

Main Types of Lines



solid line, full line, visible out line



Dashed line, ~~invisible line~~ Hidden Line



**construction line, guide line, (Transfer Line)
extension line, dimension line, Section
Line (Cross-Hatching Line)**



Center line



Cutting-plane line



Break line















Chain line



Phantom line

Line Groups

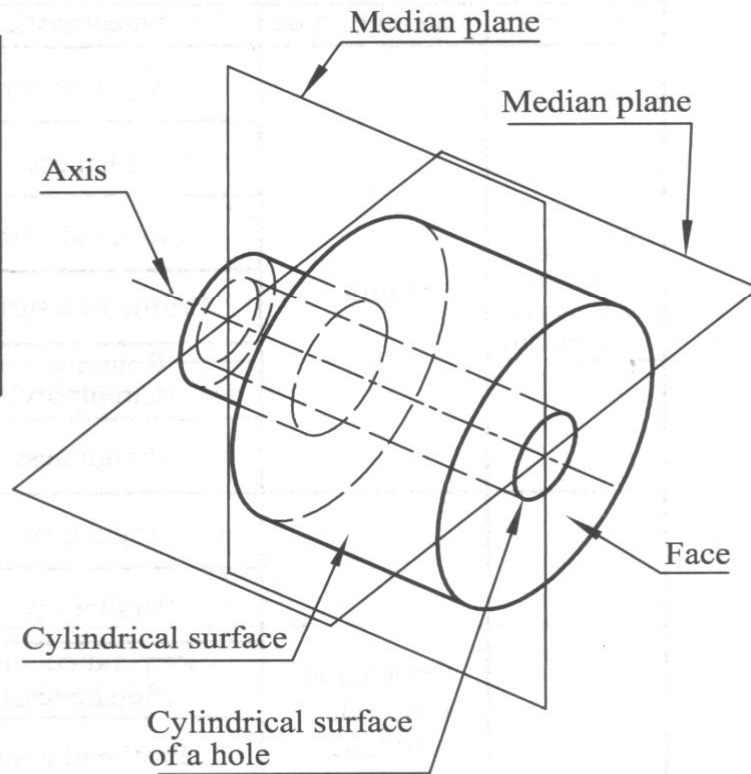
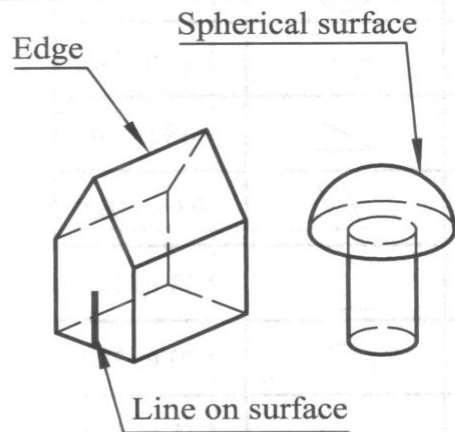
Line Group	Thickness of Lines	
	01.2-02.2-04.2	01.1-02.1-04.1-05.1
0,25	0,25	0,13
0,35	0,35	0,18
0,5 ^a	0,5	0,25
0,7 ^a	0,7	0,35
1	1	0,5
1,4	1,4	0,7
2	2	1
a : Preferable		

.007" 	.010" 	.012" 	.014" 	.020" 	.024" 
.18 mm	.25 mm	.30 mm	.35 mm	.50 mm	.60 mm
.028" 	.031" 	.039" 	.047" 	.055" 	.079" 
.70 mm	.80 mm	1.00 mm	1.20 mm	1.40 mm	2.00 mm

SINGLE FEATURES

The following sketches illustrate some of the single features that could be on a component.

Some examples of single features
An axis
A cylindrical surface
A cylindrical surface of a hole
An edge
A face
A line on a surface
A median plane
A spherical surface



Combinations of Single Features

The following sketch illustrates some combinations of single features that could be on a component.

