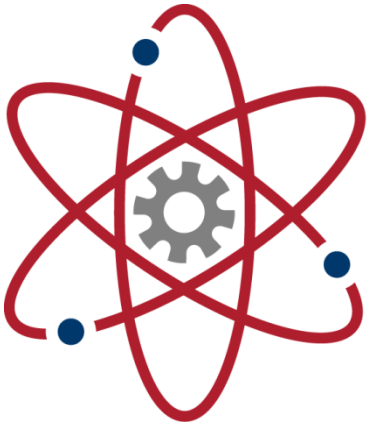


PROJECT LEAD THE WAY

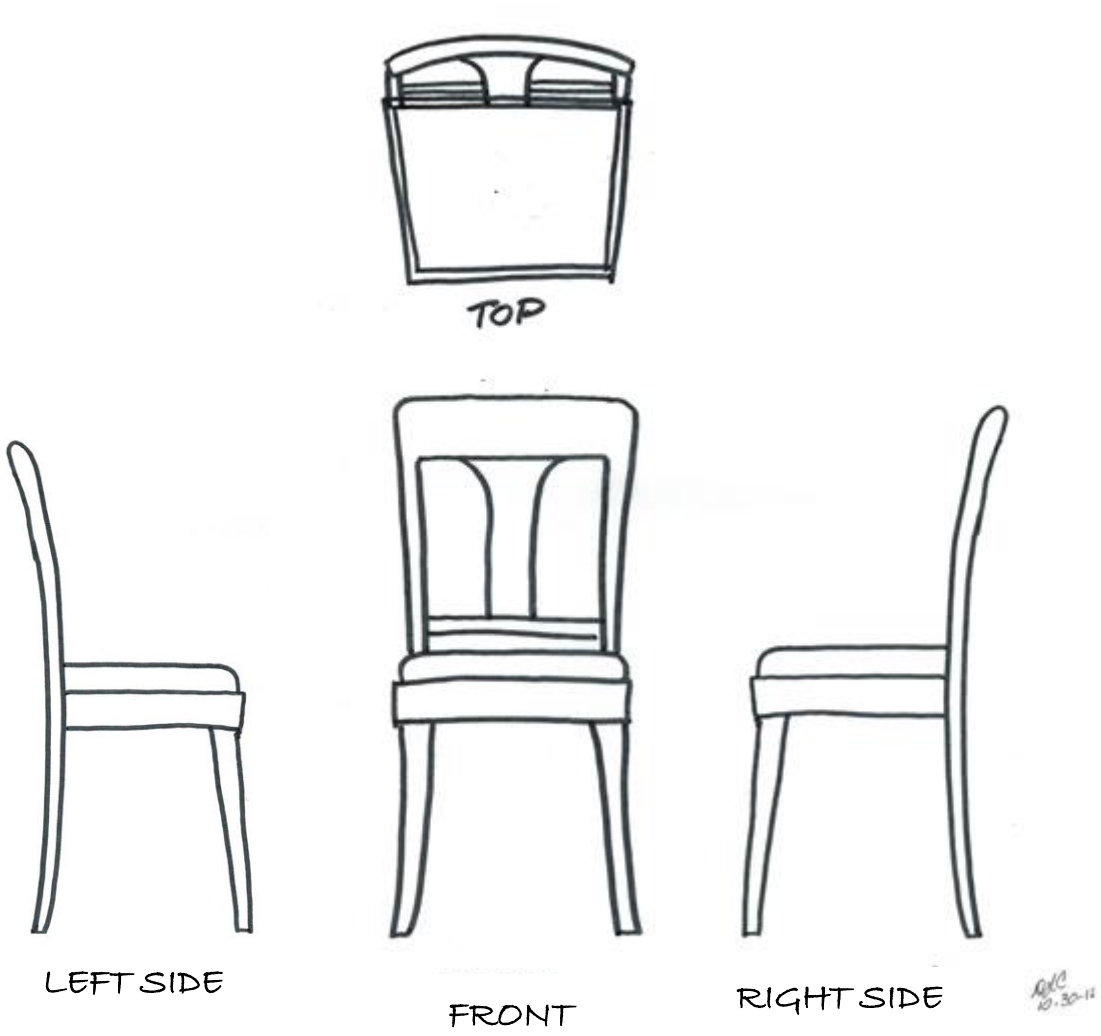
PLTW

Multiview Sketching

Multiview Drawing

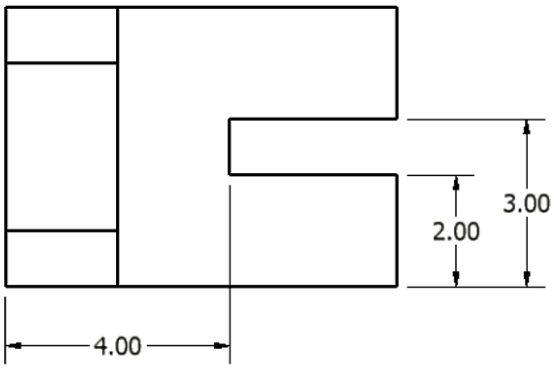
- Shows two or more two-dimensional views of a three-dimensional object.
- Provides the shape description of an object.
- When combined with dimensions, serves as the main form of communication between designers and manufacturers.

