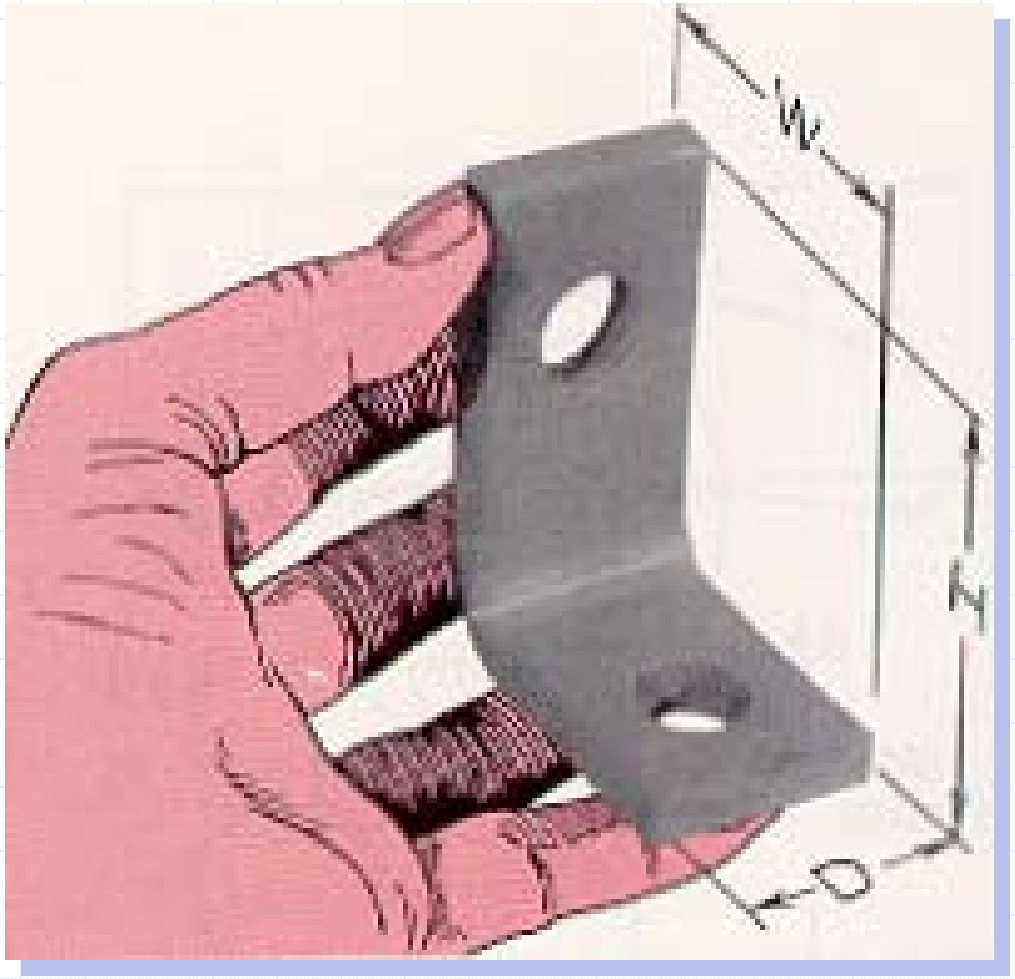
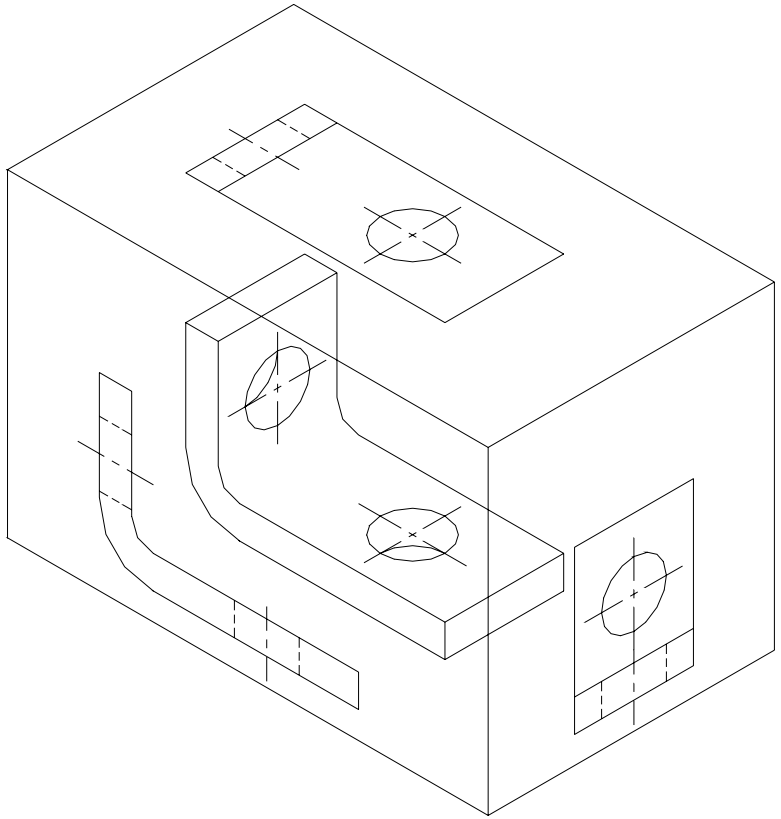
Basics of Drafting

Describing an Angle Bracket



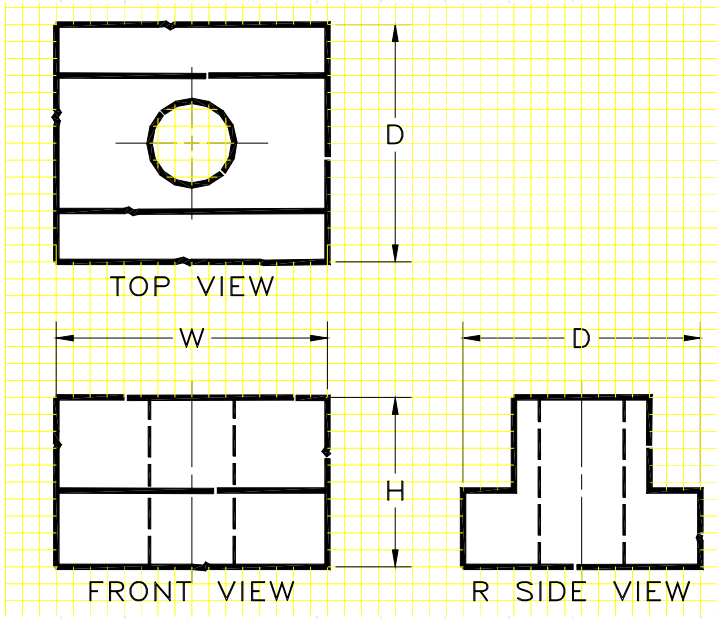
Orthographic Projection

- Orthographic drawings represent three dimensional objects in three separate views arranged in a standard manner.

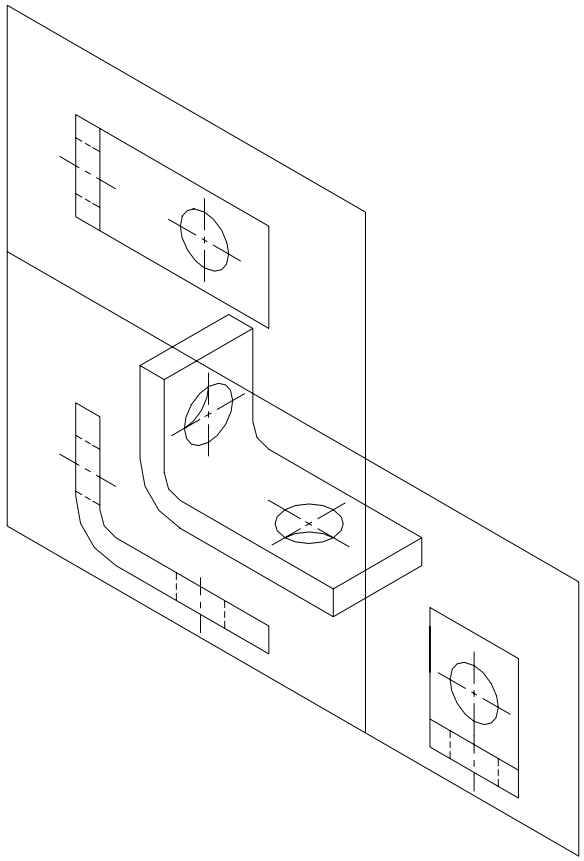


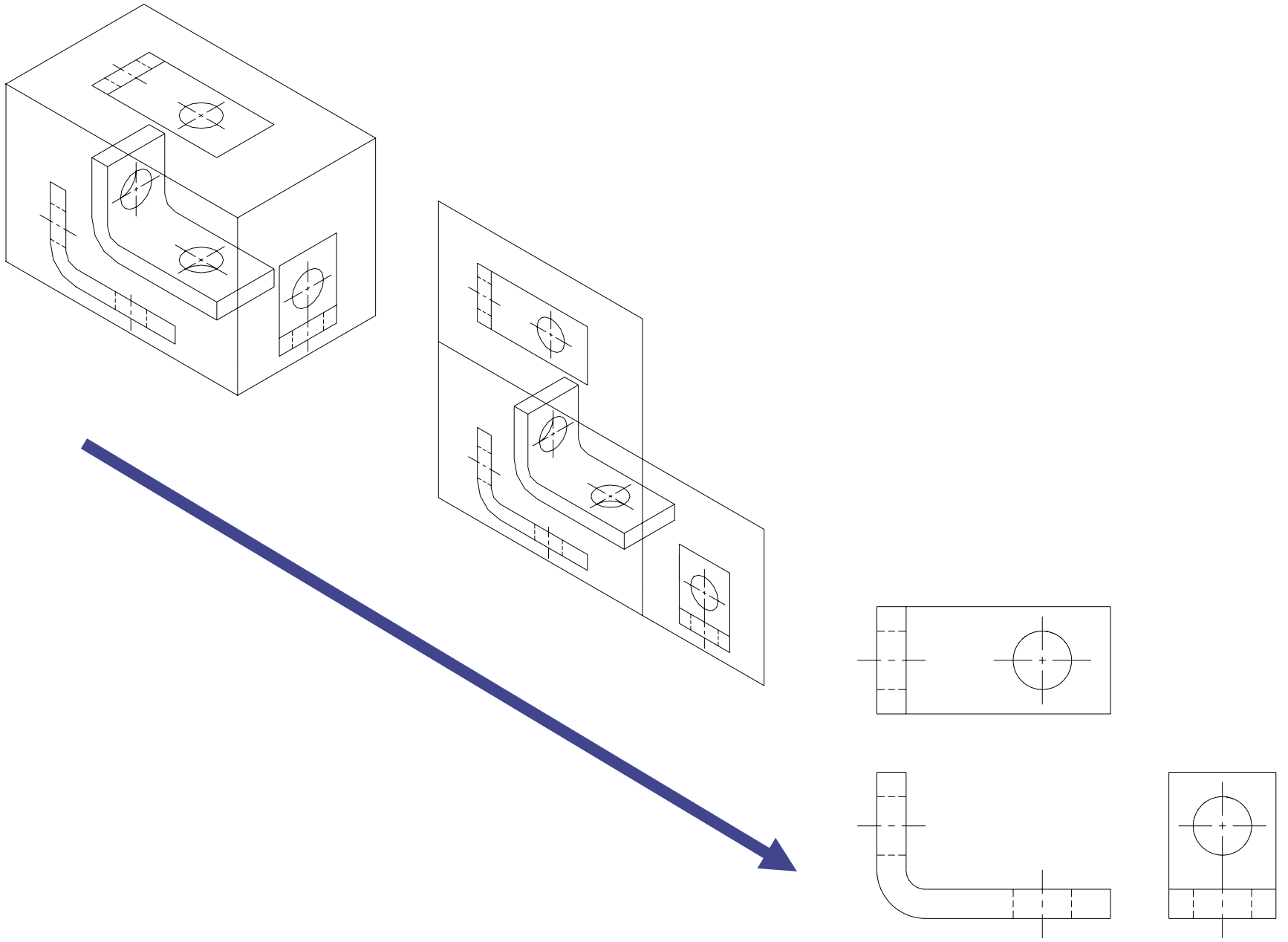
Orthographic Views

- You can adequately describe most objects with three orthographic views.
  - **Front**
  - **Top**
  - **Right**