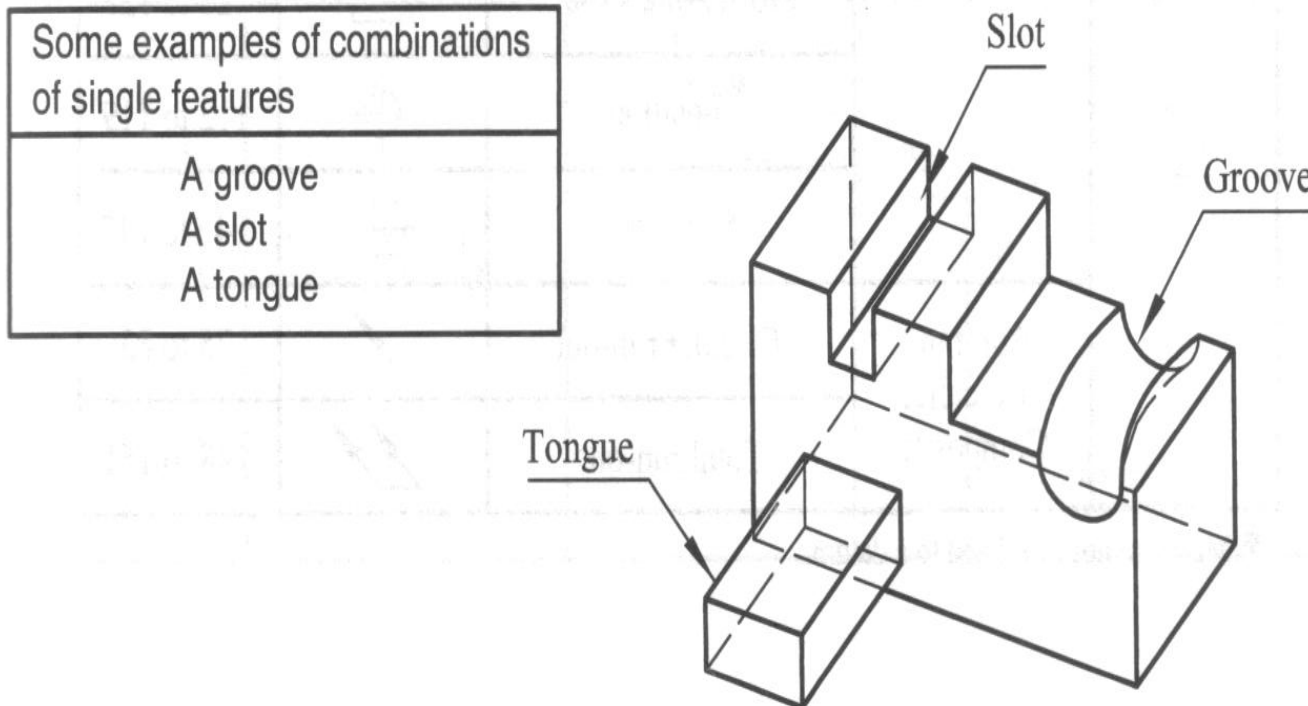

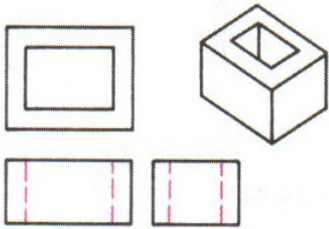

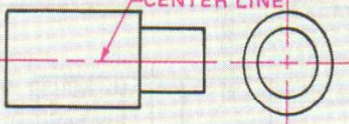
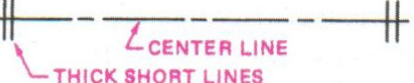
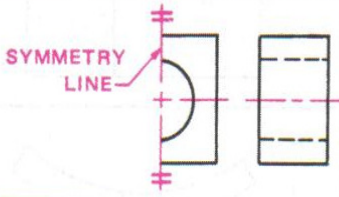
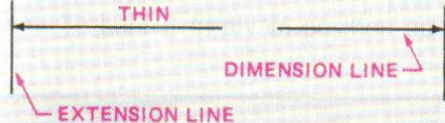
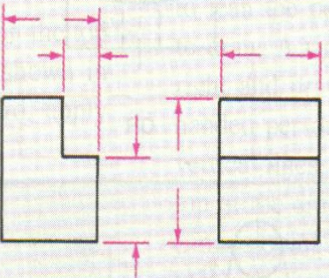


TABLE 4-1 Types of lines. (continued on next page)

