Chapter 5

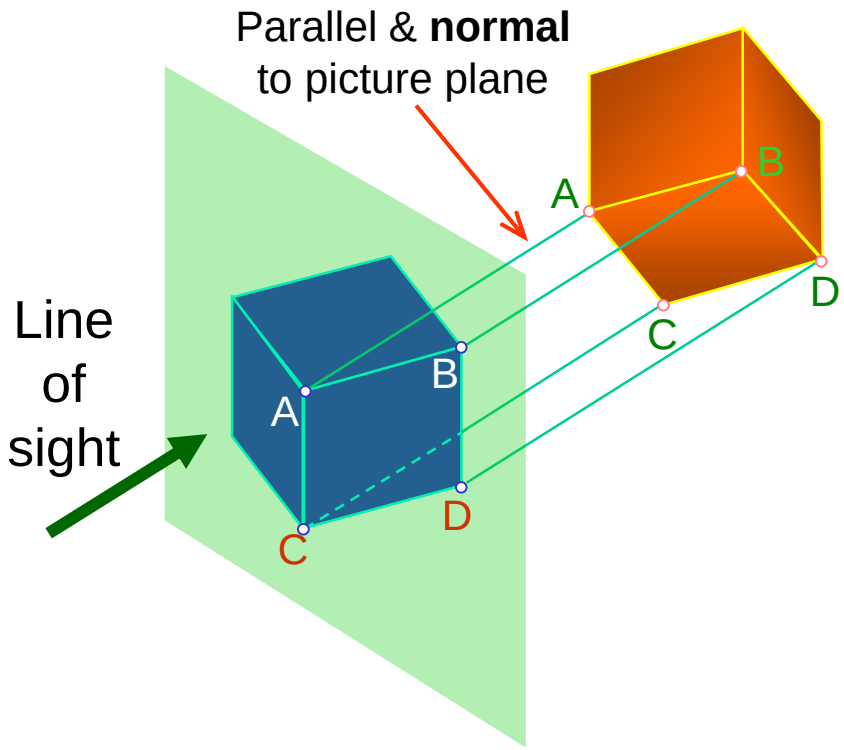
Pictorial Sketching

Objectives

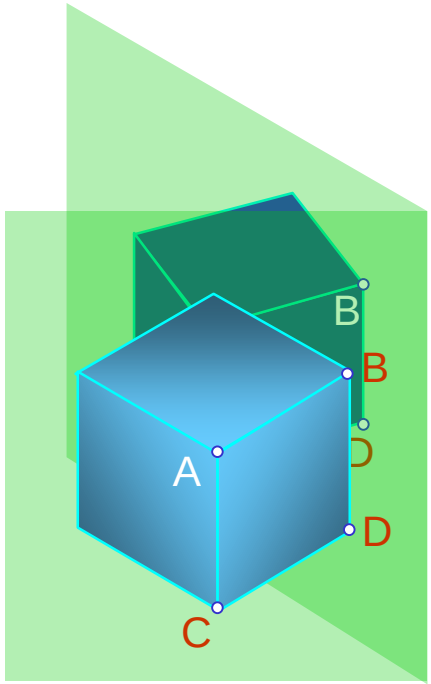
- Be able to explain the difference between an ***axonometric projection*** and an ***oblique projection***.
- Be able to explain the difference between an ***isometric projection*** and an ***isometric drawing/sketch***.
- Be able to create an ***isometric*** and ***oblique sketches*** from an actual object and multiview drawing.

Axonometric & Oblique Projection

Axonometric Projection

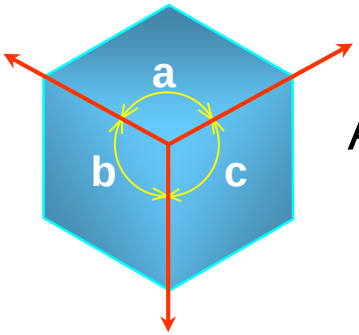


Axonometric Projection



Type of axonometric drawing

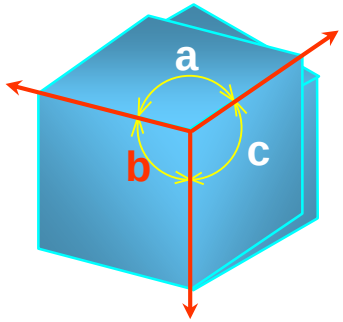
1. Isometric



Axonometric axis

All angles are equal.

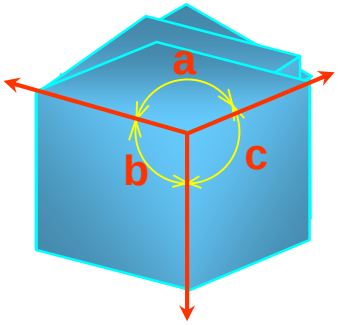
2. Dimetric



Axonometric axis

Two angles are equal.

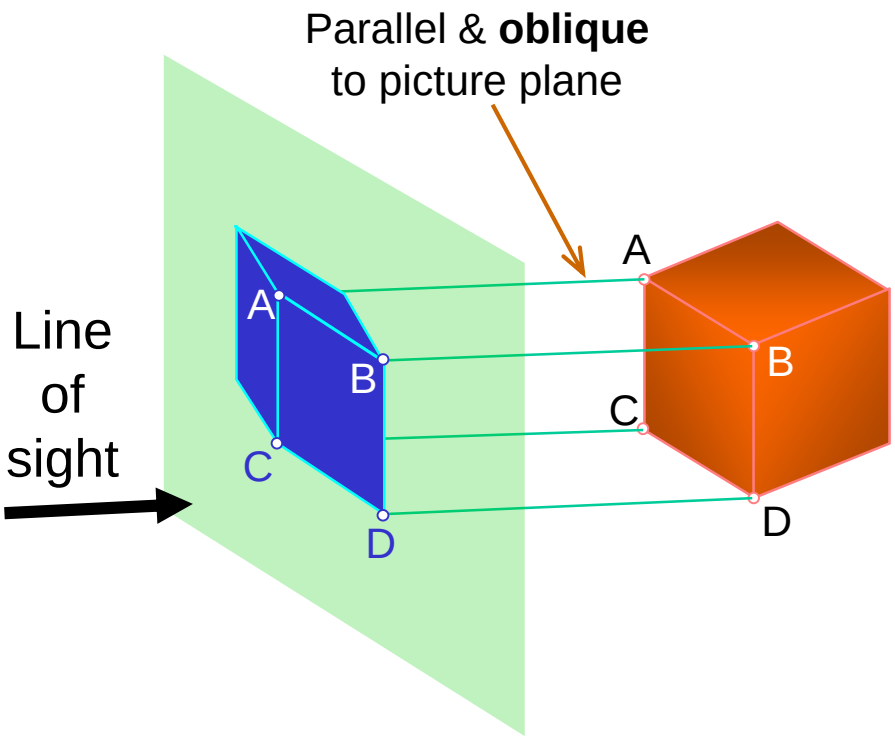
3. Trimetric



Axonometric axis

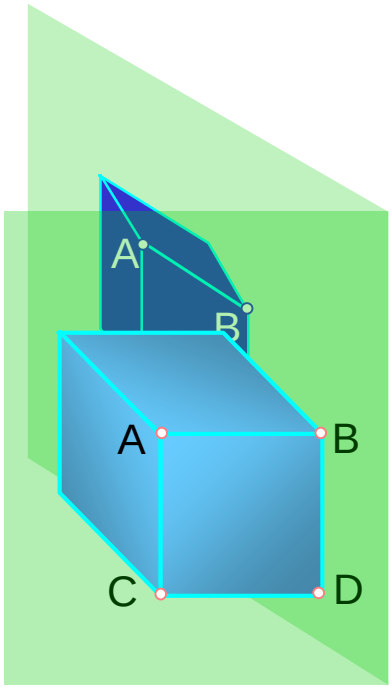
None of angles are equal.