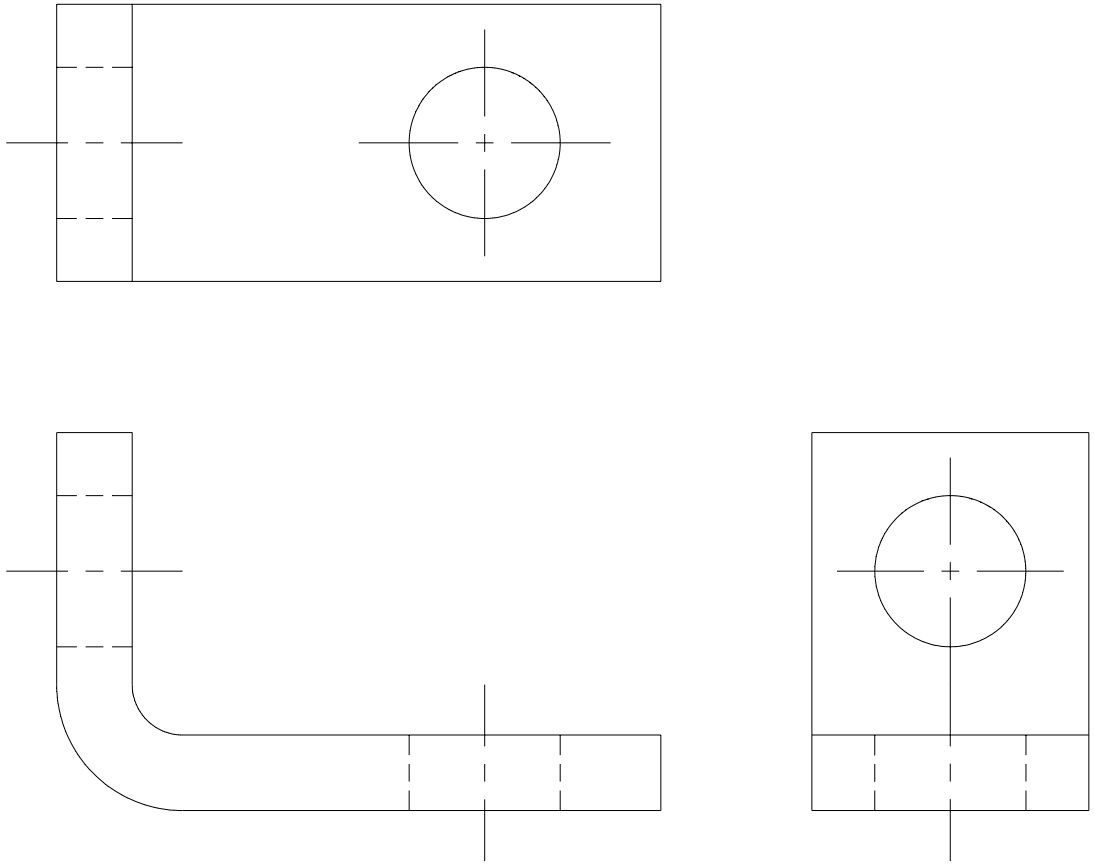


Converting to Orthographic

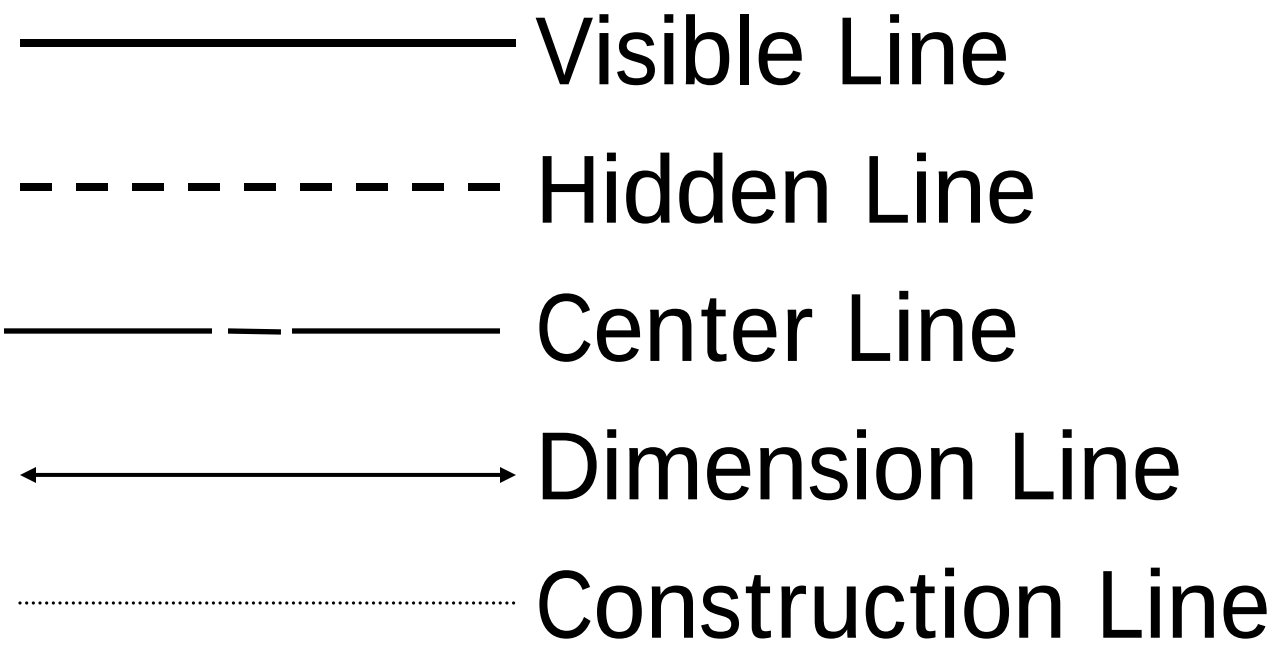




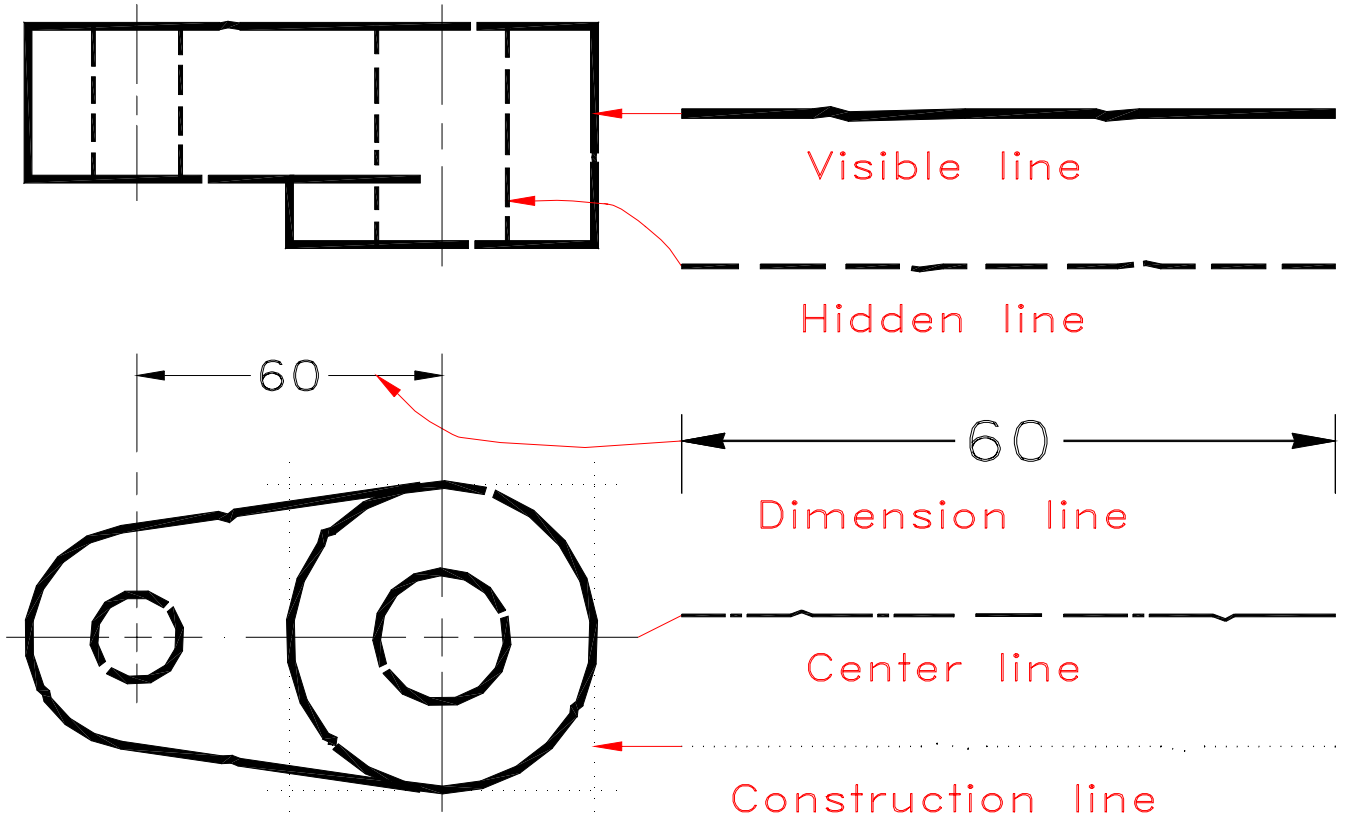
Orthographic Views



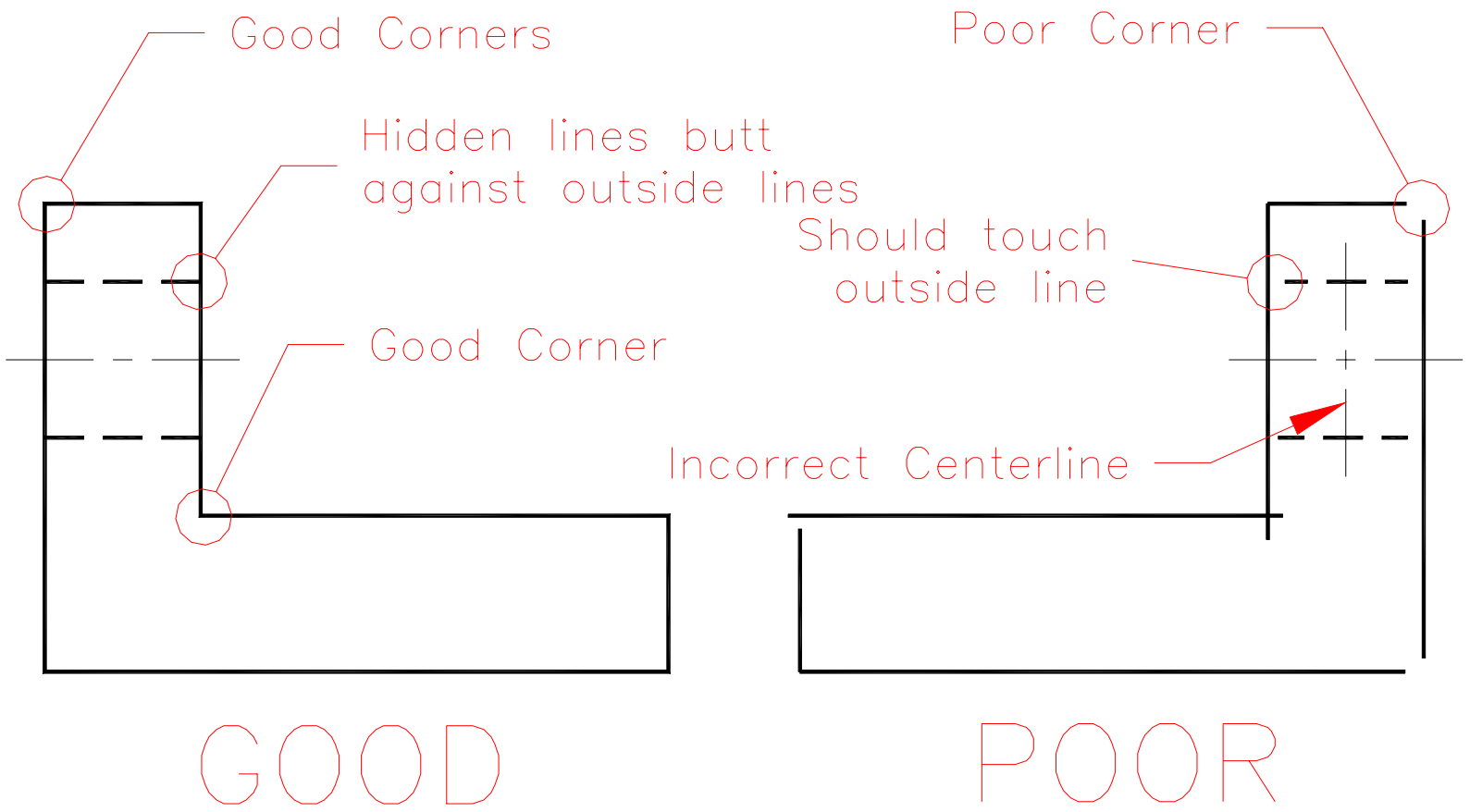
Line Types


Visible Line
Hidden Line
Center Line
Dimension Line
Construction Line

Line Types


Visible line
Hidden line
60
60
Dimension line
Center line
Construction line

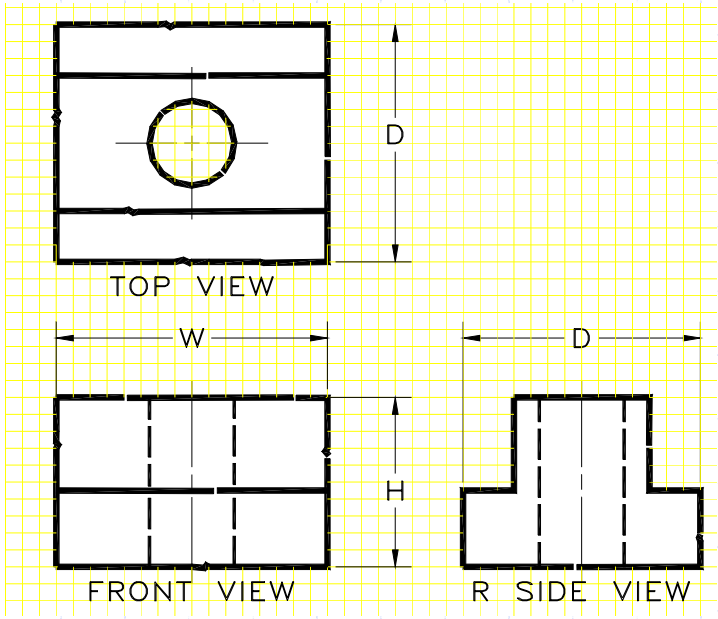
Sketching Techniques



Drafting Handouts

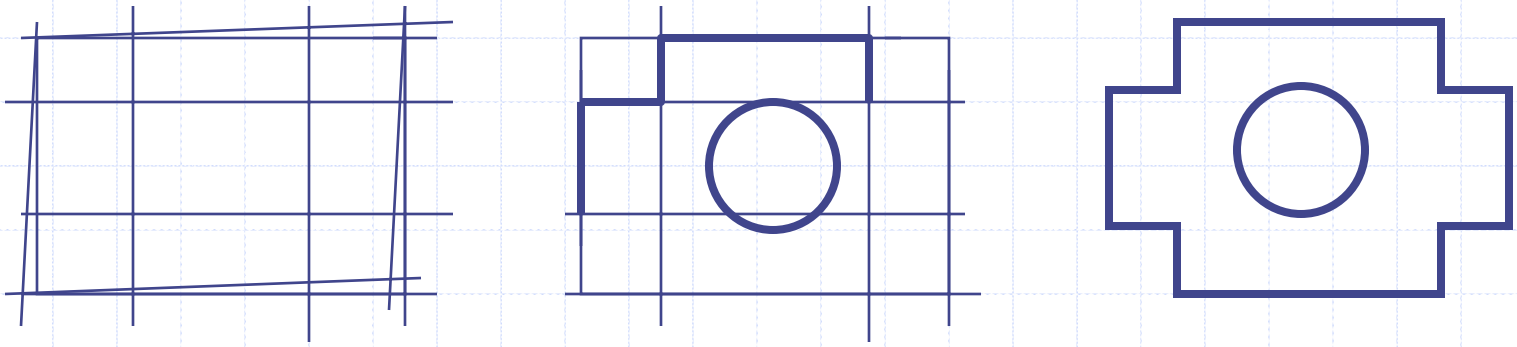
Orthographic Views

- You can adequately describe most objects with three orthographic views.
  - **Front**
  - **Top**
  - **Right**



Sketching techniques

- Use very light construction lines
- “Box in” the rough outline of the object
- Darken only the lines you wish to keep
- Clean up the edges and rough spots