Type of Line	Application	Description
<p>Hidden line</p> <p>THIN</p> 		<p>The hidden object line is used to show surfaces, edges, or corners of an object that are hidden from view.</p>
<p>Center line</p> <p>THIN</p> <p>ALTERNATE LINE AND SHORT DASHES</p> 	<p>CENTER LINE</p> 	<p>Center lines are used to show the center of holes and symmetrical features.</p>
<p>Symmetry line</p> <p>CENTER LINE</p> <p>THICK SHORT LINES</p> 	<p>SYMMETRY LINE</p> 	<p>Symmetry lines are used when partial views of symmetrical parts are drawn. It is a center line with two thick short parallel lines drawn at right angles to it at both ends.</p>
<p>Extension and dimension lines</p> <p>THIN</p> <p>EXTENSION LINE</p> <p>DIMENSION LINE</p> 		<p>Extension and dimension lines are used when dimensioning an object.</p>


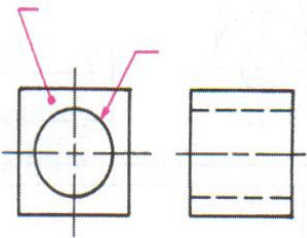
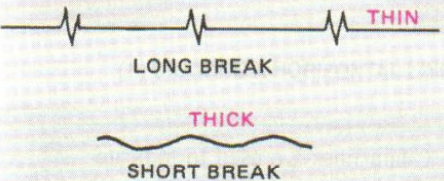
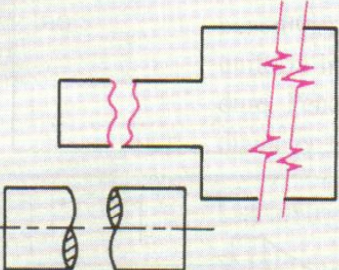


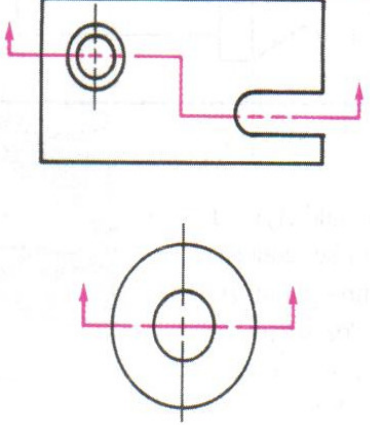

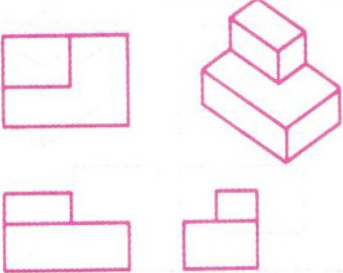

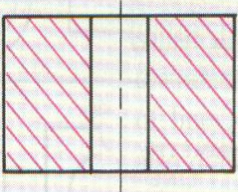
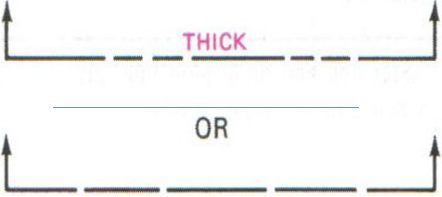
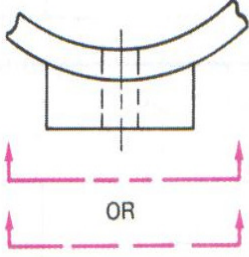

