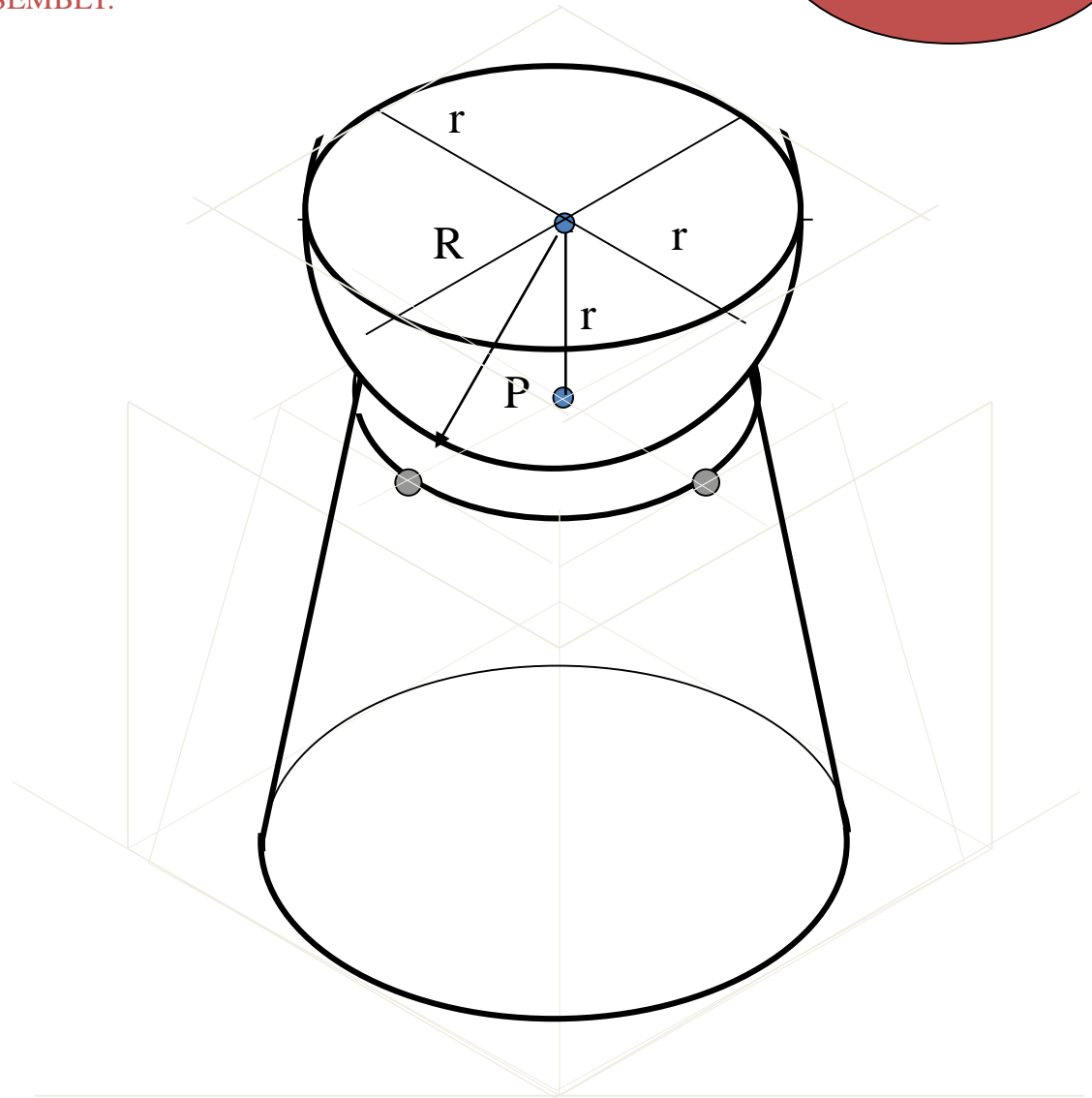
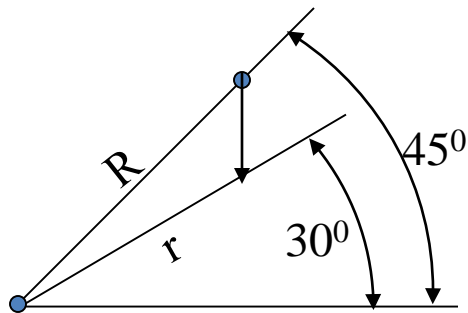
C = Center of Sphere.
P = Point of contact
R = True Radius of Sphere
r = Isometric Radius.

PROBLEM:

A HEMI-SPHERE IS CENTRALLY PLACED ON THE TOP OF A FRUSTUM OF CONE.
ON THE TOP OF A FRUSTUM OF CONE.
DRAW ISOMETRIC PROJECTIONS OF THE ASSEMBLY.

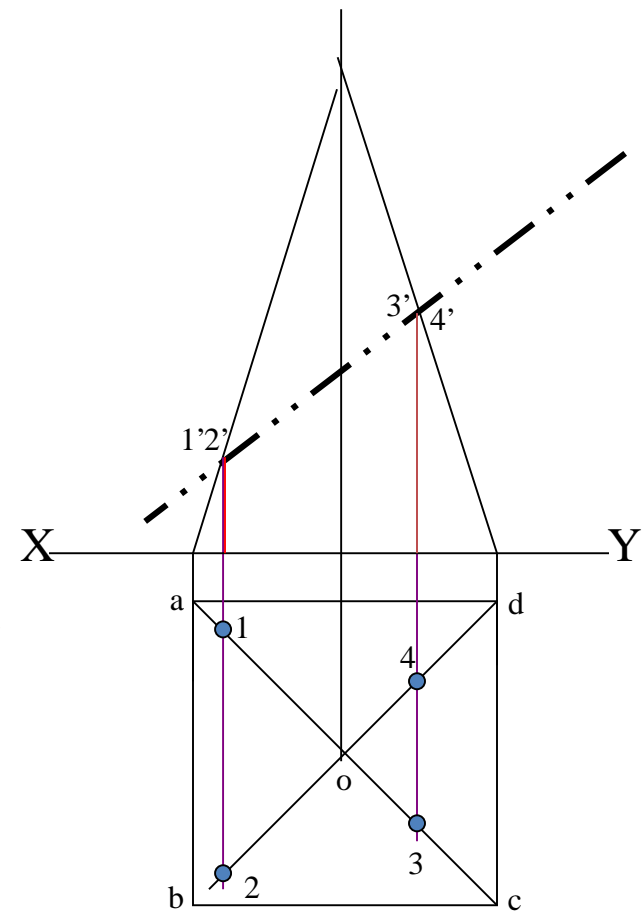
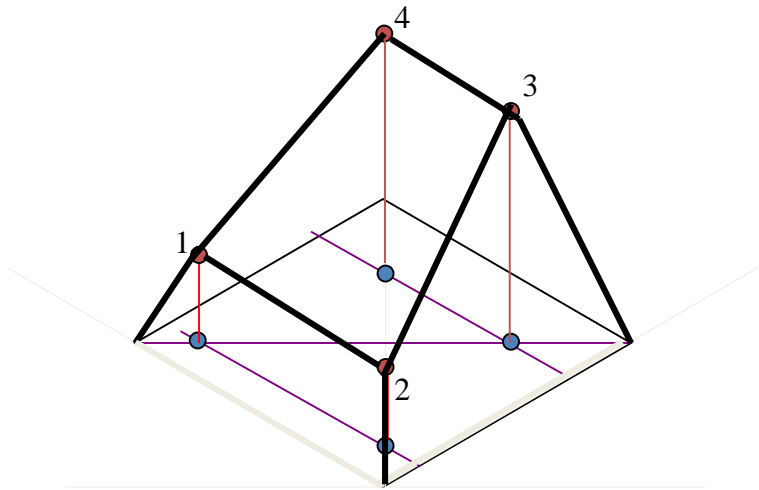


FIRST CONSTRUCT ISOMETRIC SCALE.
USE THIS SCALE FOR ALL DIMENSIONS
IN THIS PROBLEM.