Orthographic Drawings

Multi-view 2D Drawings

Learning Objectives

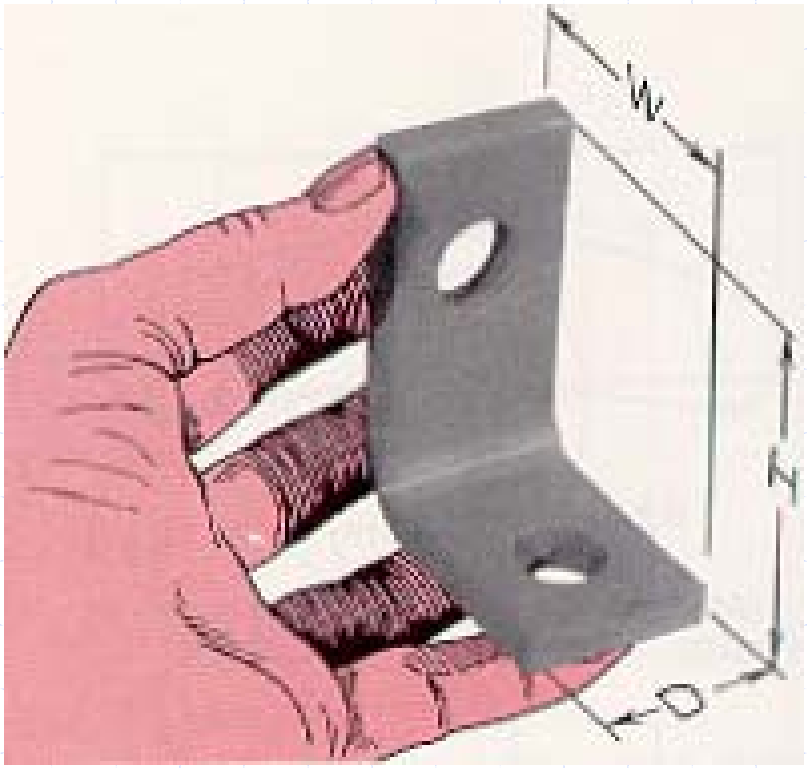
- Name the three principle projection planes and what dimensions each shows
- Sketch Top, Front, and Right Side views of simple objects
- Know the correct pattern and line weight for visible, center, and hidden lines

Orthographic Projection

- 2 Dimensional projections on Orthogonal planes
- Show lines based on change of plane or change of material
- Use multiple line types
  - Visible
  - Hidden
  - Center

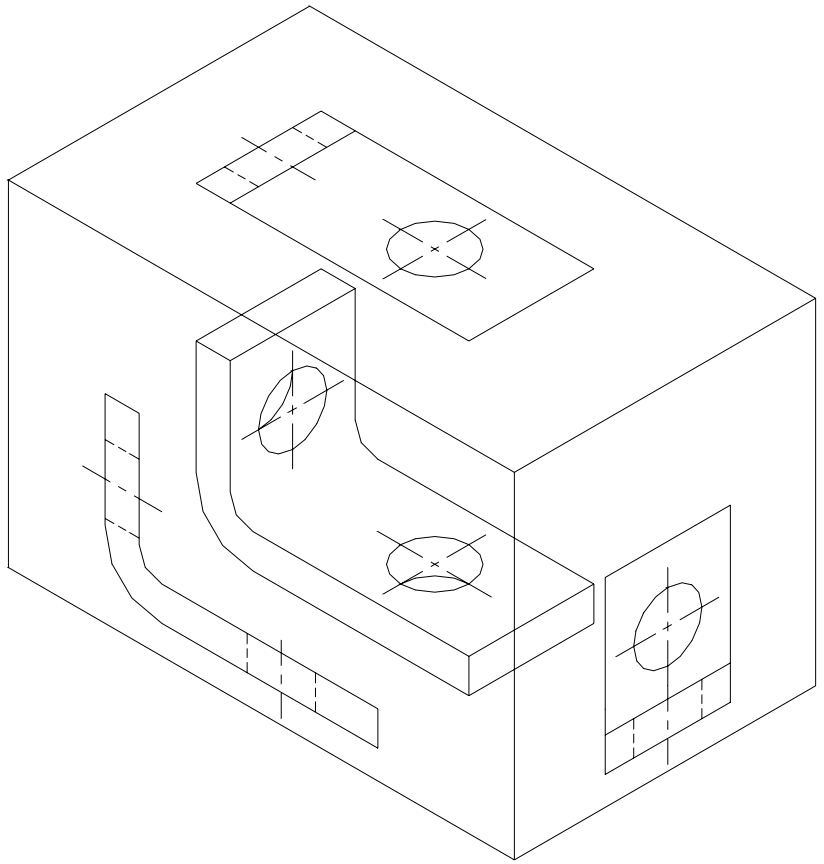
Describing an Angle Bracket

- A relatively simple object
- Pictorial view may be difficult



Glass Box concept

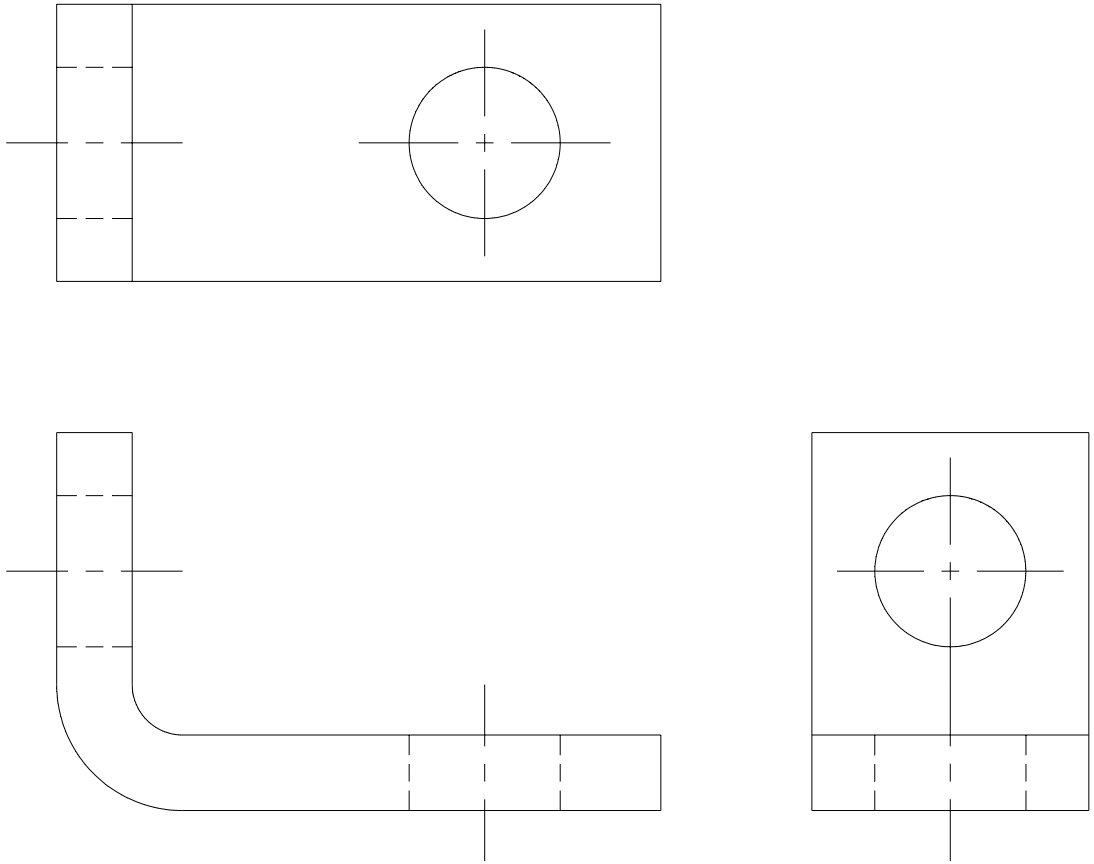
- Envision the object surrounded in a glass box
- Project the views out onto the pieces of glass
- Each pane shows a 2D projection of the object



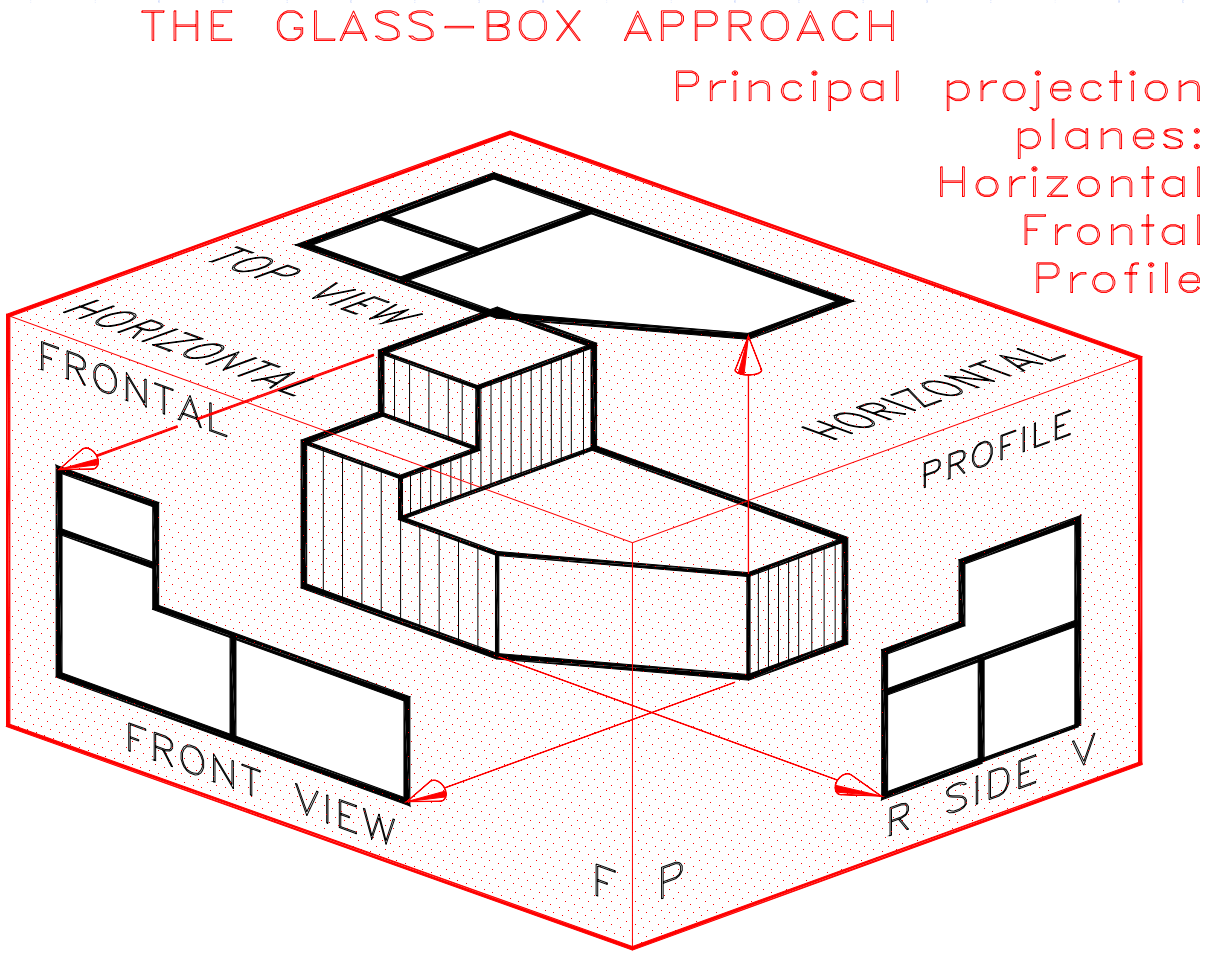
Projection Planes

- The three panes of glass represent the principal orthographic planes
  - Horizontal
  - Frontal
  - Profile
- Each plane illustrates two of the principal dimensions: Height, Width, and Depth