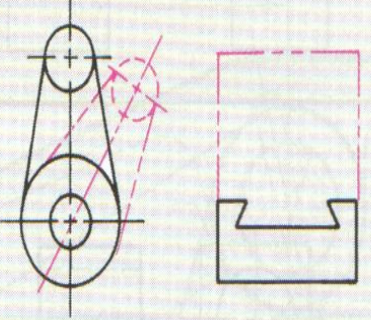


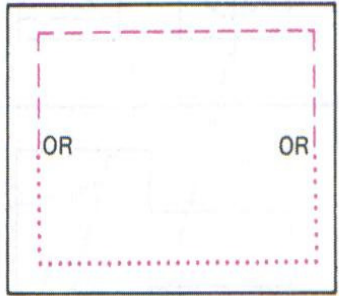

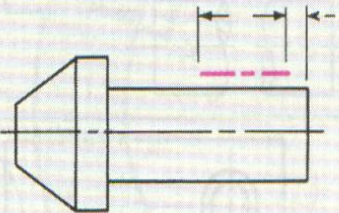
<p style="text-align: center;">Leaders</p> 		<p>Leaders are used to indicate the part of the drawing to which a note refers. Arrowheads touch the object lines while the dot rests on a surface.</p>
<p style="text-align: center;">Break lines</p> 		<p>Break lines are used when it is desirable to shorten the view of a long part.</p>
<p style="text-align: center;">Cutting-plane line</p> <p>!!! ANSI !!!!</p>  <p style="text-align: center;">OR</p>  <p style="text-align: center;">ISO rep.</p>		<p>The cutting-plane line is used to designate where an imaginary cutting took place.</p>

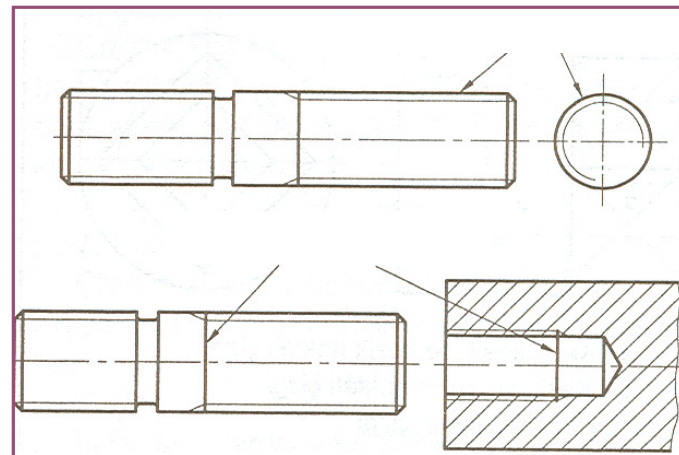
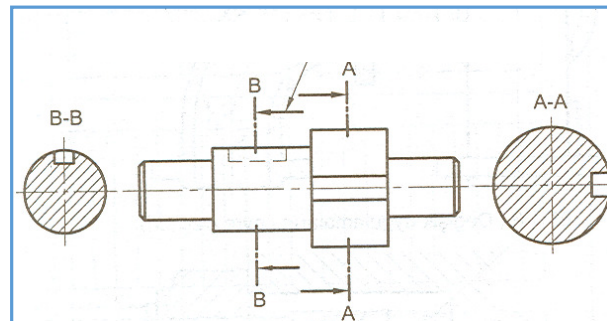
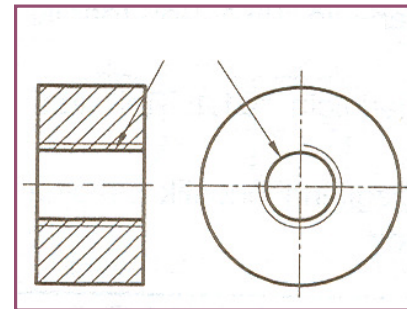
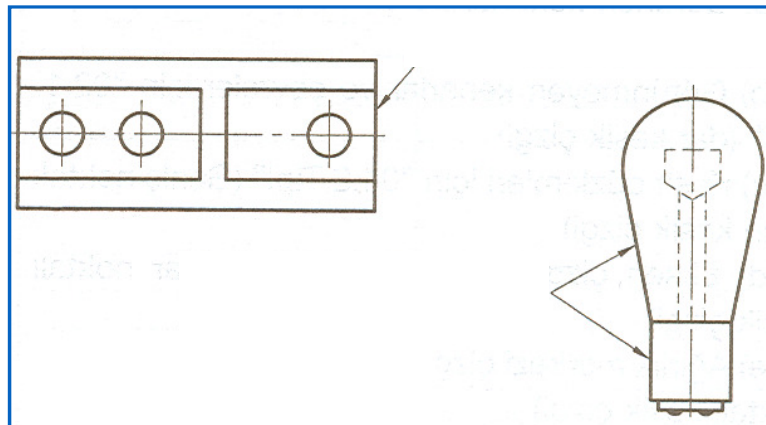
TABLE 4-1 Types of lines. (continued)