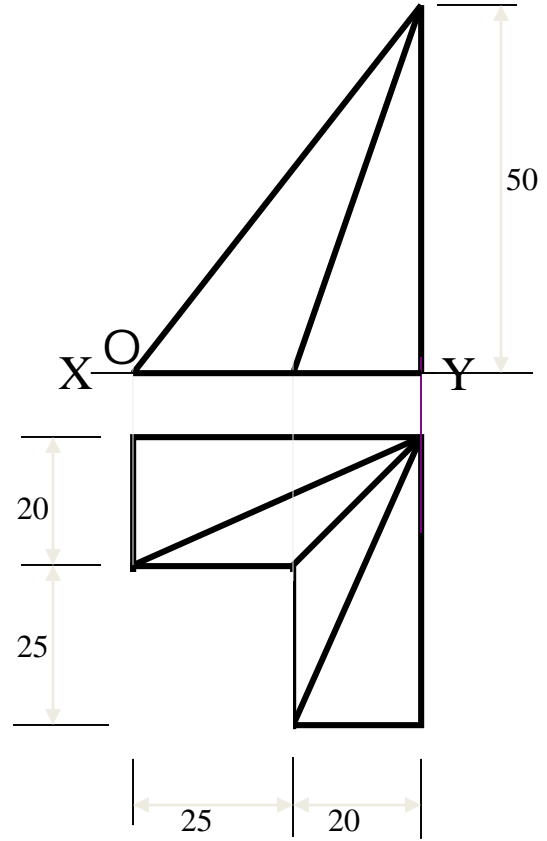
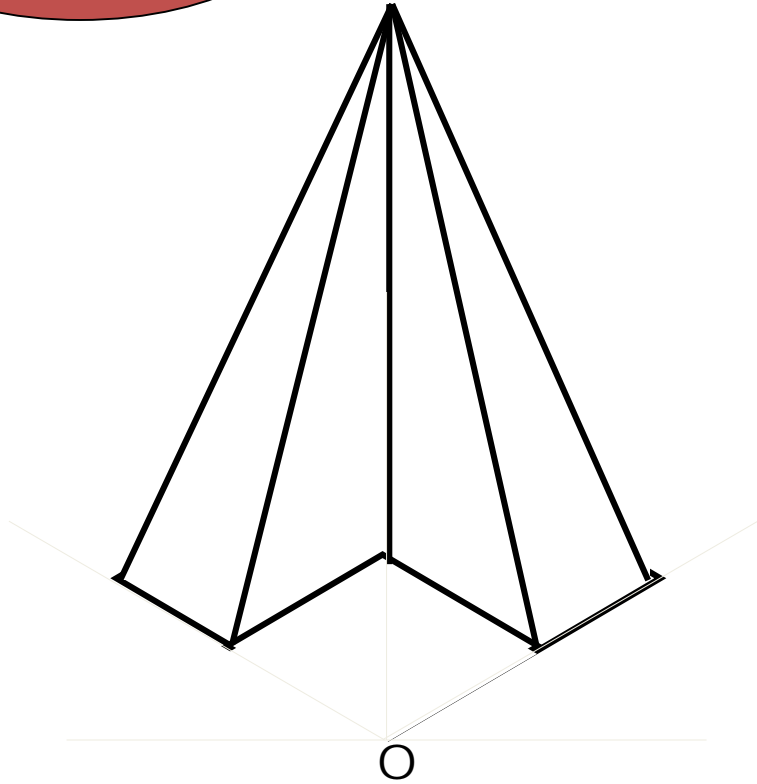
STUDY ILLUSTRATIONS

A SQUARE PYRAMID OF 40 MM BASE SIDES AND 60 MM AXIS IS CUT BY AN INCLINED SECTION PLANE THROUGH THE MID POINT OF AXIS AS SHOWN. DRAW ISOMETRIC VIEW OF SECTION OF PYRAMID.