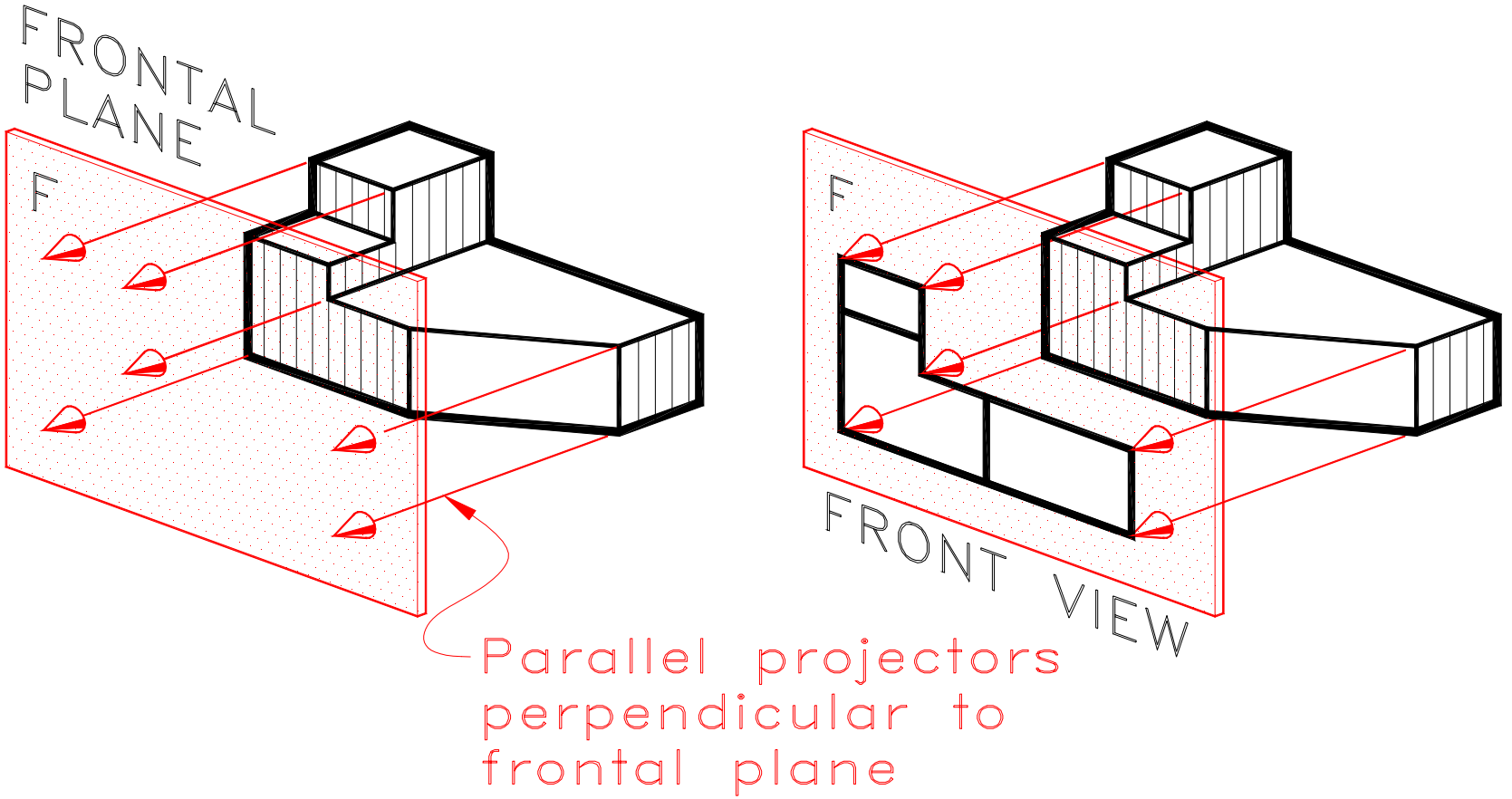
Completed Orthographics



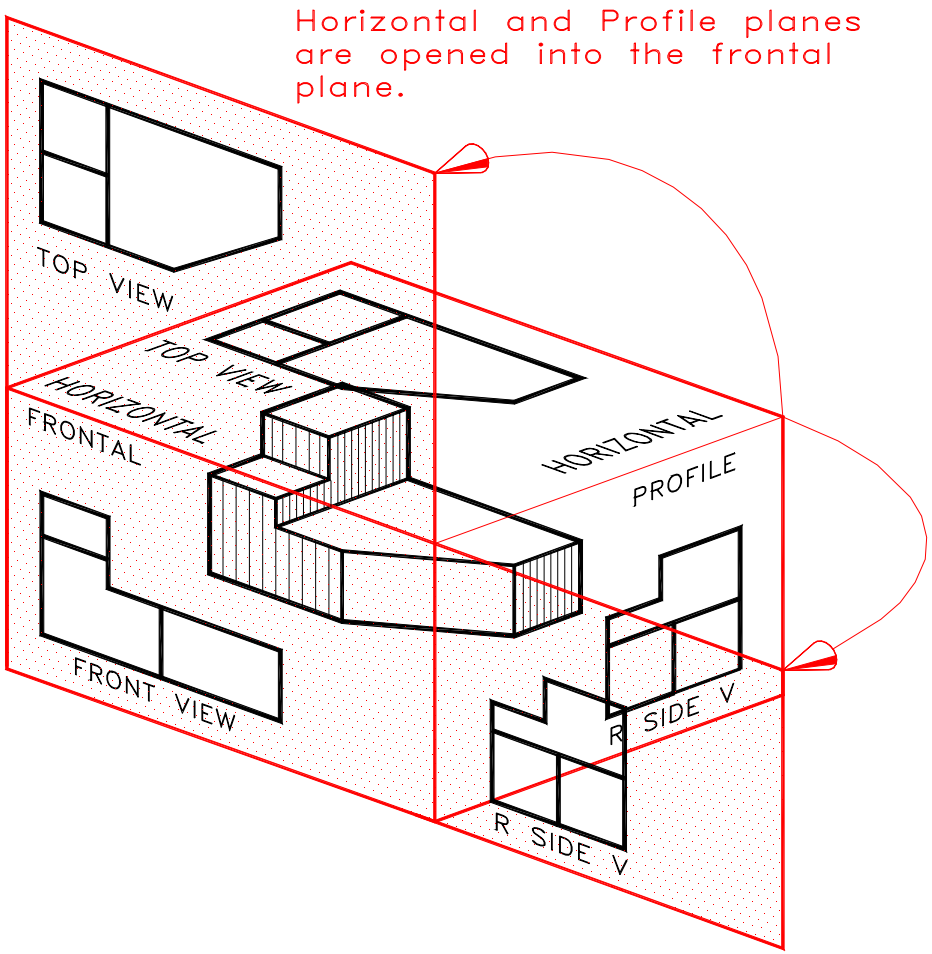
The Glass Box Approach



Orthographic Projection

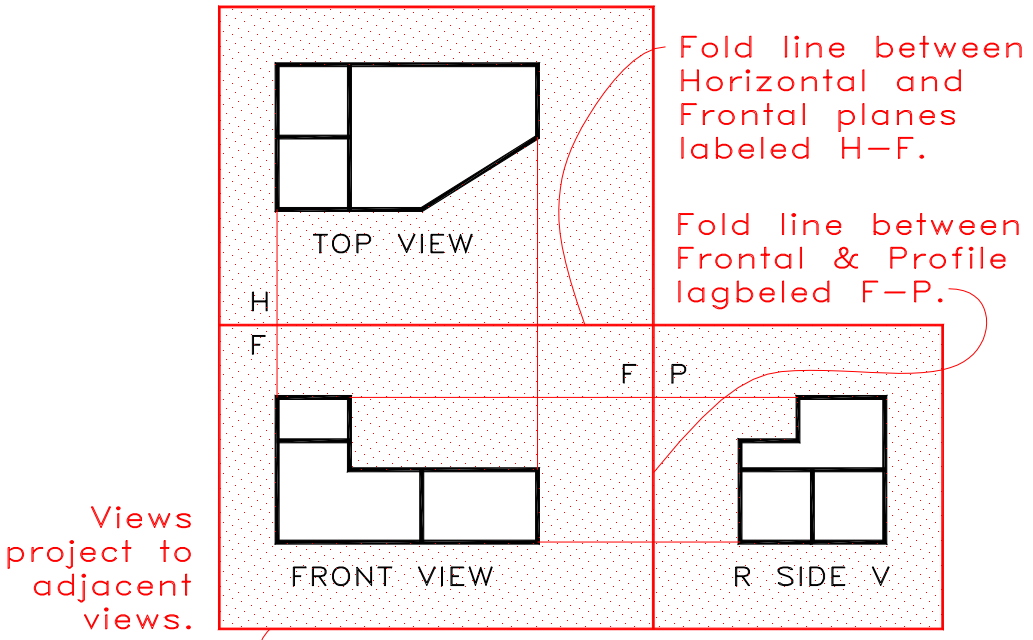


Opening the Box

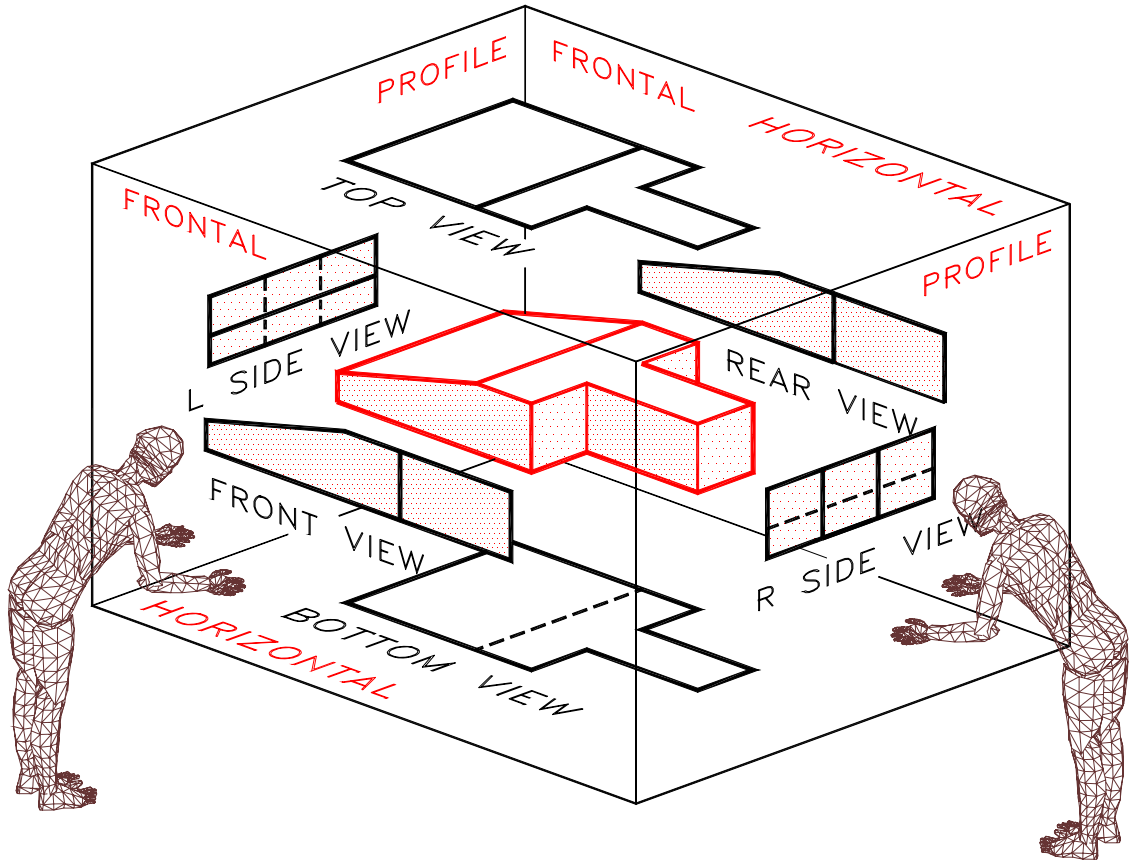


Final Views

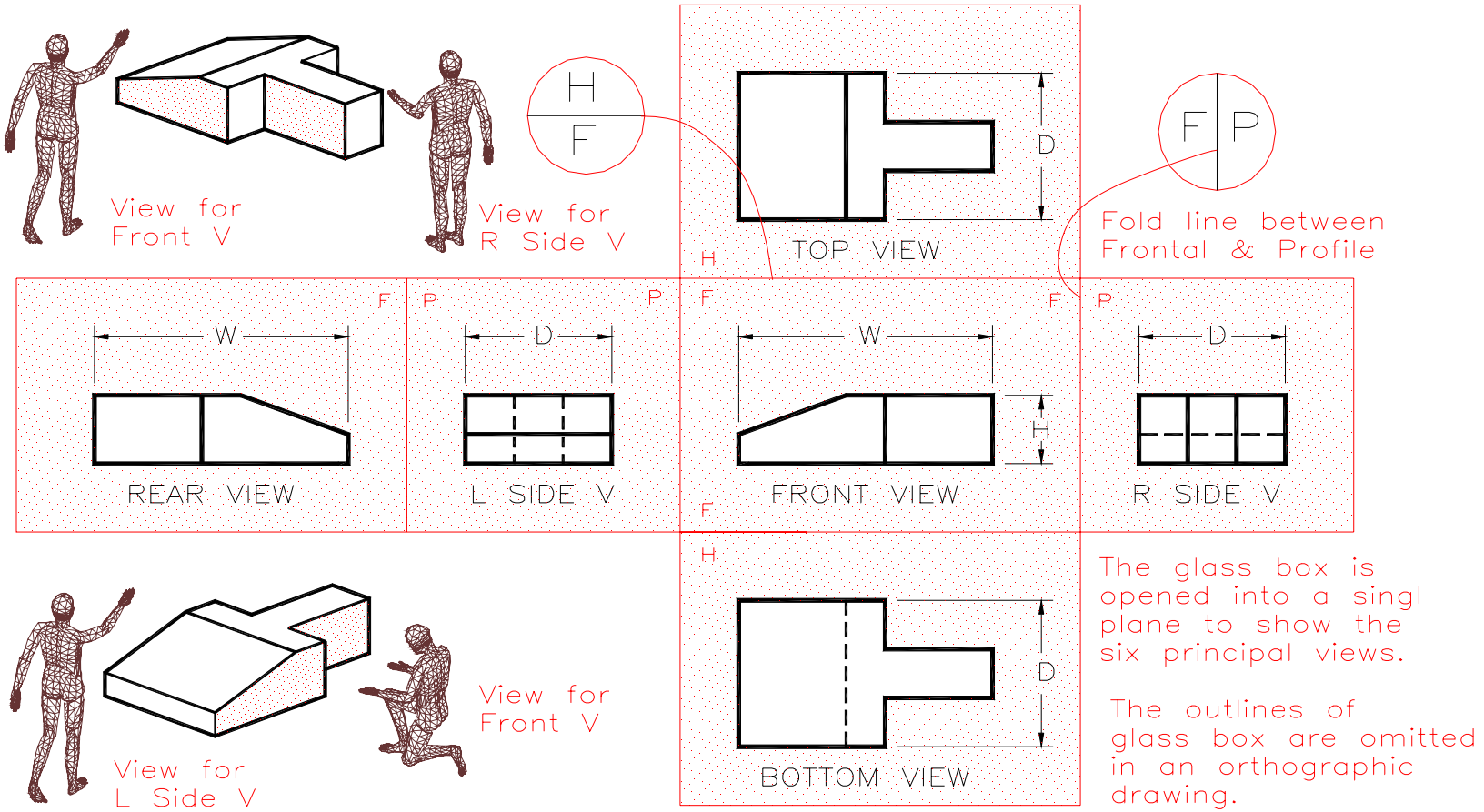
The standard arrangement of three orthographic views:
Top View above the Front View
R Side View right of the Front View