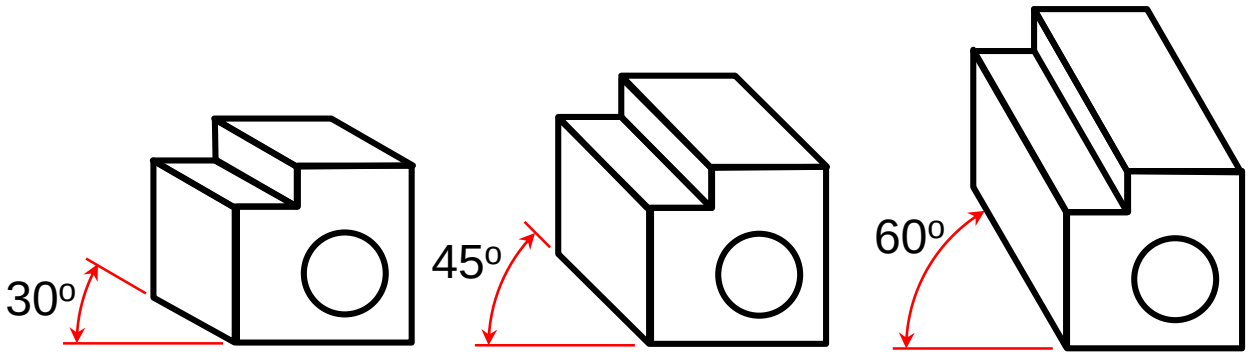
Oblique Projection



Oblique Projection

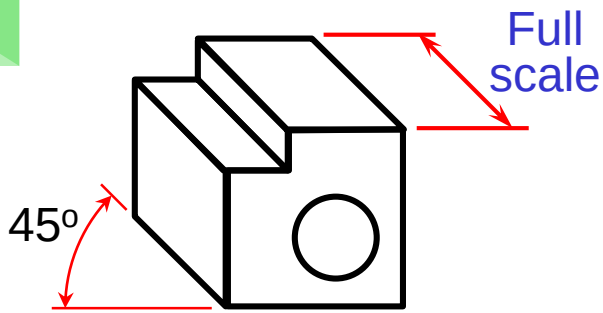
Oblique drawing angle



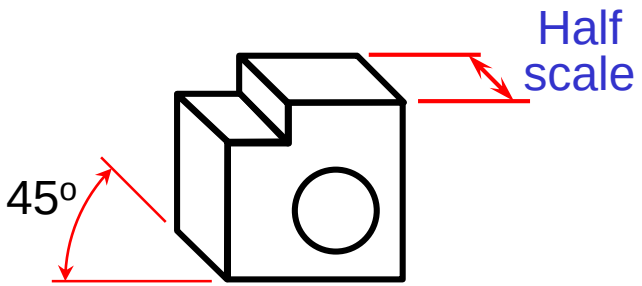


Type of Oblique drawing

1) Cavalier

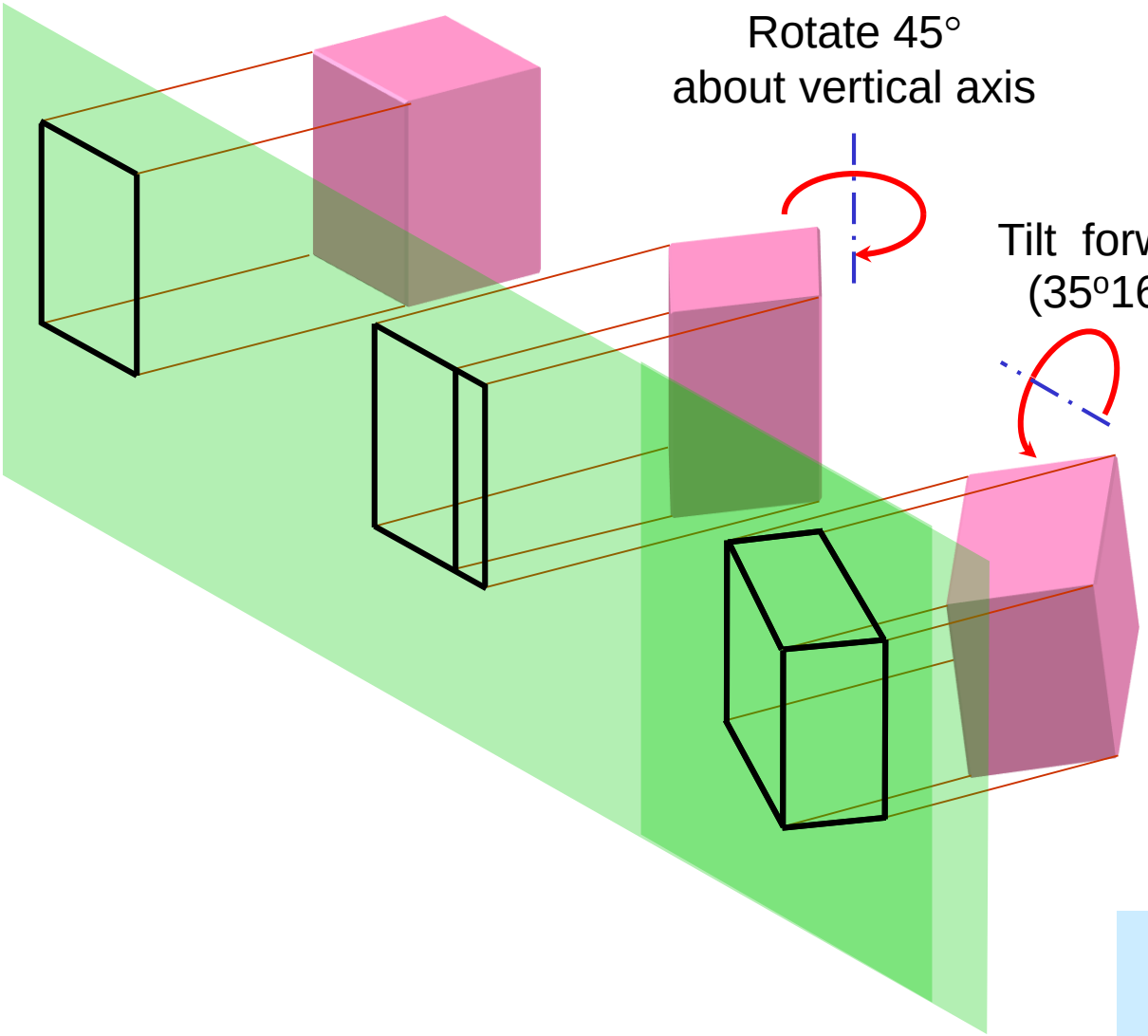


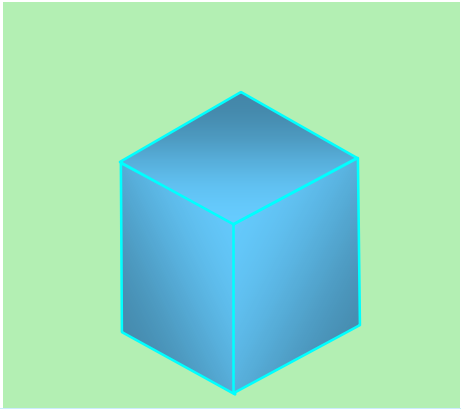
2) Cabinet



Isometric Projection & Isometric drawing

Isometric Projection



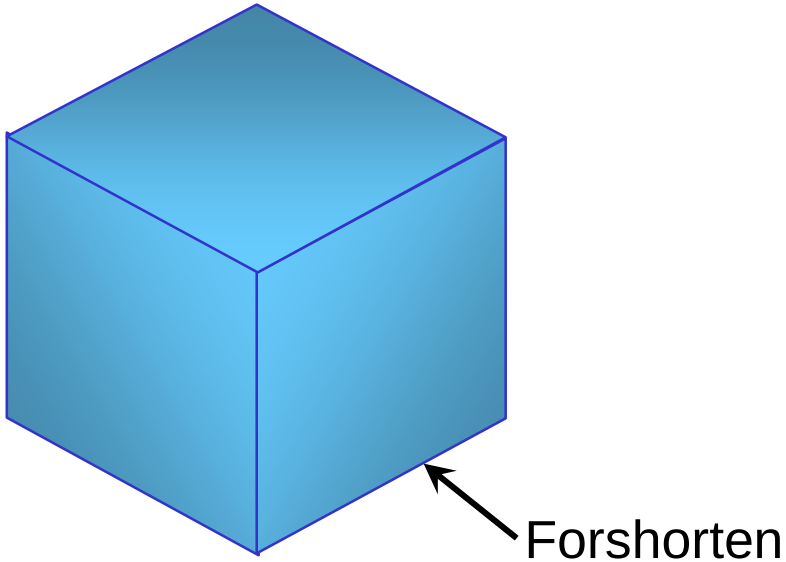


All edges ***foreshorten*** about 0.8 time.

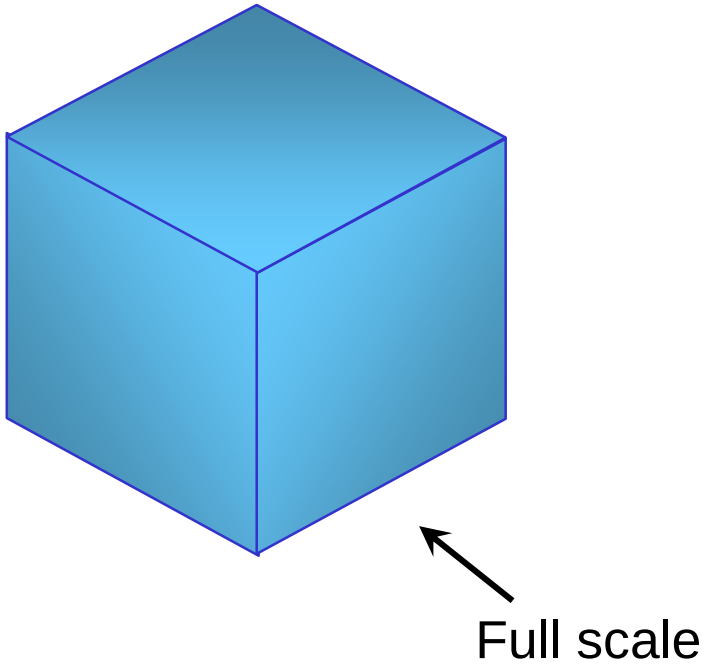
Isometric Drawing

Isometric drawing is a drawing drawn on an isometric axes using ***full scale***.

Isometric projection
(True projection)



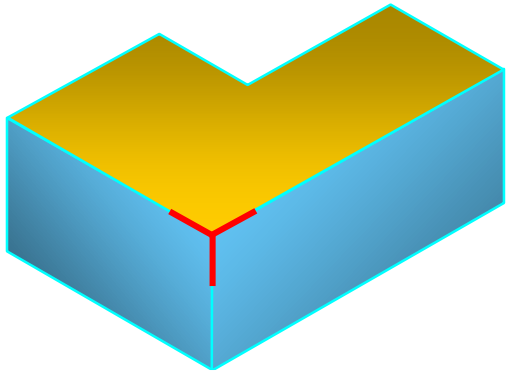
Isometric drawing
(Full scale)



Positions of Isometric Axes

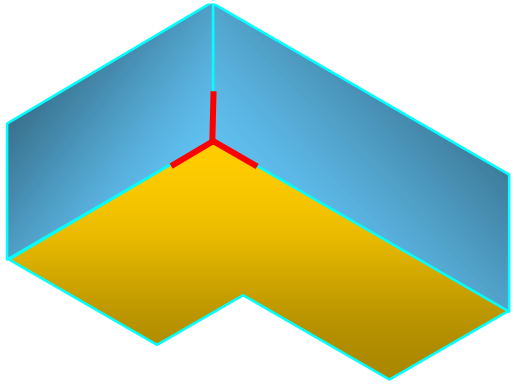
Isometric axes can be arbitrarily positioned to create different views of a single object.

Regular isometric



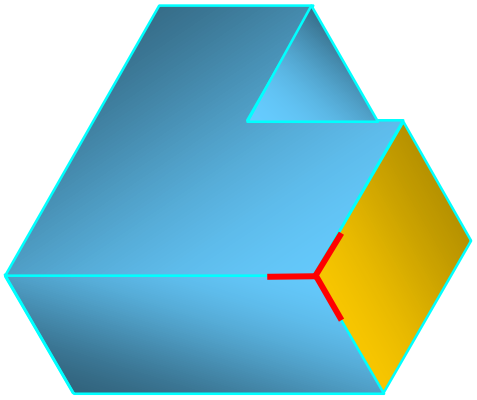
View point is looking down on the top of the object.

Reverse axis isometric



View point is looking up on the bottom of the object.

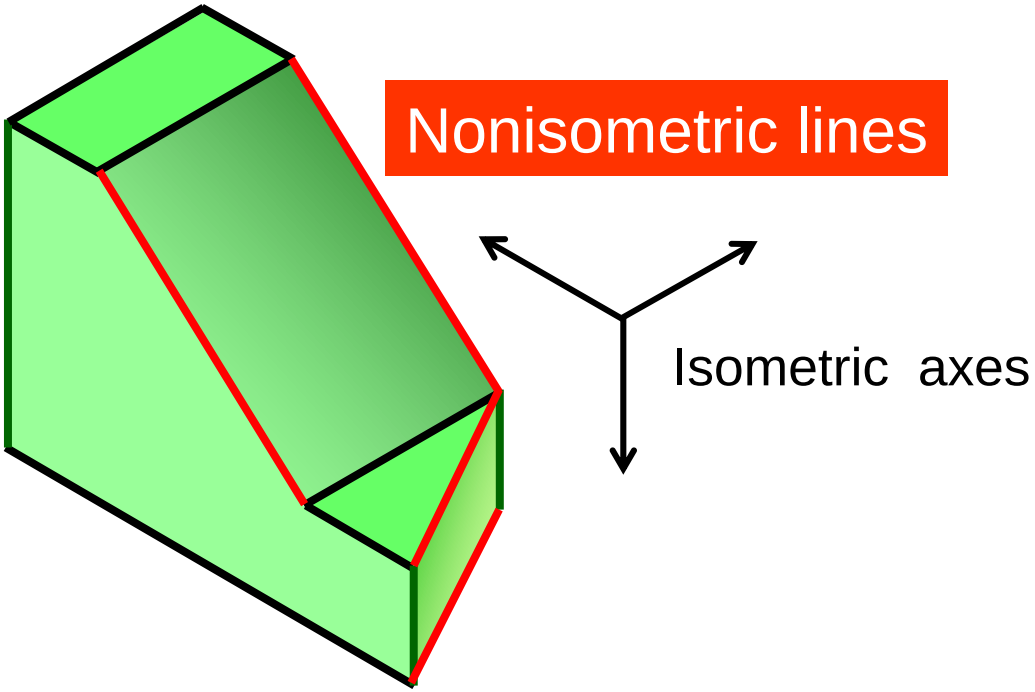
Long axis isometric



View point is looking from the right (or left) of the object.