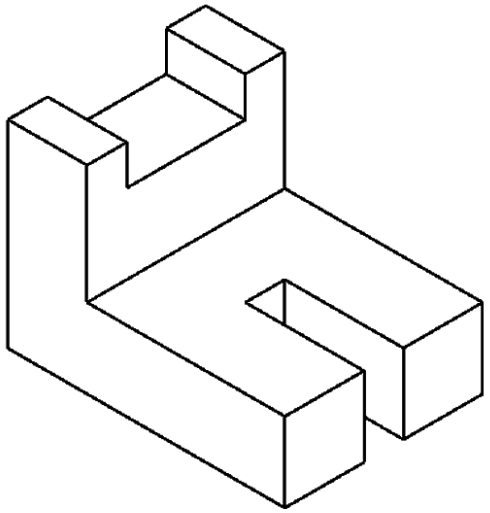
Example of Multiview Sketch

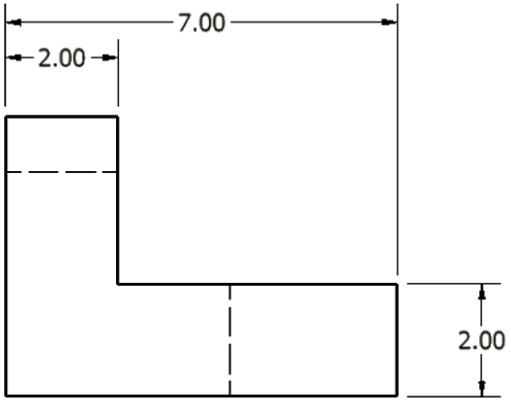


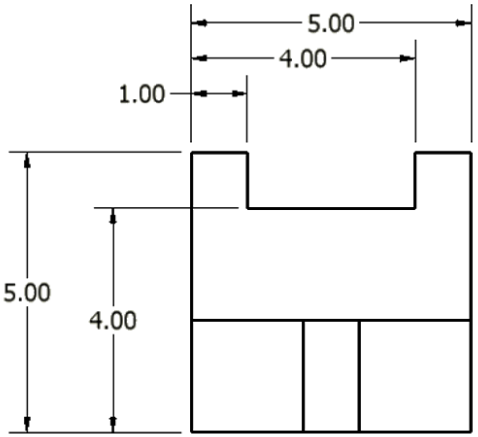
Dining Chair

Multiview Drawing









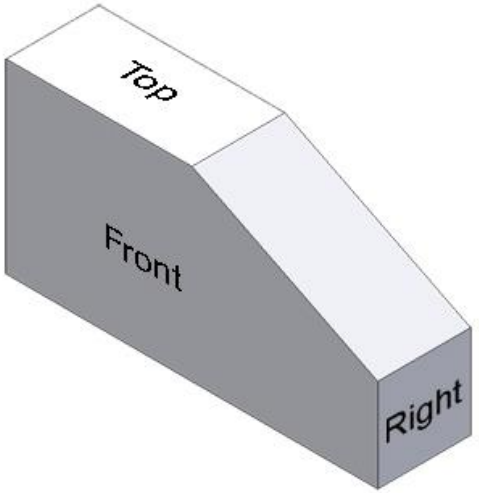
Multiview Drawing

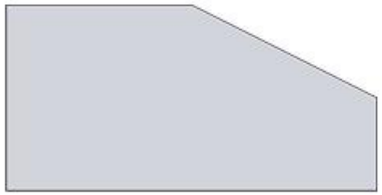
All three-dimensional objects have *width*, *height*, and *depth*.

- *Width* is associated with an object's *side-to-side* dimension.
- *Height* is associated with an object's *top-to-bottom* dimension.
- *Depth* is associated with an object's *front-to-back* dimension.

Multiview Drawing

TOP VIEW

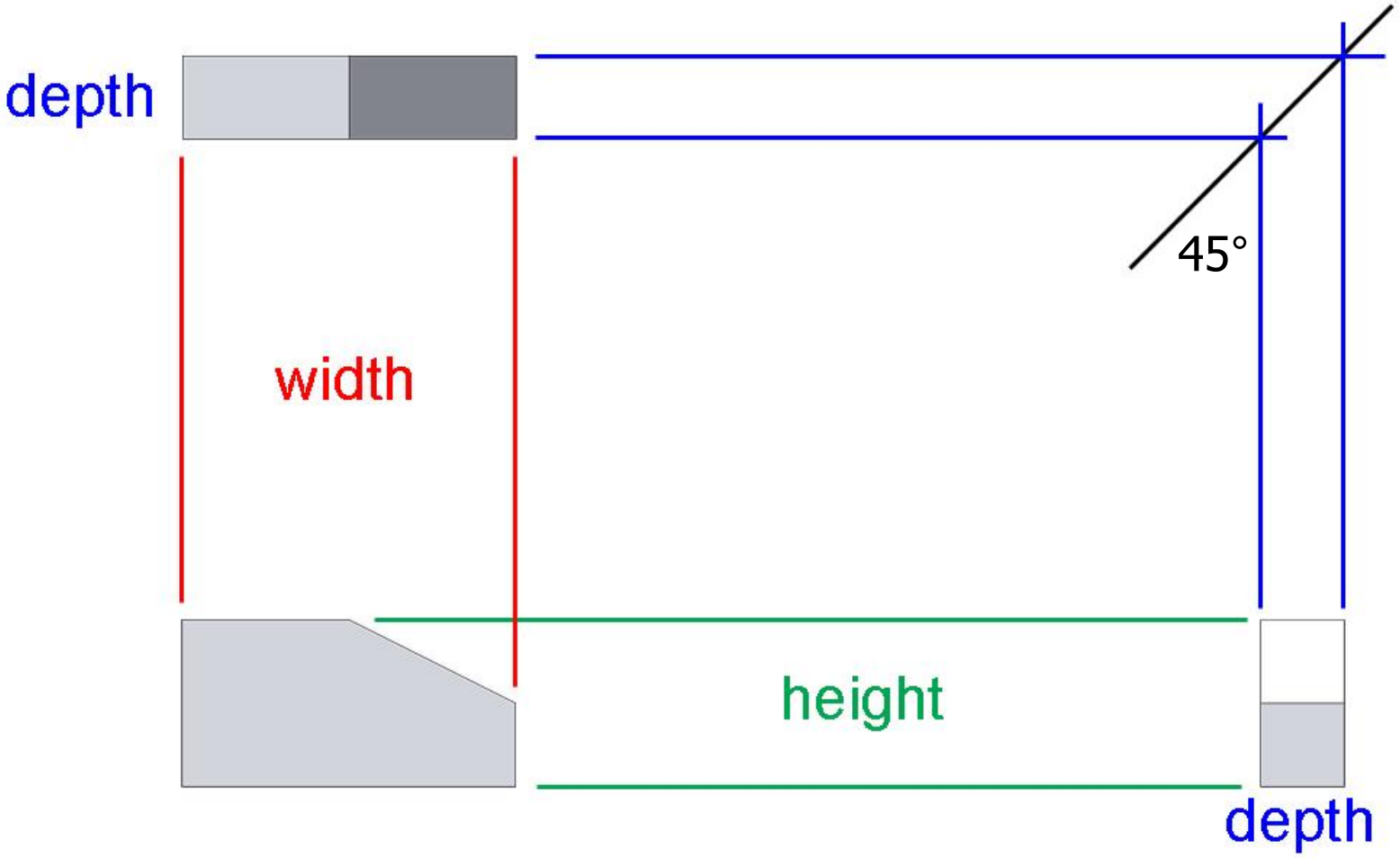




FRONT VIEW

RIGHT-SIDE VIEW

Multiview Drawing

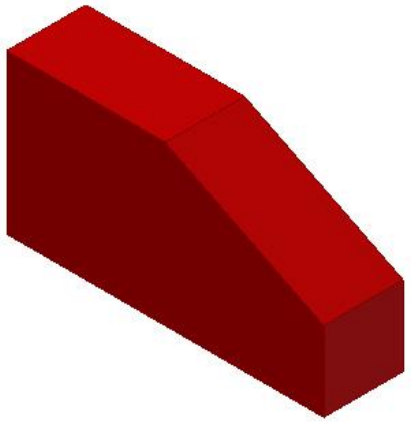


Orthographic Projection

- A technique used to create multiview drawings.
- Any projection of the features of an object onto an imaginary plane of projection.
  - The projection of the features of the object is made by lines of sight that are perpendicular to the plane of the feature.