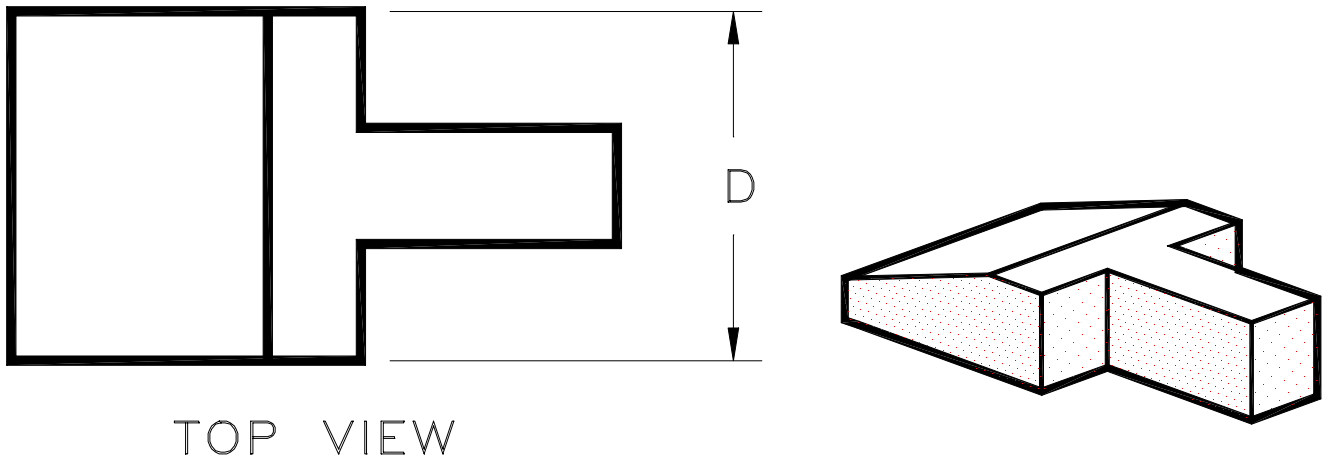
Six Orthographic Views



Laying Out All Six Views

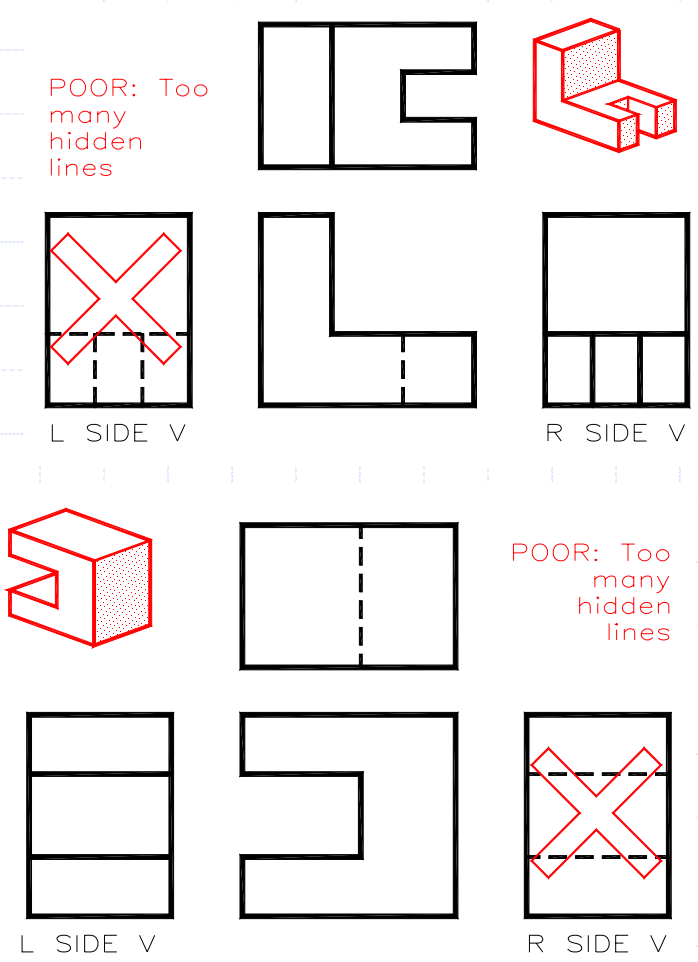


Three Primary Views



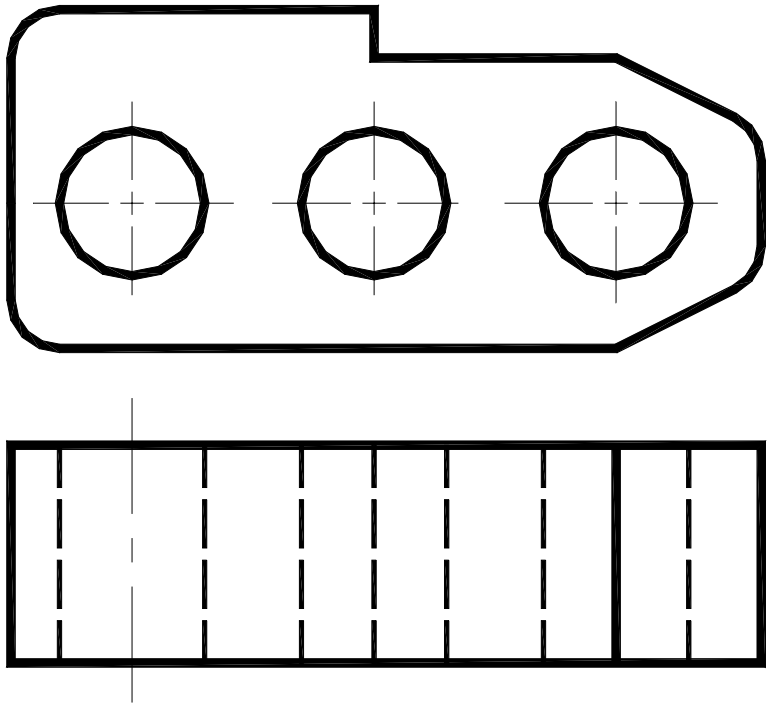
View Selection

- If the object has an obvious top, then it must be the top view
- Minimize the number of hidden lines
- Use the most descriptive view as the front view
- Conserve space by choosing the depth to be the smallest dimension



Precedence of Lines

1. Visible over hidden lines
2. Hidden over centerlines

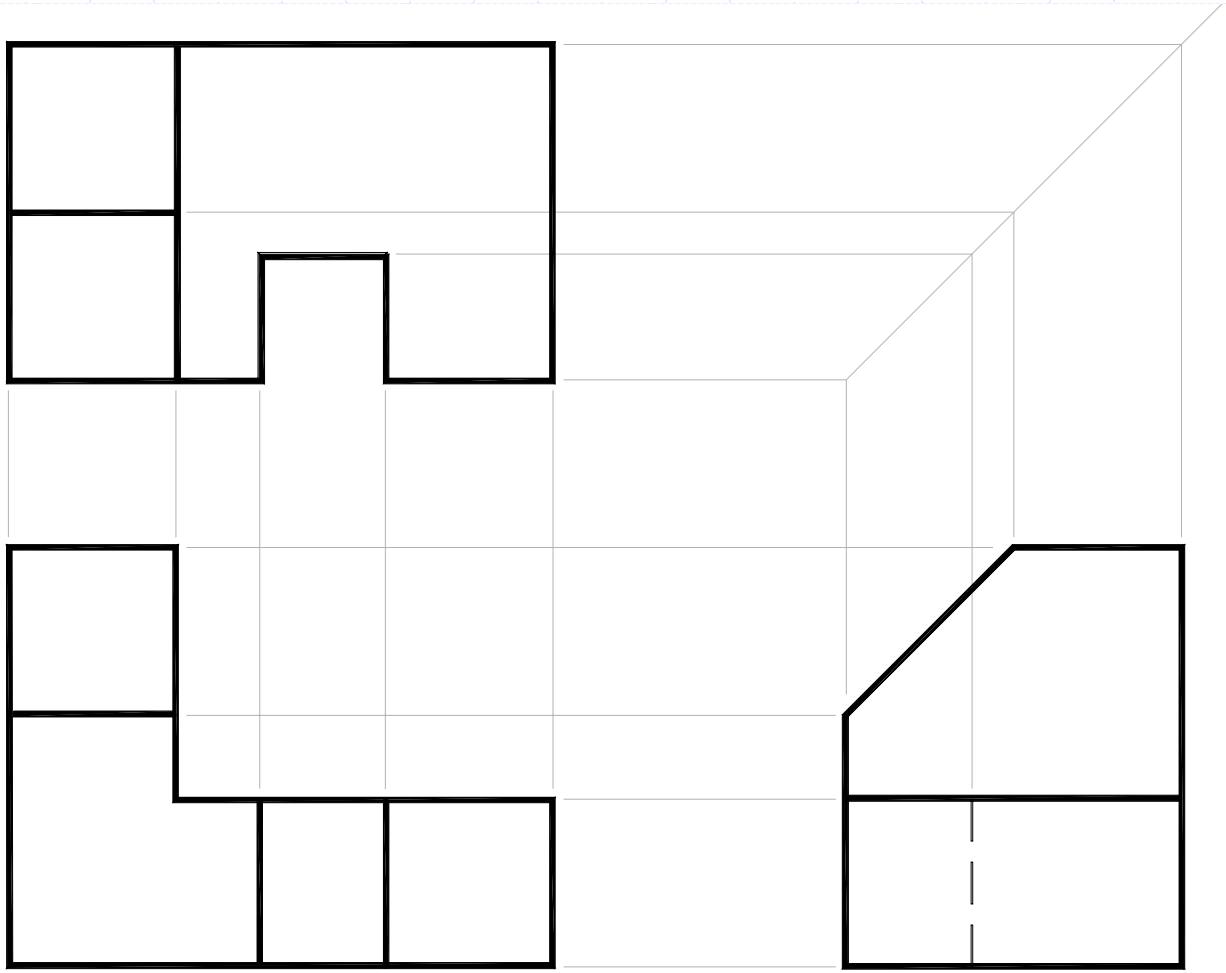


A. Center—line shown Hidden line shown Visible line shown

Construction of Views

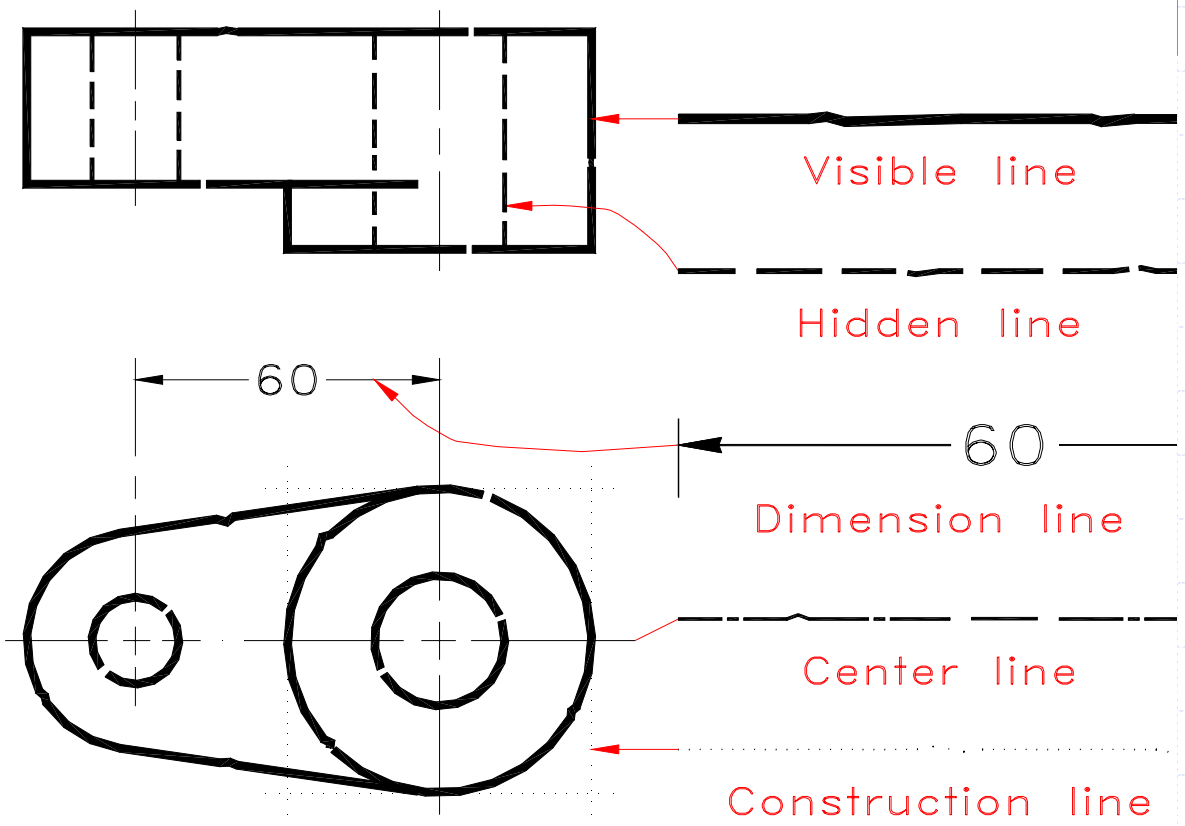
- Must align orthographic views
- Width appears in Top and Front
- Height appears in Front and Side
- Depth appears in Side and Top
- Height and width project directly
- Depth must be projected via a 45° angle

Construction of Views



Line Types

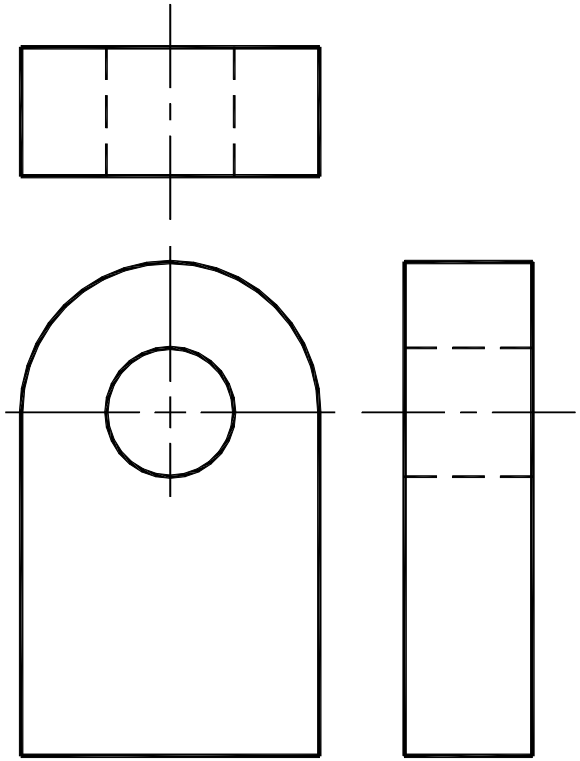
- Visible
- Hidden
- Center
- Construction



Class Exercise

- Draw three orthographic views of a tombstone. Remember to include all lines: visible, hidden, and center, where appropriate
- Add a bullet hole (large caliber) concentric with the top arc. Adjust the views for this new feature.