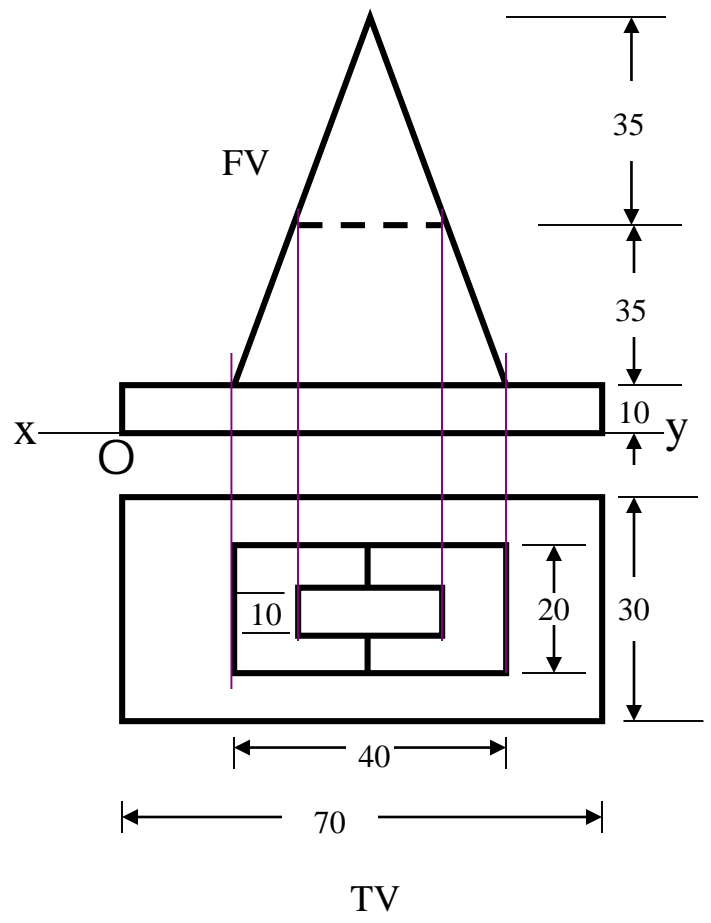
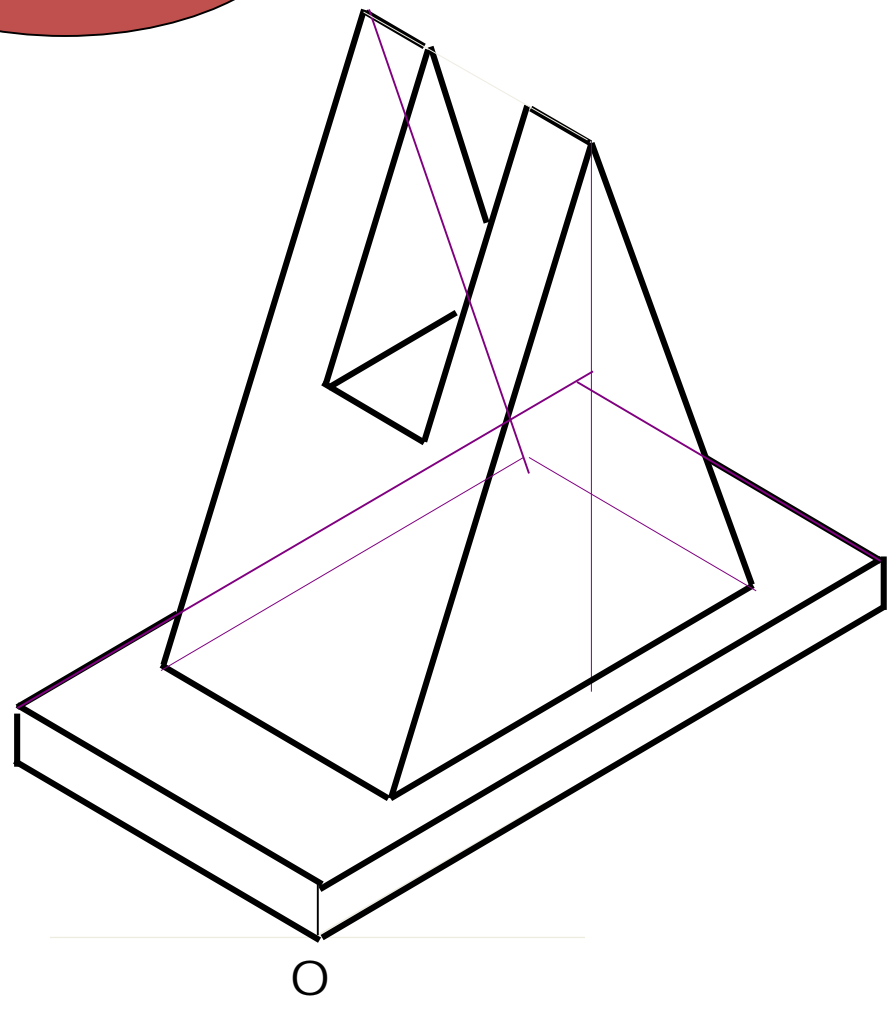
**STUDY
ILLUSTRATIONS**

F.V. & T.V. of an object are given. Draw its isometric view.



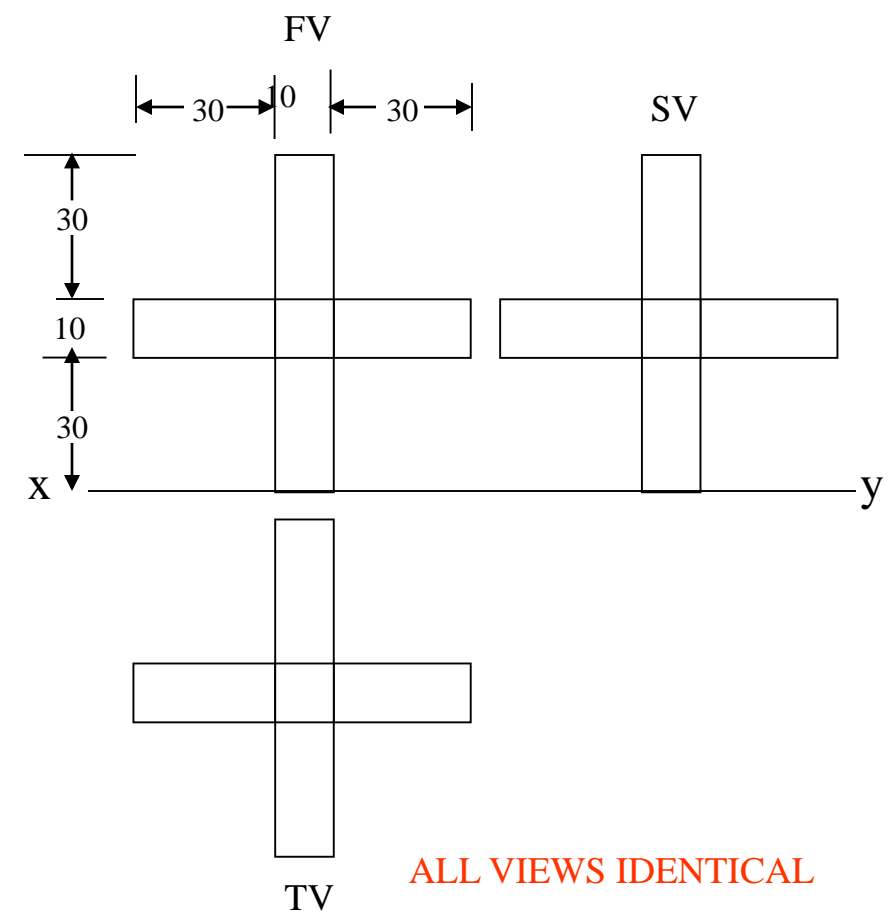
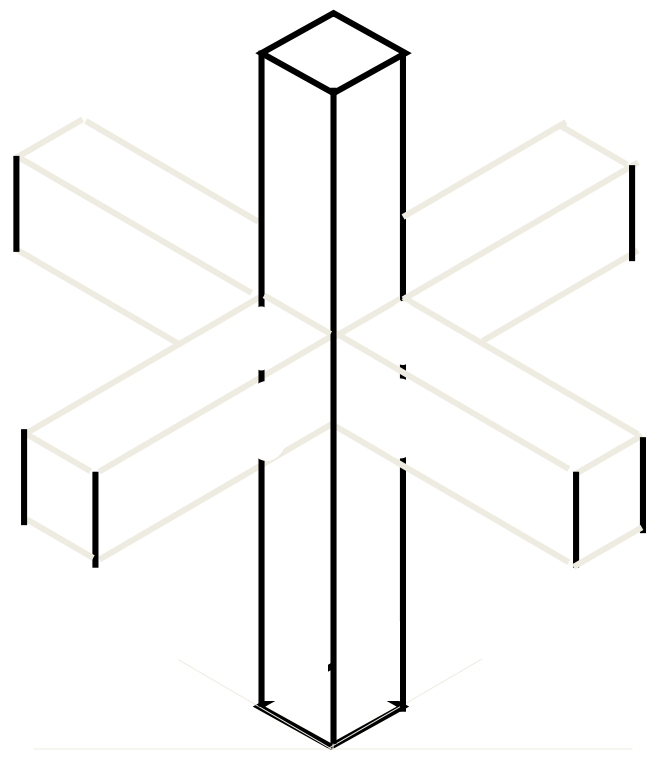
STUDY ILLUSTRATIONS

