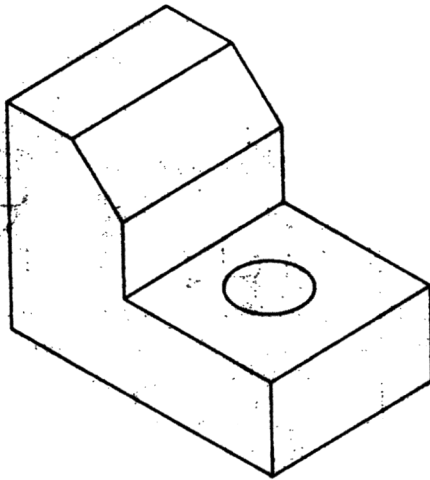


## Basic 3-D Drawing: Pictorial Drawings

### Background Knowledge



**Figure 1: Pictorial Drawing**

**Pictorial Drawings** show three principal dimensions (width, height, and depth) of an object in one view. It depicts the object similar to the way people are used to view in everyday life.

**Characteristics of pictorial drawings:**

- Shapes are easier to visualize and intersections of surfaces can be seen.
- Used for advertising, repair manuals, and general information.
- Pictorials distort the lengths of lines and angles at corners. These drawings cannot be used for production.
- Pictorial drawings are 2-D drawings ( $Z = 0$ ).

## Types of Pictorial Drawing:

Axonometric	Oblique
Isometric	
Dimetric	
Trimetric	

**Axonometric drawings** are characterized by how the angles of the axes (axon-) are measured (-metric) with respect to each other.

**Isometric drawings:** all the axes have equal angular measurement ( $120^\circ$ ).

$$\alpha_{XY} = \beta_{YZ} = \gamma_{ZX}$$

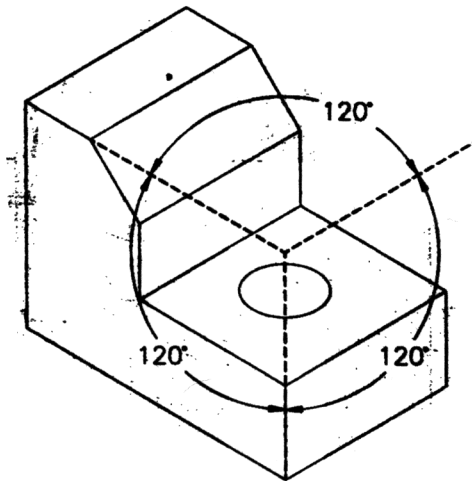


Figure 2: Example of isometric drawing

Dimetric drawings: the angles between two axes are equal.

$$\alpha_{XY} = \beta_{YZ} \neq \gamma_{ZX}$$

or

$$\alpha_{XY} \neq \beta_{YZ} = \gamma_{ZX}$$

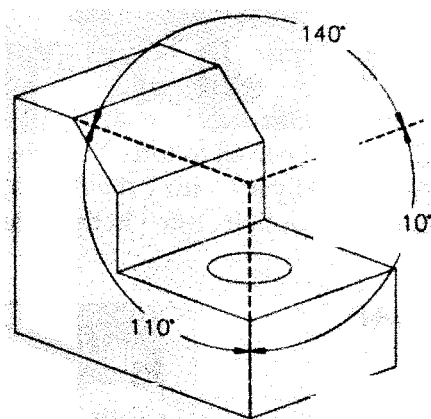


Figure 3: Example of dimetric drawing

Trimetric drawings: have three unequal angles between the axes.

$$\alpha_{XY} \neq \beta_{YZ} \neq \gamma_{ZX}$$

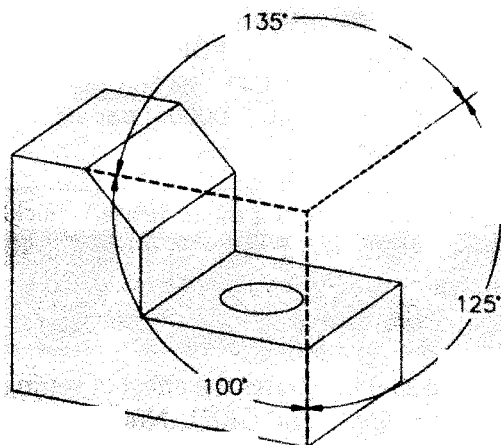


Figure 4: Example of trimetric drawing

**Oblique** drawings are characterized by a vertical axis and a horizontal axis for the two dimensions of the front face and a third axis of either  $30^0$ ,  $45^0$ , or  $60^0$ .