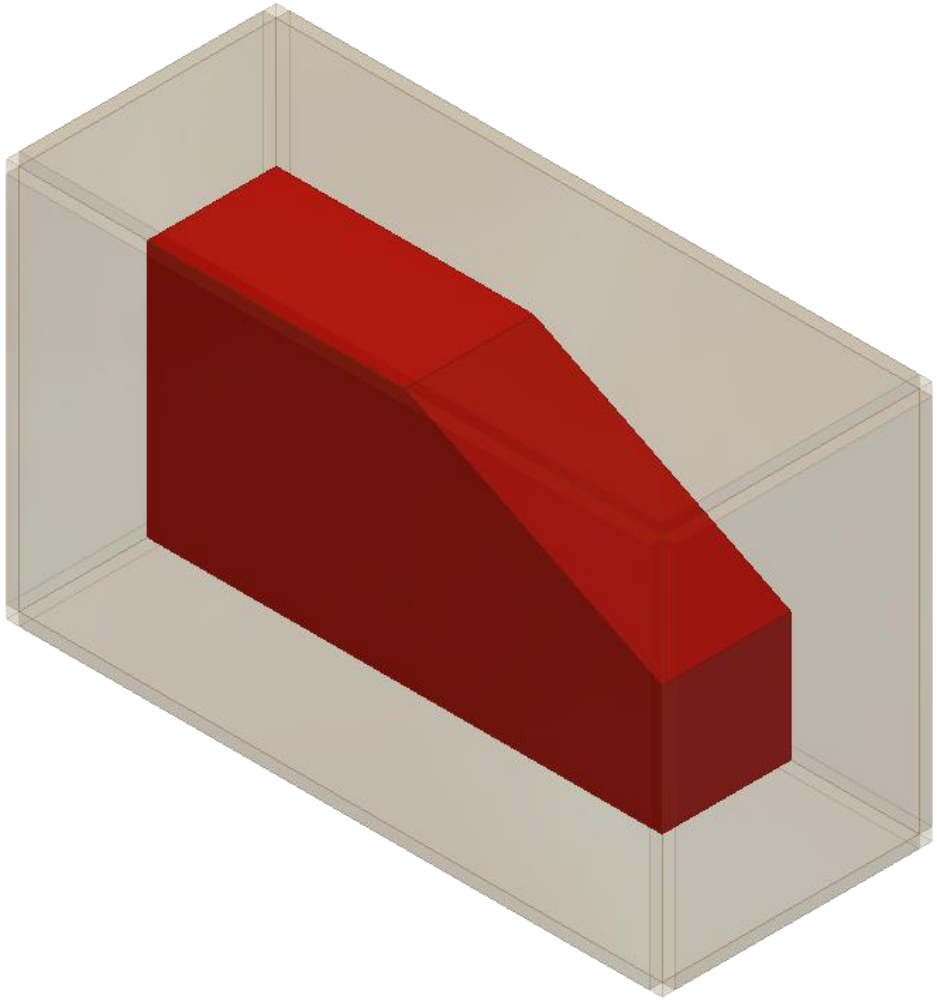
Orthographic Projection

The best way to understand ***orthographic projection*** is to imagine an object contained inside a glass box.



Orthographic Projection

There is a total of six glass walls surrounding the object. Each wall represents a ***projection plane*** onto which a two-dimensional object view will be created.



Projection Plane

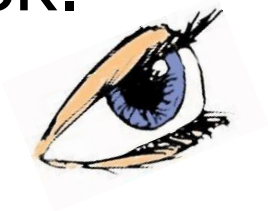
Also referred to as a ***plane of projection*** or ***picture plane***, is an imaginary surface that exists between the viewer and the object.

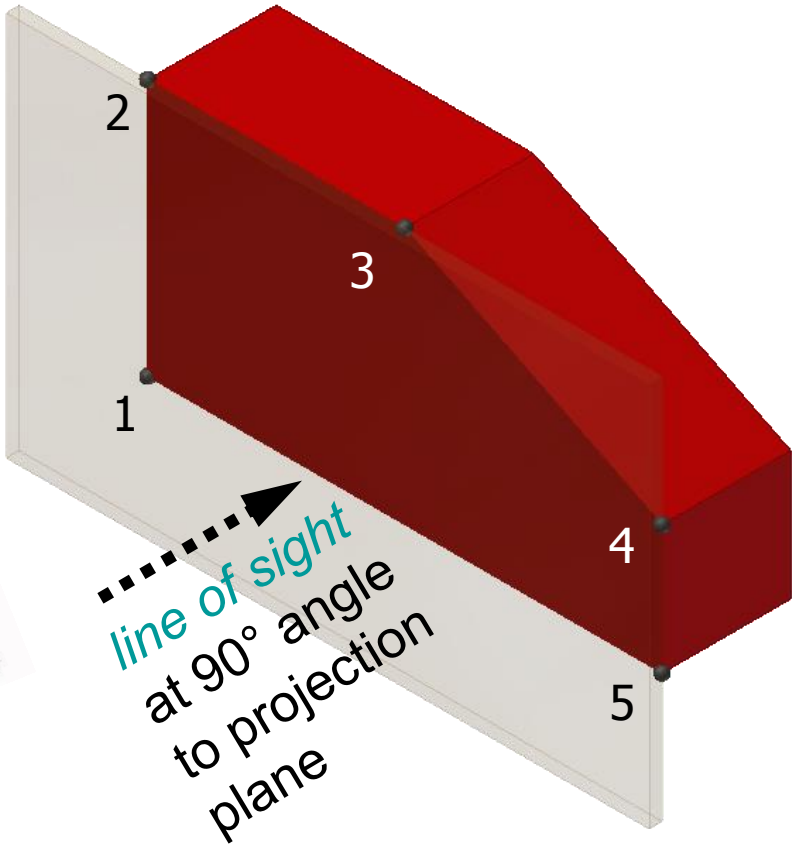
The surface onto which a two-dimensional view of a three-dimensional object is projected and created.

Orthographic Projection

Start by focusing only on the front ***projection plane***.

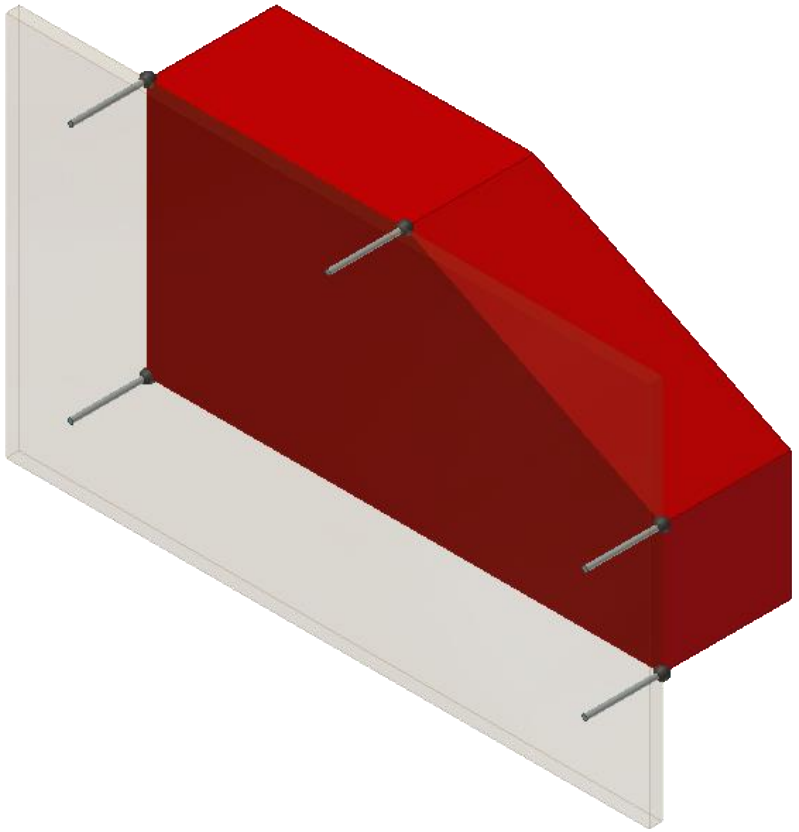
A person standing in front of the object would see only the five corners identified in black.





Orthographic Projection

Projection lines are used to project each corner outward until they reach the ***projection plane***.