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STUDY ILLUSTRATIONS

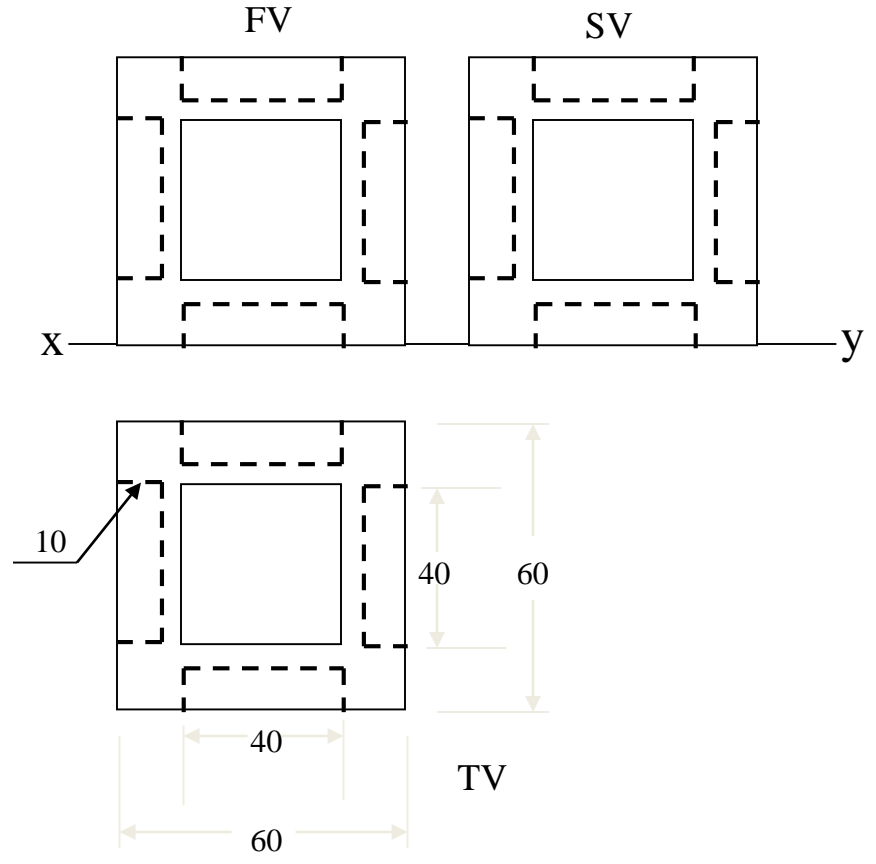
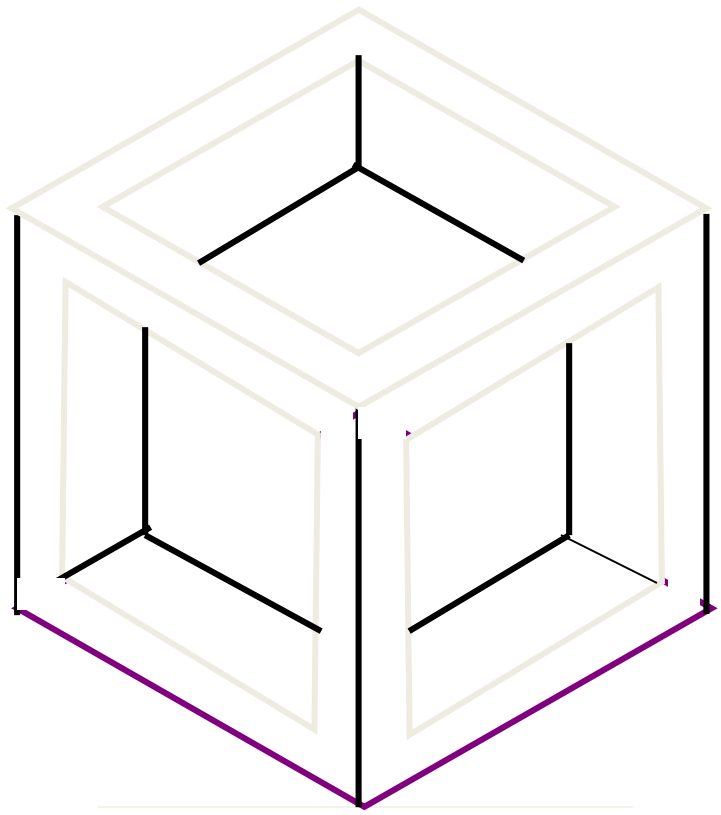
F.V. & T.V. and S.V. of an object are given. Draw its isometric view



