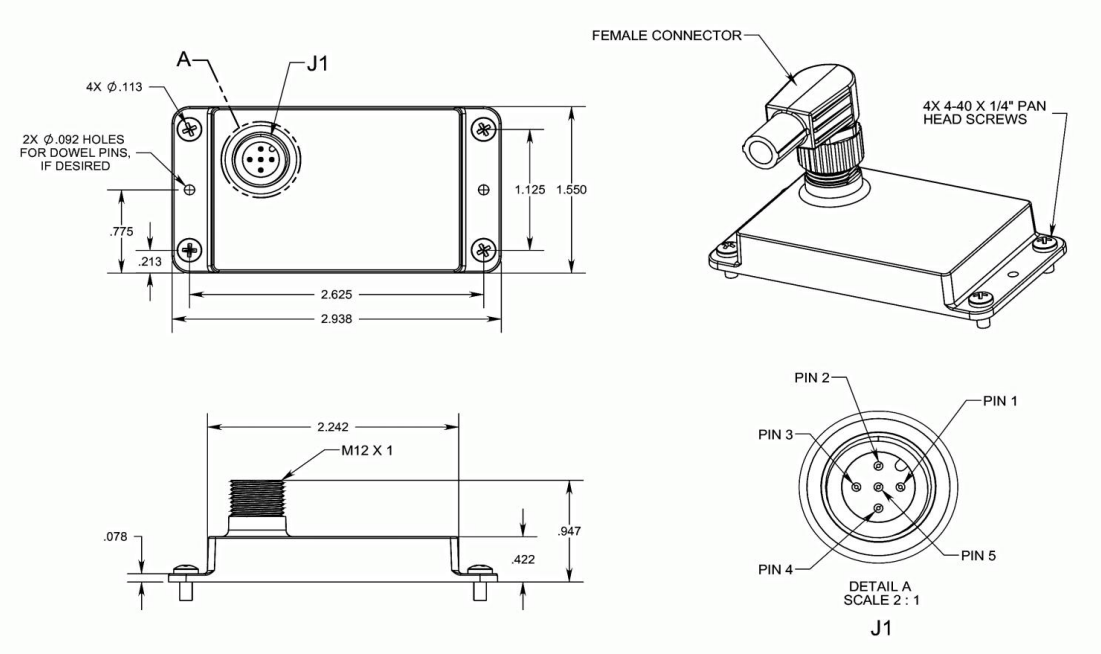
Mechanical Engineering Drawing



Dr. Mostafizur Rahman

Assistant Professor

Dept. of Mechanical Engineering, CUET

Code: ME 1104

Credit: 0.75

Class: 1.5 hr./week

Marks Distributions

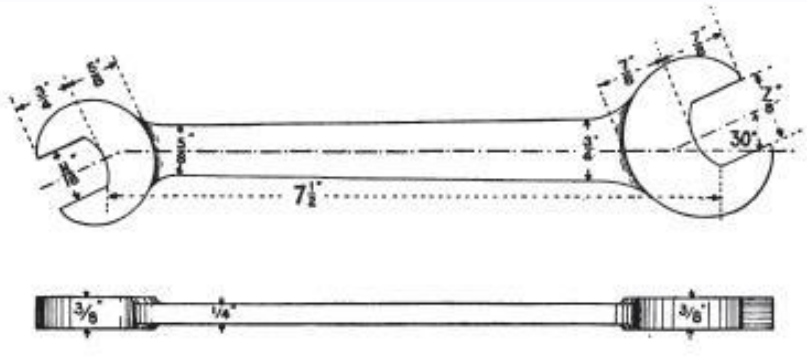
Distribution	Percentage	Marks
Attendance	10%	7.5
Class performance and Report	60%	45
Quiz	15%	11.25
Viva	15%	11.25
Total	**100%**	**75**

Contents

- Introduction
- Dimensioning
- Orthographic Projection
- Sectional View
- Auxiliary View
- Isometric View
- Detail drawing & assembly drawing
- Brief introduction to CAD

Mechanical Engineering Drawing

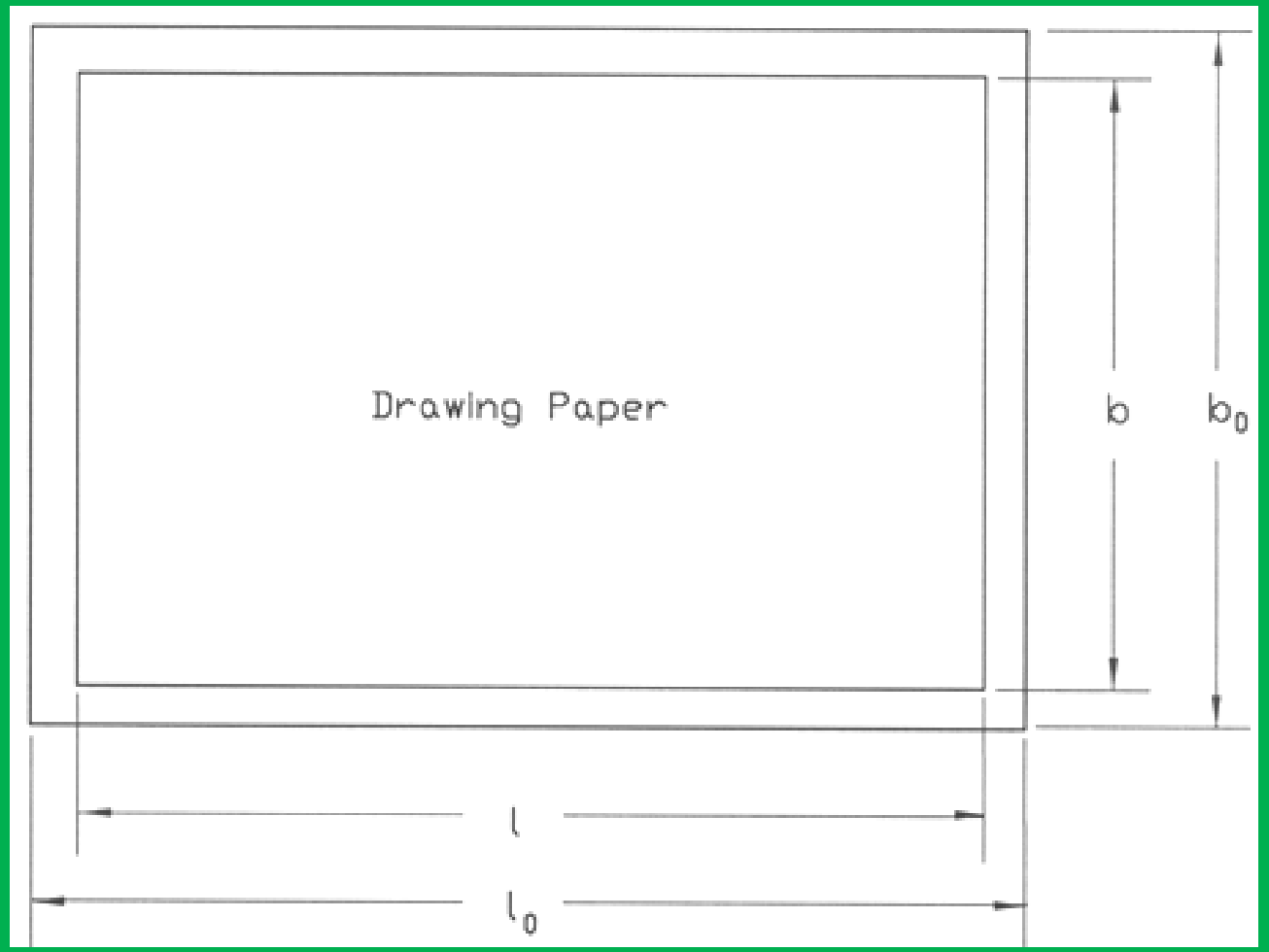
- A drawing is a **graphic representation** of real thing or an idea. It is the **communication medium** between the various persons involved in the design and manufacturer of machines, buildings, bridges, etc. It is also called **graphic language**.
- Mechanical drawing is one class of engineering drawing that is used to manufacture the various machine elements.



