



LINES, LETTERS & DIMENSIONING

Engineering Graphics and Design (BTME-101-21)





Course for Unit-I

Drawing Techniques: Various types of lines, principles of dimensioning, size and location of dimensions, symbols, conventions scales (plane and diagonal) and lettering as per IS Code SP-46 of practice for general engineering drawings. Practice of drawing various types of lines and dimensioning exercises. Drawing exercises pertaining to symbols, conventions. Exercise on lettering techniques: Free hand printing and numerals in 3, 5, 8 and 12 mm sizes vertical and inclined at 75 ; instrumental lettering in single stroke.

Projection of Points, Lines and Planes: First angle and third angle projections, concept of horizontal and vertical planes, Projection of points and lines, True length, Horizontal and vertical traces, Projection of Planes, Traces of Planes, Auxiliary planes. Practice exercises on projection of points, lines and planes.

Projection and Selection of Solids: Projection of solids such as Prisms, Pyramids, Cylinders, Cones, Spheres, Auxiliary View. Principles of sectioning, types of sectioning, section lines, cutting plane lines. Practice on projection of solids.

Basic Line Types

Types of Lines	Appearance	Name according to application
Continuous thick line		Visible line
Continuous thin line		Dimension line Extension line Leader line
Dash thick line		Hidden line
Chain thin line		Center line

Meaning of Lines

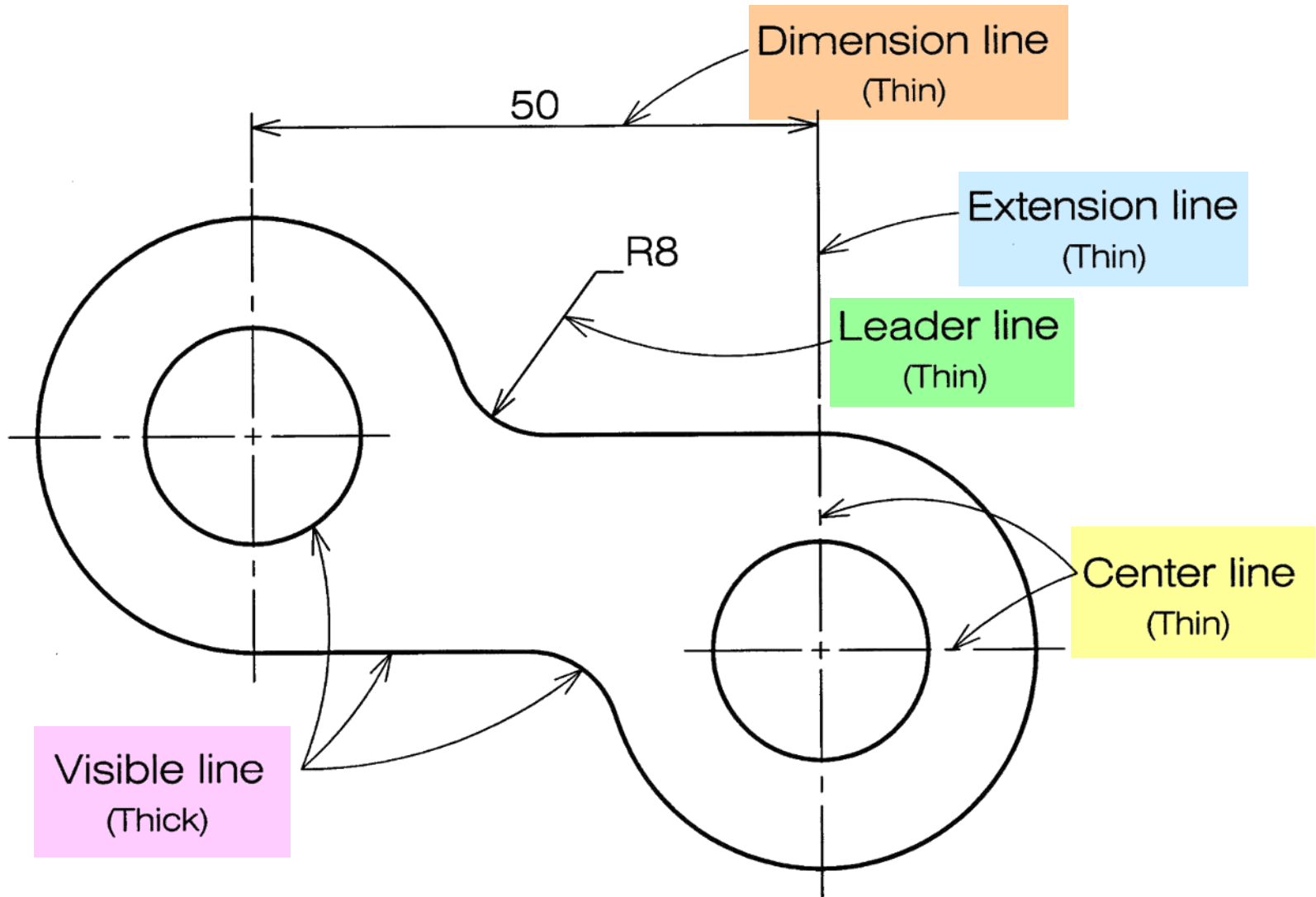
Visible lines represent features that can be seen in the current view