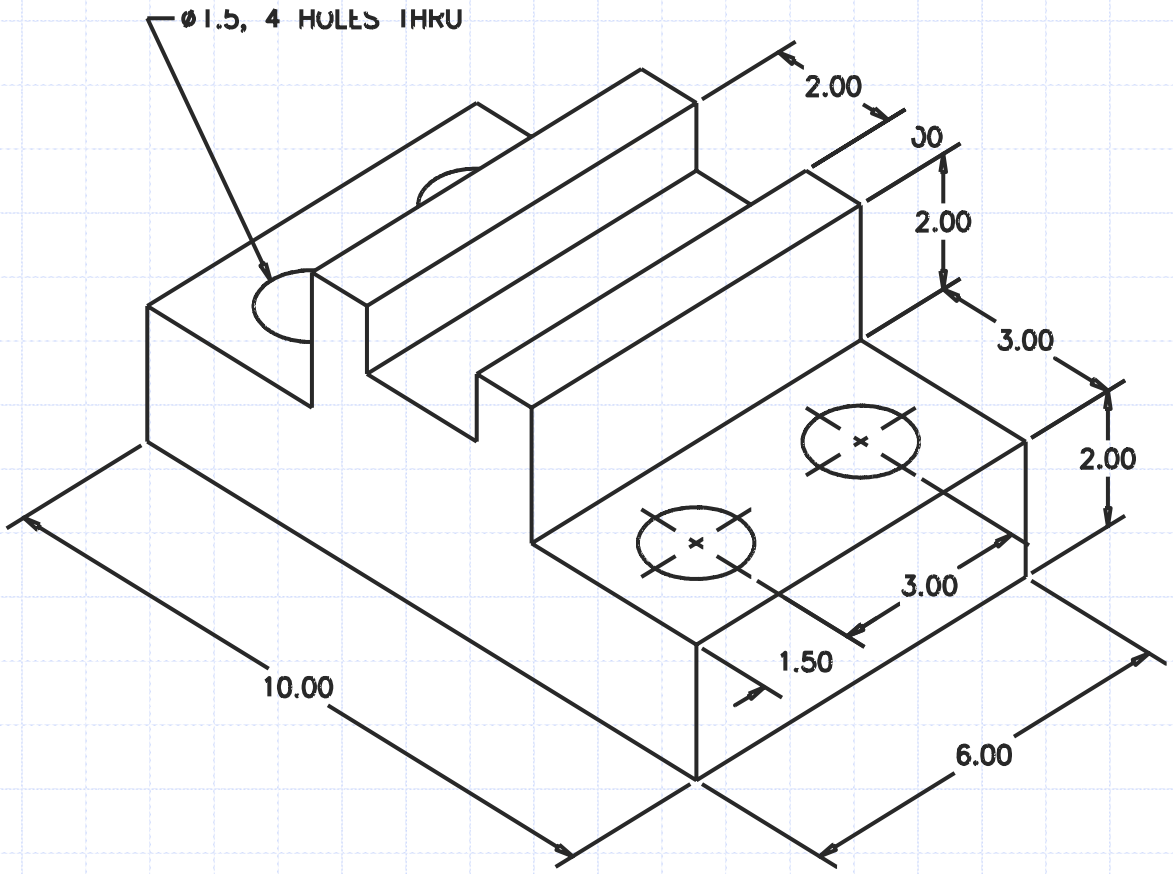
Tombstone Solution



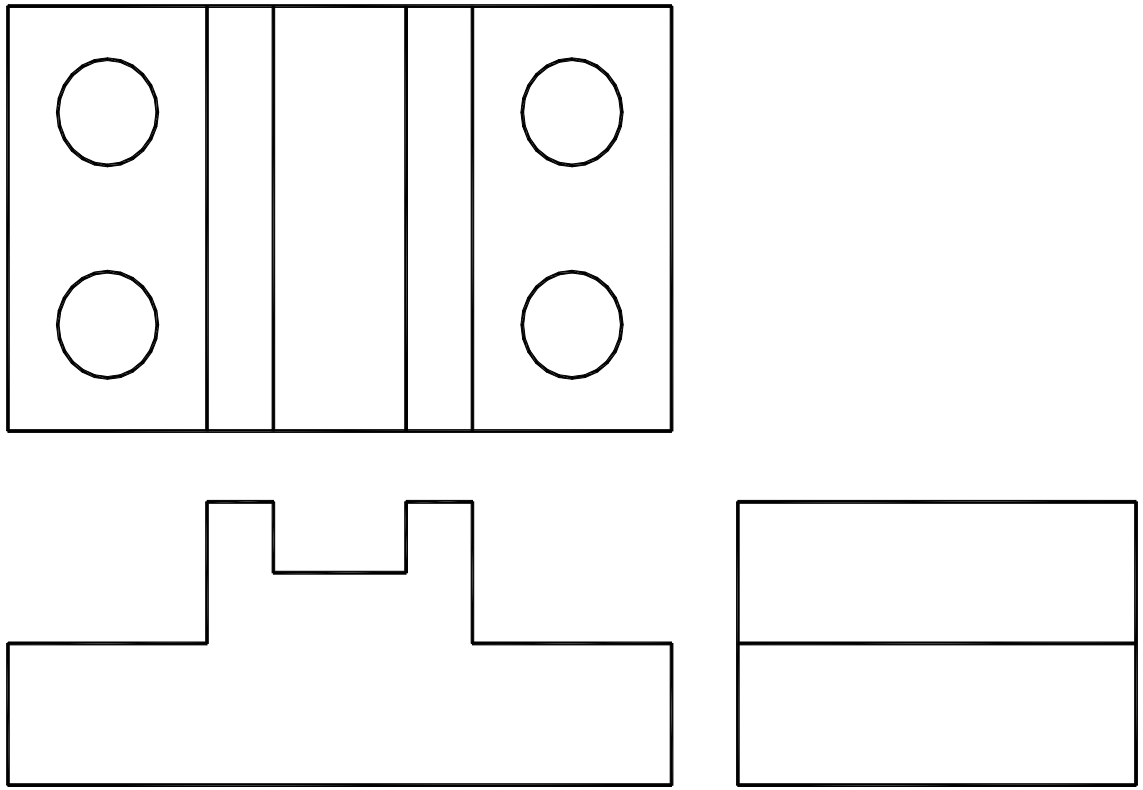
Class Exercise

- Complete three orthographic views of the object shown on the next slide.
- Include visible, hidden, and center lines where appropriate.
- Use the grid paper in the back of your book or your engineering sketch pad.
- You will be given 7 minutes.

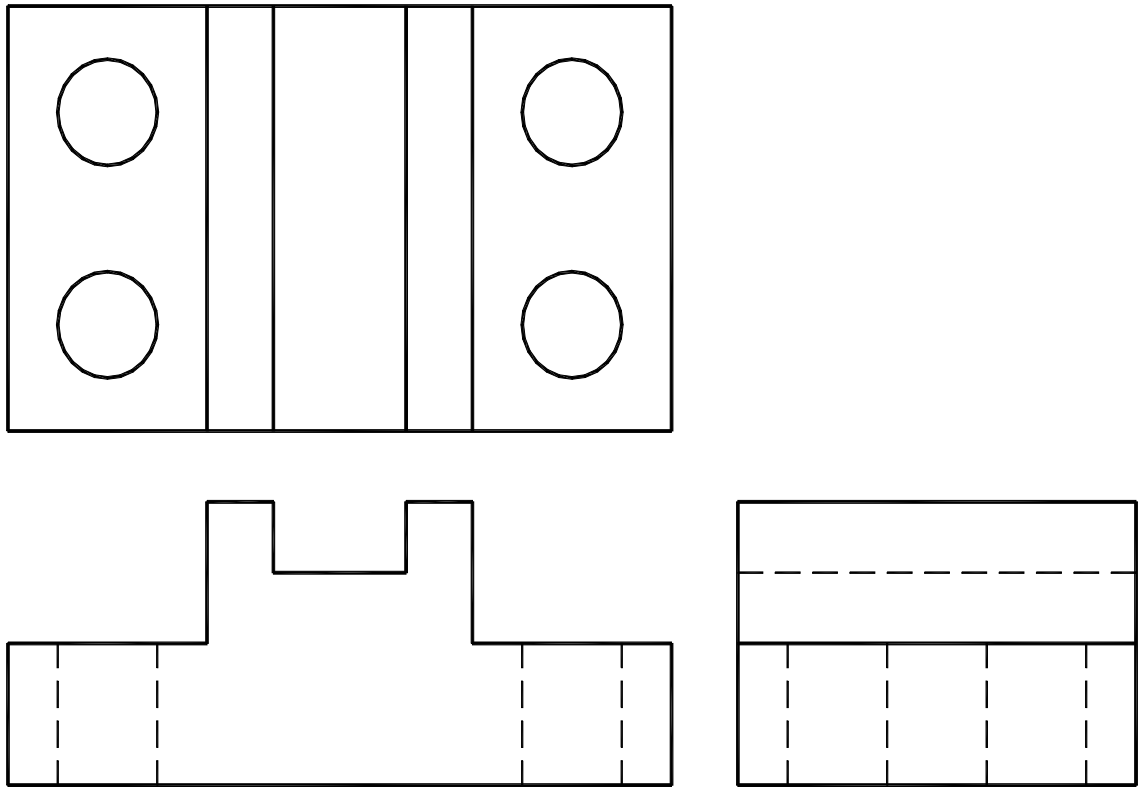
Object for exercise



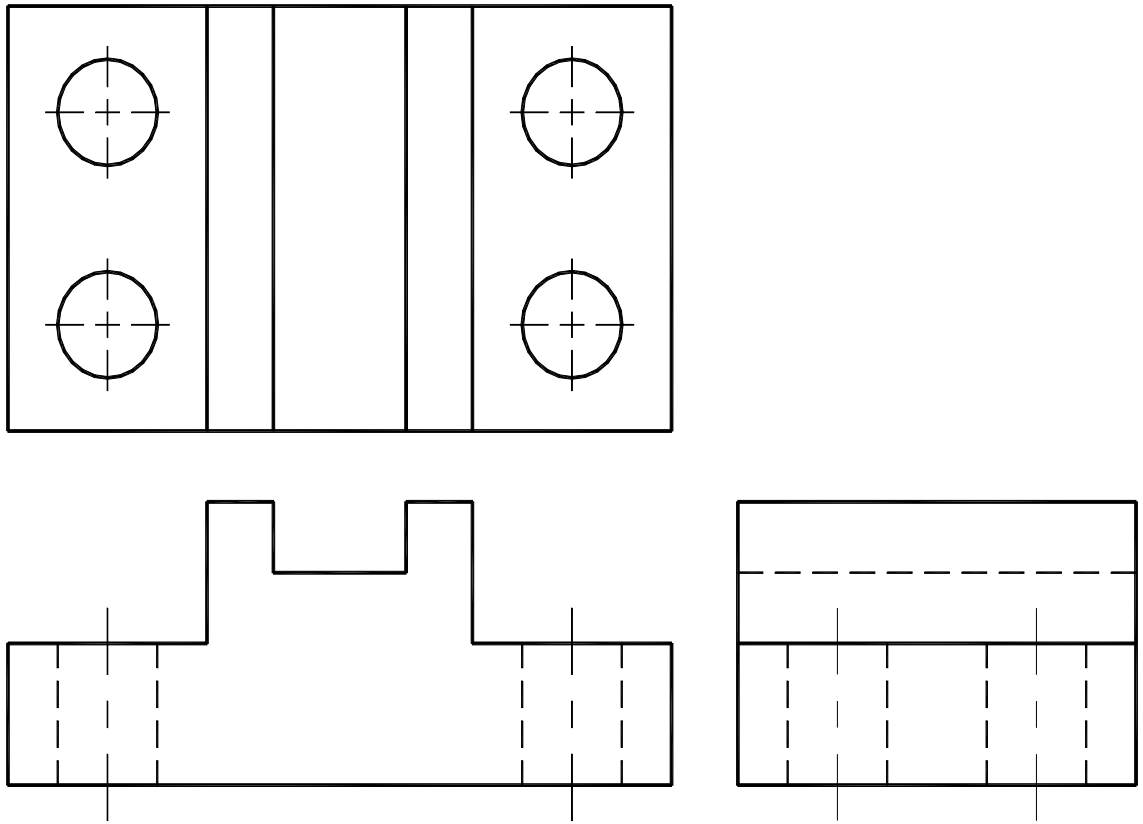
Solution



Solution

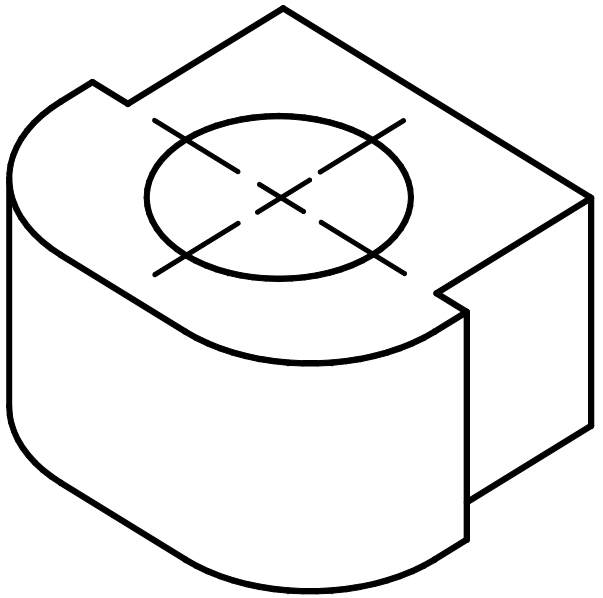


Solution



Post Assessment Test

- Use a clean sheet of paper to sketch orthographic views of the object.
- You will be given 5 minutes to complete the drawing individually



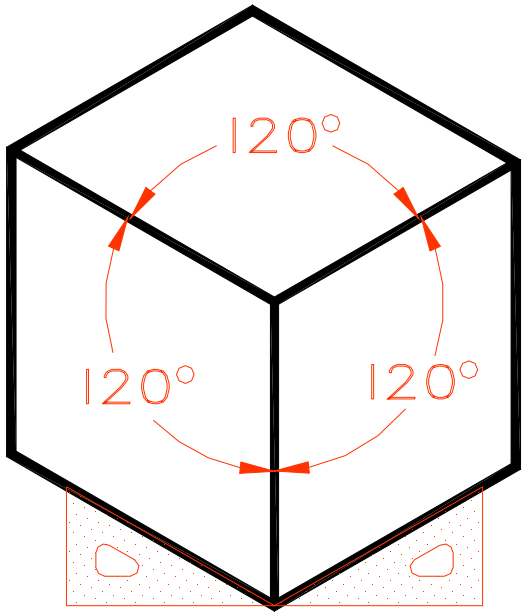
THRU HOLE

Pictorial

- A three dimensional pictorial is a drawing that shows an object's three principal planes, much as they would be captured by a camera
- Sometimes they are called Technical Illustrations