Importance of Mechanical Drawing

- The graphic language had its existence when it became necessary to build new structures and create new machines or the like, in addition to representing the existing ones. In the absence of graphic language, the ideas on technical matters have to be conveyed by speech or writing, both are unreliable and difficult to understand by the shop floor people for manufacturing. This method involves not only lot of time and labor, but also manufacturing errors. Without engineering drawing, it would have been impossible to produce objects such as aircrafts, automobiles, locomotives, etc., each requiring thousands of different components.

Drawing paper



Drawing Instruments Required

- **Drawing Board**: Drawing board is used for placing the drawing paper on it with the help of either cellophane tape or board pin. Drafting table can be used also.

Drawing Instruments

- **T-Square (T scale):** T-Square is used **to draw horizontal** line. It is used on a drawing board. It must be made of transparent plastic. The head of the T-square is placed on the left edge of the board for the right handed person and vice versa.

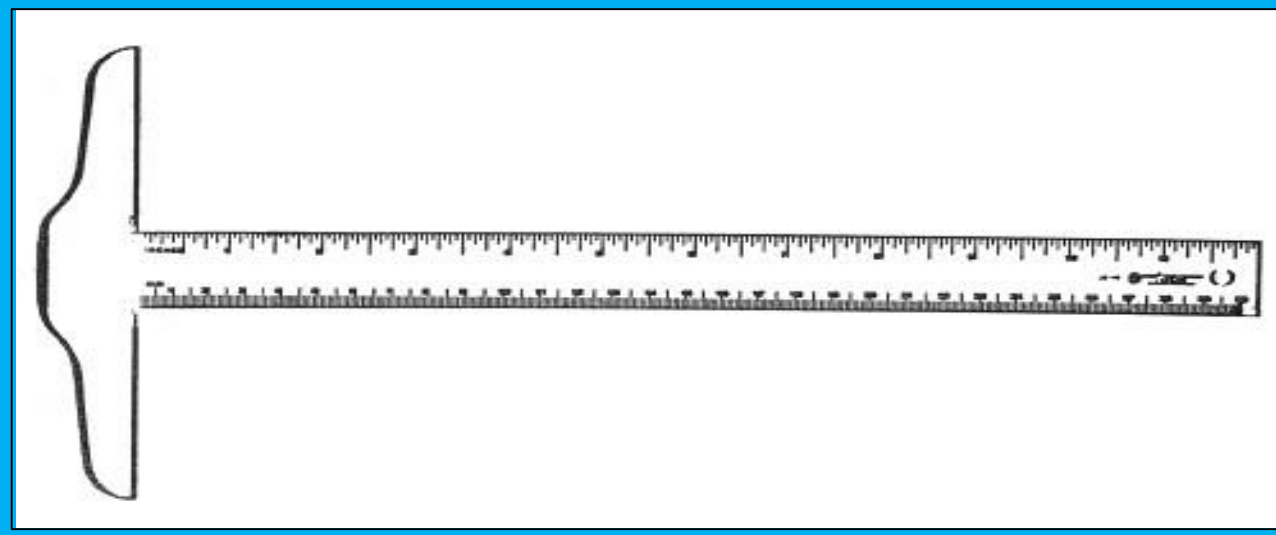
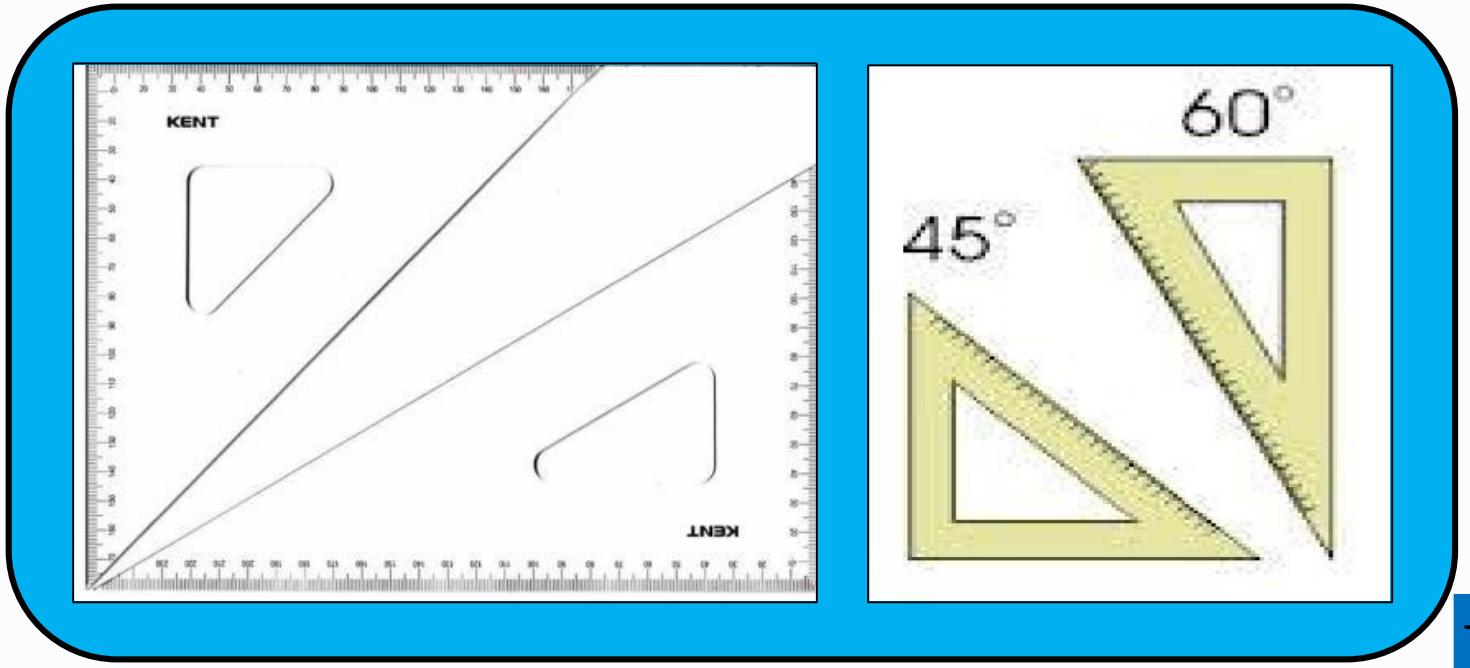