Distance in Isometric Drawing

- **True-length distances** are shown along isometric lines.
- ***Isometric line*** is the line that run ***parallel*** to any of the isometric axes.



Isometric Sketching

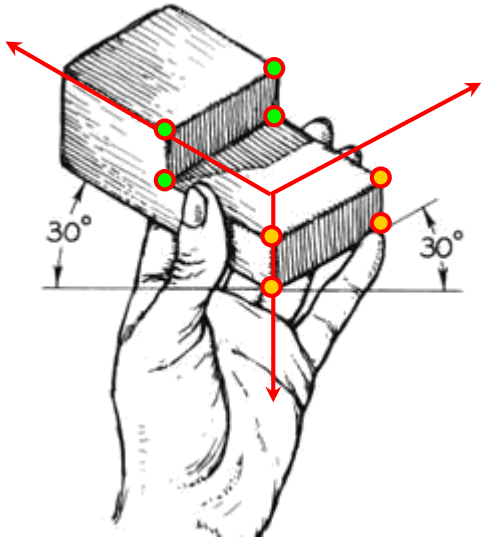
Sketch from an actual object

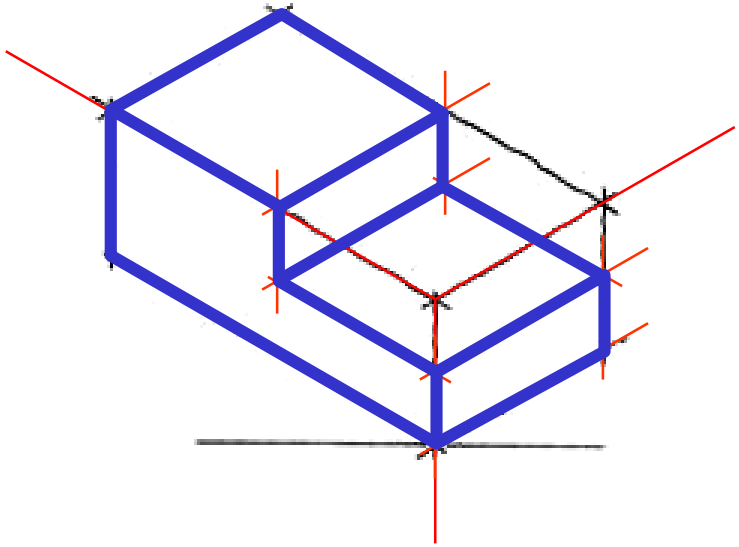
1. Place the object in the position which its shape and features are clearly seen.
2. Define an isometric axis.
3. Sketching the enclosing box.
4. Estimate the size an and relationship of each details.
5. Darken all visible lines.

Sketch from an actual object

STEPS

1. Positioning object.
2. Select isometric axis.
3. Sketch enclosing box.
4. Add details.
5. Darken visible lines.

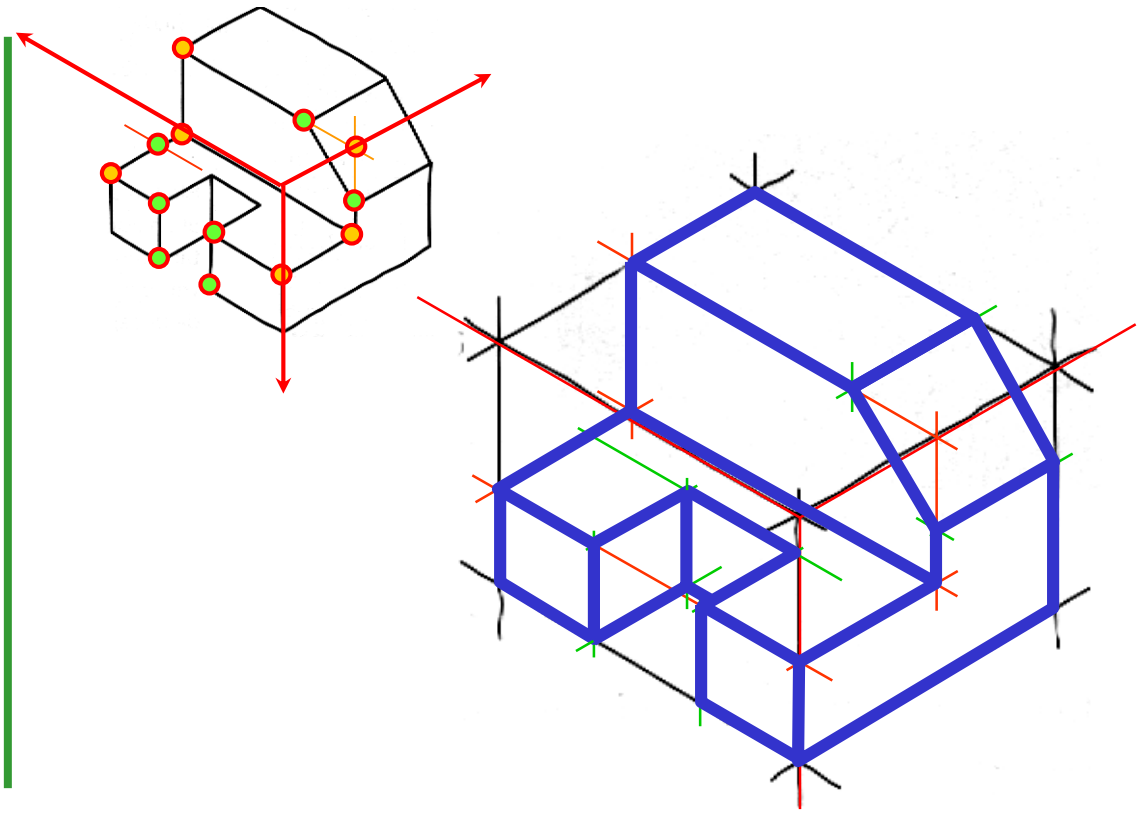




Sketch from an actual object

STEPS

1. Positioning object.
2. Select isometric axis.
3. Sketch enclosing box.
4. Add details.
5. Darken visible lines.

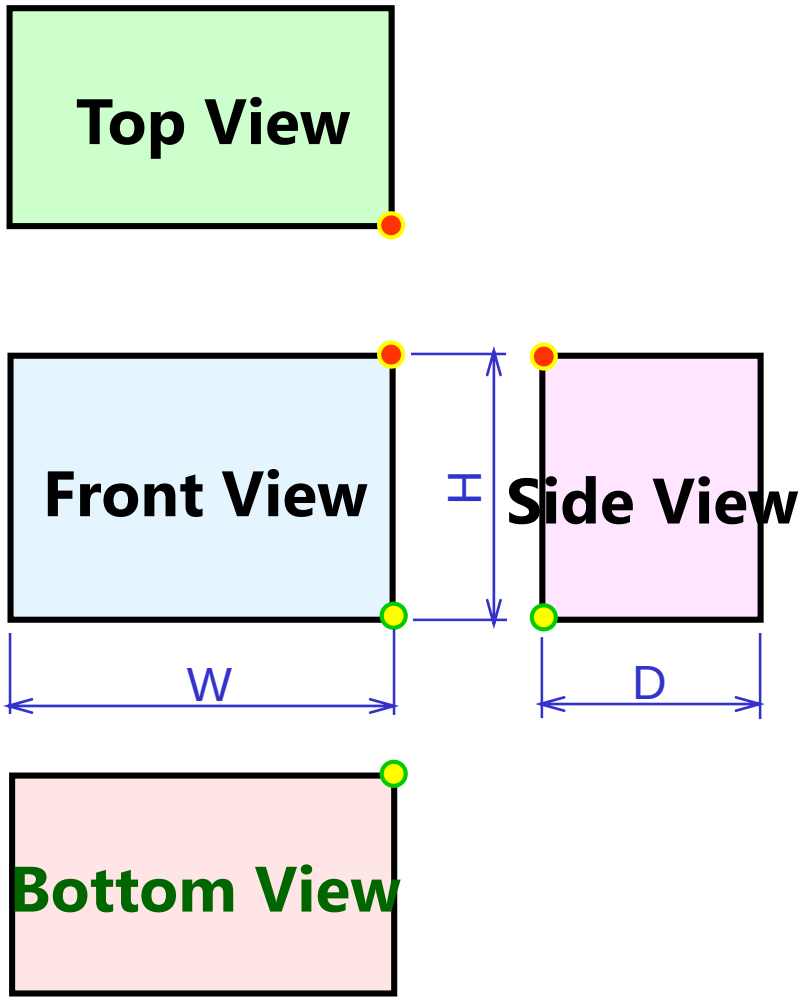


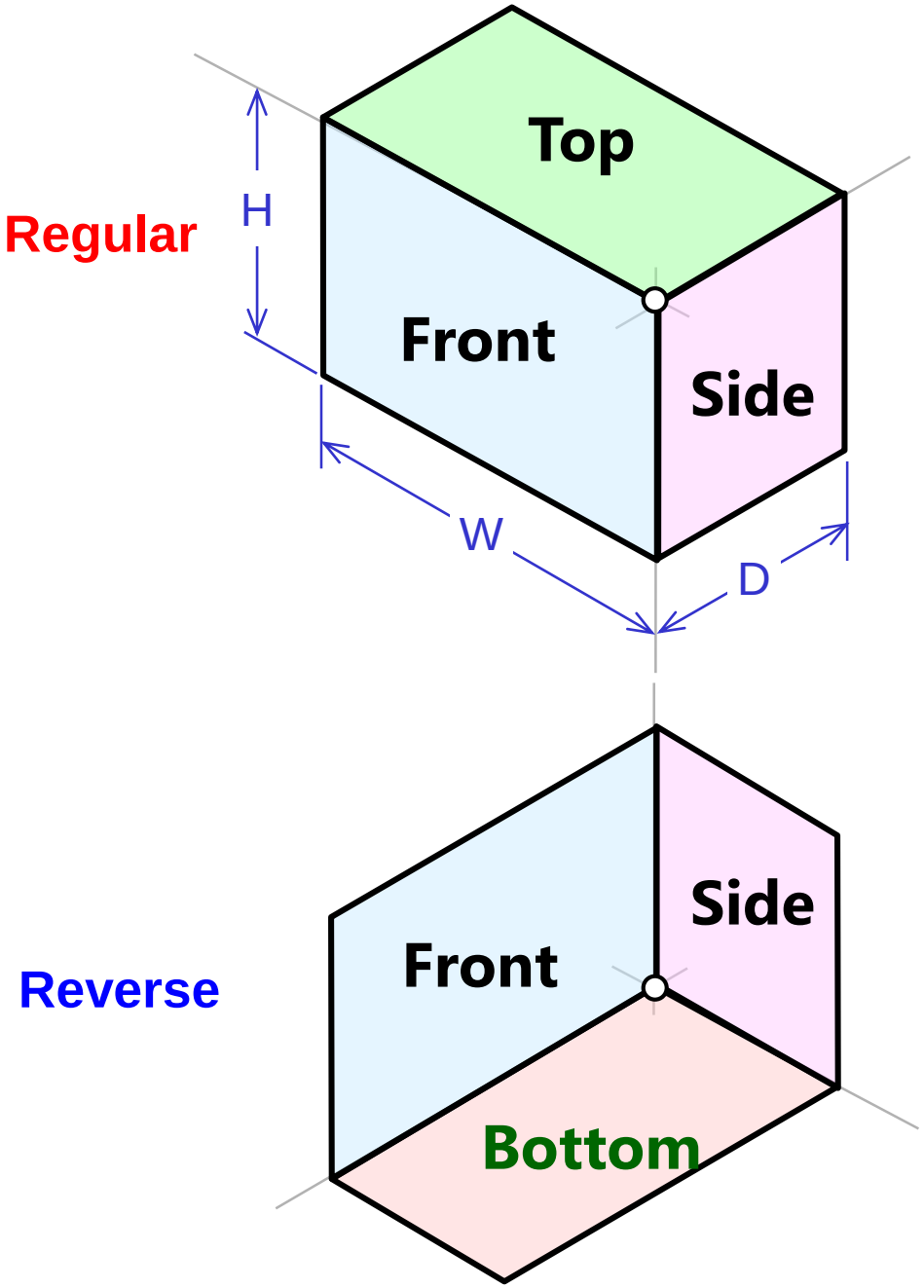
Note In isometric sketch/drawing), hidden lines are ***omitted*** unless they are absolutely necessary to completely describe the object.