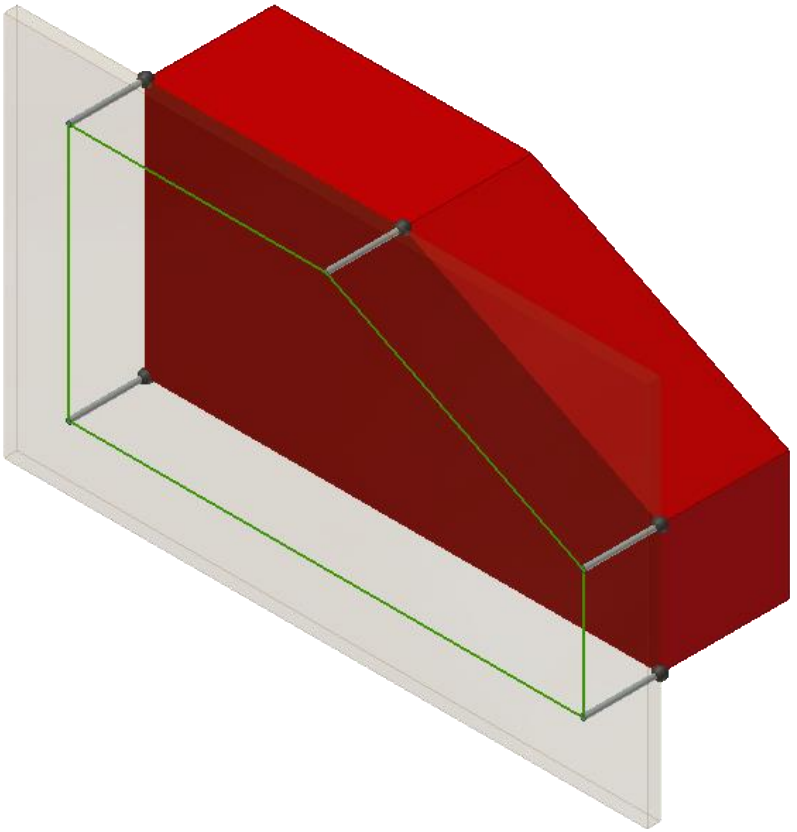


Projection Line

An imaginary line that is used to locate or project the corners, edges, and features of a three-dimensional object onto an imaginary two-dimensional surface.

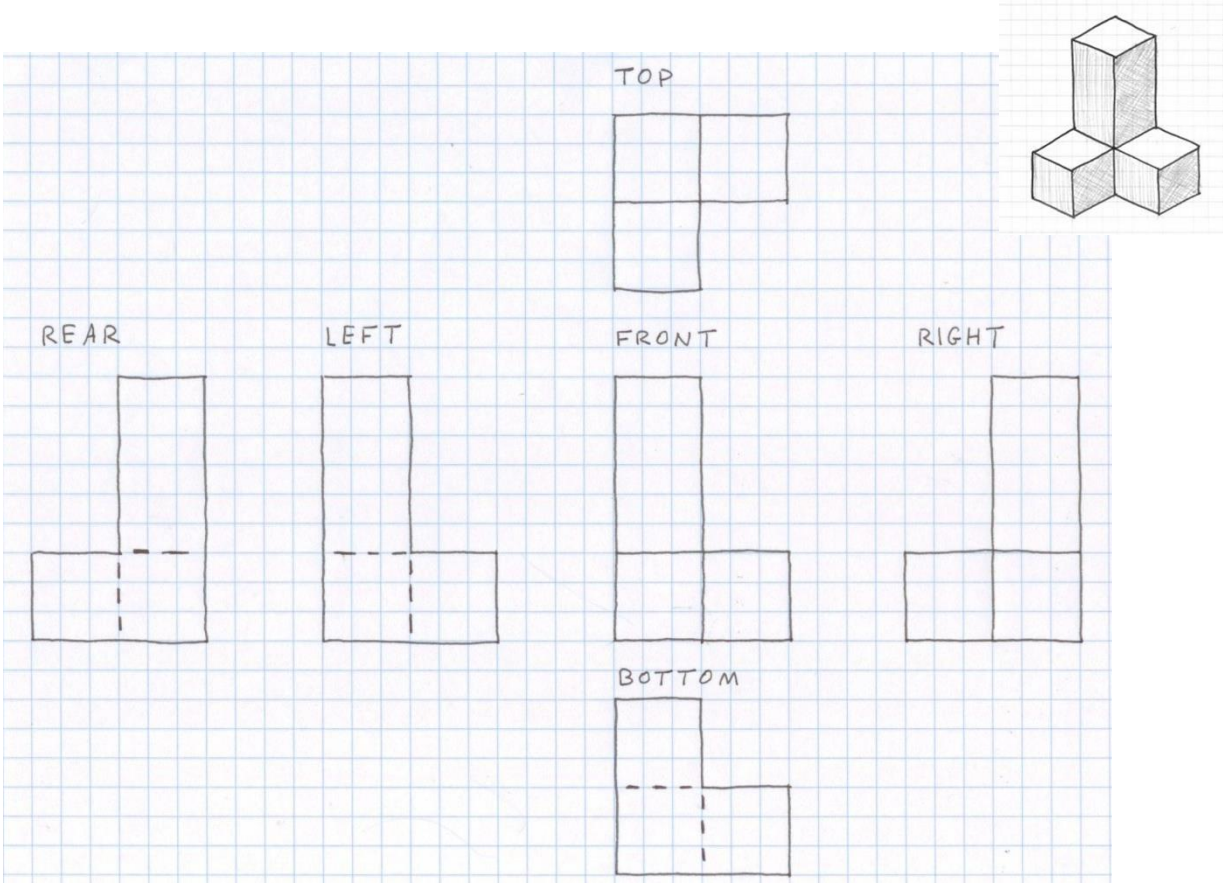
Orthographic Projection

The *visible edges* of the object are then identified on the ***projection plane*** by connecting the projected corners with ***object lines***.



Orthographic Projection

The ***orthographic projection*** process is then repeated on the other ***projection planes***.