Hidden lines represent features that can not be seen in the current view

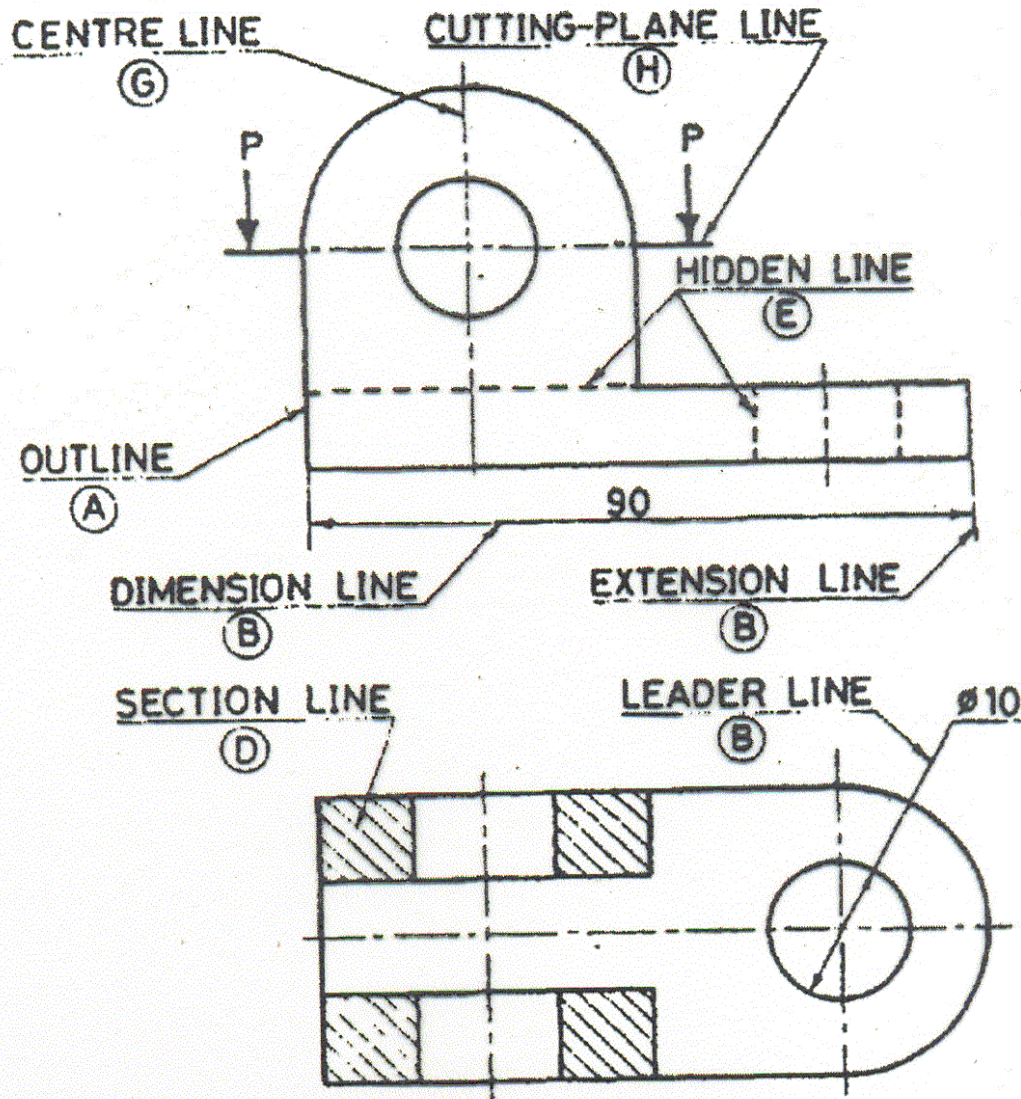
Center line represents symmetry, path of motion, centers of circles, axis of axisymmetrical parts

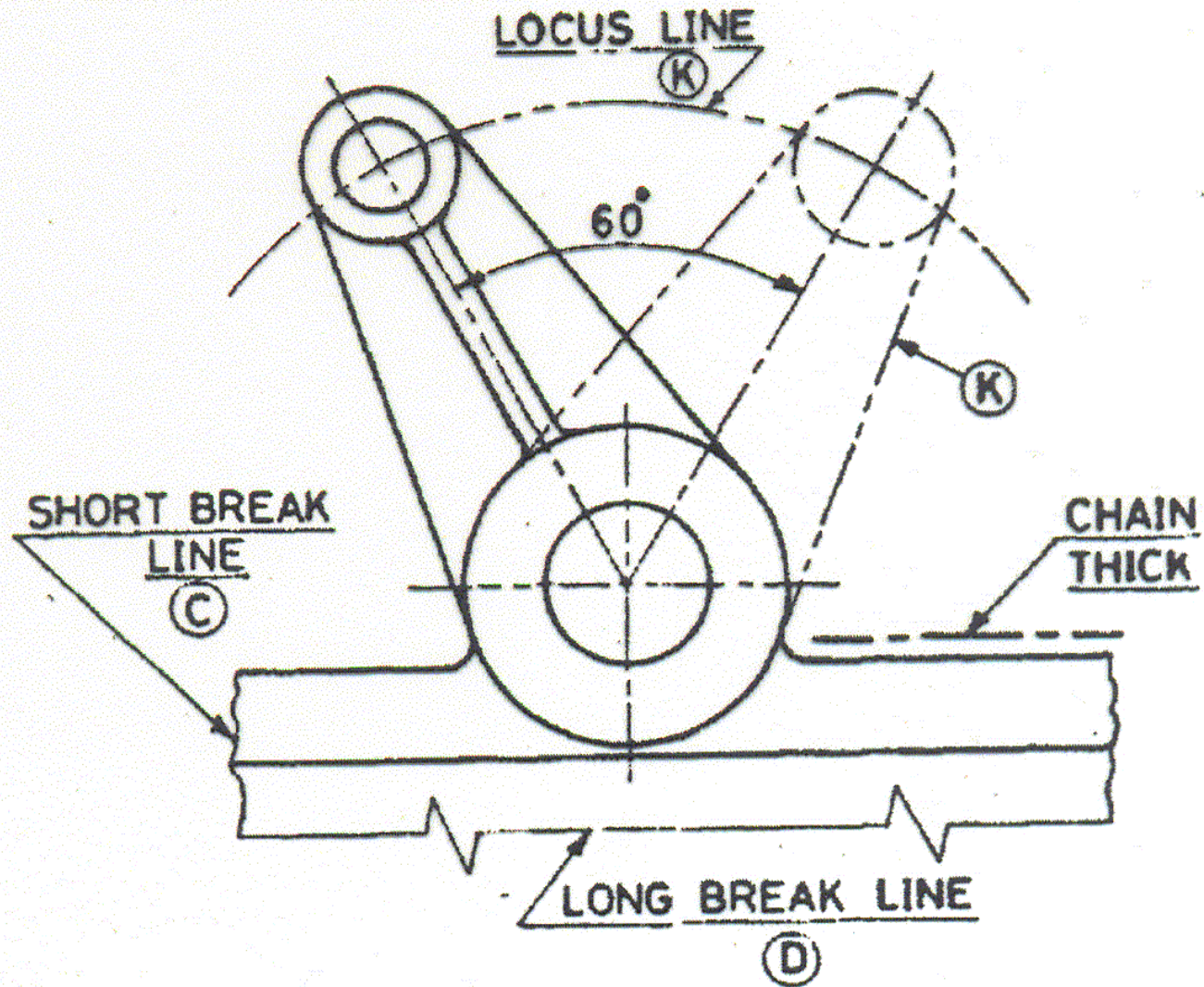
Dimension and Extension lines indicate the sizes and location of features on a drawing