STUDY ILLUSTRATIONS

F.V. & T.V. and S.V. of an object are given. Draw its isometric view

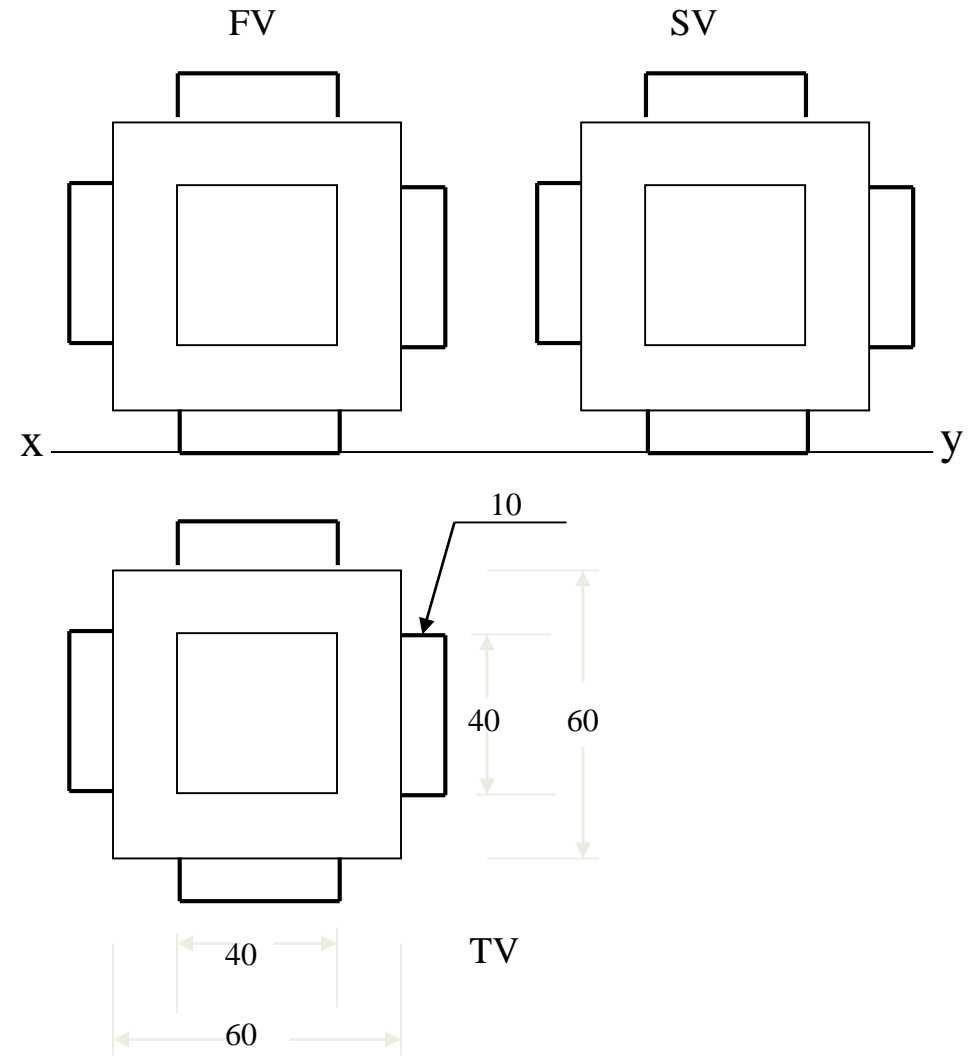
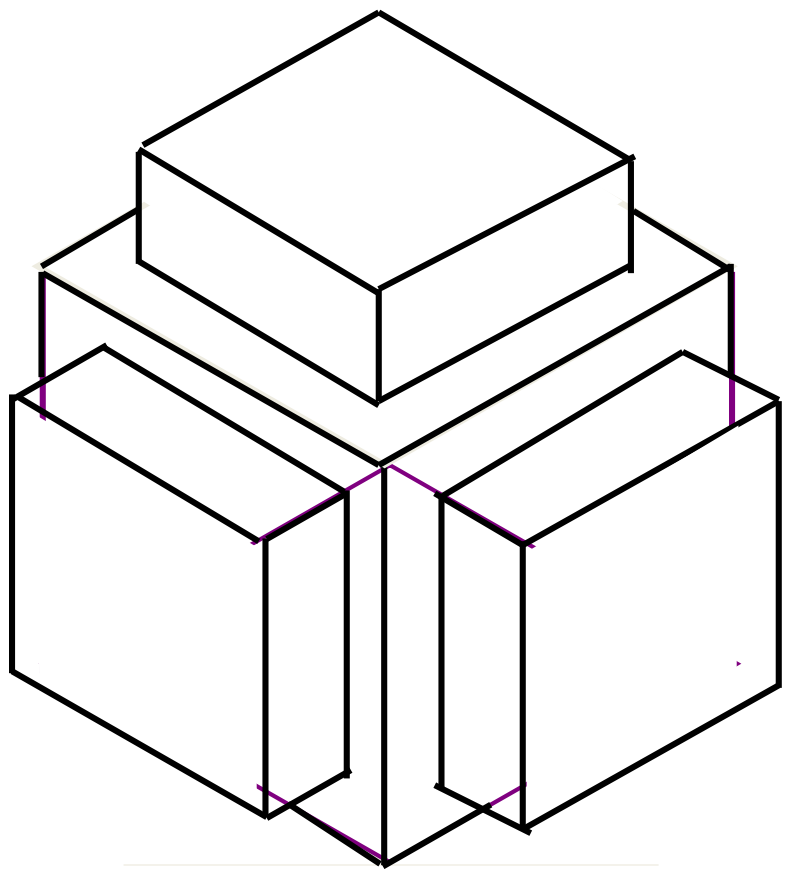
ALL VIEWS IDENTICAL



STUDY ILLUSTRATIONS

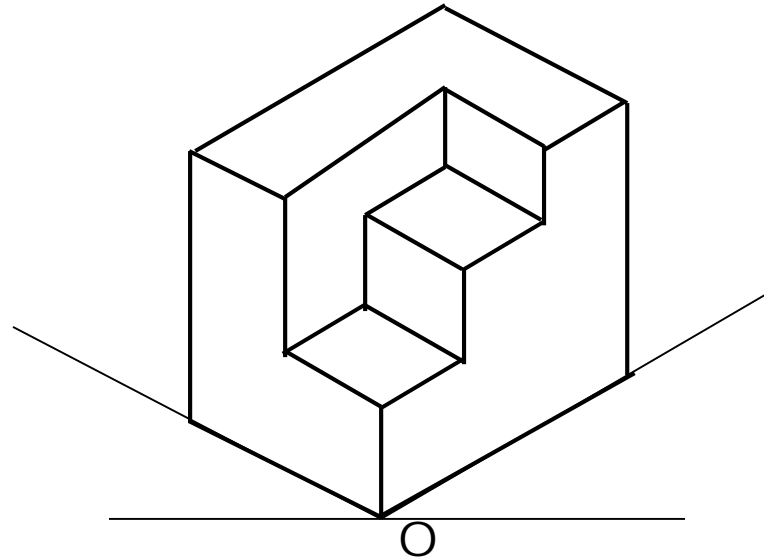
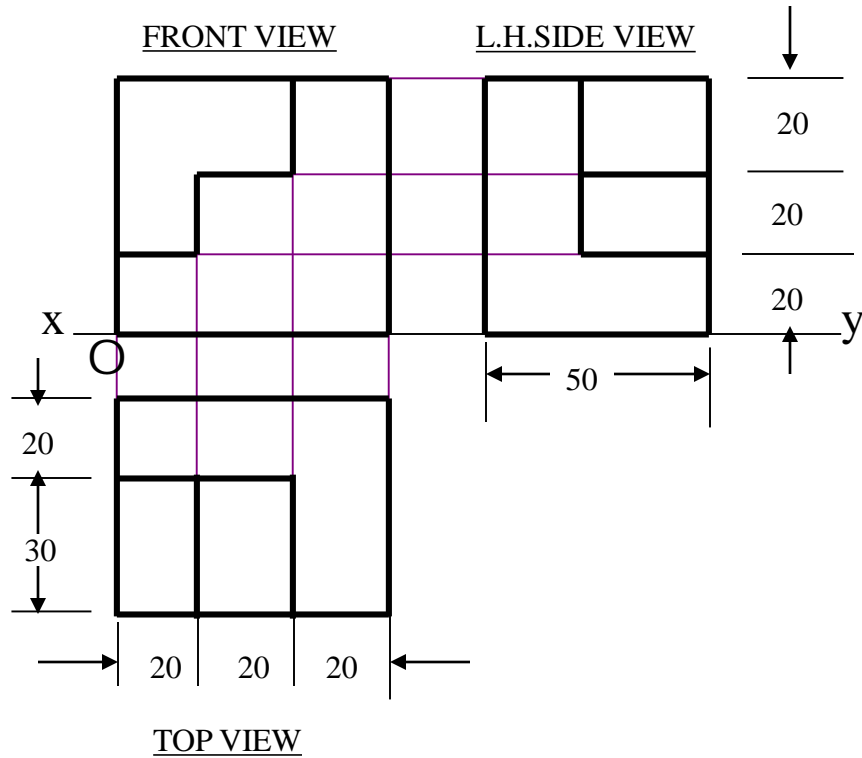
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ALL VIEWS IDENTICAL