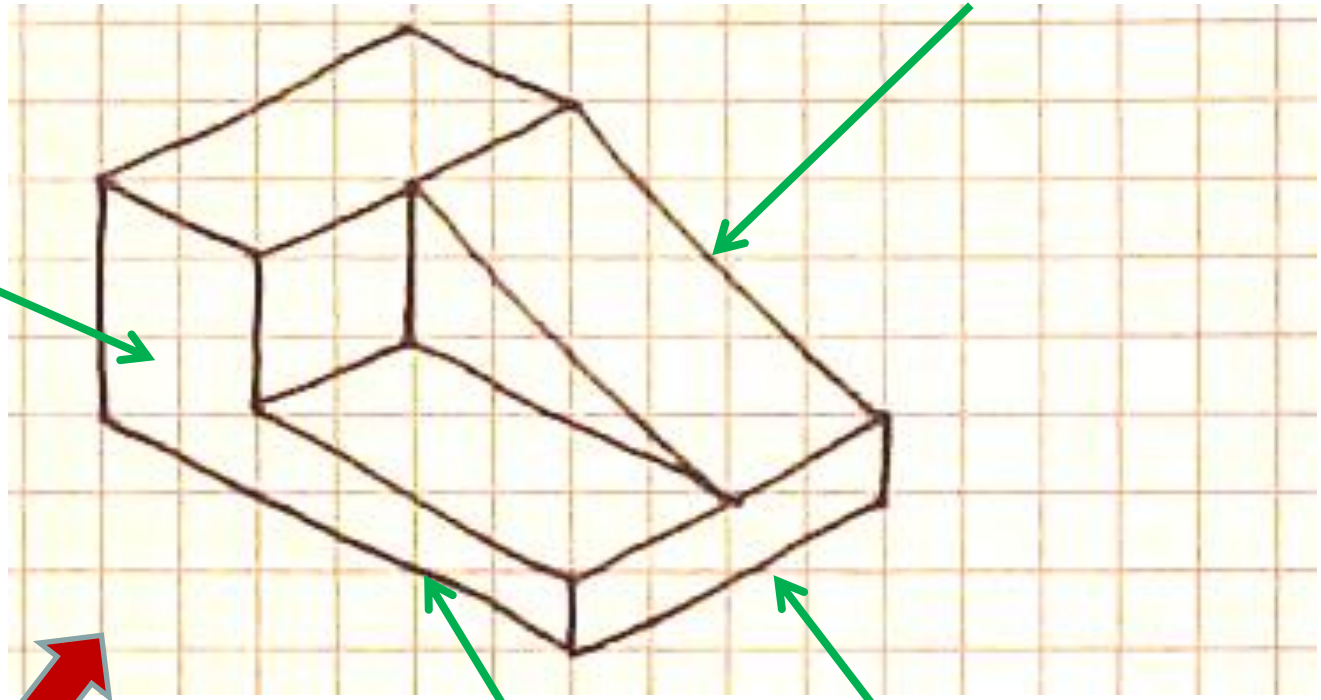


Orthographic View Selection

Recommendations for how to select the front view

- Most natural position or use
- Shows best shape and characteristic contours
- Longest dimensions
- Fewest hidden lines
- Most stable and natural position

Orthographic View Selection



No hidden edges

Best shape description

BEST FRONT VIEW

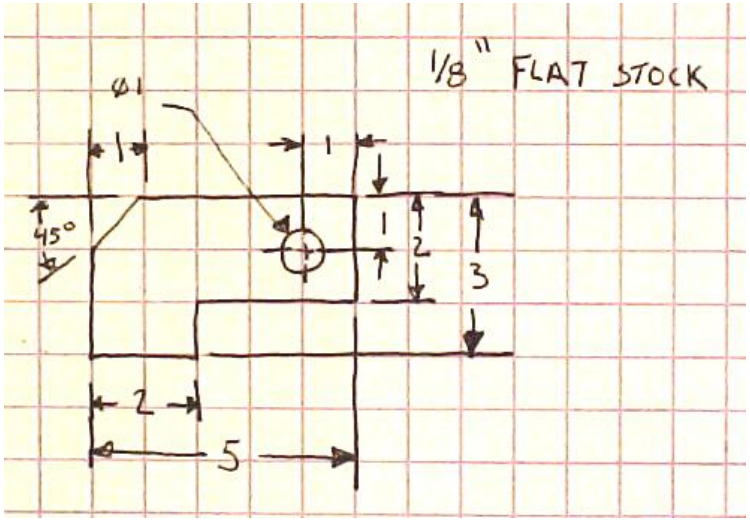
Most natural position

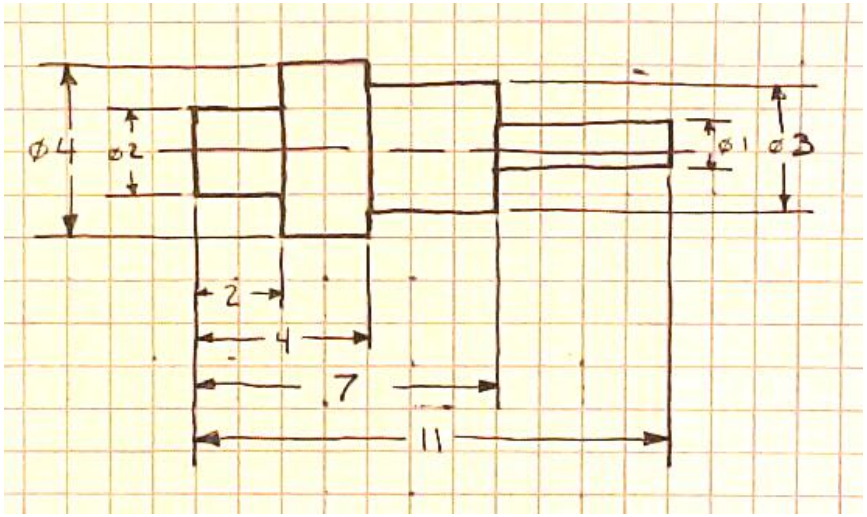
Longest dimension

Number of Orthographic Projections

One View

- Uniform thickness or shape
- Two views would be identical
- All dimensions properly and easily shown on one view

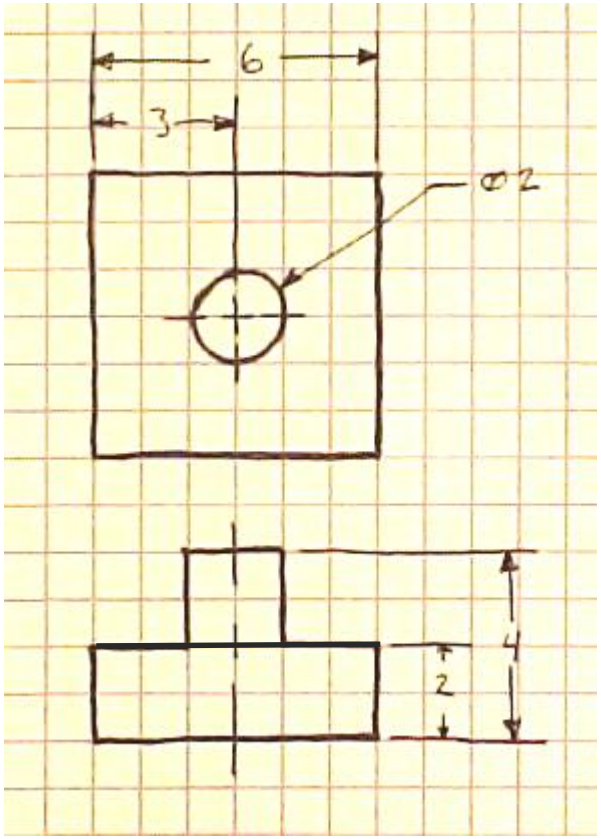




Number of Orthographic Projections

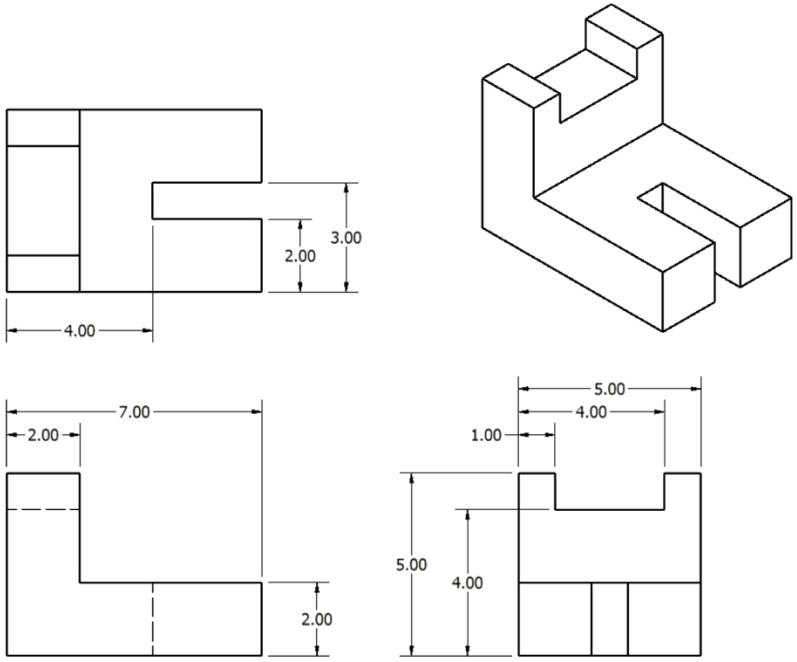
Two Views

- Symmetrical part
- A third view would be identical to one other
- Second view is necessary for depth