Example : Line conventions in engineering drawing








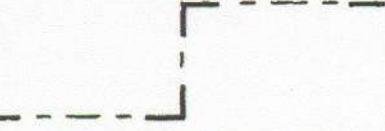




TYPES OF LINES





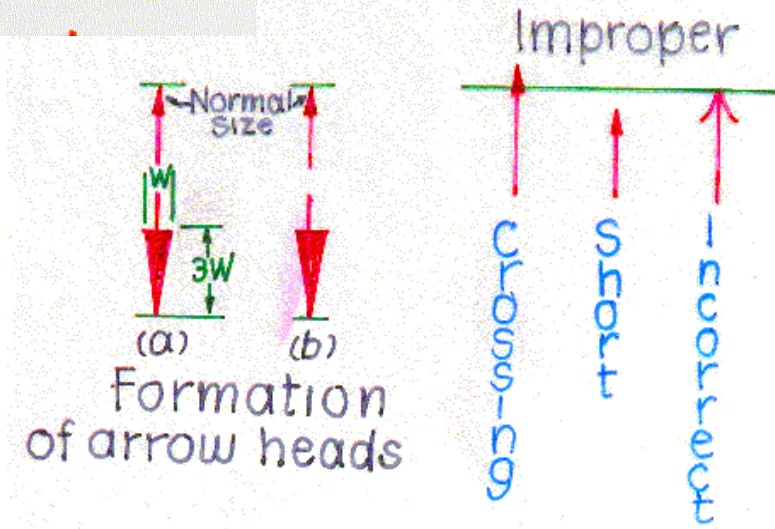
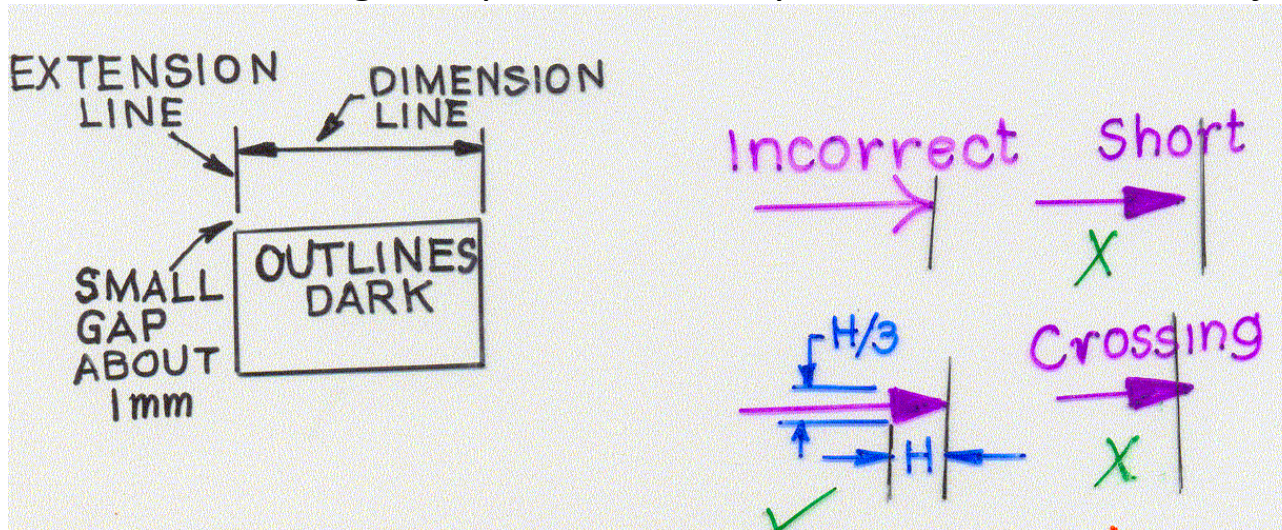
Lines	Pencil
Initial work and construction lines	H
Outlines, dotted lines, section-plane lines, dimension lines, arrowheads	2H
Centre lines, section lines	3H or 4H