$$\alpha_{XY}=90^0$$
$$\gamma_{ZX}=30^0, 45^0, \text{ or } 60^0$$

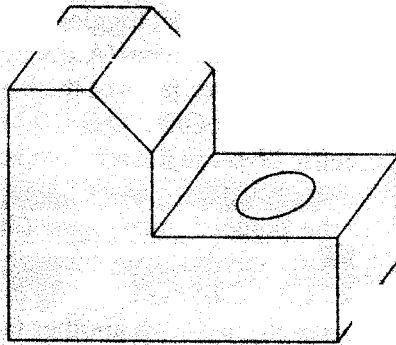
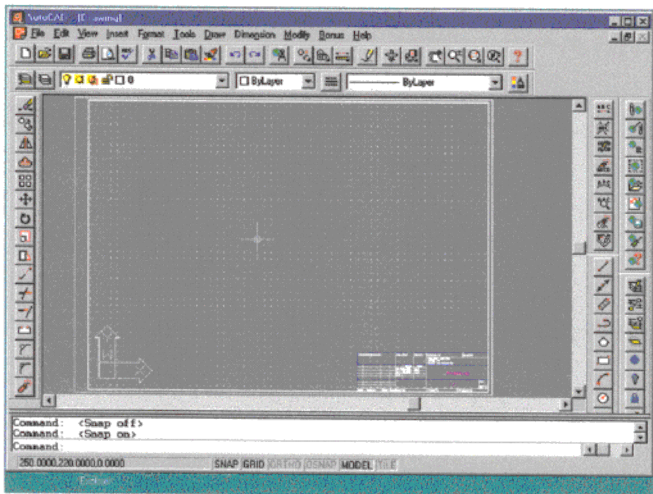


Figure 5: Example of oblique drawing

## Construction Commands



**Command: snap**

**Snap spacing or ON/OFF/Aspect/Rotate/Style <10.0000>: Style**

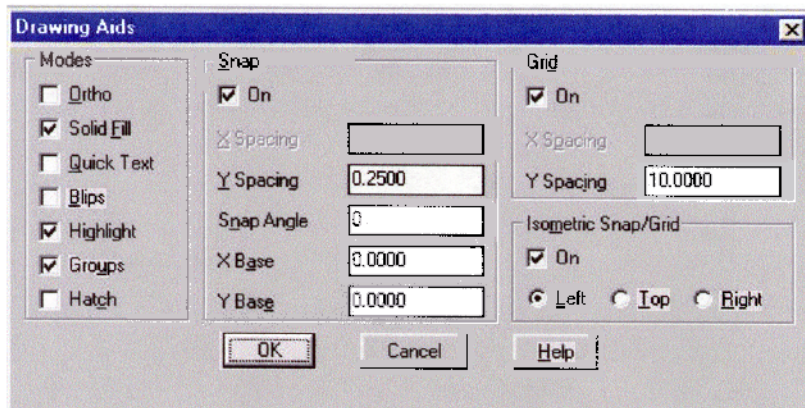
**Standard/Isometric <S>: I**

**Vertical spacing <10.0000>: Enter**



## Isometric Drawing Aids

Click on Tools from the menu bar, select Drawing Aids... By selecting Isometric Snap/Grid on or off, one can switch from Isometric mode to Standard mode or vice verse.



The Left, Top, and Right modes change the looking of cursor. Left means that entities falling into the top-left area should be constructed in this mode (YZ plane). Top means that entities falling into the top section area should be constructed in this mode (XZ plane). Right means that entities falling into the top-right area should be constructed in this mode (XY plane).

The Drawing Aids window can also be opened by type DDRMODES command.

CTRL-E can also be used for switching mode from one to another.

## Creating Isometric Circles

Circles appear as ellipses in isometric drawings. These circles are referred as Isocircles which can be constructed by using the ellipse command.

**Command: ellipse**

**Arc/Center/Isocircle/<Axis endpoint 1>: I**

**Center of circle: (select a center point)**

**<Circle radius>/Diameter: (enter a value)**

**Make sure that the isocircles must match the isometric planes, or the Right, Left, or Top views.**