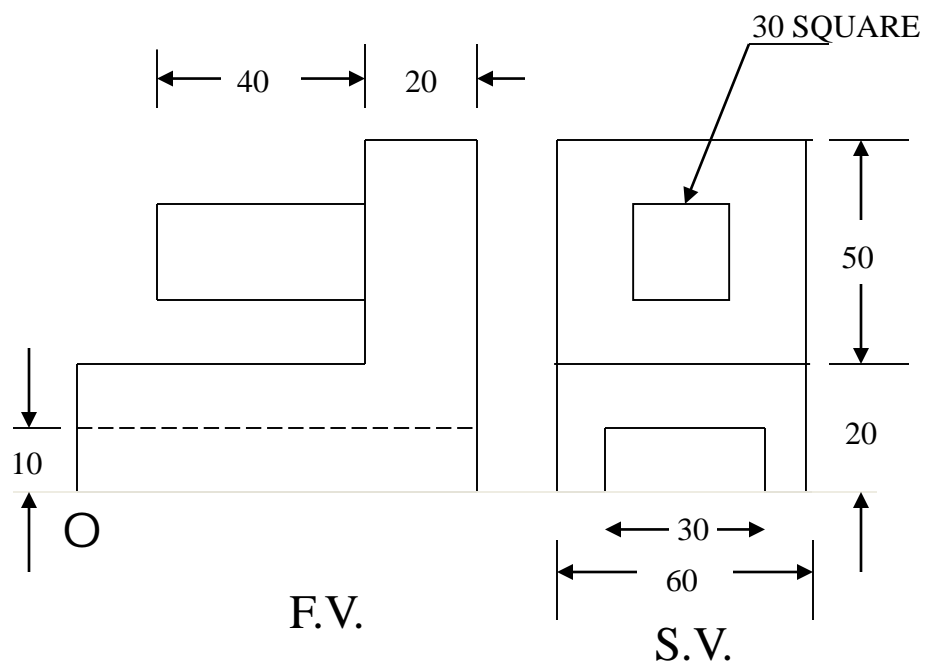
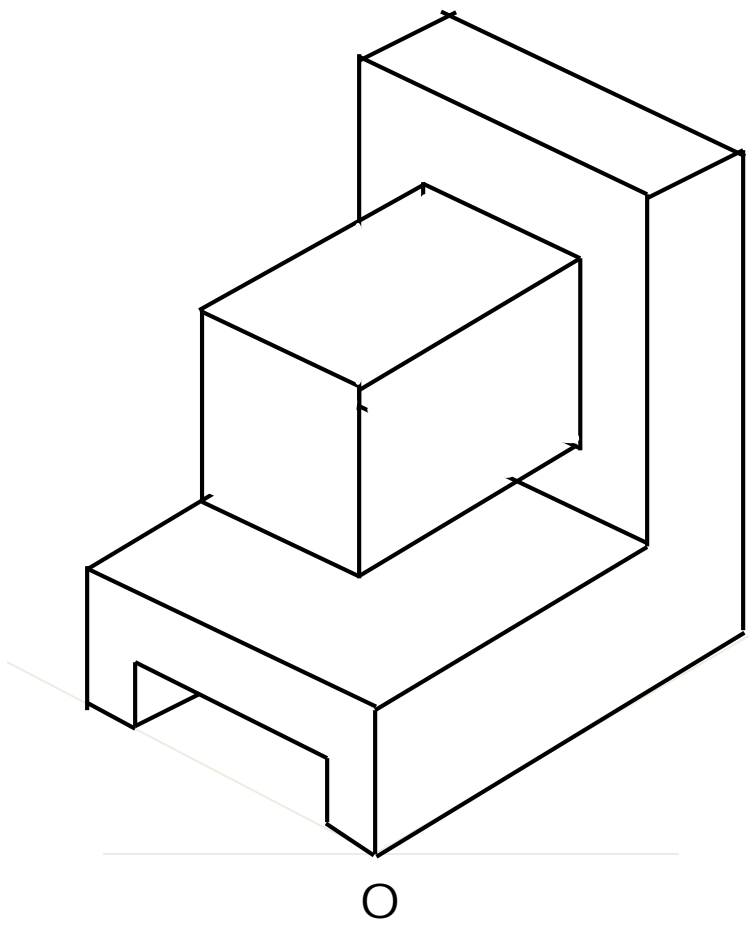
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ORTHOGRAPHIC PROJECTIONS



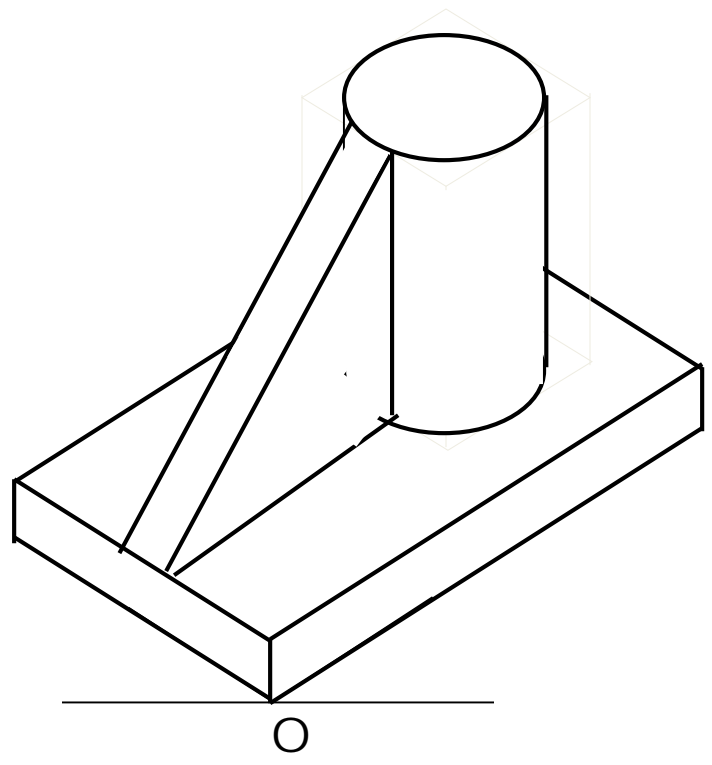
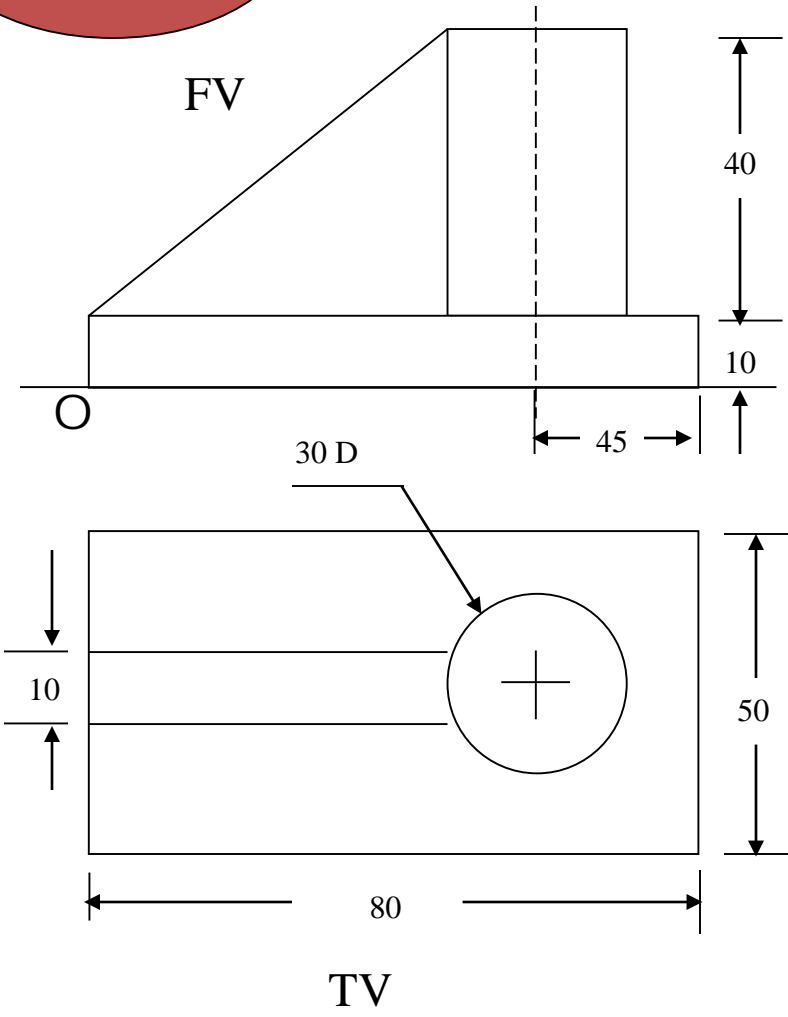
STUDY
ILLUSTRATIONS