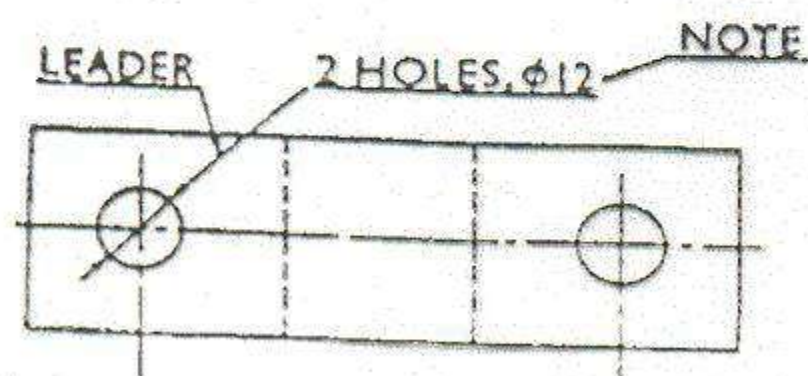
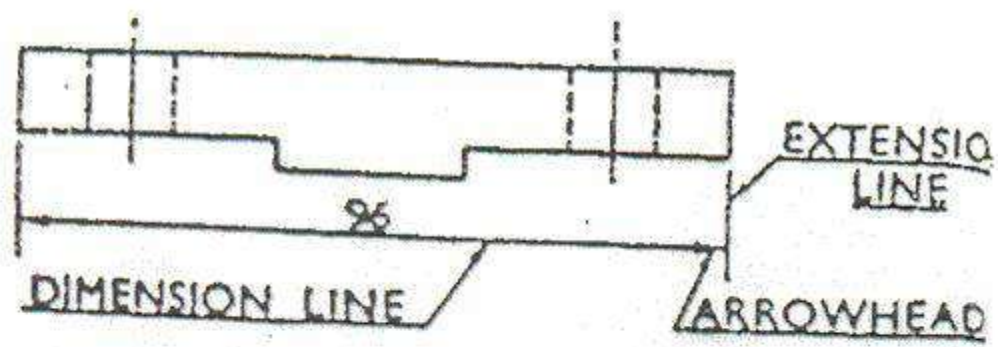
Line	Description	General applications
A 	Continuous thick	Visible outlines Visible outlines
B 	Continuous thin (straight or curved)	Imaginary lines of intersection Dimension lines Projection lines Leader lines Hatching Outlines of revolved sections in place Short centre lines
C 	Continuous thin freehand	Limits of partial or interrupted views and sections, if the limit is not a chain thin line
D 	Continuous thin (straight) with zigzags	Long-break line
E 	Dashed thick	Hidden outlines Hidden edges
F 	Dashed thin	Hidden outlines Hidden edges
G 	Chain thin	Centre line Lines of symmetry Trajectories
H 	Chain thin, thick at ends and changes of direction	Cutting planes
J 	Chain thick	Indication of lines or surfaces to which a special requirement applies
K 	Chain thin double-dashed	Outlines of adjacent parts Alternative and extreme positions of movable parts Centroidal lines Initial outlines prior to forming Parts situated in front of the cutting plane

DIMENSIONING

Orthographic Views convey the *shape* information

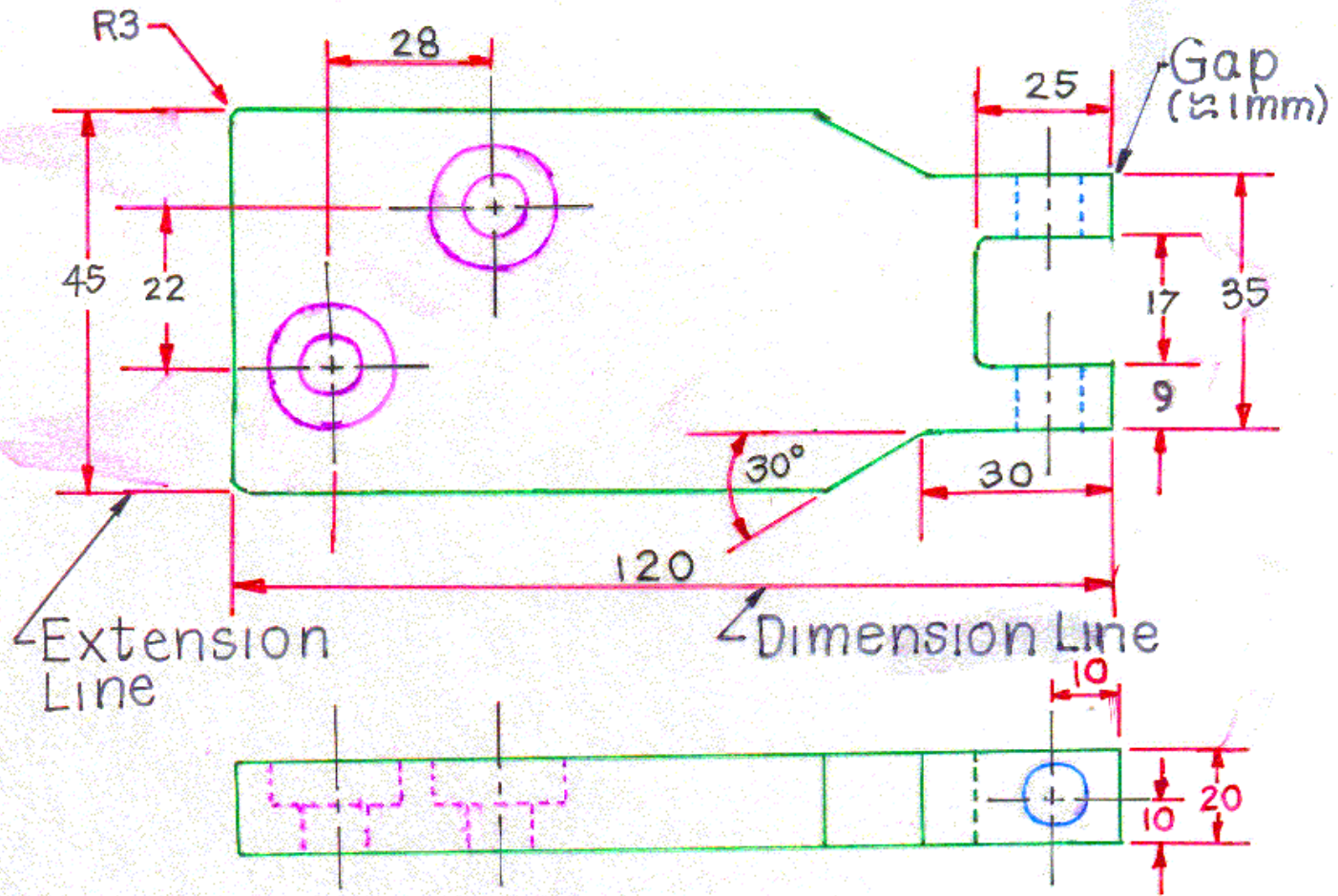
Dimensioning is required to convey the exact *size* of the object