Fig.: T - Square

Drawing Instruments

- **Triangles / Set squares** : Triangles are set of 45^0 and $30^0 - 60^0$ triangles which are made of clear plastic. They are used together with the straightedge of the T-square to draw **vertical and inclined** lines.



Drawing Instruments

- **Scales**: Scales are used for **measurement** only, not for drawing lines.
- **Compasses**: Compasses are used to draw a **circle** or an **arc**. Most common type compasses are friction head compass and drop bow compass.

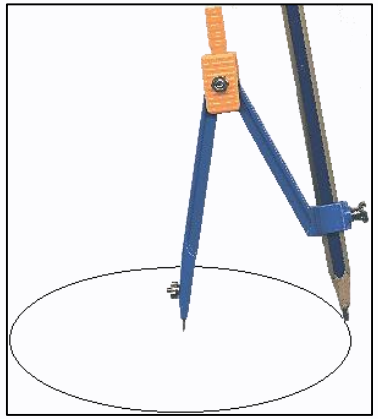
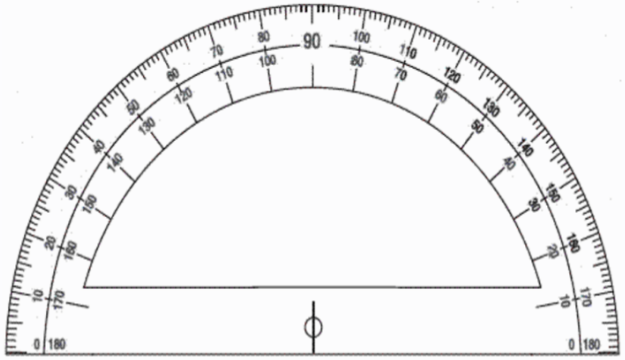


Fig.: Pencil Compass

Drawing Instruments

- **Protractor**: **Angles** can be measured with this tool.



- **Paper**: Drawing paper / Art paper are used for drafting.
- **Pencils and leads**: HB and 2B/3B pencils are used to draw. 0.5mm lead can be used also.
- **Handkerchief**: to clean the paper.

Sheet Layout and Title

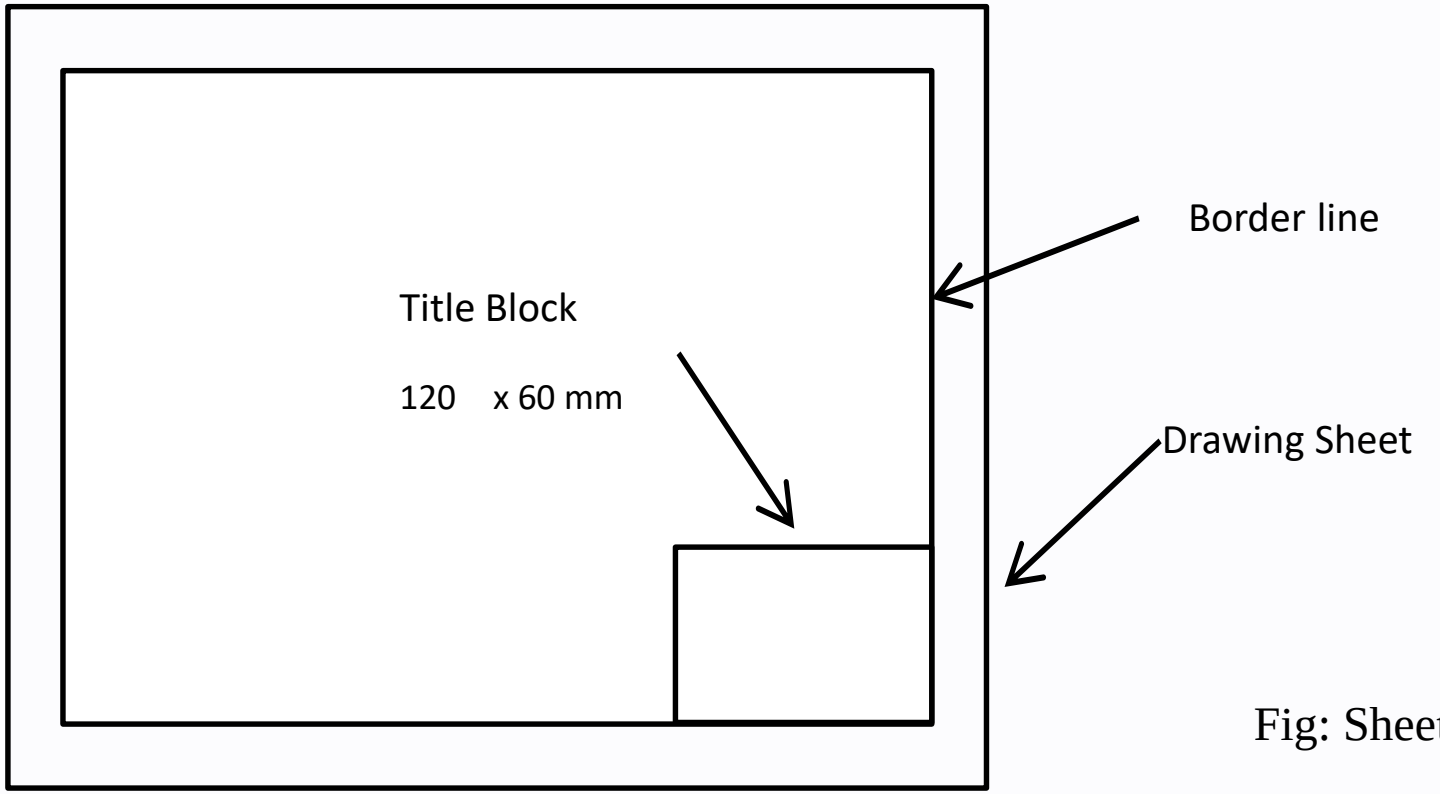


Fig: Sheet layout

Sheet Layout and Title

PREMEIR UNIVERSITY		
TITLE :		
SCALE :	MAT. :	
NAME :		
DEPT. :	ID:	DATE :