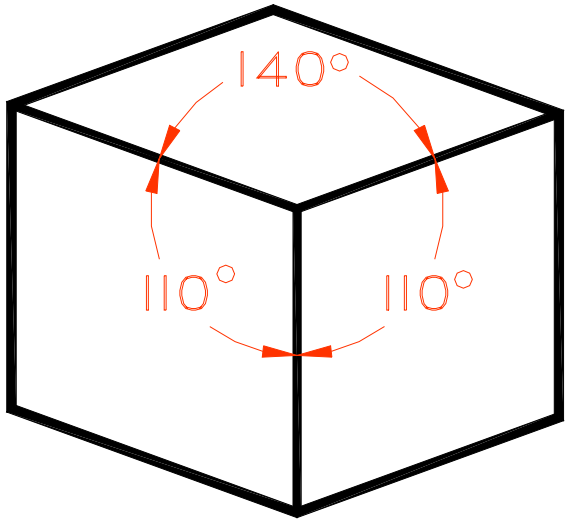
Types of Axonometrics

3 Equal axes
3 Equal angles



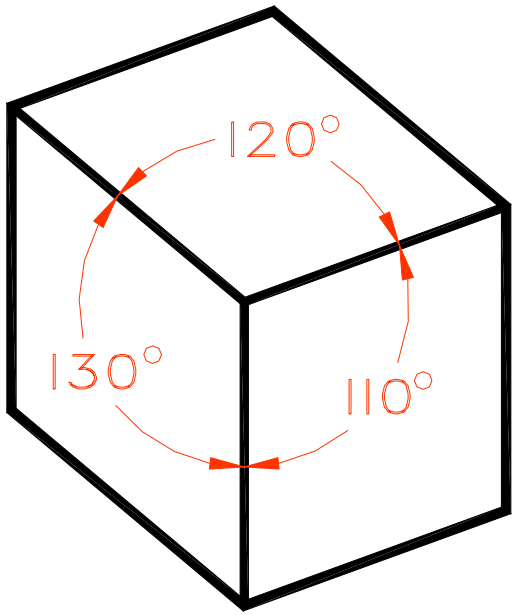
A.ISOMETRIC

2 Equal axes
2 Equal angles



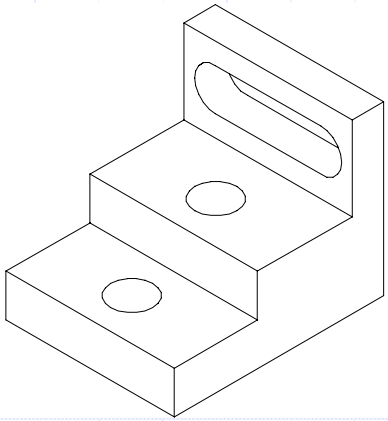
B.DIMETRIC

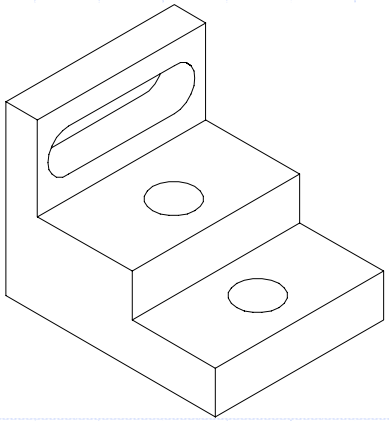
0 Equal axes
0 Equal angles

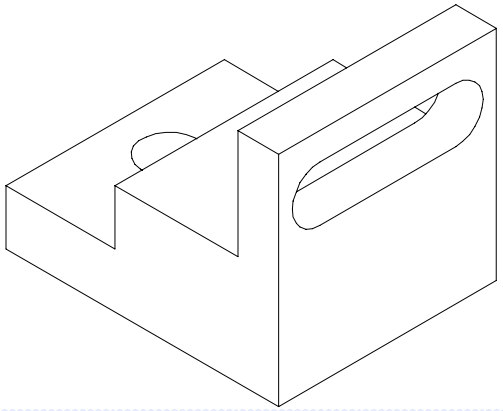


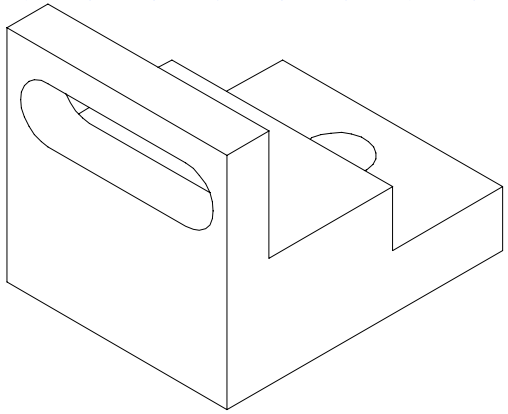
C.TRIMETRIC

Orientation of Pictorial Objects



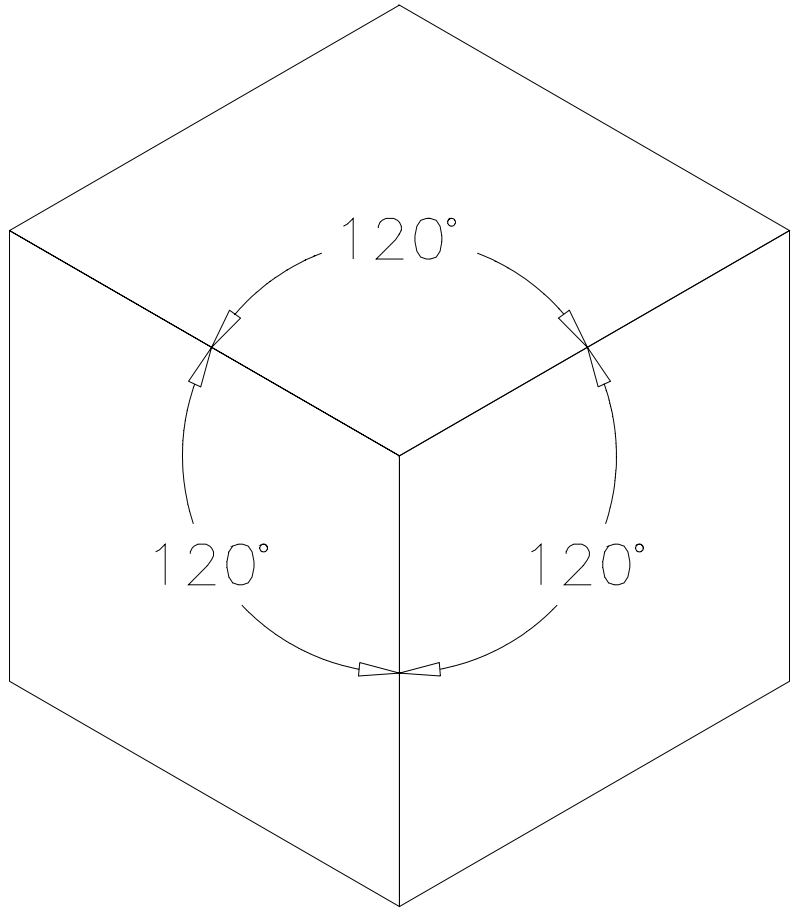




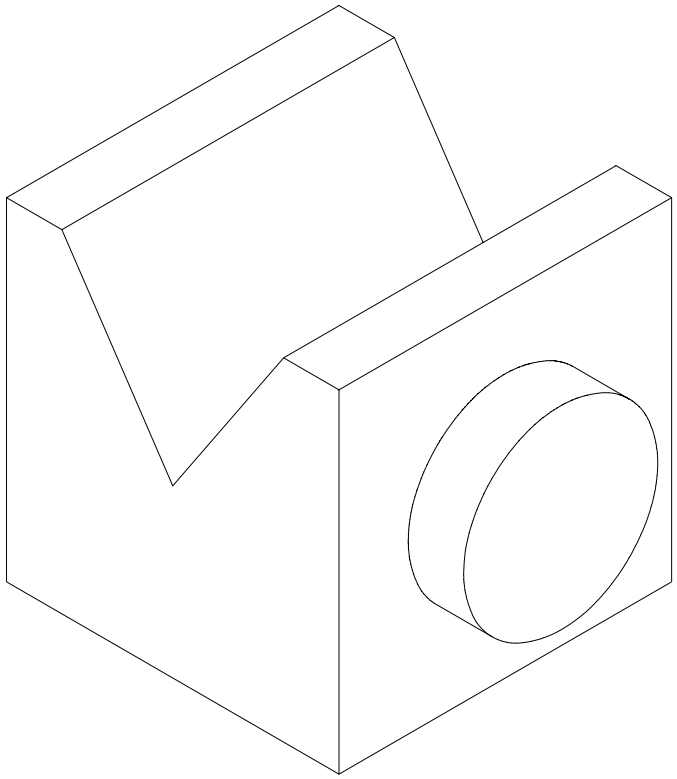


Isometrics

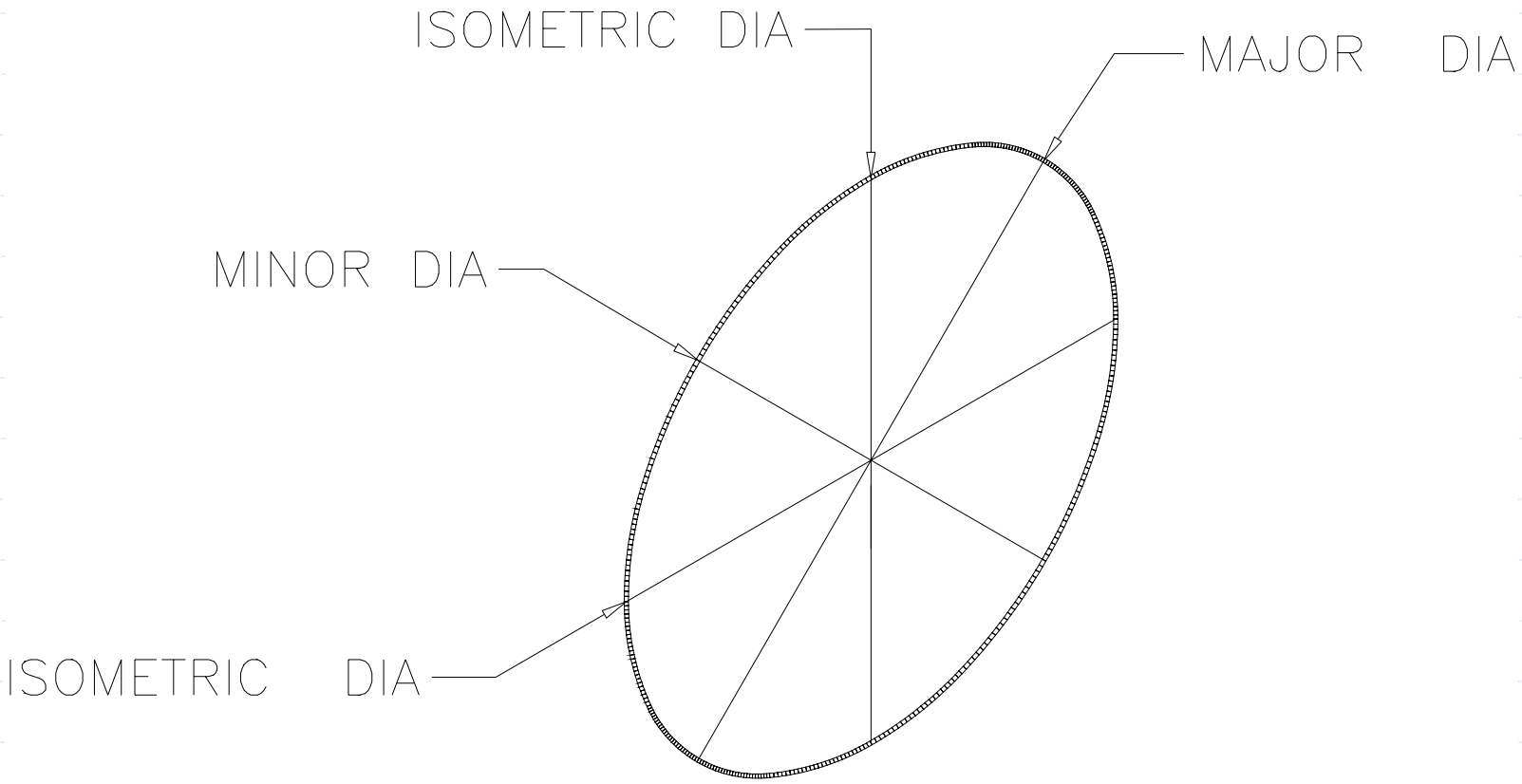
- Axes equally separated (120°)
- H, W, and D measurements are true size along iso. axes
- Angles must be located by coordinates
- Circles appear as ellipses on all surfaces