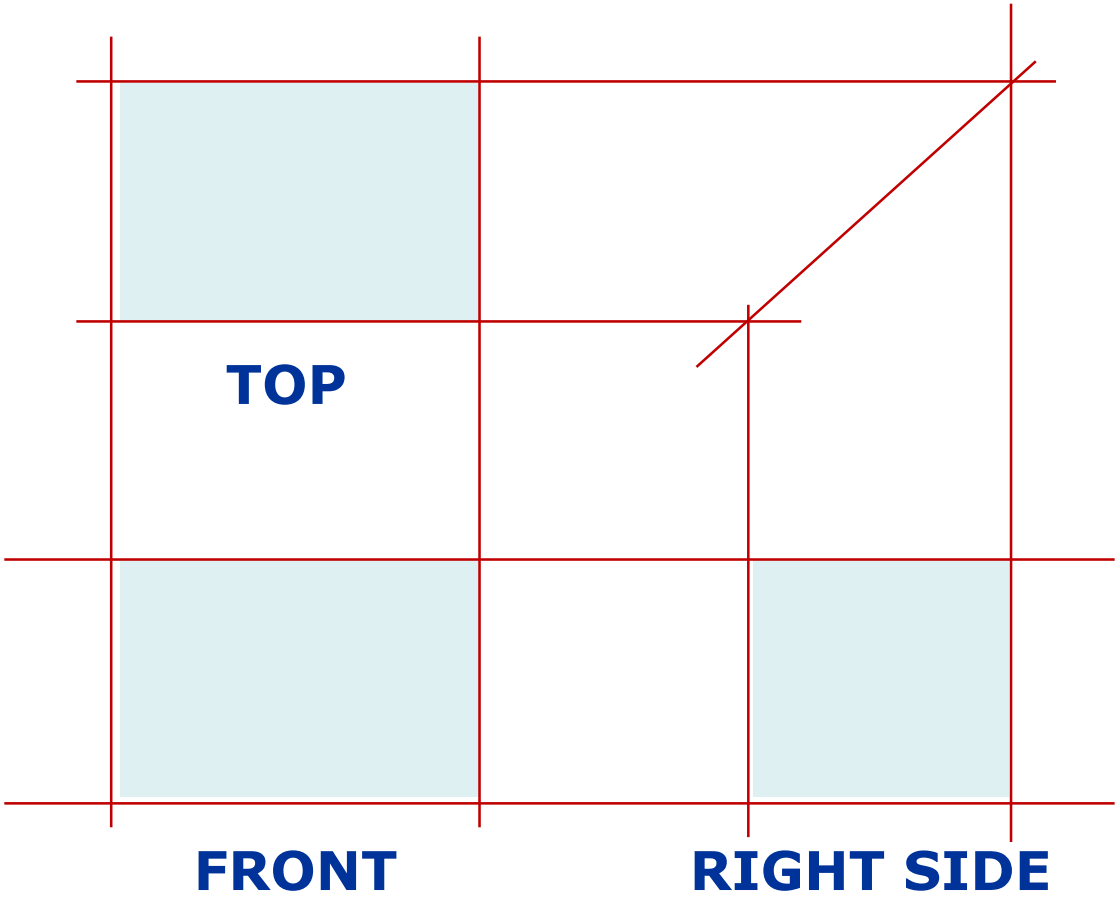
Sketching a Multiview Drawing

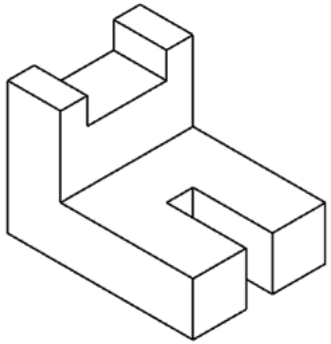
Given the overall dimensions of the object, a pencil, and a sheet of graph paper, sketching a multiview drawing can be easily done using points, construction lines, and object lines.



Sketching a Multiview Drawing

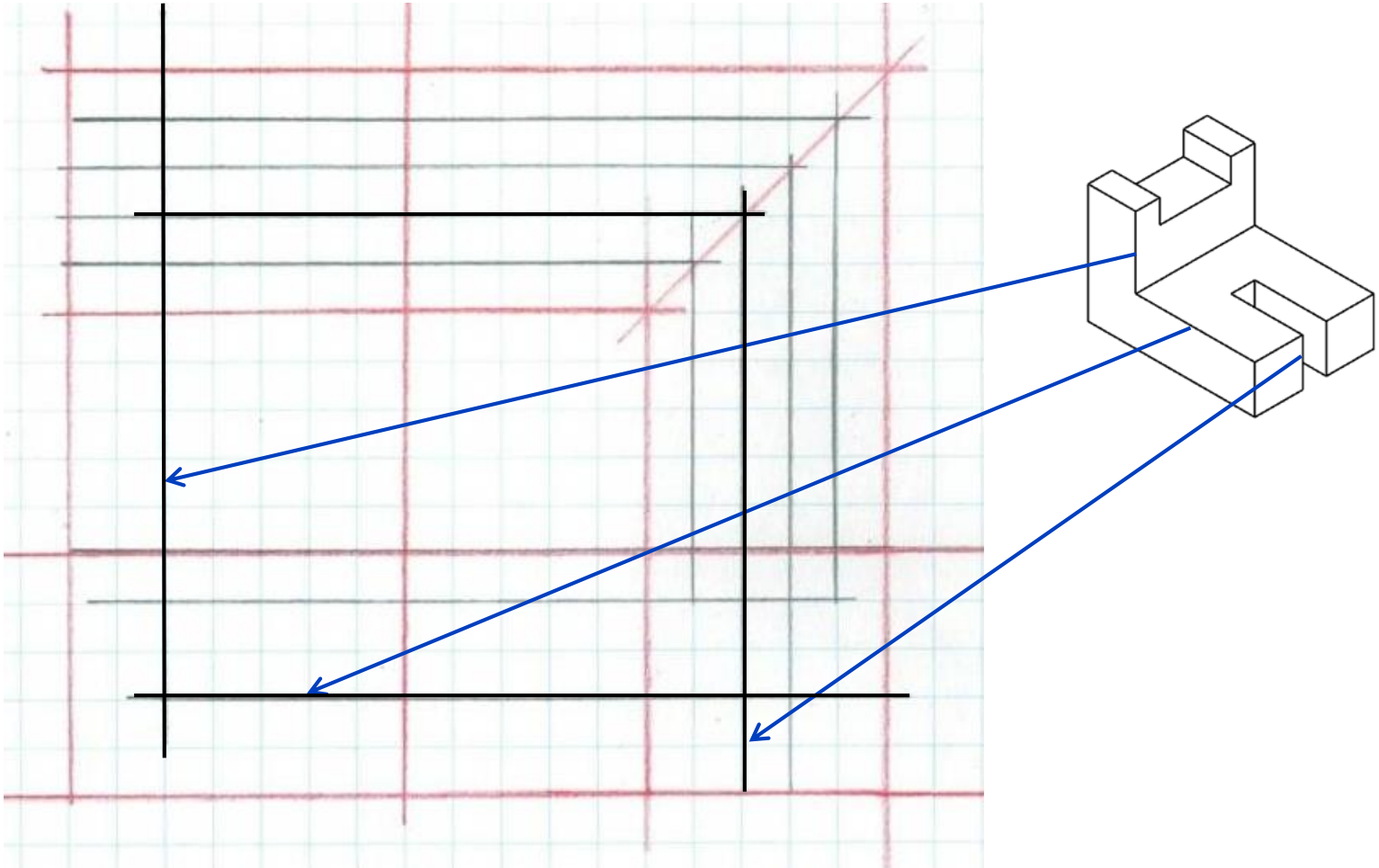
Step 1 – Layout the boxes within which the individual views will occur using points and construction lines.