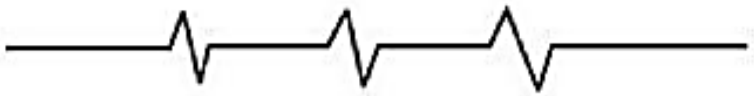
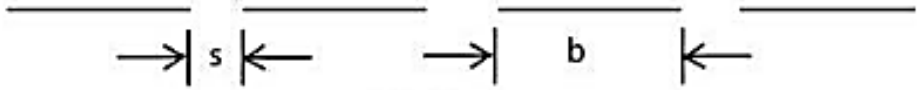
Scale of Drawing

>> **Full size:** when the part is drawn on its actual size it is in full size i.e. 1:1 (in case of smart phone design)

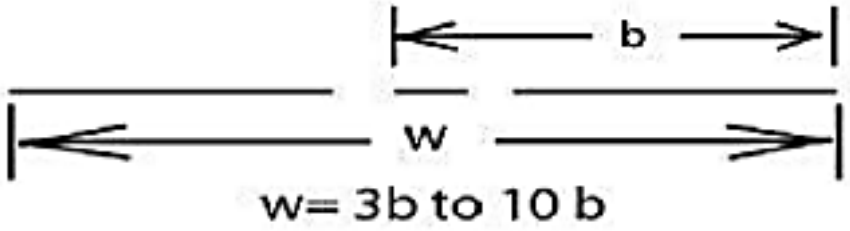
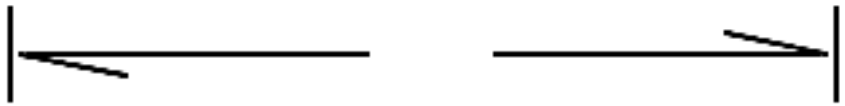
>> **Enlarged scale:** when drawing size is bigger than the actual size of the part. E.g. 2:1, 5:1, 10:1, 20:1, 50:1. (in case of small gear design)

>> **Reduction Scale:** part drawing size smaller than the actual size. E.g.: 1:2, 1:5, 1:10, 1:20, 1:50, 1:100, 1:200, 1:500, 1: 1000, 1: 2000, 1: 5000, 1:10000 (in case of ship design)

Types of Lines and their use

Sl #	Types of lines		Usage
1.		Continuous line(thick)	Visible outline of the object
2.		Continuous line(thin)	Dimension lines, Projection lines, Leader lines, Hatching lines.
3.		Long break line	To show a break on the object
		Short break line	
4.		Hidden line/ dashed line	To represent the hidden edge of an object

Types of Lines and their use

5.		Center line	To show the center lines of the holes
6.		Extension line	To show dimension of an object
7.		Section line	To indicate the cut portion of an object
8.		Cutting plane line	To show the imaginary cutting line

Reference Book:

Mechanical Engineering Drawing

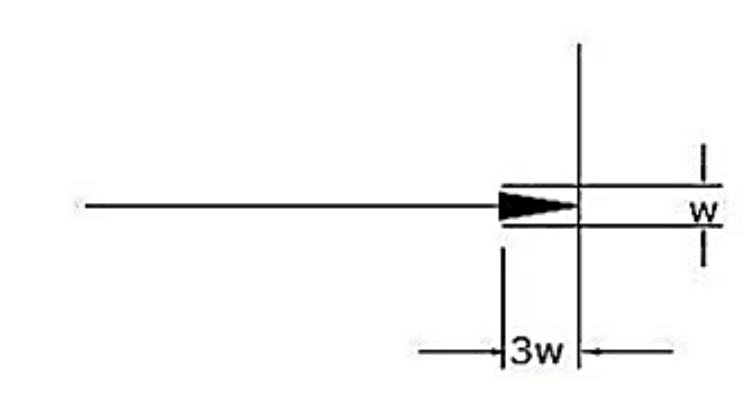
by Prof. Dr. Amalesh Chandra Mandal

and

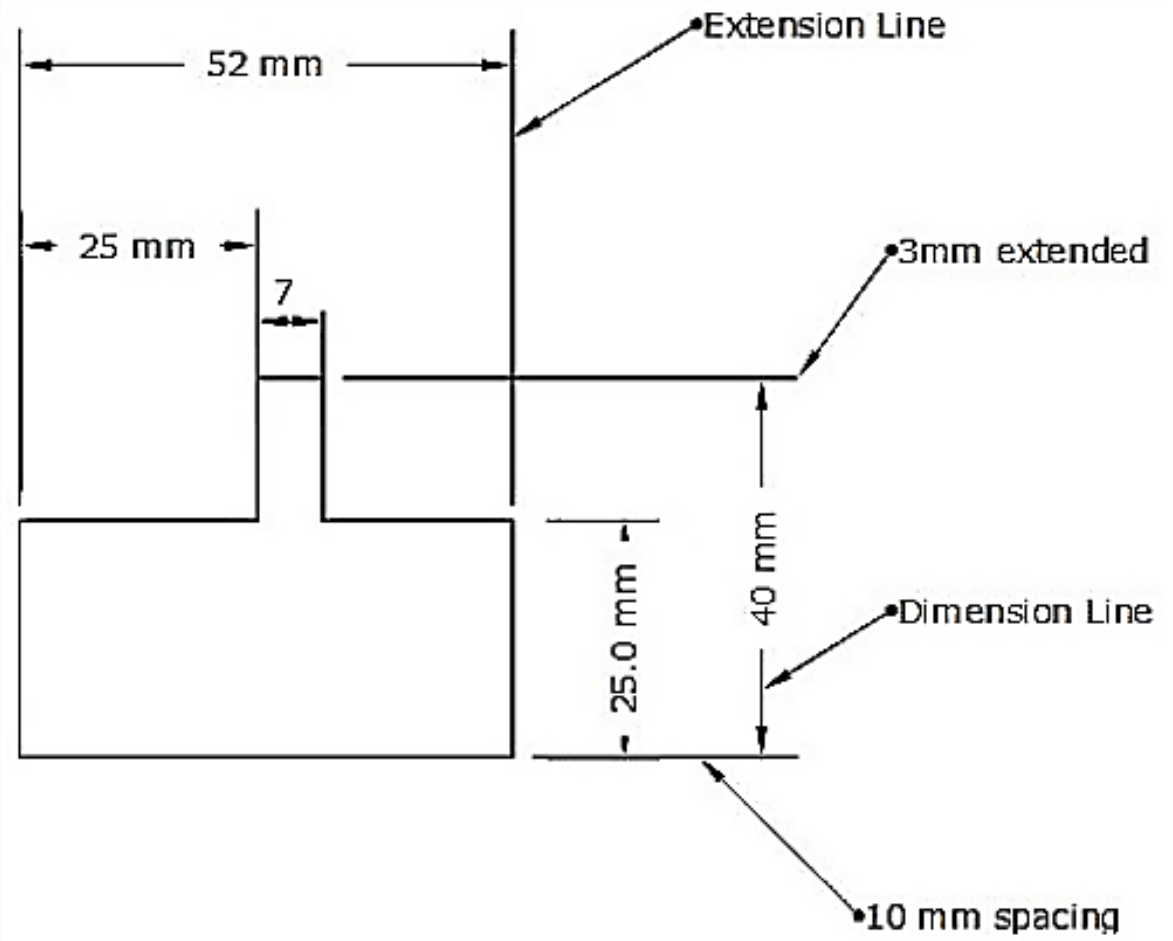
Prof. Dr. Md. Quamrul Islam

Dimensioning

1. Arrow heads:



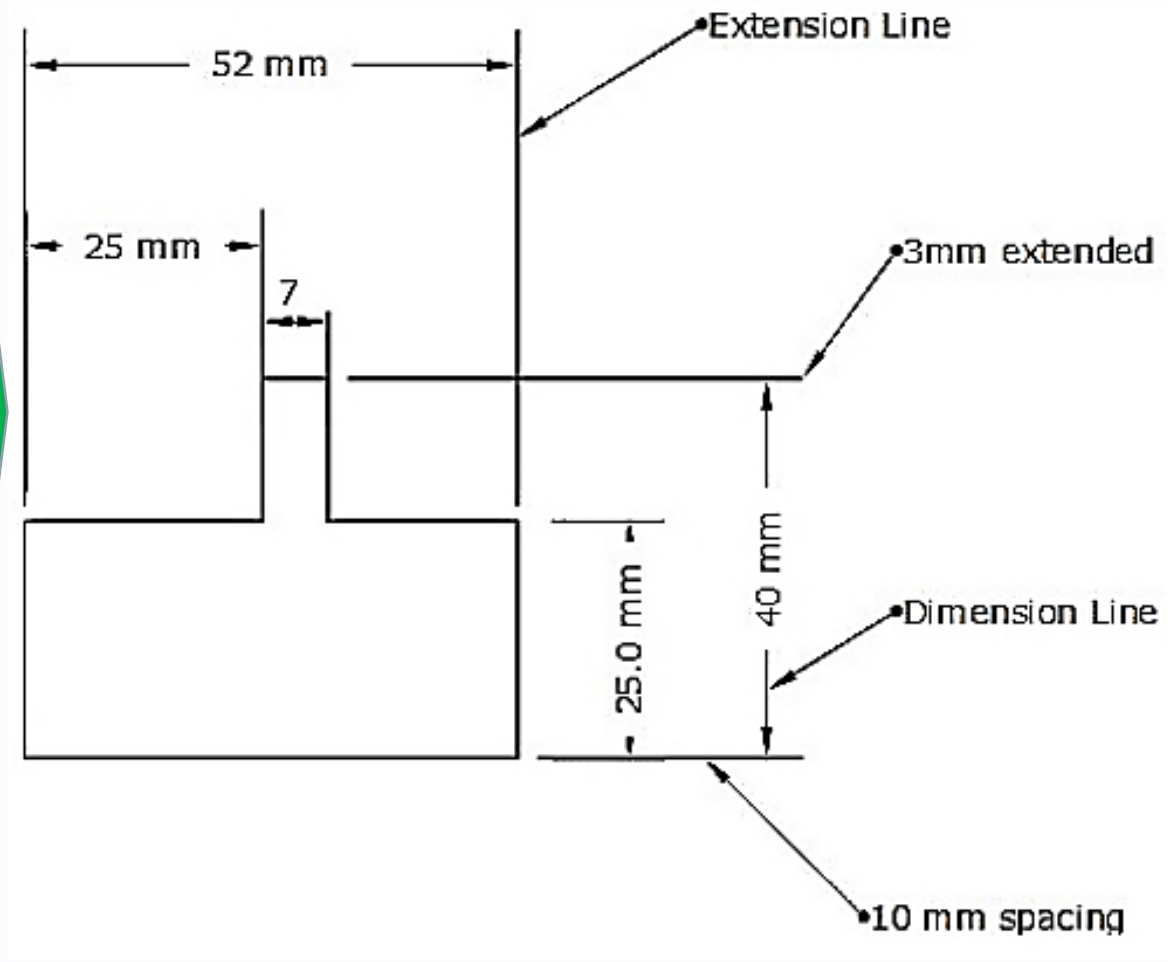
2. Extension line, Dimension line



Dimensioning

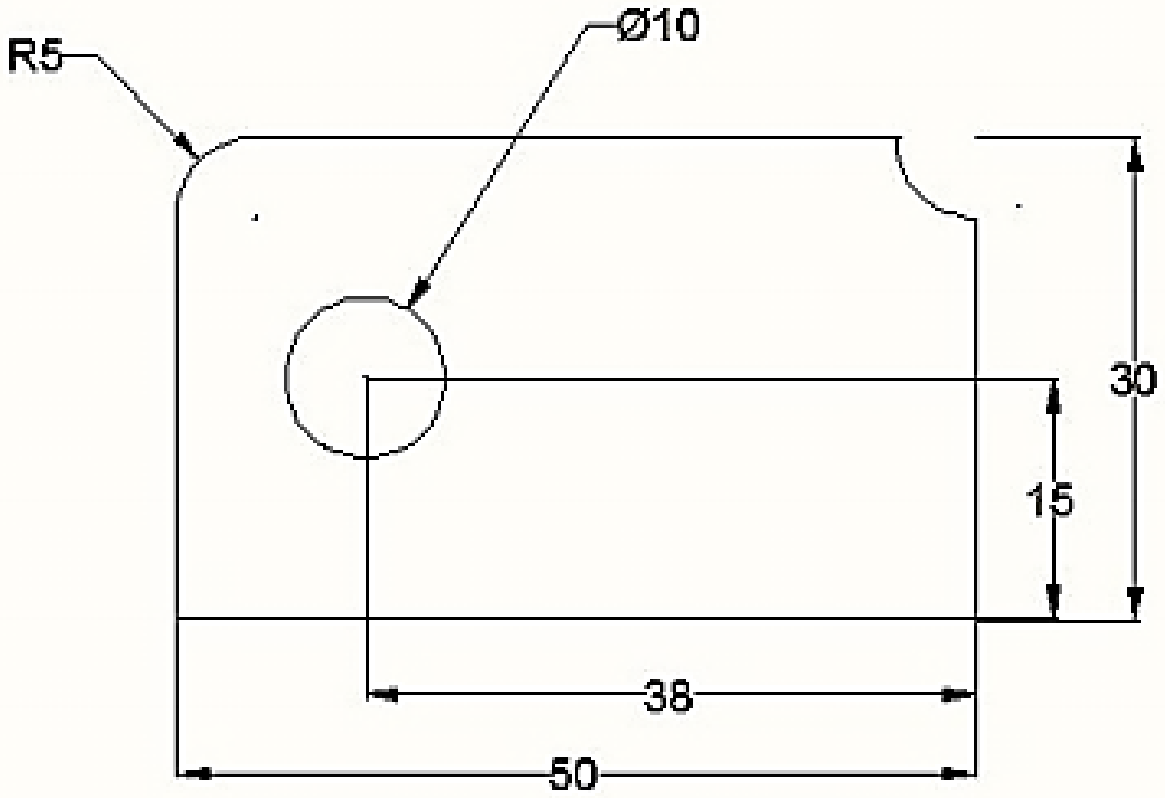
- >> A gap of 1mm has to be kept between the extension line and visible line.
- >> An extension line should extend about 3mm from the outmost dimension line.
- >> Dimension line should be approximately 10 mm away from the visible line.