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Draw its isometric view.



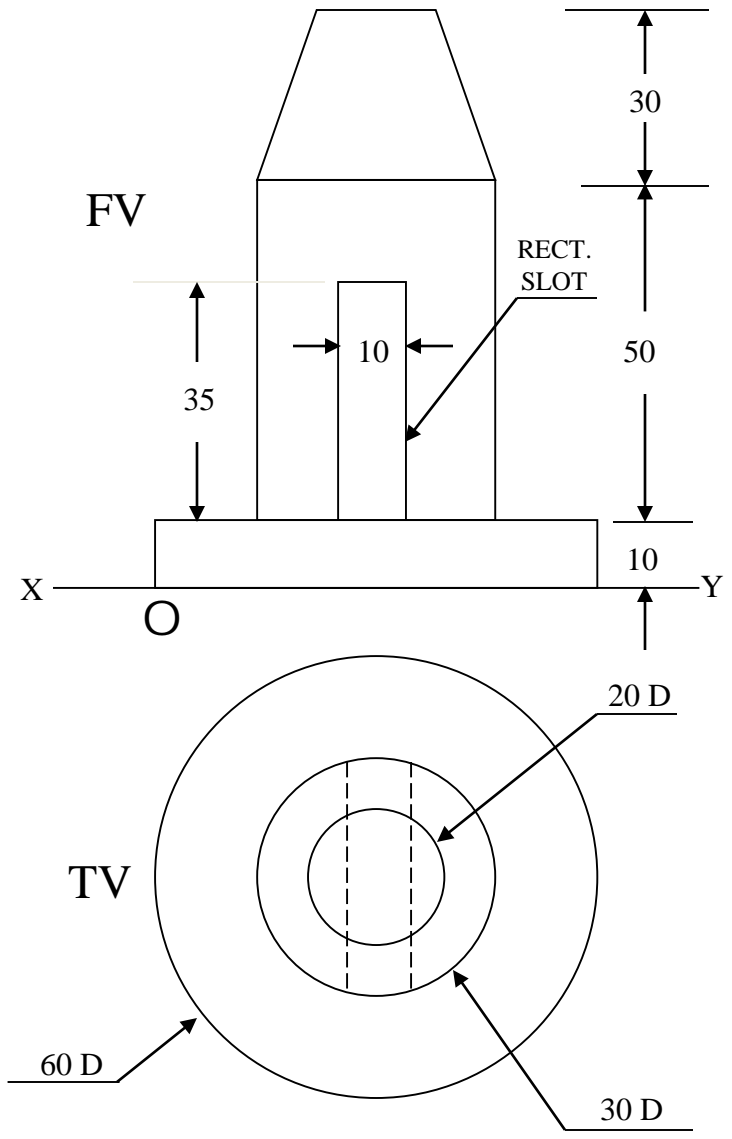
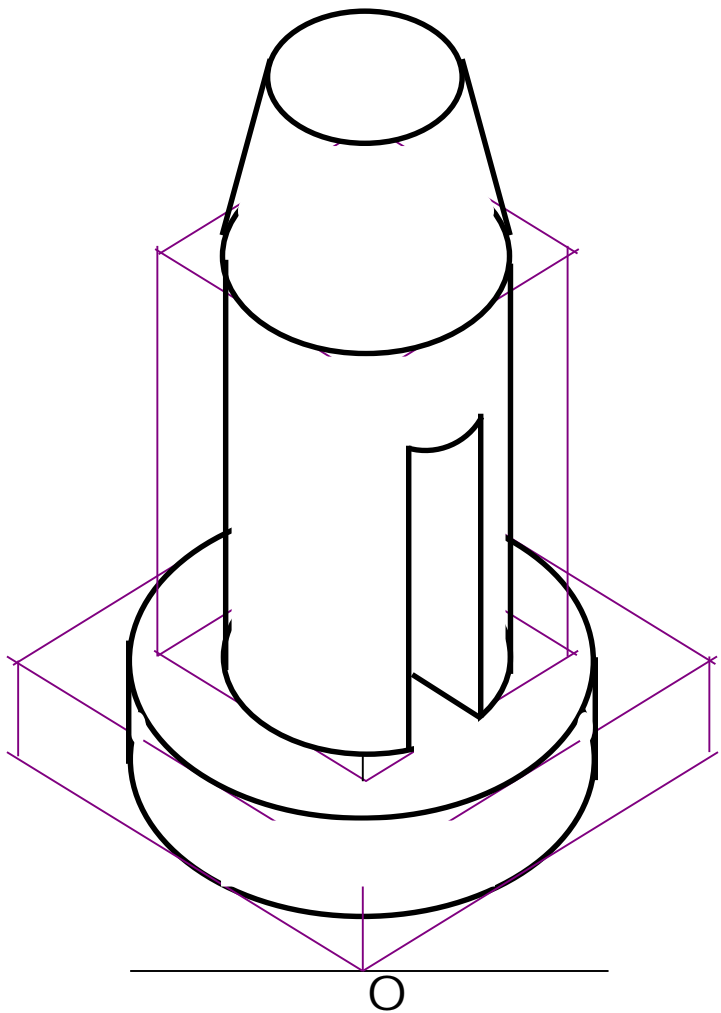
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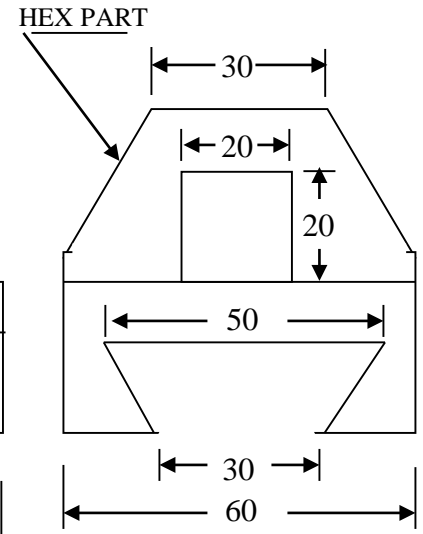
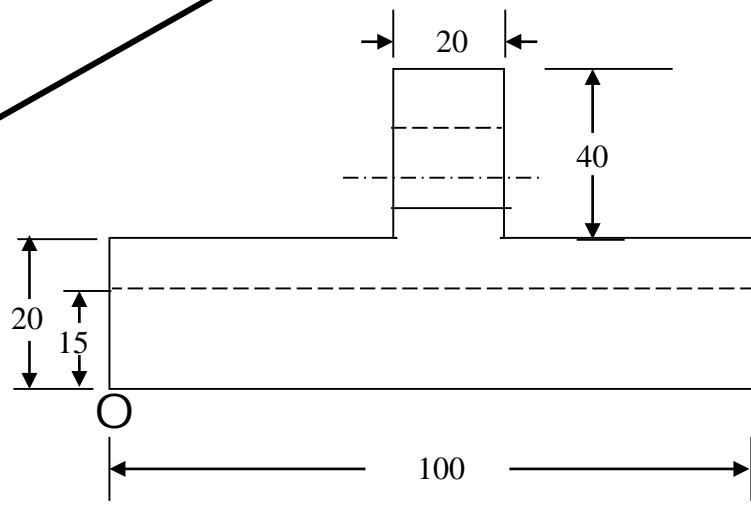
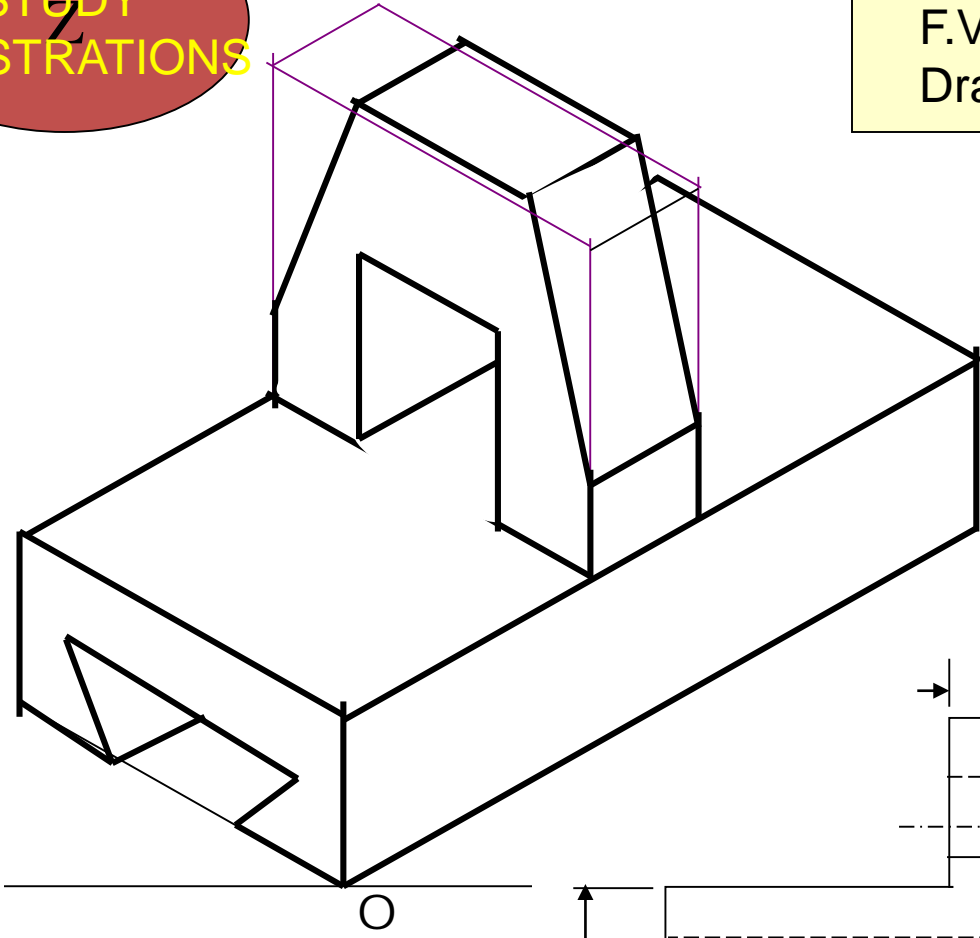