Sketch from multiview drawing

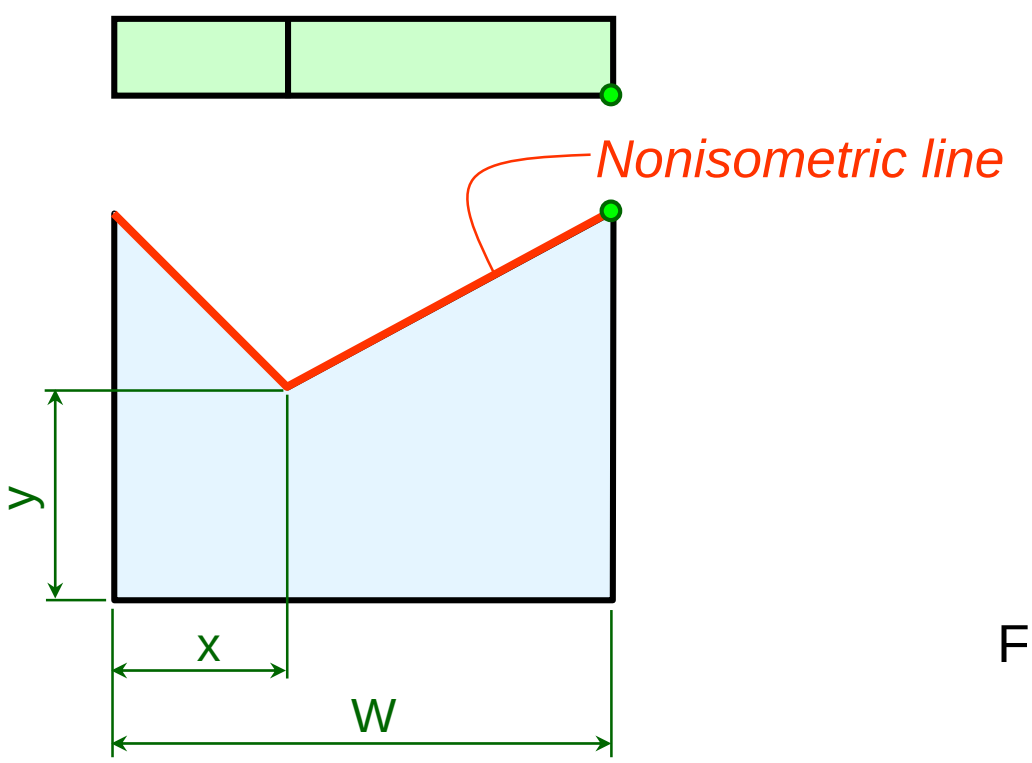
1. Interprete the ***meaning of lines/areas*** in multiview drawing.
2. Locate the lines or surfaces relative to isometric axis.

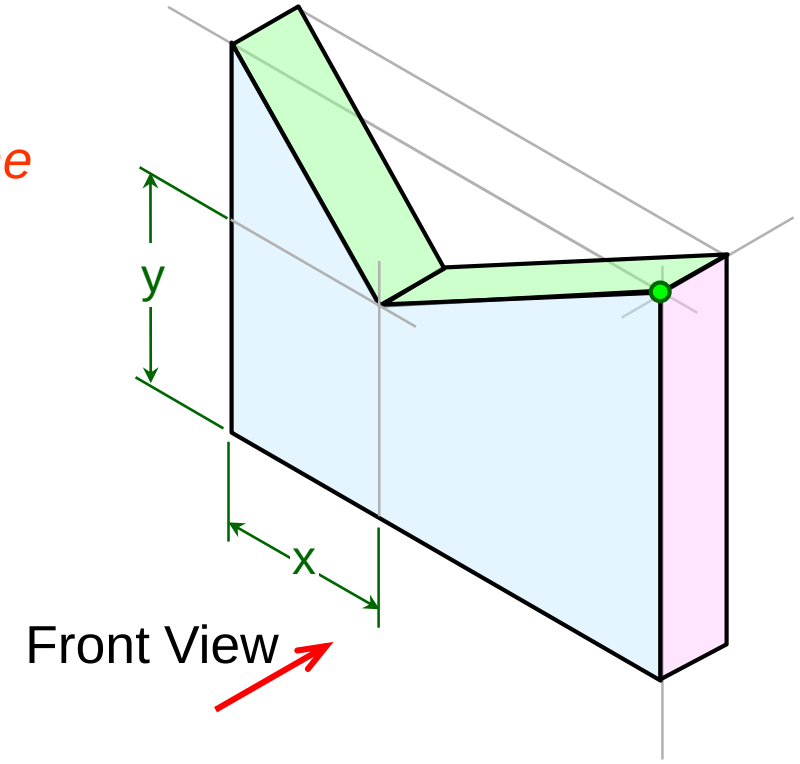
Example 1 : Object has only normal surfaces



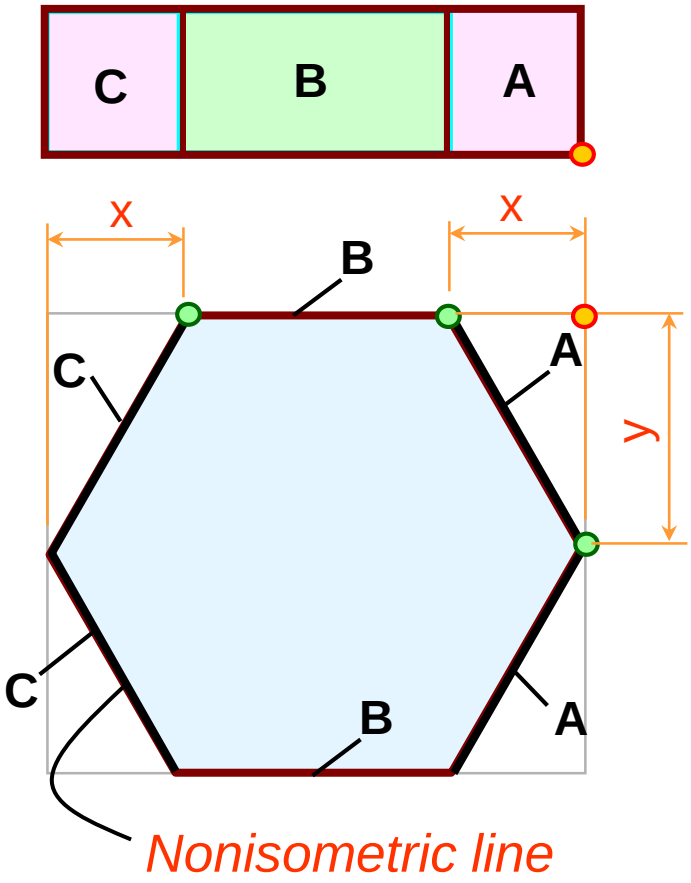


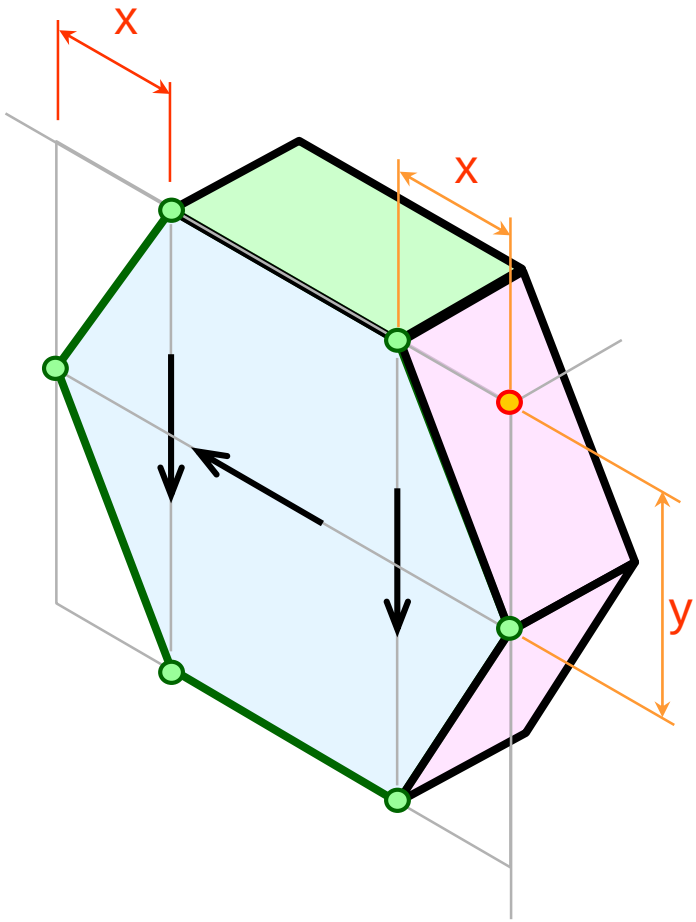
Example 2 : Object has inclined surfaces