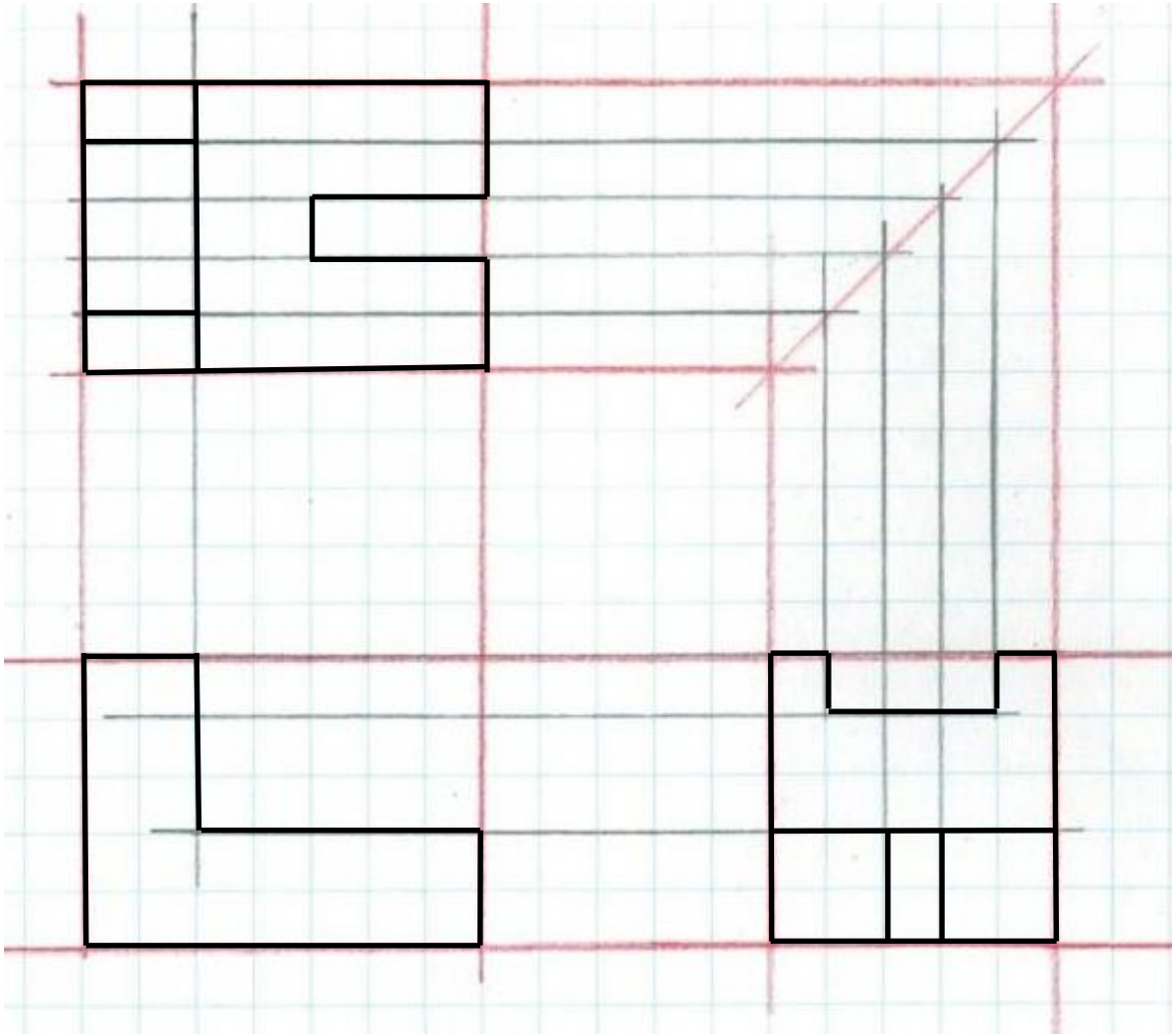
Sketching a Multiview Drawing

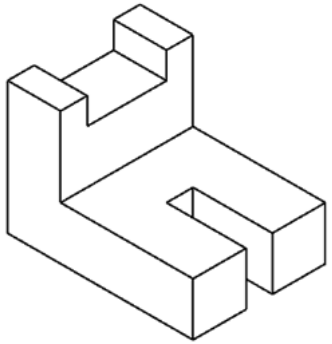
Step 2 – Use construction lines between the views to indicate the geometry of the views.



Sketching a Multiview Drawing

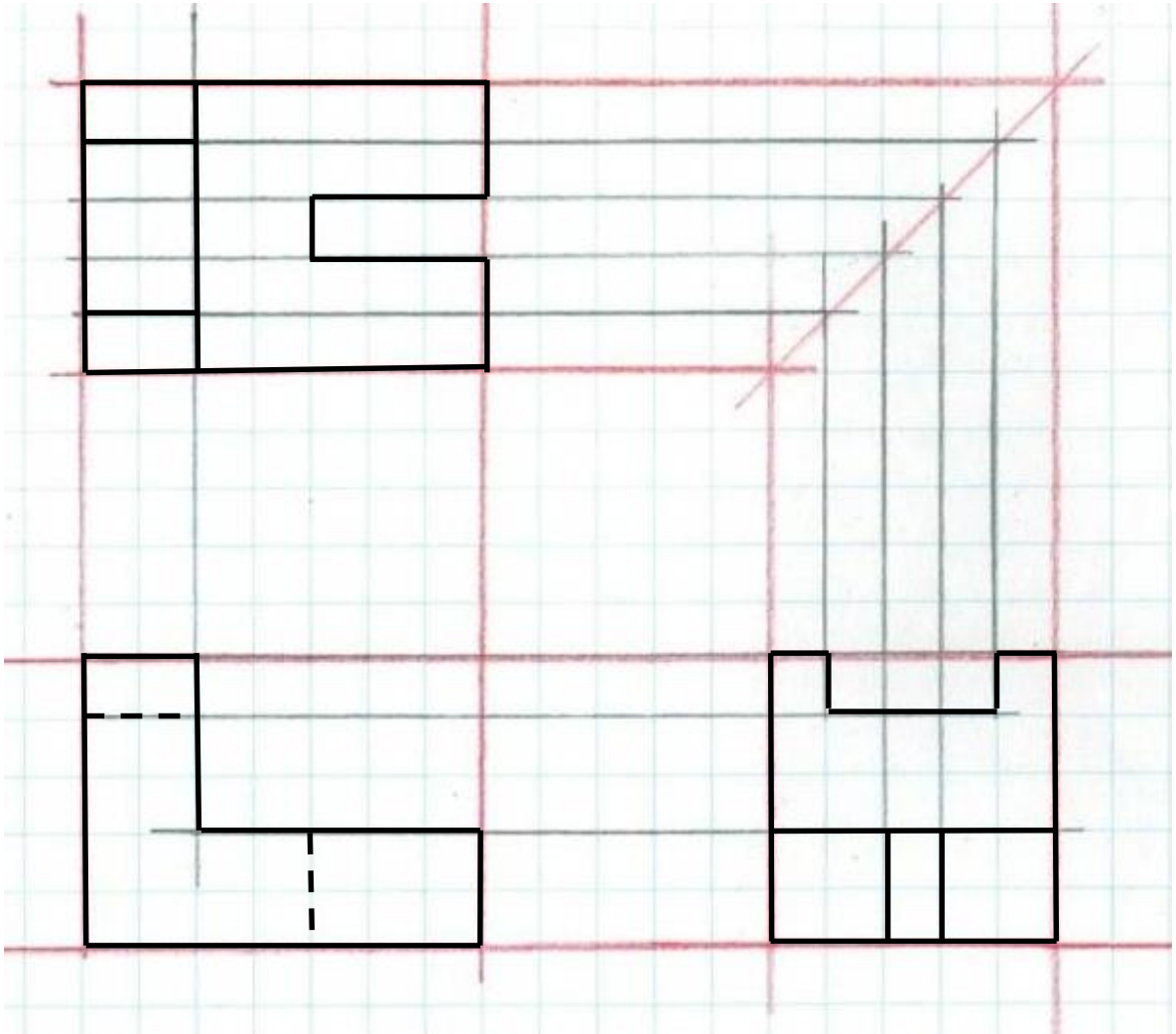
Step 3 – Identify the visible edges with object lines.