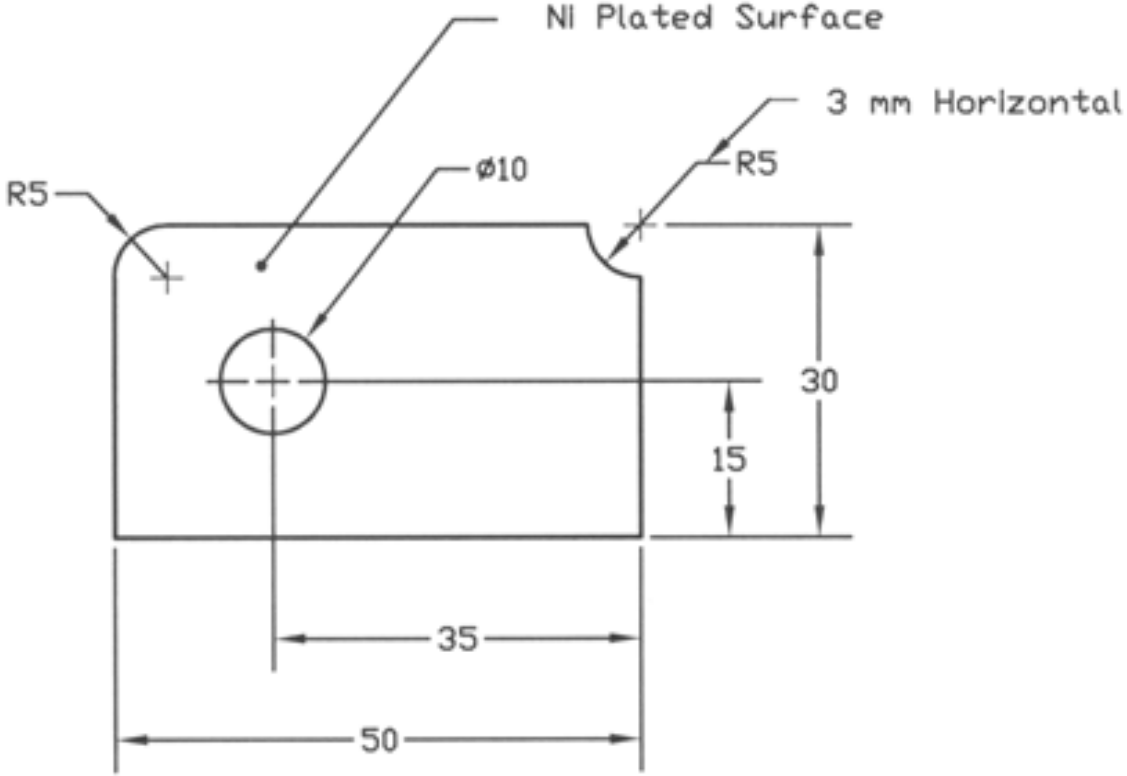
2. Extension line, Dimension line



Dimensioning

3. Leader: A leader should be inclined at an angle 60^0.





Dimensioning

4. Dimension of angles and circles

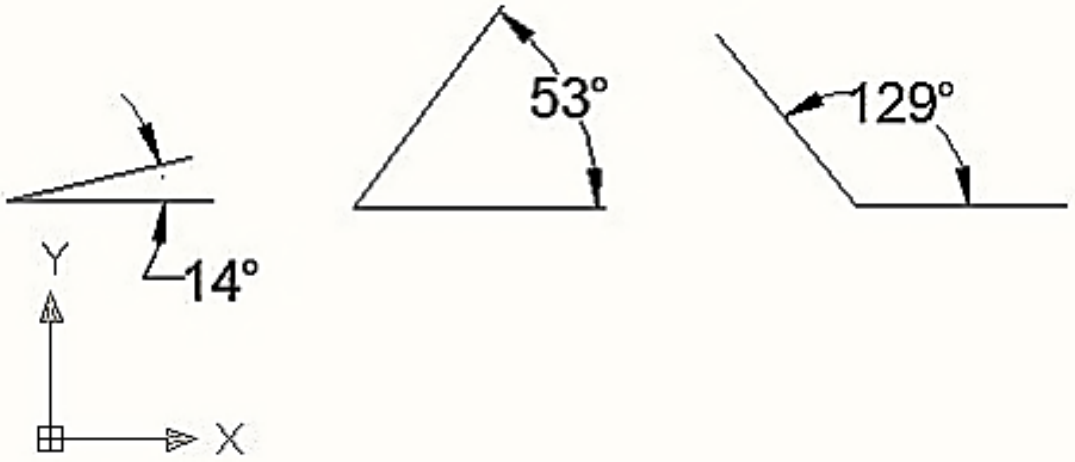


Fig: Angles dimensioning

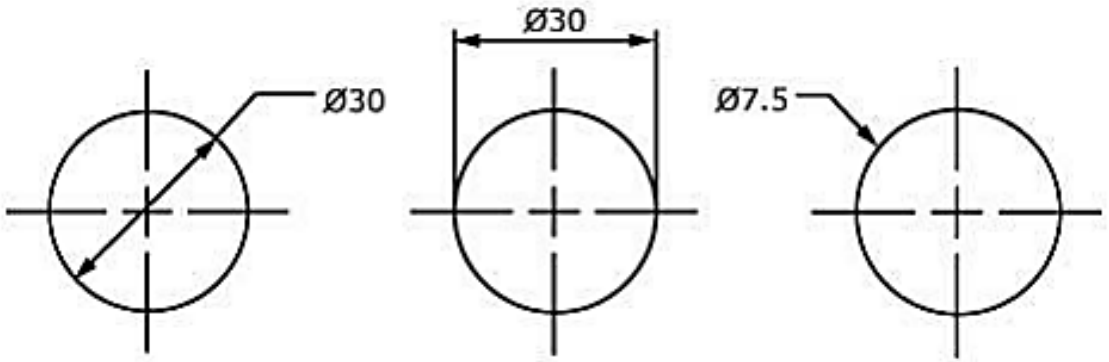