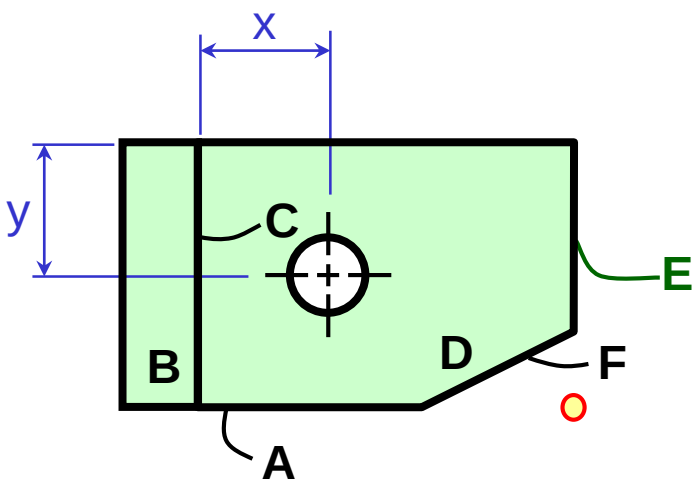


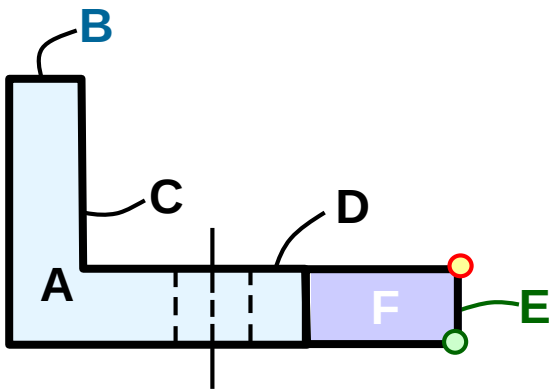
Example 3 : Object has inclined surfaces



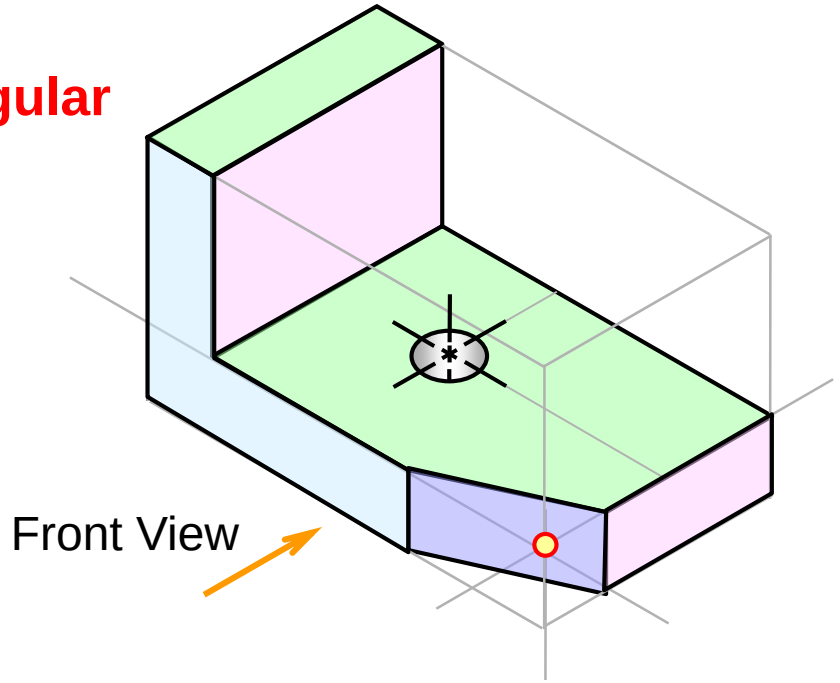


Example 4

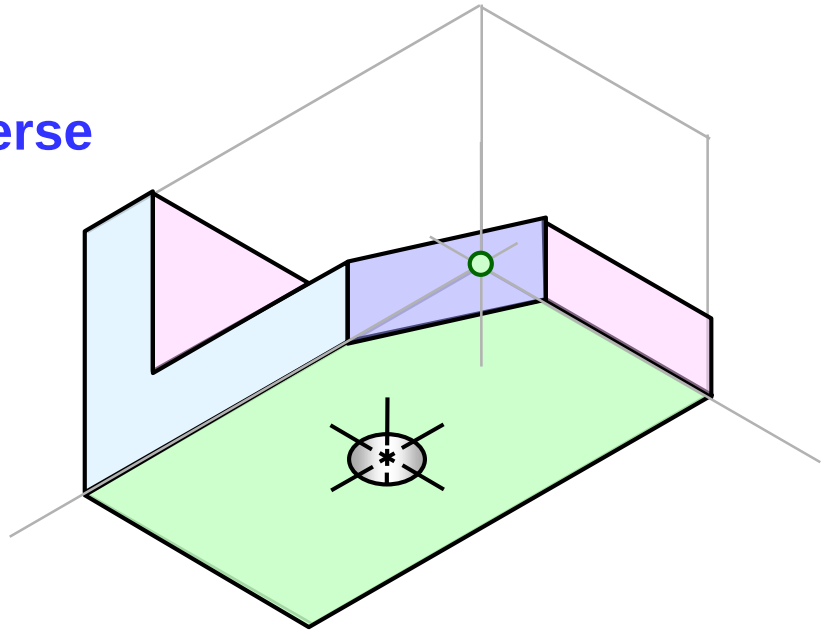




Regular



Reverse

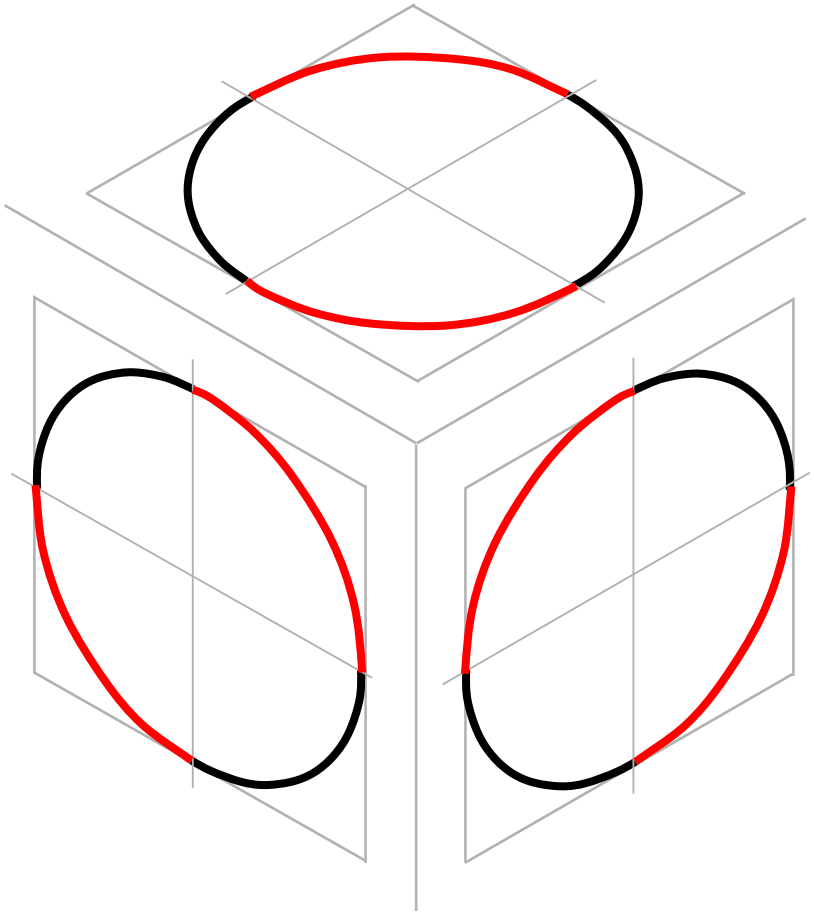


Circle & Arc in Isometric

- In isometric drawing, a circle appears as an ellipse.

Sketching Steps

1. Locate the center of an ellipse.
2. Construct an isometric square.
3. Sketch arcs that connect the tangent points.

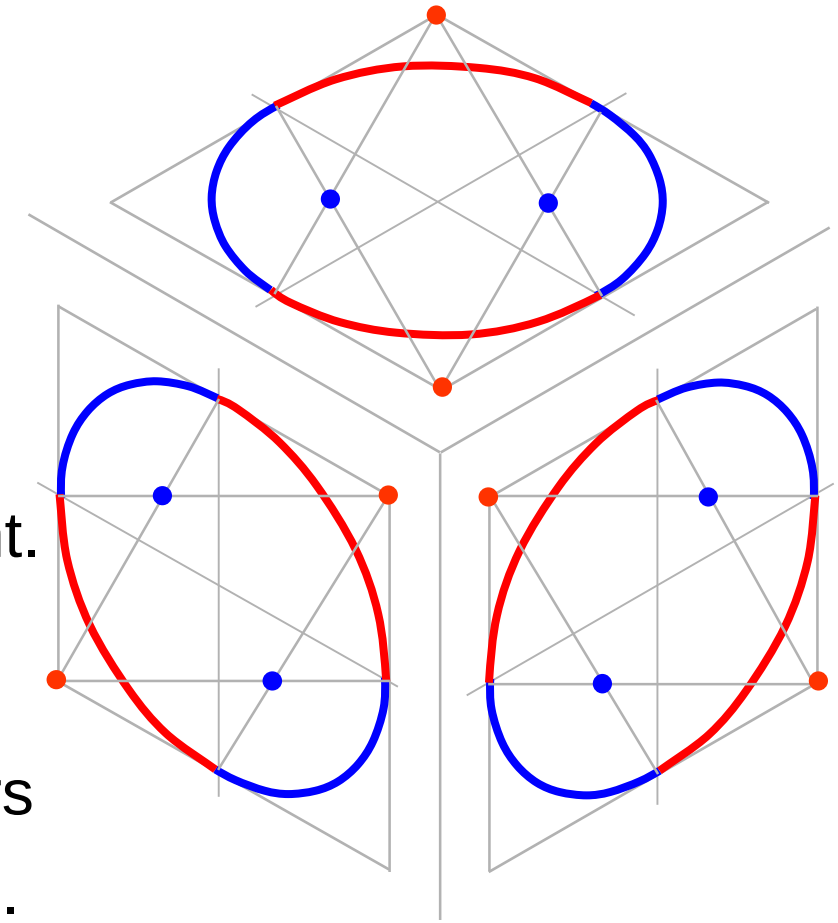


Circle & Arc in Isometric

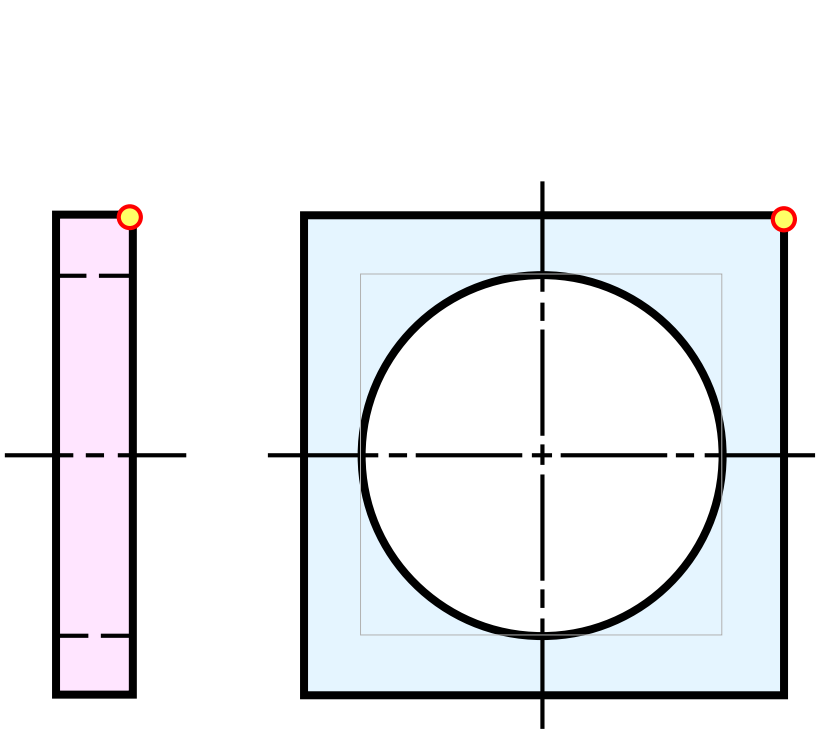
- ***Four-center*** method is usually used when drawn an isometric ellipse with drawing instrument.