Type of Line	Application	Description
<p data-bbox="562 461 688 488">Visible line</p> 		<p data-bbox="1293 461 1661 638">The visible line is used to indicate all visible edges of an object. They should stand out clearly in contrast to other lines so that the shape of an object is apparent to the eye.</p>
<p data-bbox="558 776 693 803">Section lines</p> 		<p data-bbox="1293 776 1633 914">Section lining is used to indicate the surface in the section view imagined to have been cut along the cutting-plane line.</p>
<p data-bbox="527 1036 724 1063">Viewing-plane line</p> 		<p data-bbox="1293 1036 1644 1141">The viewing-plane line is used to indicate direction of sight when a partial view is used.</p>

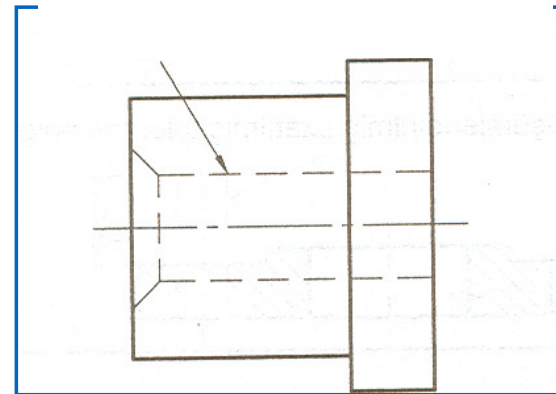
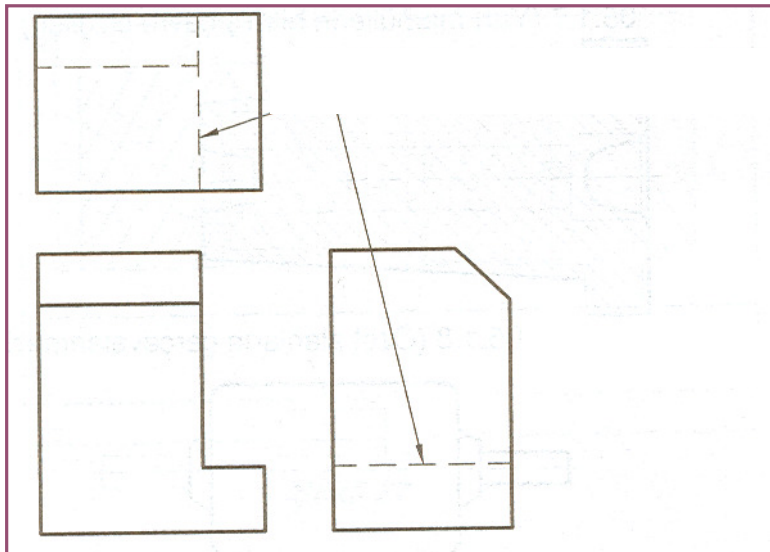
<p style="text-align: center;">Phantom line</p> <p style="text-align: center;">THIN</p> 		<p>Phantom lines are used to indicate alternate position of moving parts, adjacent position of moving parts, adjacent position of related parts, and repetitive detail.</p>
<p style="text-align: center;">Stitch line</p> <p style="text-align: center;">THIN</p> <p style="text-align: center;">OR</p> <p style="text-align: center;">SMALL DOTS</p>  		<p>Stitch lines are used for indicating a sewing or stitching process.</p>
<p style="text-align: center;">Chain line</p> <p style="text-align: center;">THICK</p> 		<p>Chain lines are used to indicate that a surface or zone is to receive additional treatment or considerations.</p>