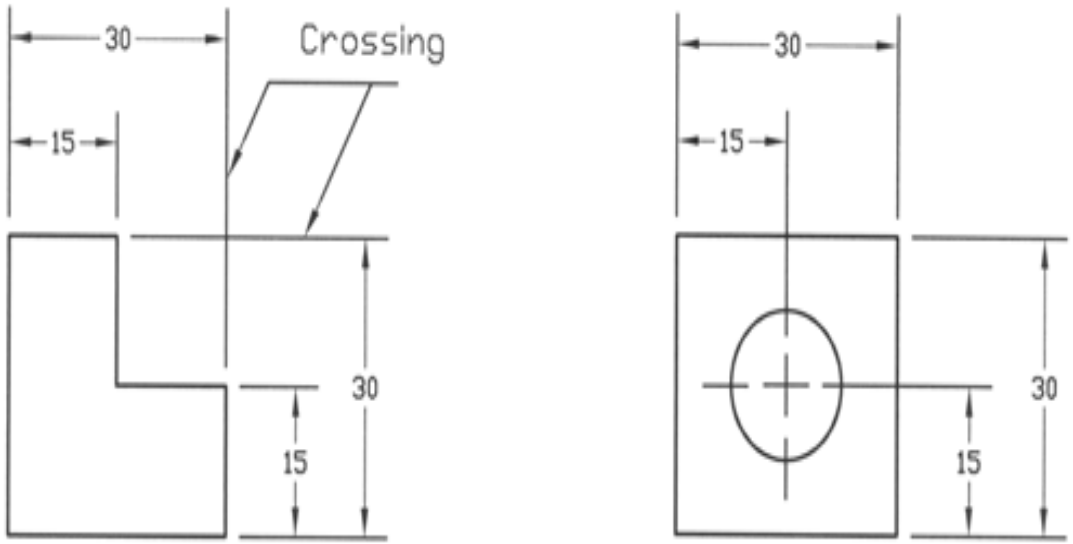


Fig. Dimensioning of circles

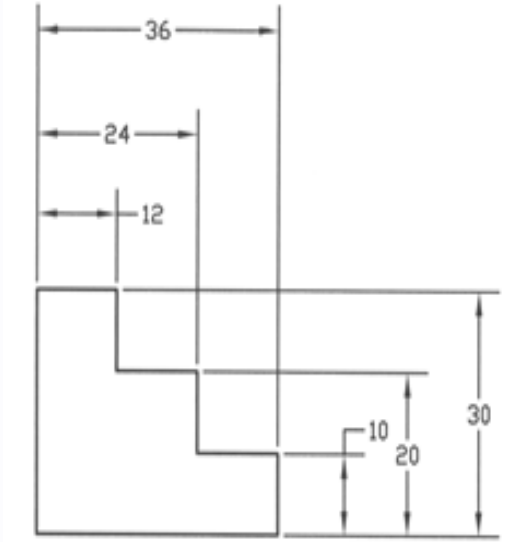
Dimensioning

Fig. 1



Staggered dimensioning

Fig. 2



In-line dimensioning

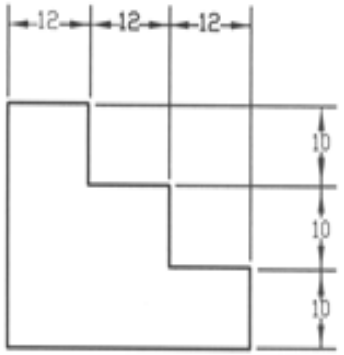
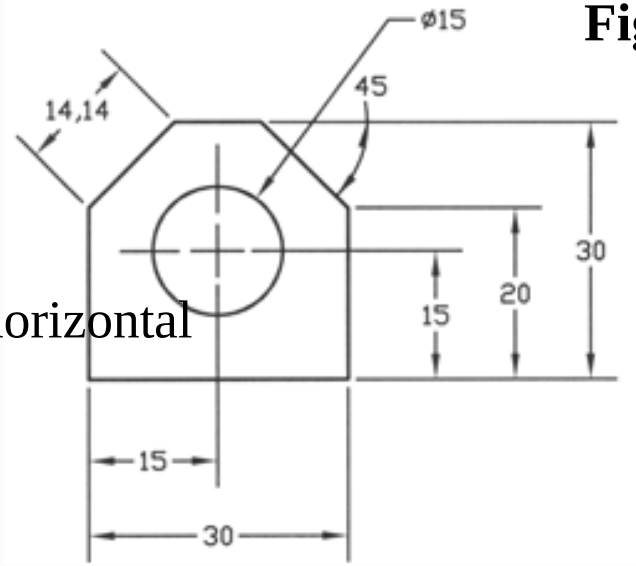
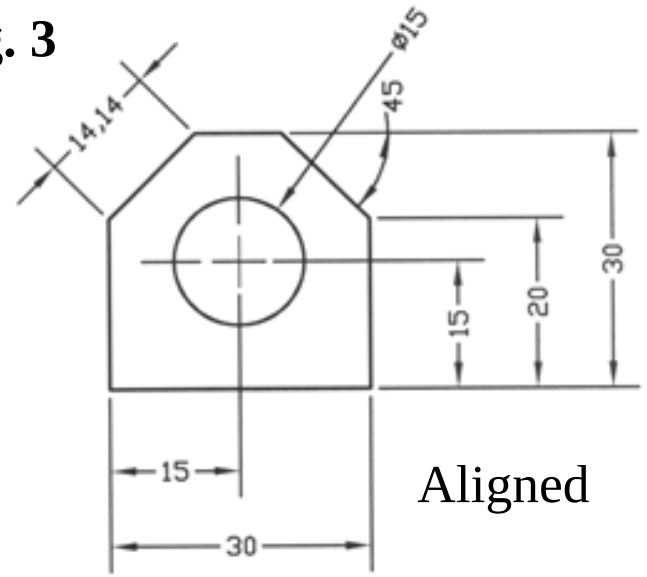