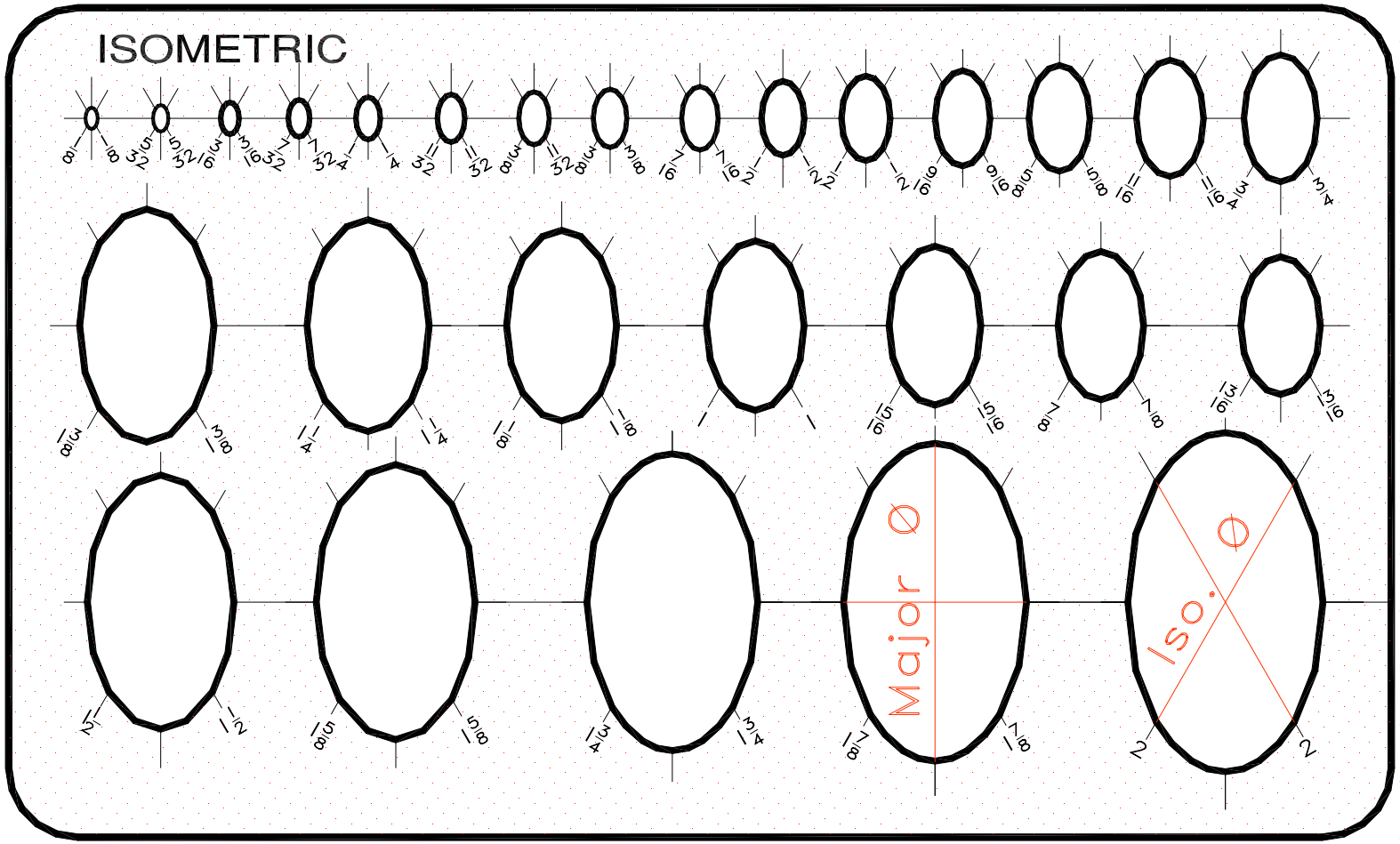
Isometric Circles & Angles



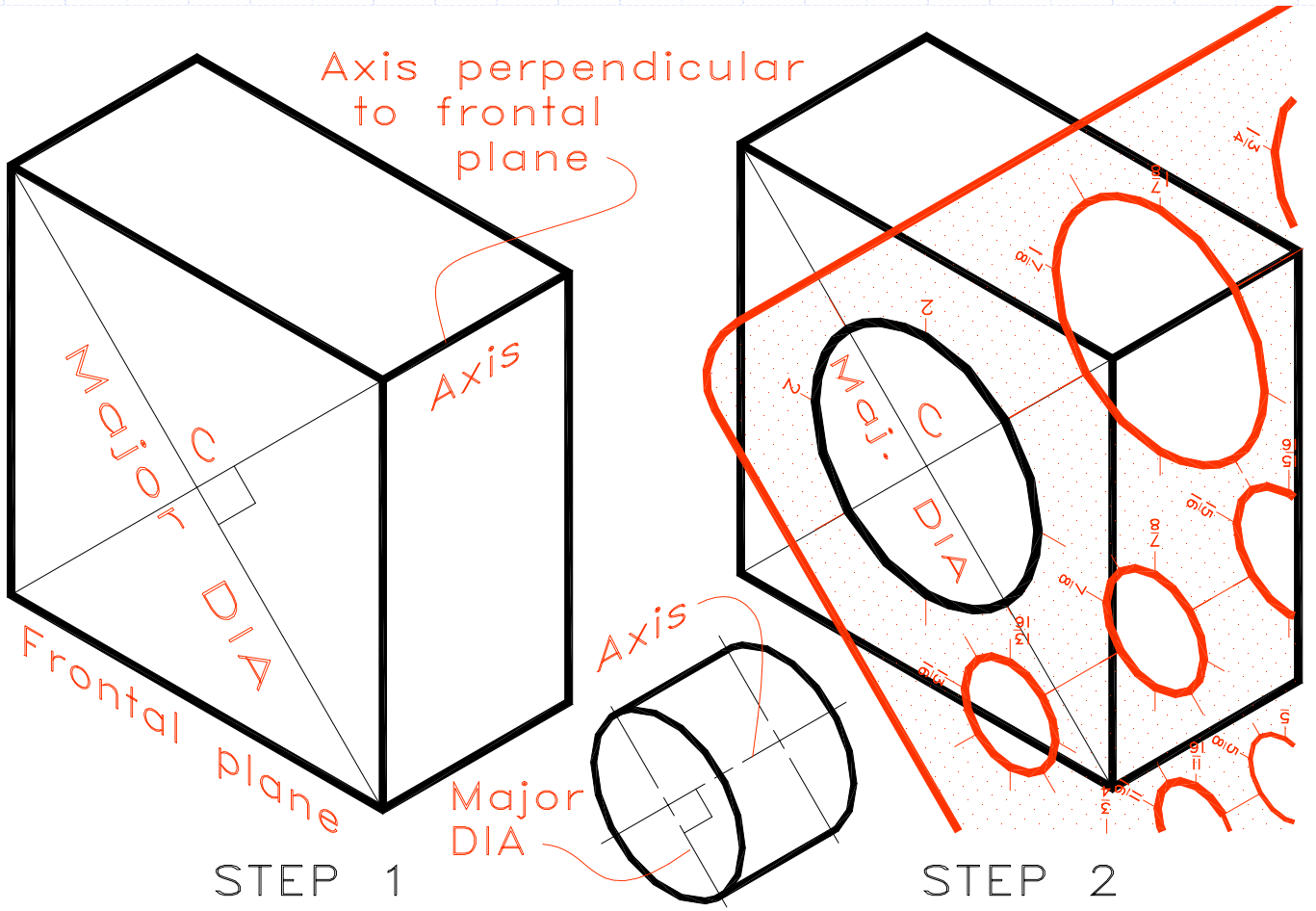
Isometric Ellipses



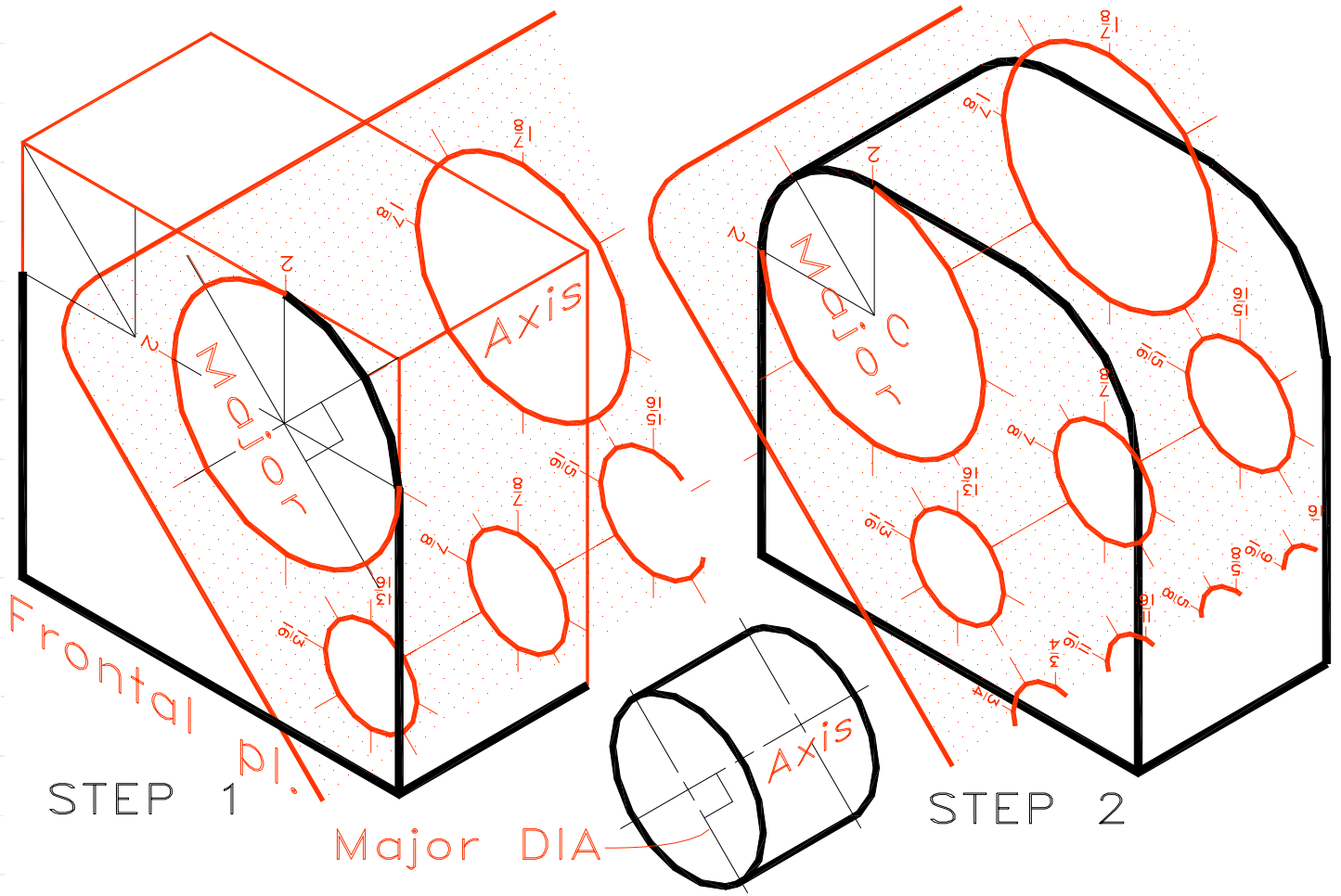
The Isometric Ellipse Template



Using the Ellipse Template

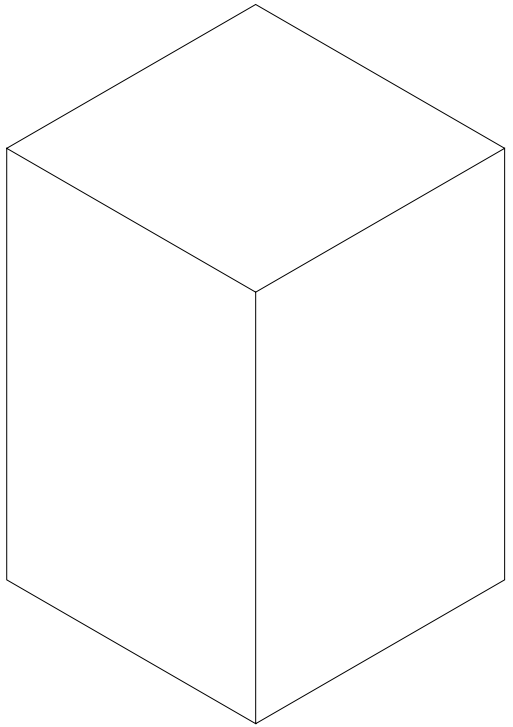


Drawing Rounded Corners



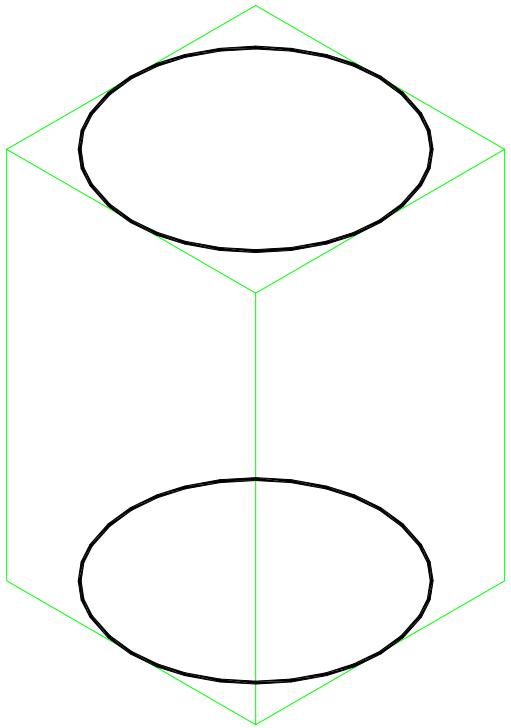
Construction of Cylinders

- Lightly block in the cylinder



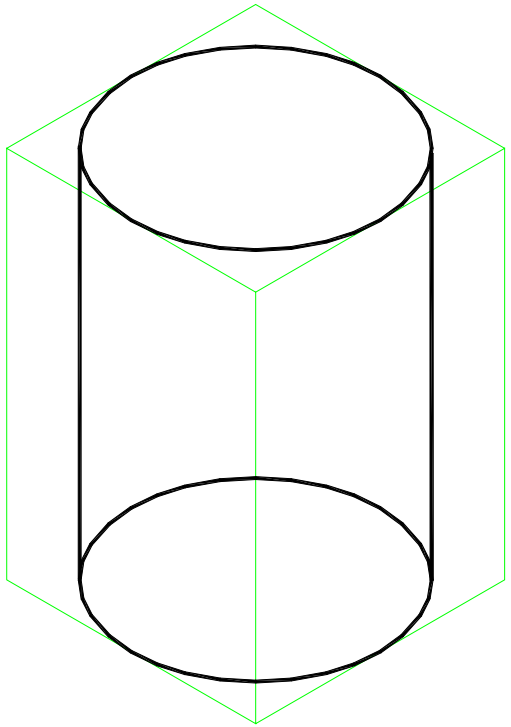
Construction of Cylinders

- Lightly block in the cylinder
- Sketch the upper and lower ellipses



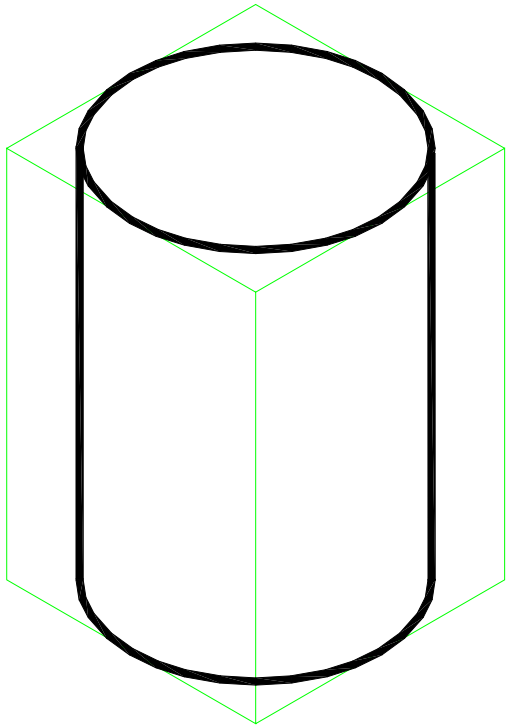
Construction of Cylinders

- Lightly block in the cylinder
- Sketch the upper and lower ellipses
- Connect the ellipses with Tangent lines



Construction of Cylinders

- Lightly block in the cylinder
- Sketch the upper and lower ellipses
- Connect the ellipses with Tangent lines
- Darken the lines



Class Exercise

- Complete the orthographic views shown and **Sketch** an isometric of the part.