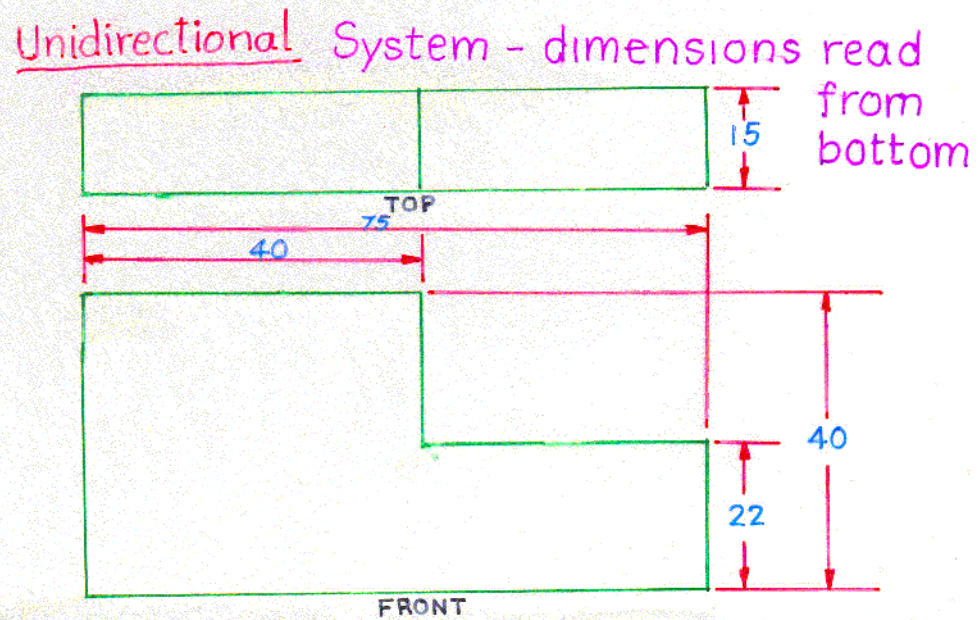
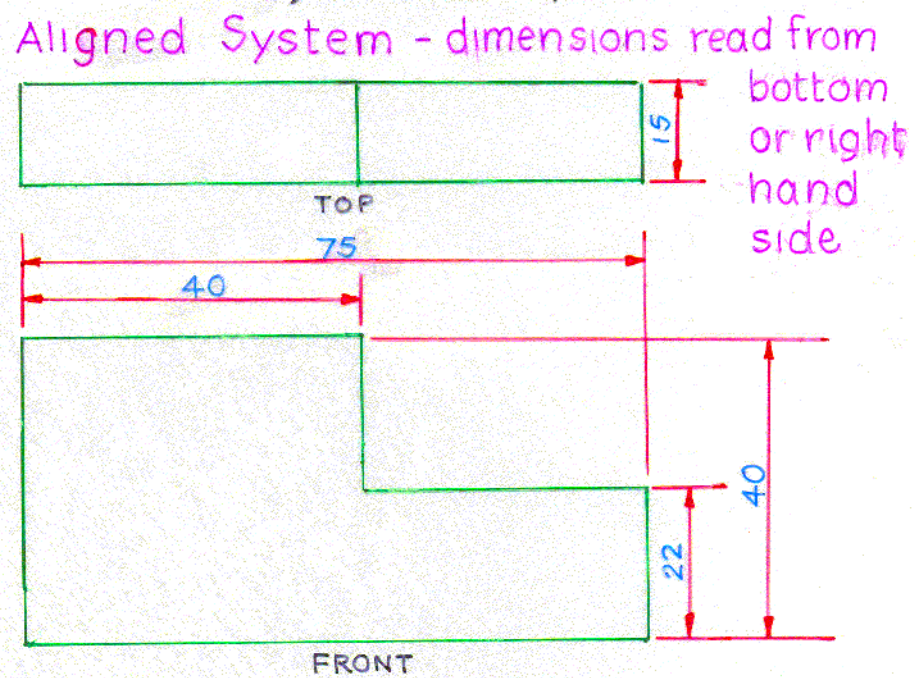