Fig. 3

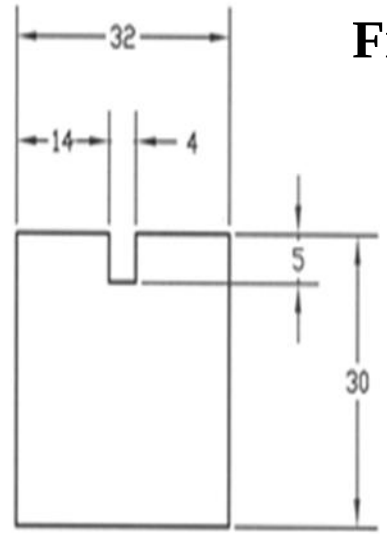


Unidirectional/horizontal

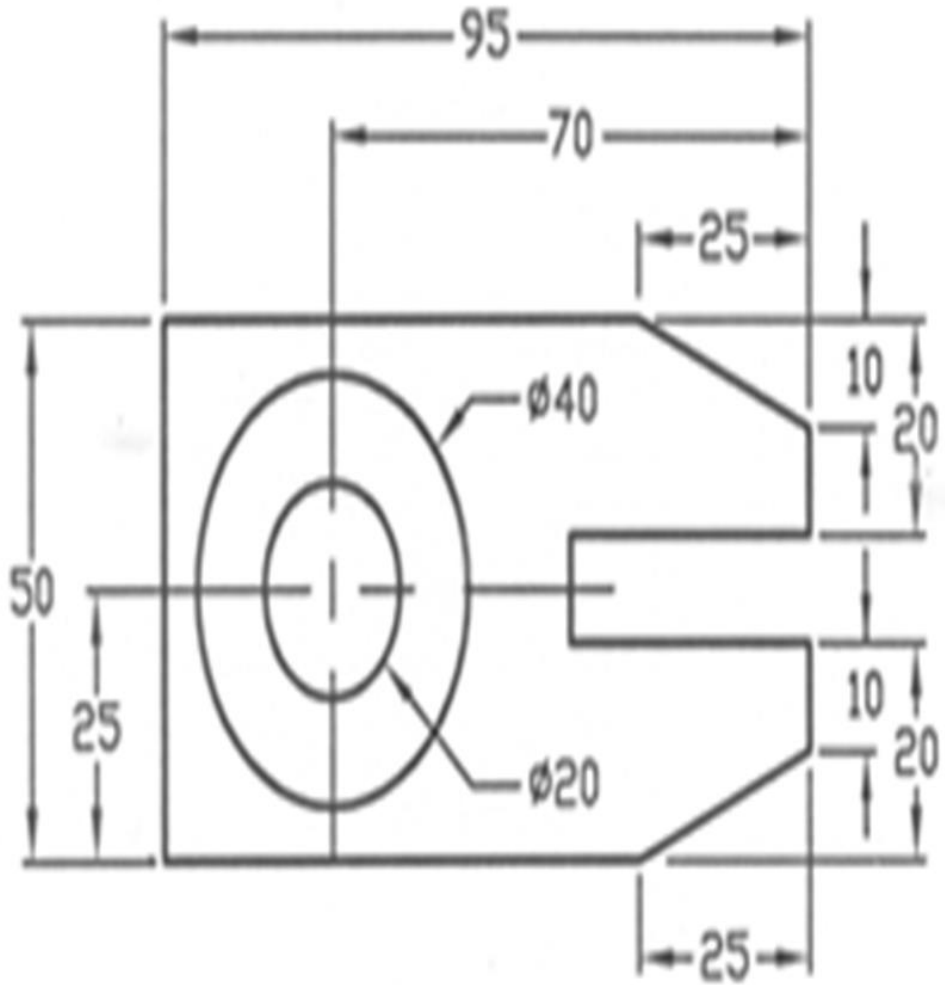


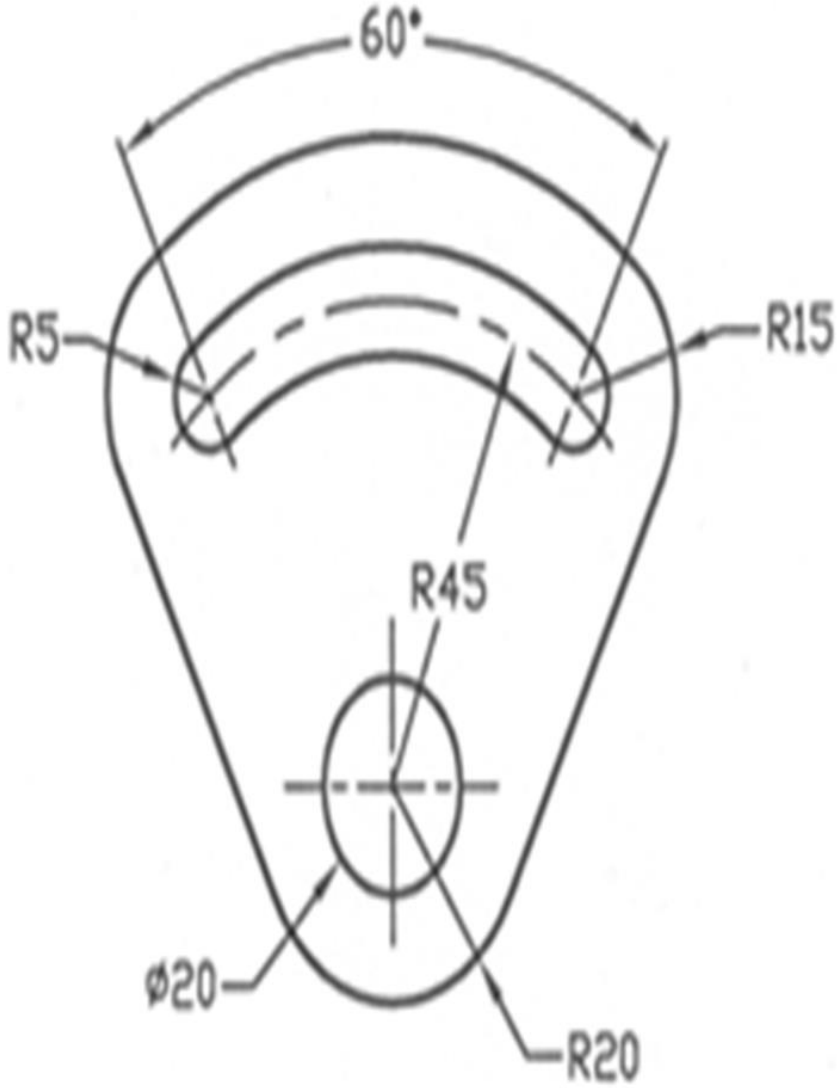
Aligned

Fig. 4



Dimensioning





Dimensioning

Put necessary dimension on this drawing to manufacture this as shown.