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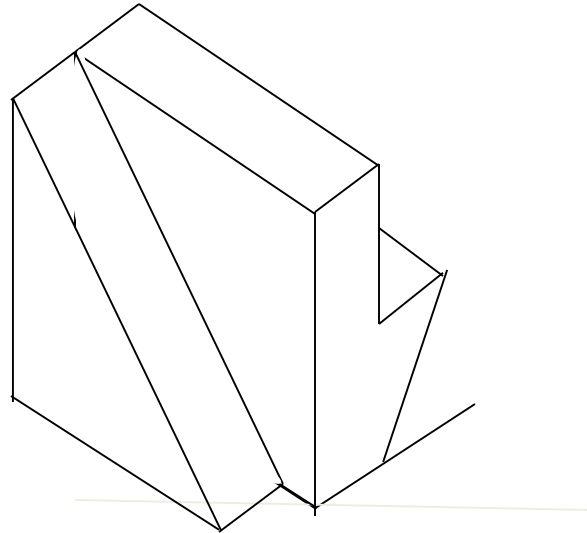
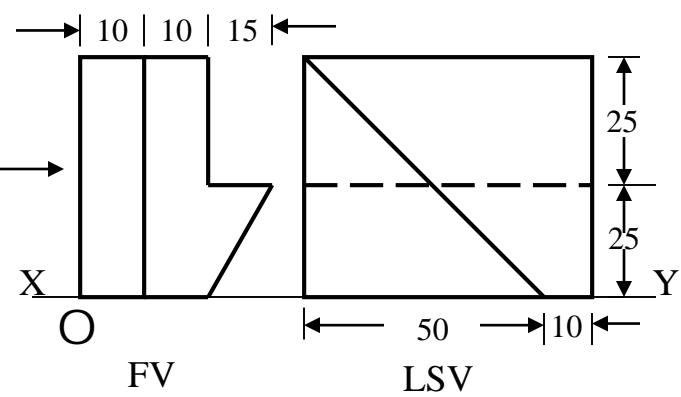
STUDY ILLUSTRATIONS

F.V. and S.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.

STUDY
ILLUSTRATIONS



NOTE THE SMALL CHZNGE IN 2ND FV & SV.
DRAW ISOMETRIC ACCORDINGLY.