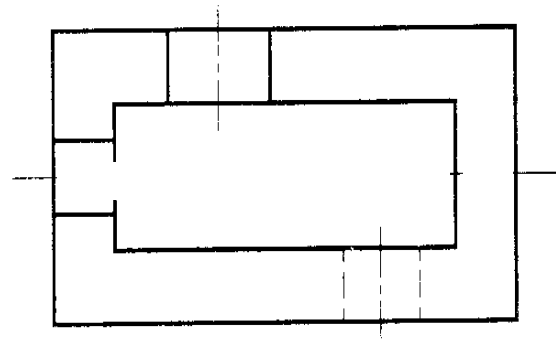
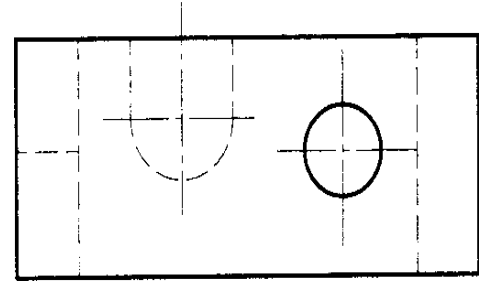
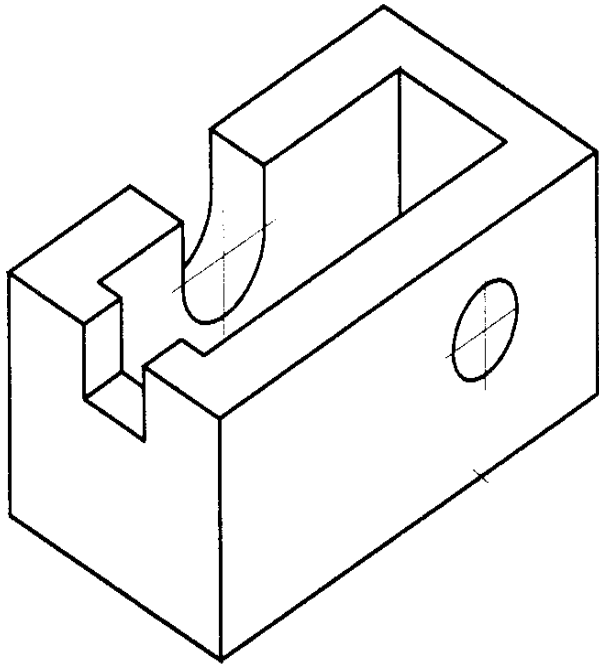
Ka