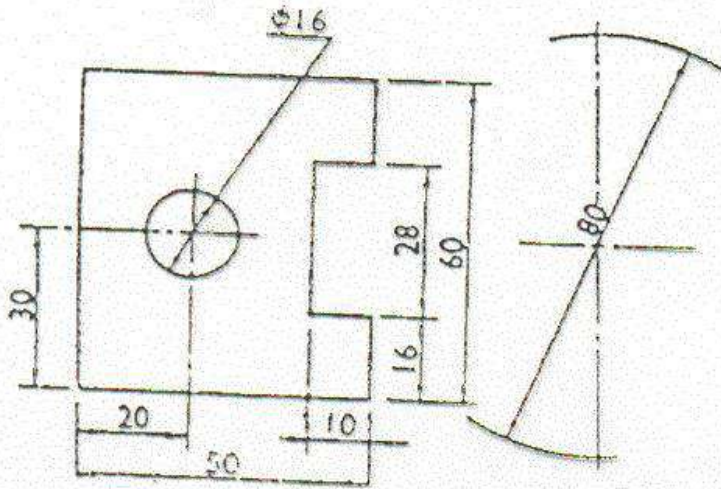
Dimensioning terms & notations

DIMENSIONING

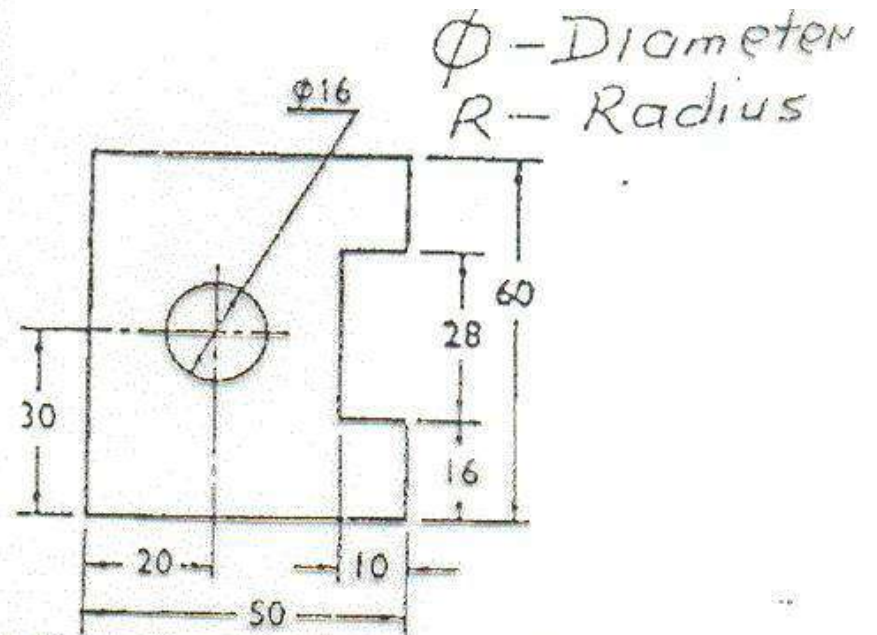


TWO MAJOR
METHODS OF
DIMENSIONING



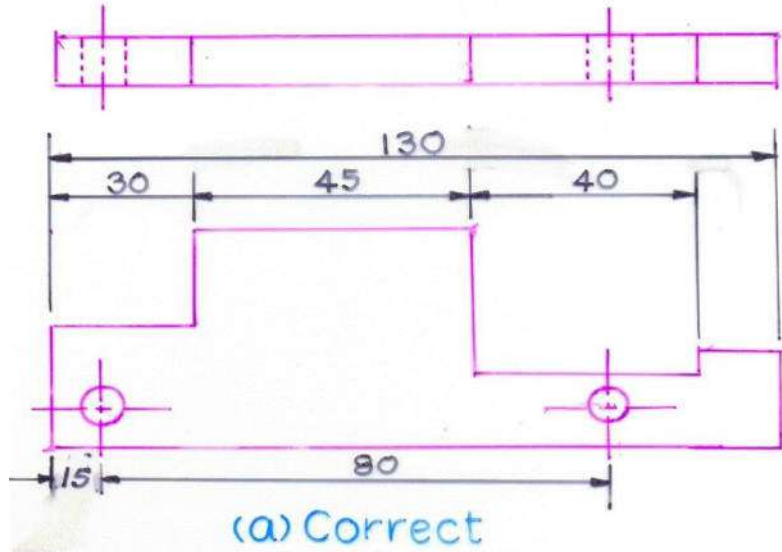


Aligned system of dimensioning

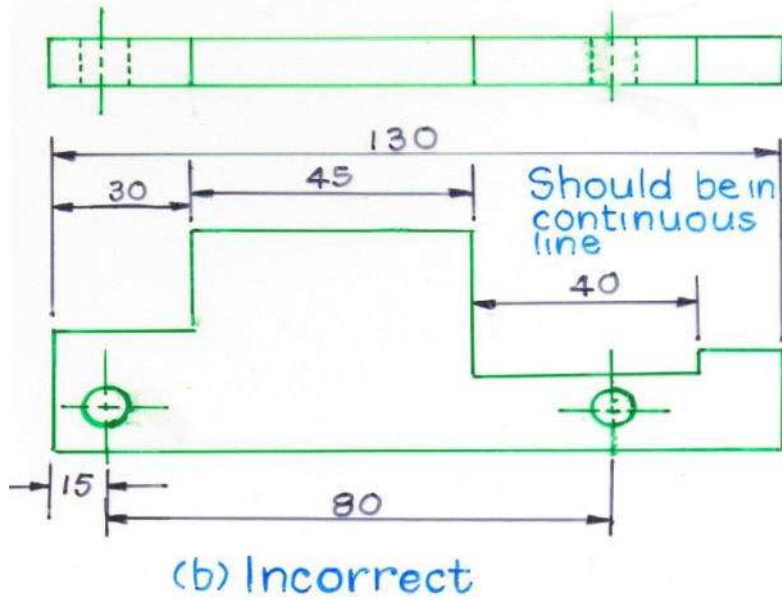


Unidirectional system of dim.

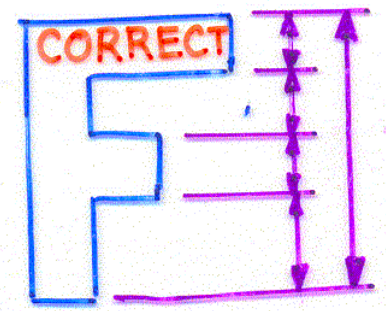
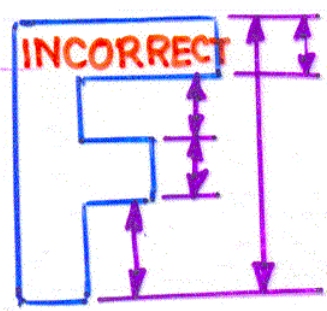
Consecutive Dimensions p.335