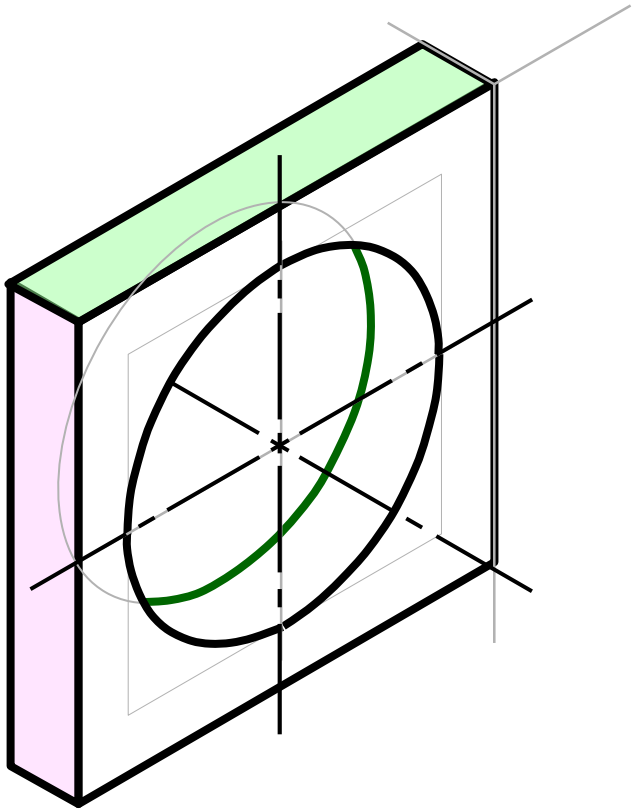
Sketching Steps

1. Locate the center of an ellipse.
2. Construct an isometric square.
3. Construct a perpendicular bisector from each tangent point.
4. Locate the four centers.
5. Draw the arcs with these centers and tangent to isometric square.



Example 5

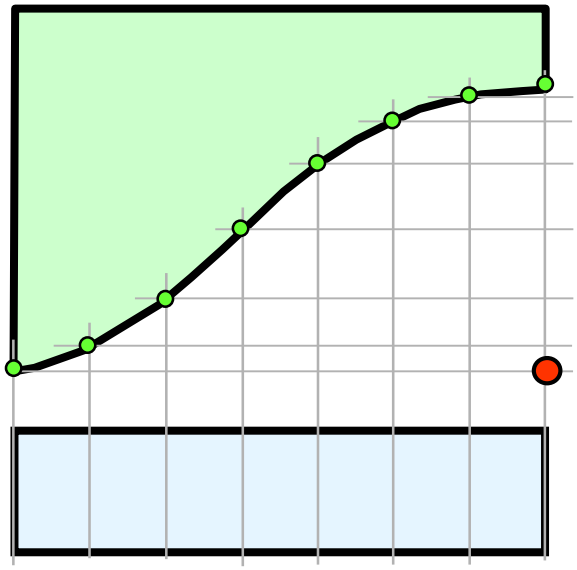


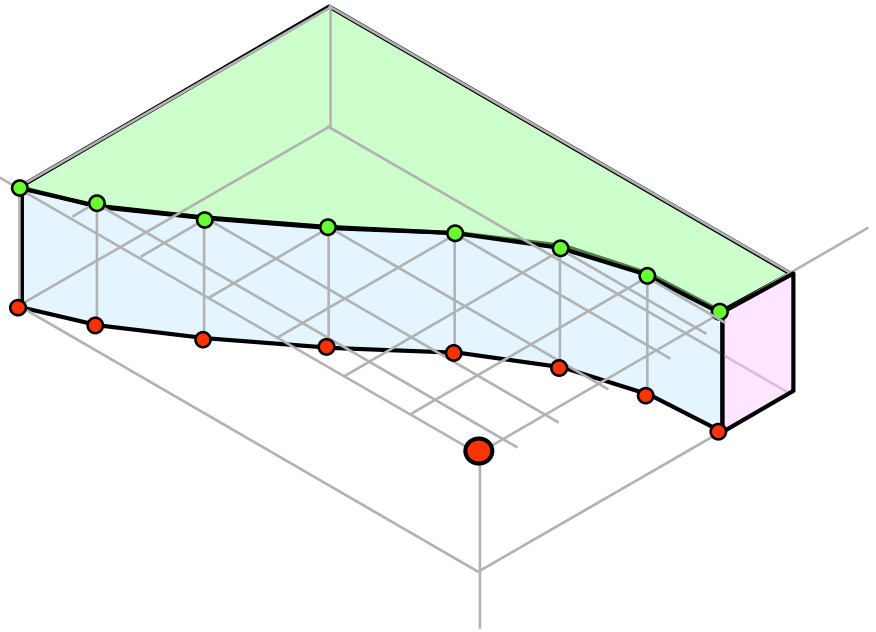


Irregular Curve in Isometric

Steps

1. Construct points along the curve in multiview drawing.
2. Locate these points in the isometric view.
3. Sketch the connecting lines.

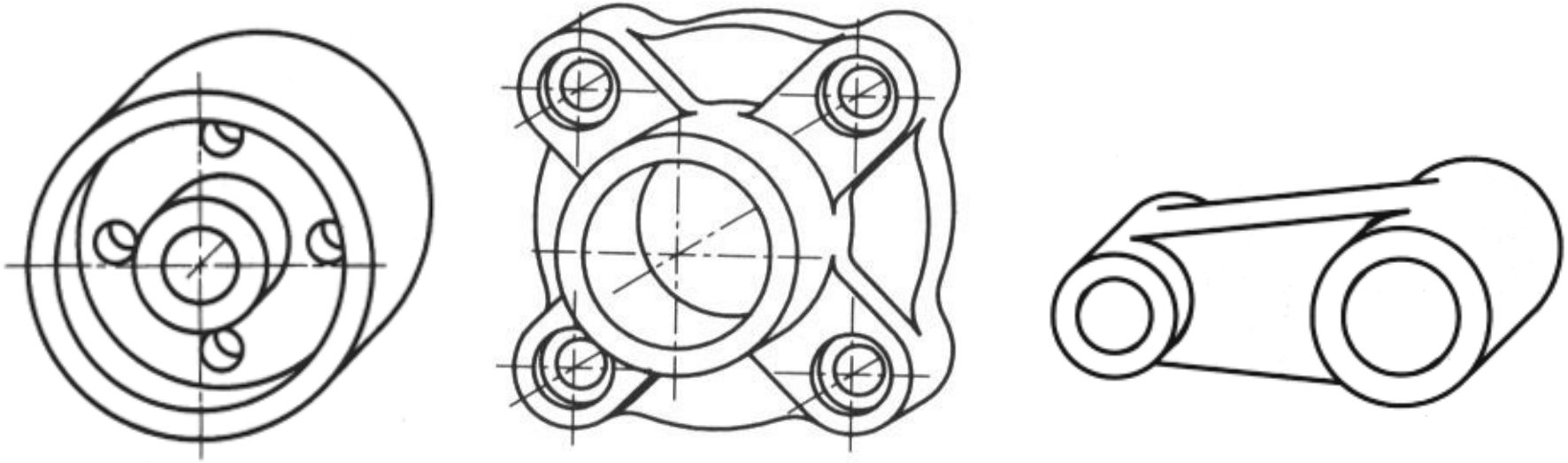




Oblique Sketching

Object Orientation Guidelines

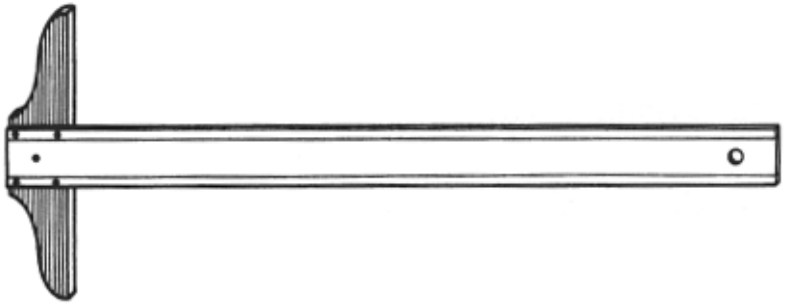
- Place complex features (arc, hole, irregular shape surface parallel to frontal plane.



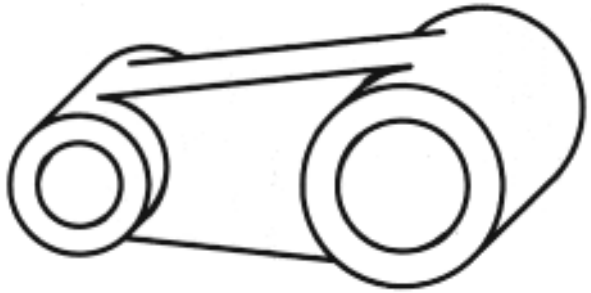
Object Orientation Guidelines

- The longest dimension of an object should be parallel to the frontal plane.