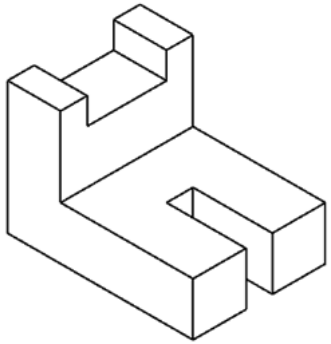




Sketching a Multiview Drawing

Step 4 – Locate hidden lines.

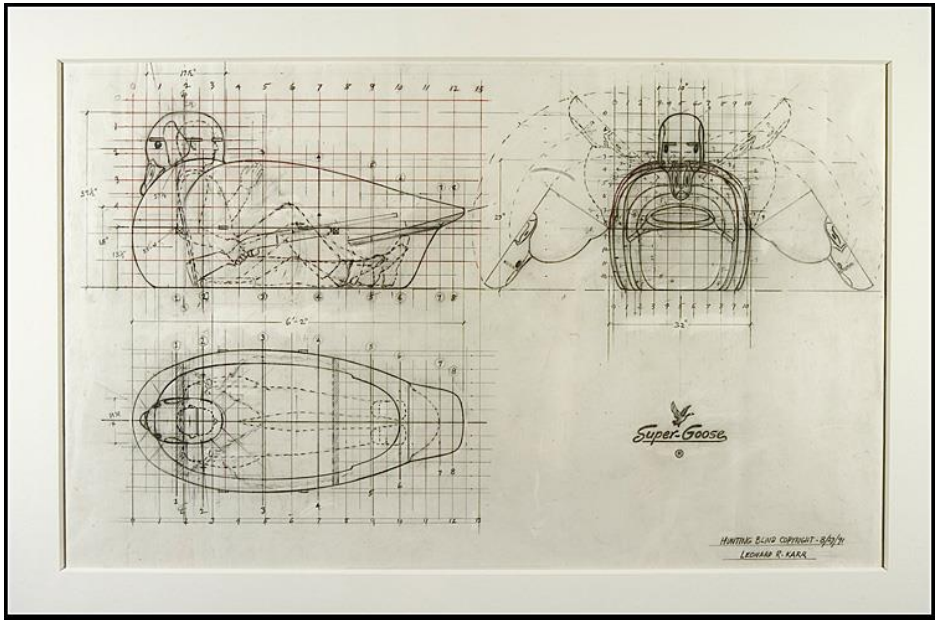




Historical Example

Leonard P. Karr (1913–1995) designed a man-sized hunting blind shaped like a goose called Super Goose, 1991.

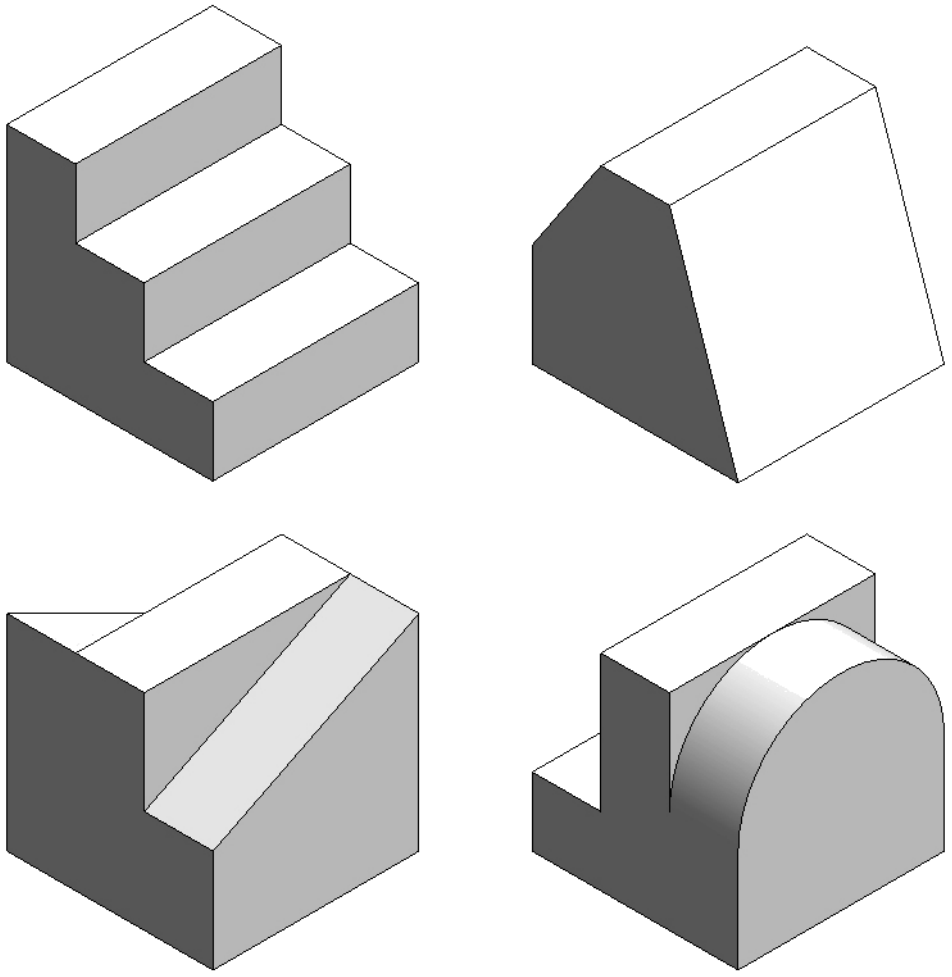
- How would you label the views presented in the drawing?
- Are Mr. Karr's views properly aligned based on the orientation presented here?
- How would you rearrange the views?



Hunting blind, 1991
Leonard P. Karr, Yakima, Washington
ink and pencil on paper
Doodles, Drafts and Designs: Industrial Drawings from the Smithsonian
Smithsonian Institution
http://www.sil.si.edu/exhibitions/doodles

A Question…

Each of the blocks at the right has the same overall dimensions and color. What else do they have in common?



A Question…

They all have identical top views!