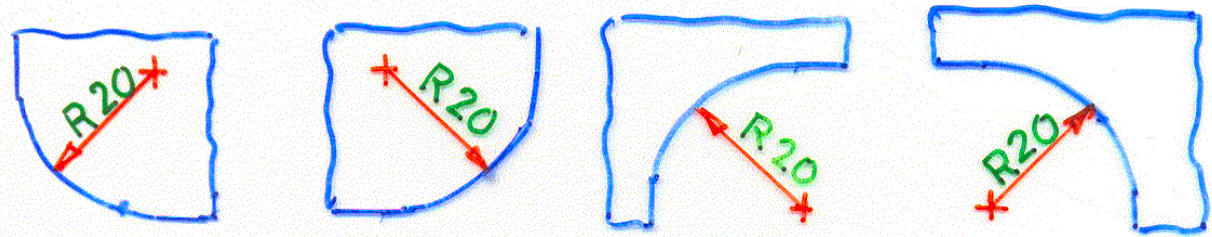
In line
Good
practice



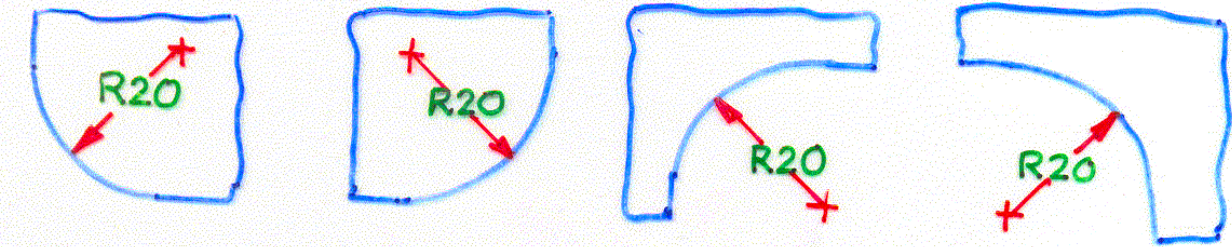
Should be in
continuous
line



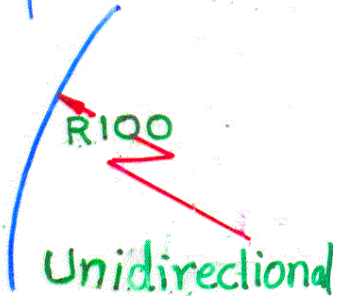
ALIGNED



UNIDIRECTIONAL



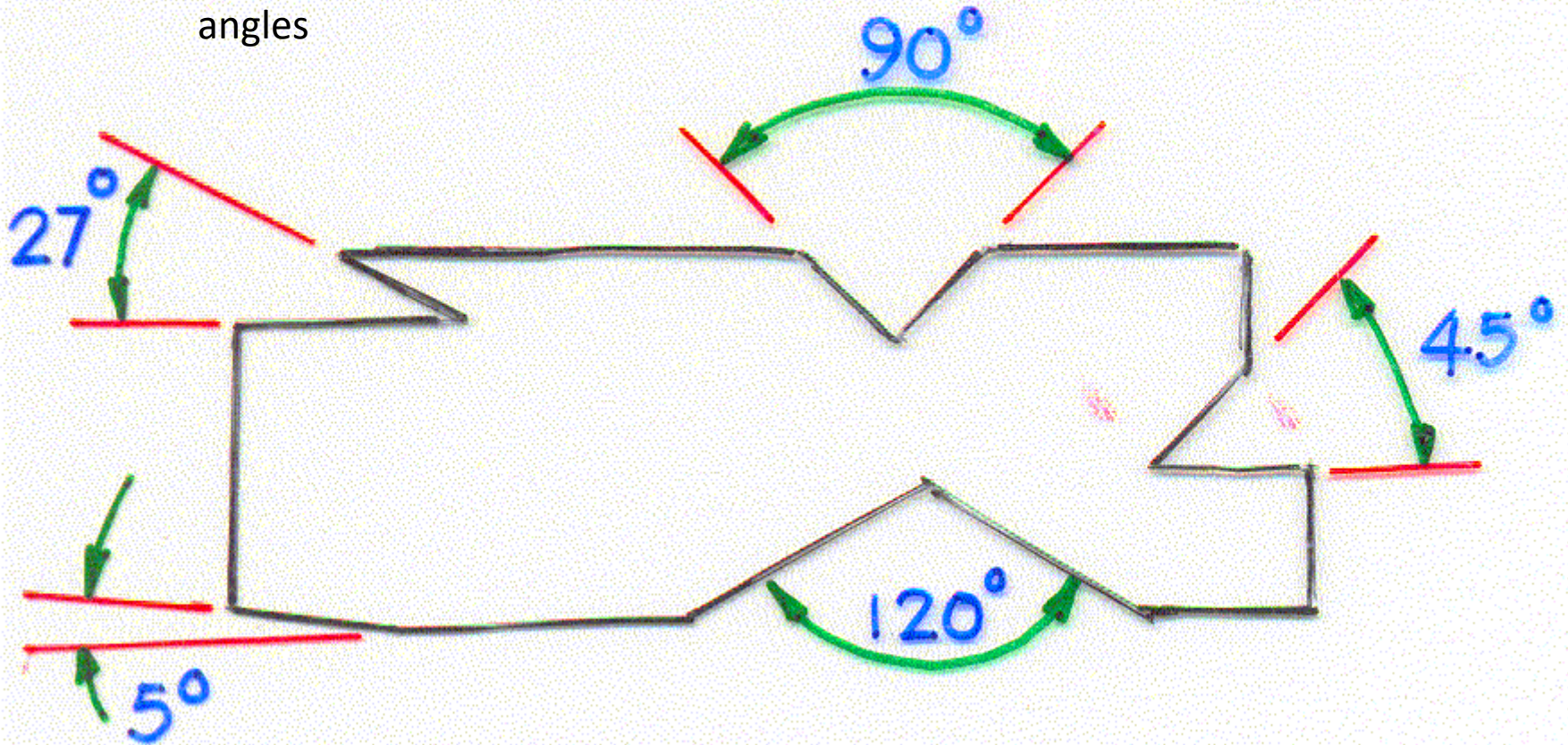
Radius
large. Centre
out of paper
or difficult
to place