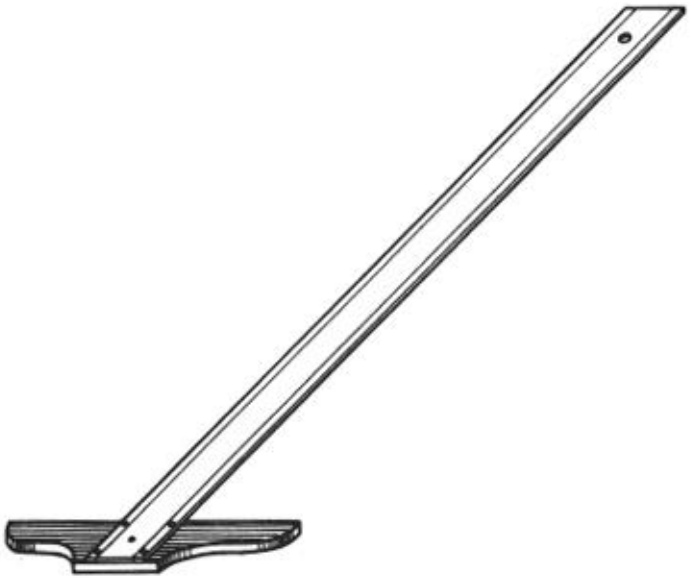
GOOD



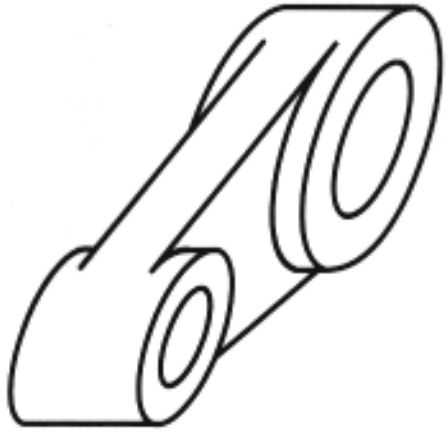
GOOD



WORSE

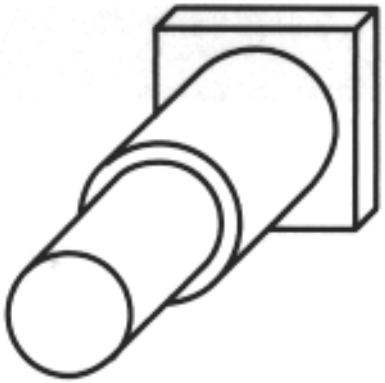


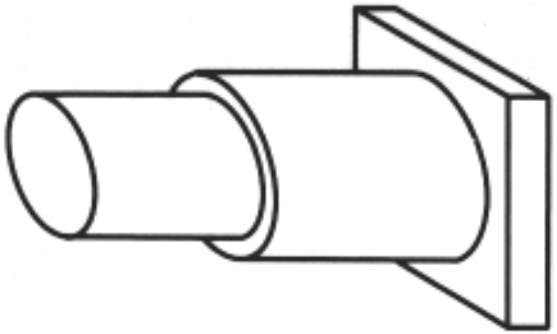
WORSE



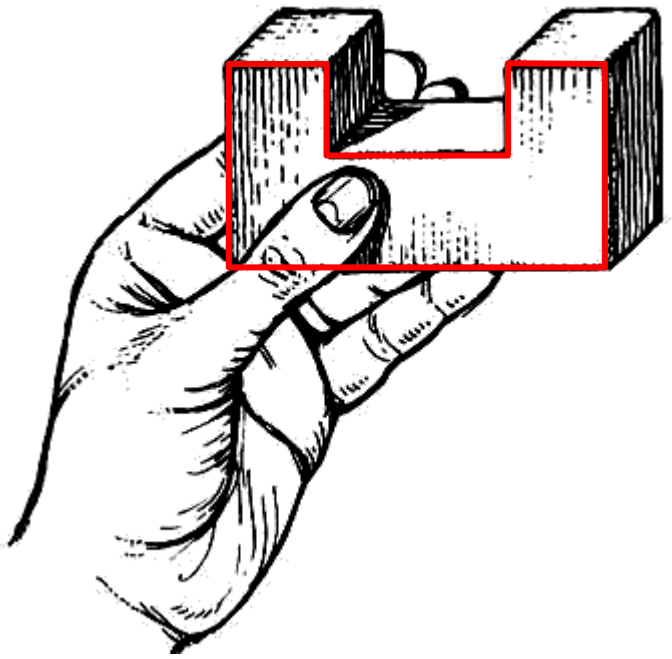
Object Orientation Guidelines

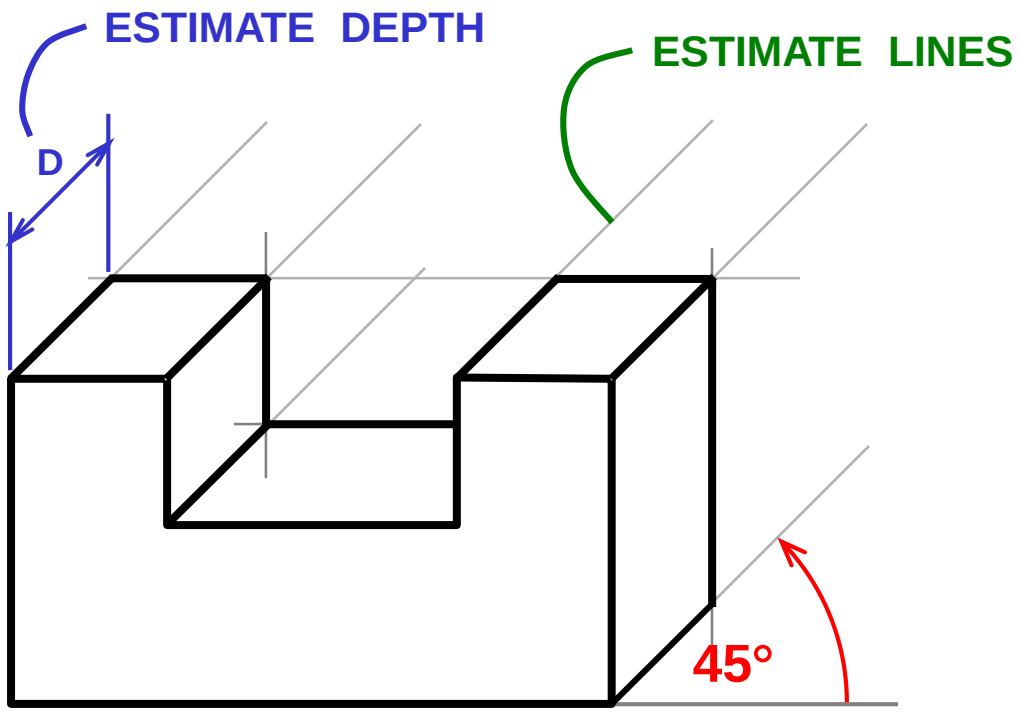
Which orientation is better ?