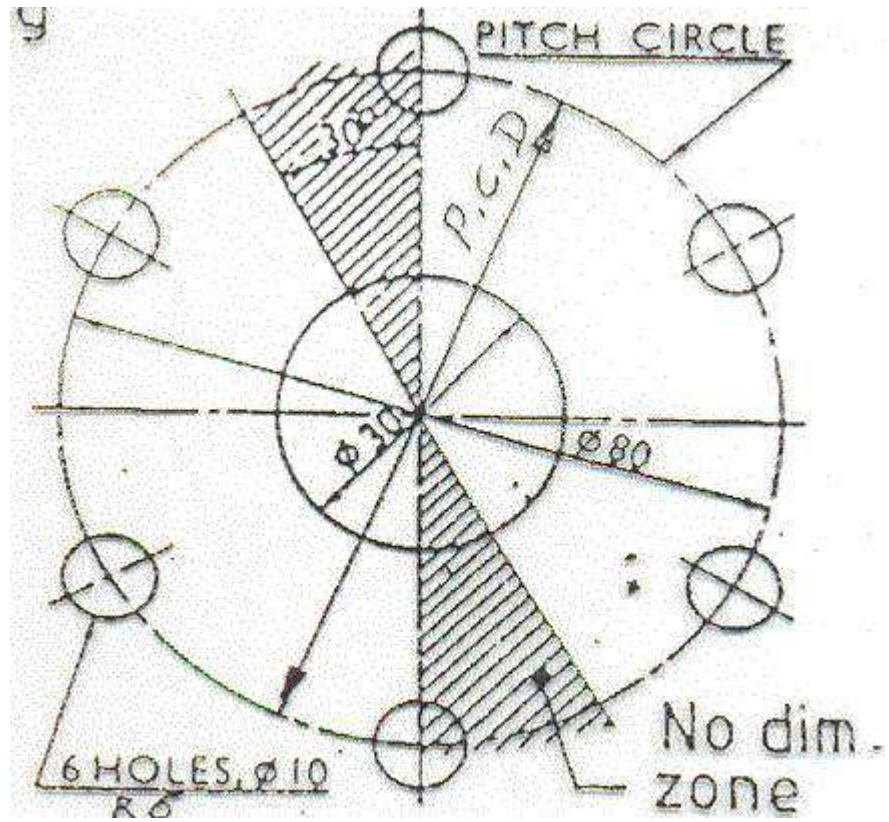
Small Radii

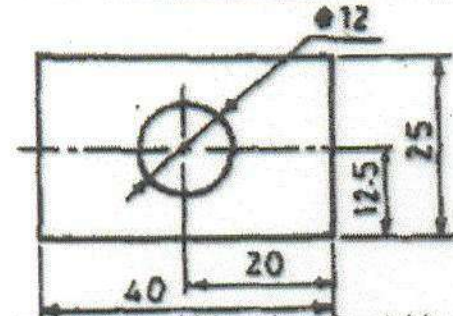
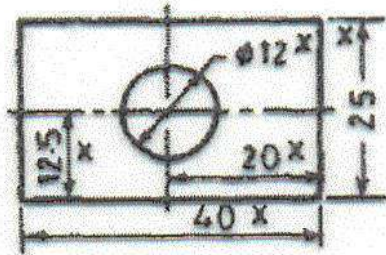


Use of leader lines for smaller angles

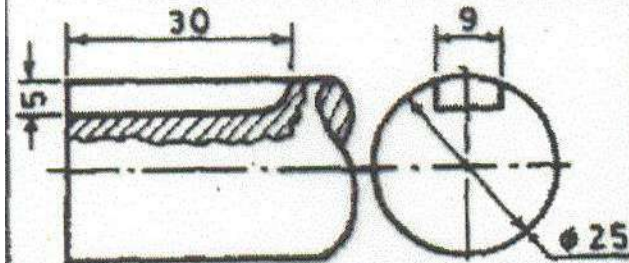
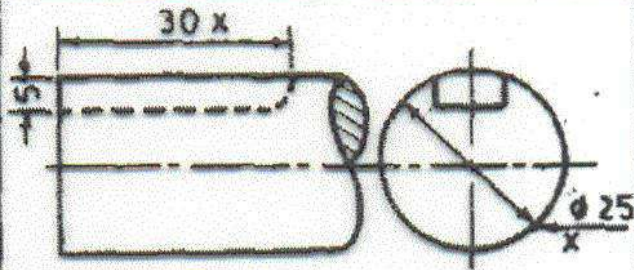


Use of object lines for large angles

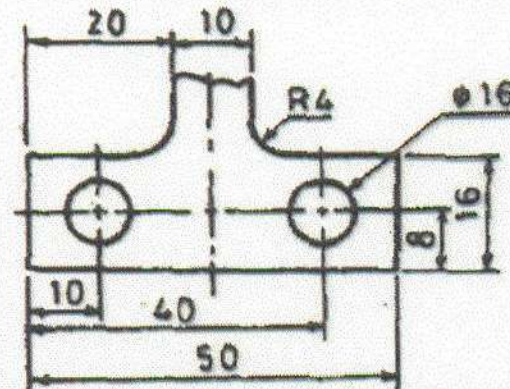
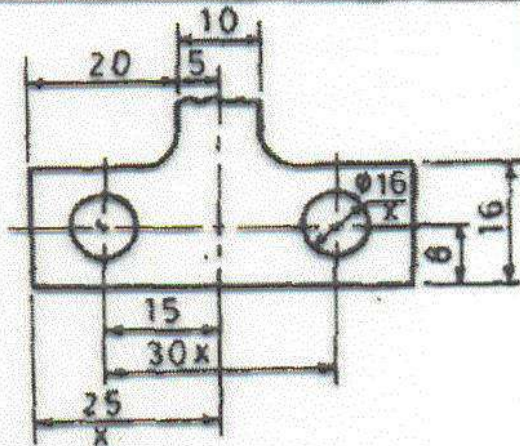




Dimensions should be placed outside view



Dim. should be marked from visible outlines



Dimensions should be given from the outlines (finished surfaces) or a centre line of a hole