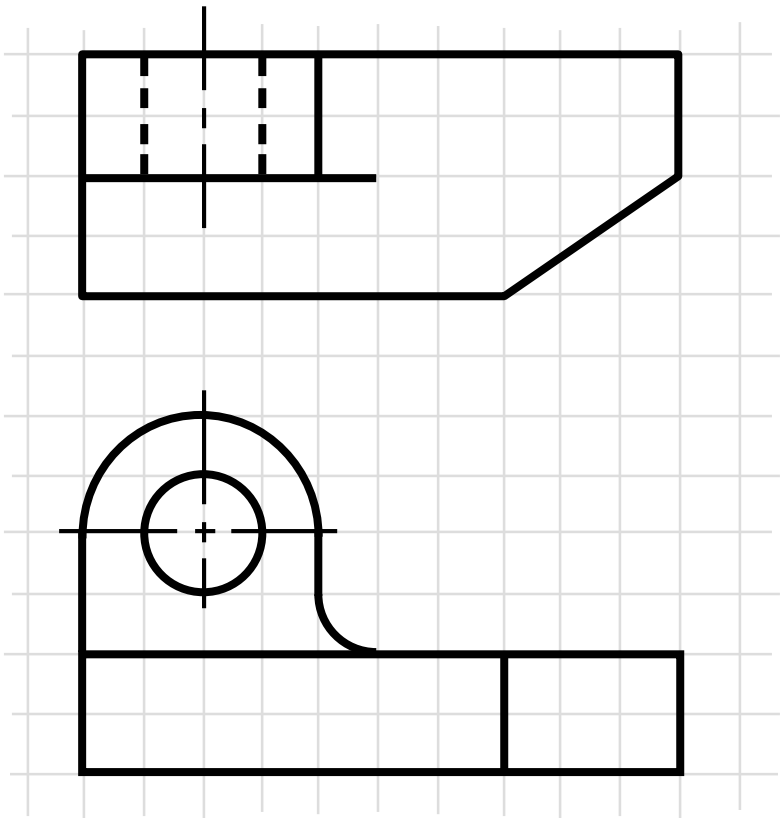


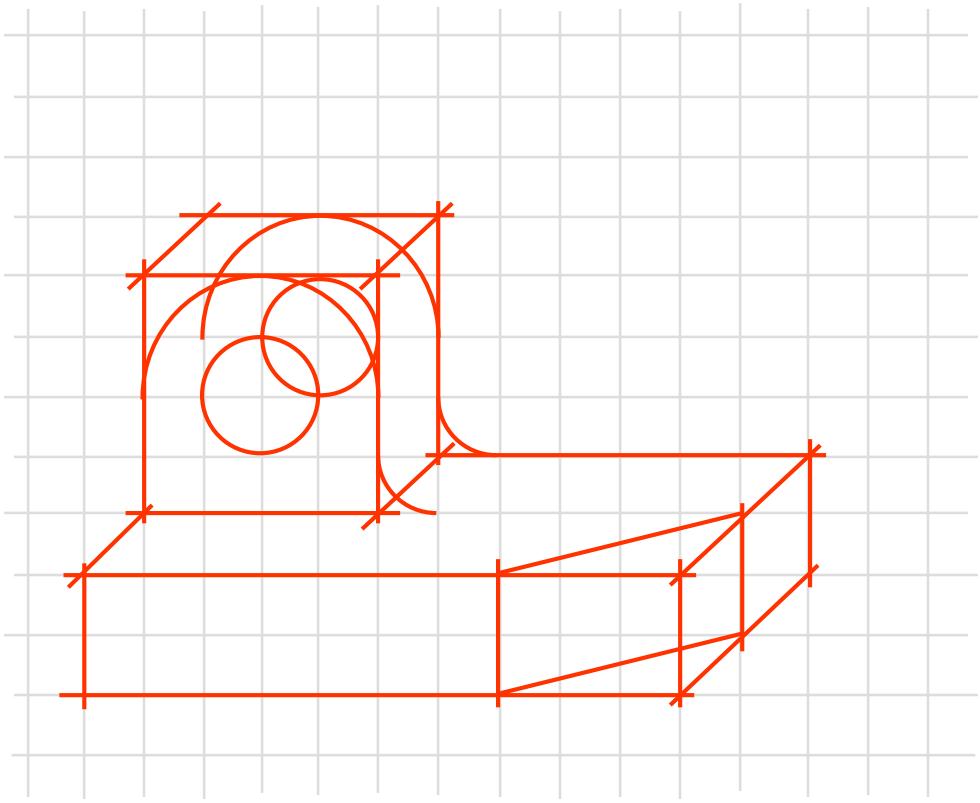
Sketch from actual object



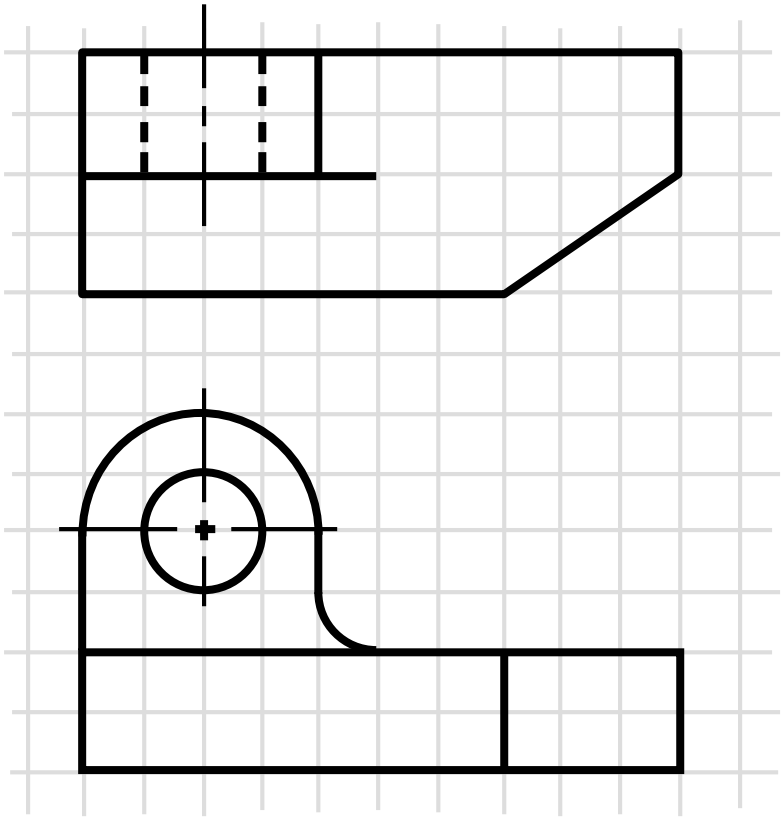


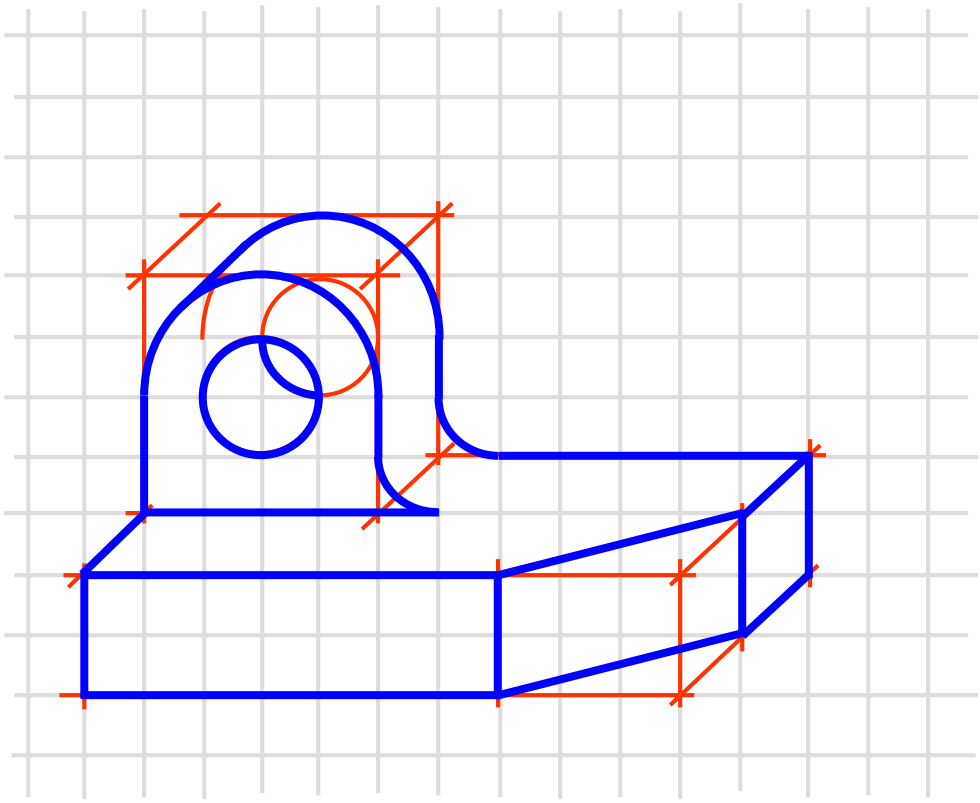
Sketch from multiview drawing



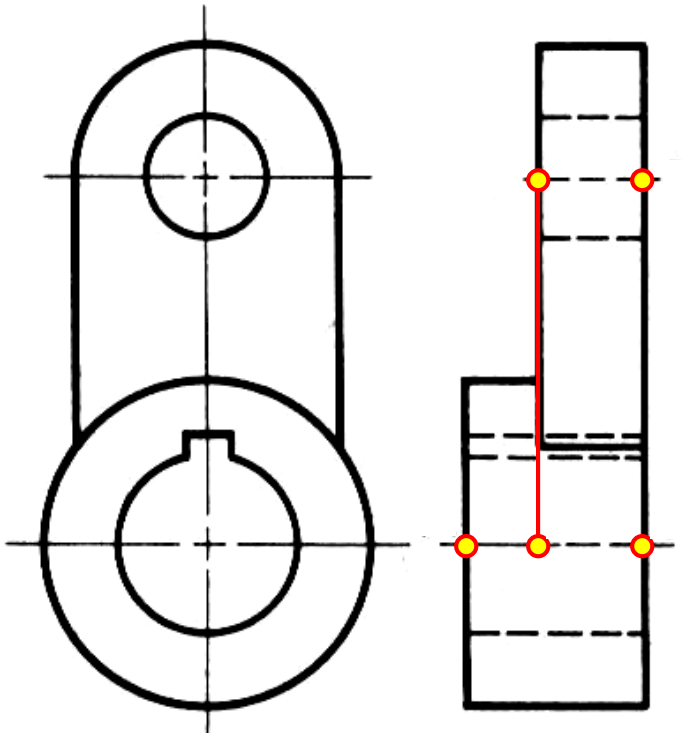


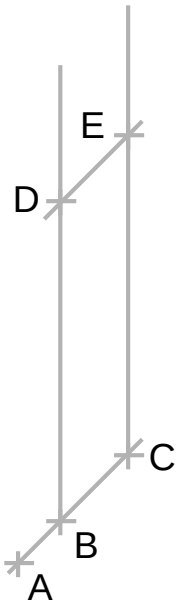
Sketch from multiview drawing



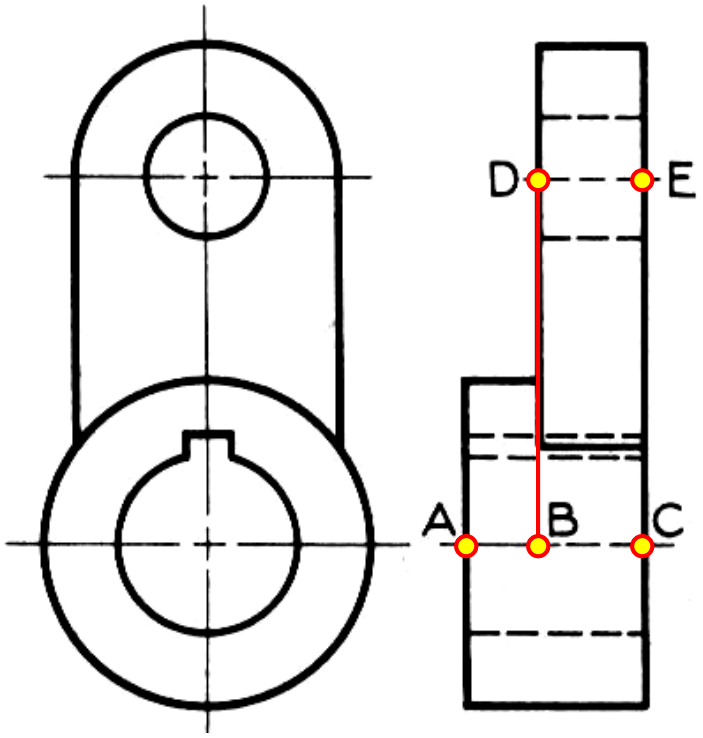


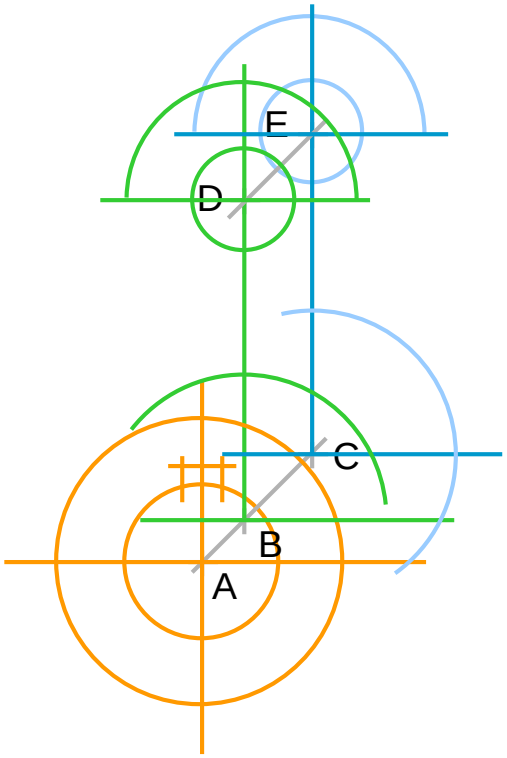
Sketch from multiview drawing



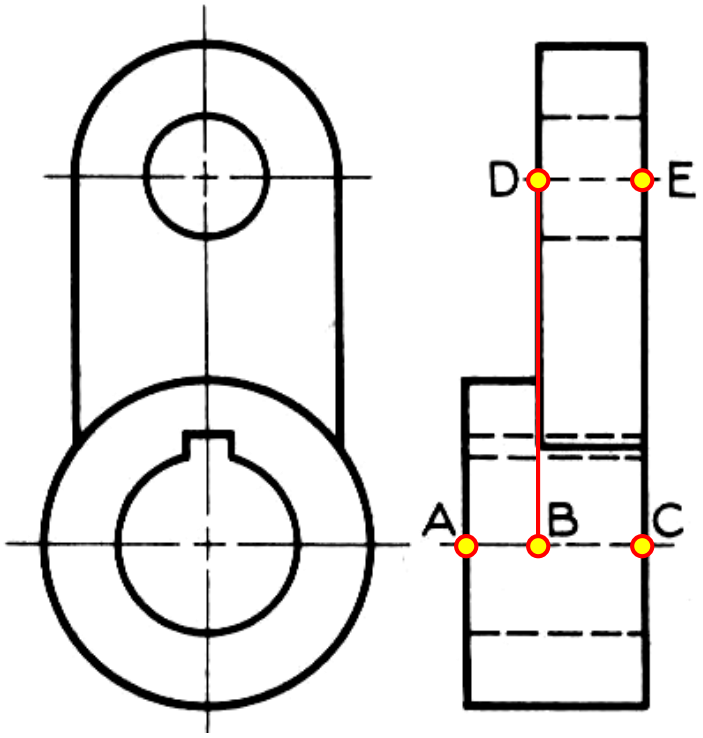


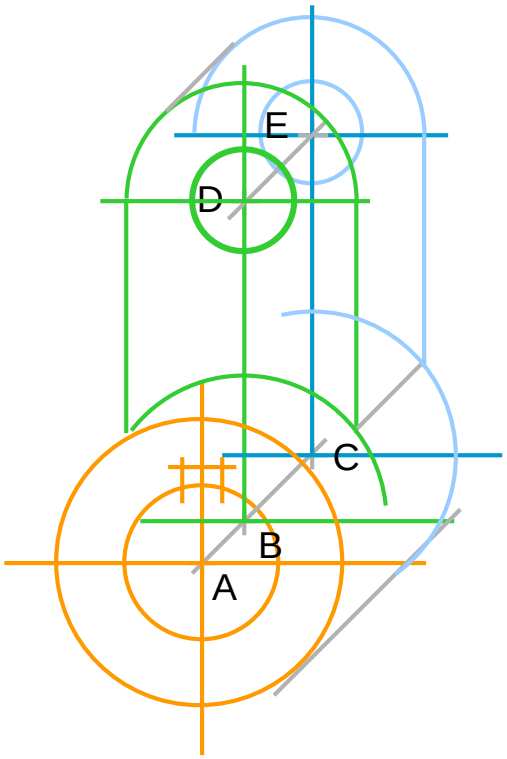
Sketch from multiview drawing





Sketch from multiview drawing





Sketch from multiview drawing