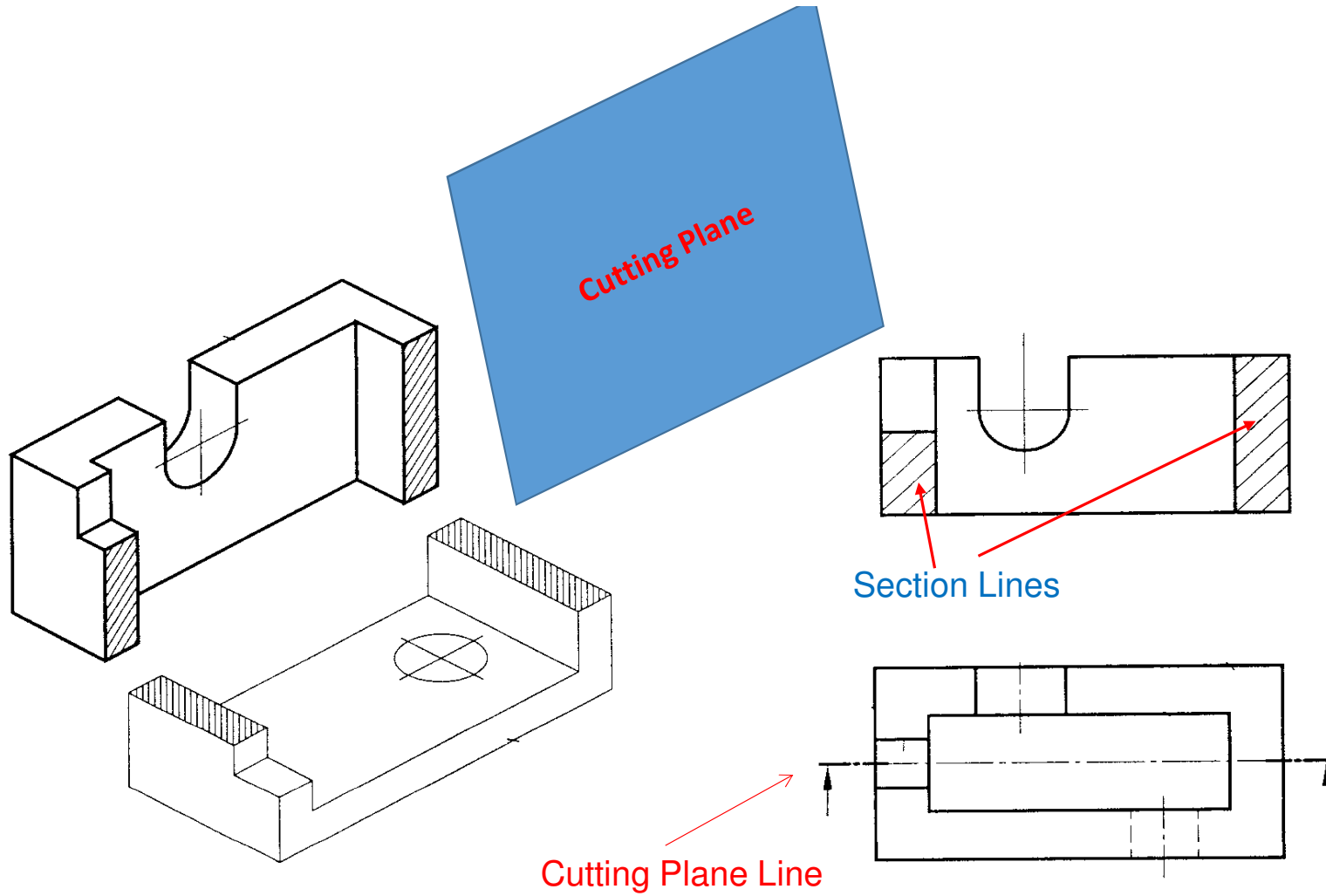
Visible Outline



Hidden Lines







Cutting-plane line

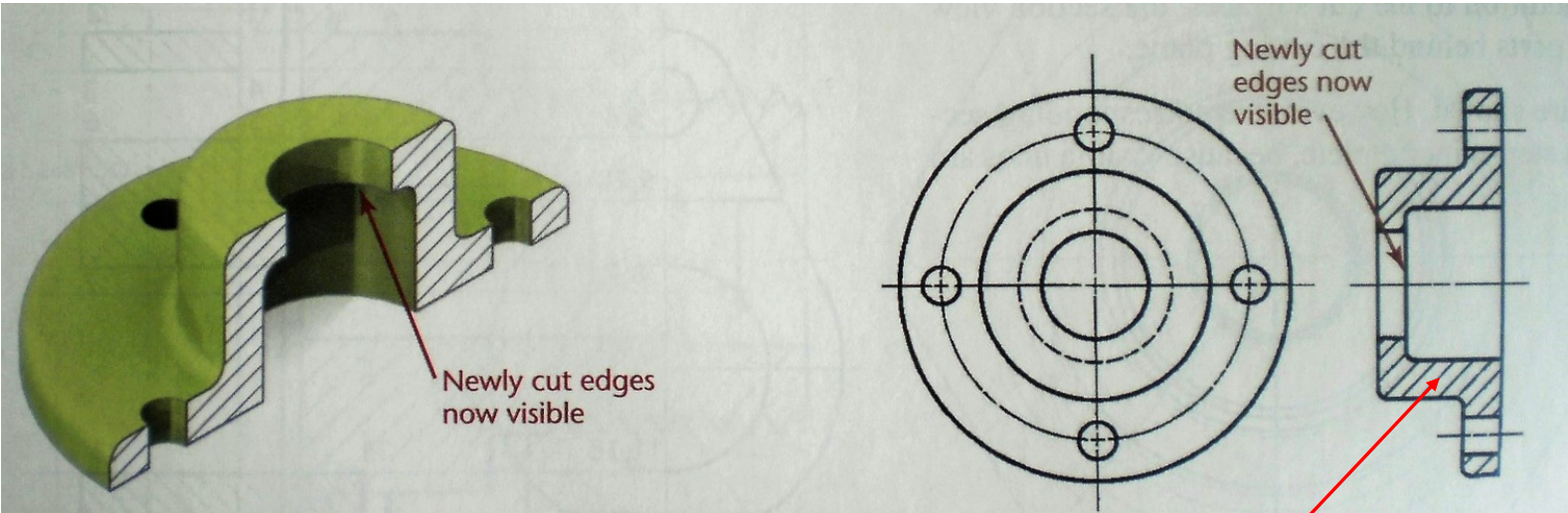


!!! ANSI !!!

OR

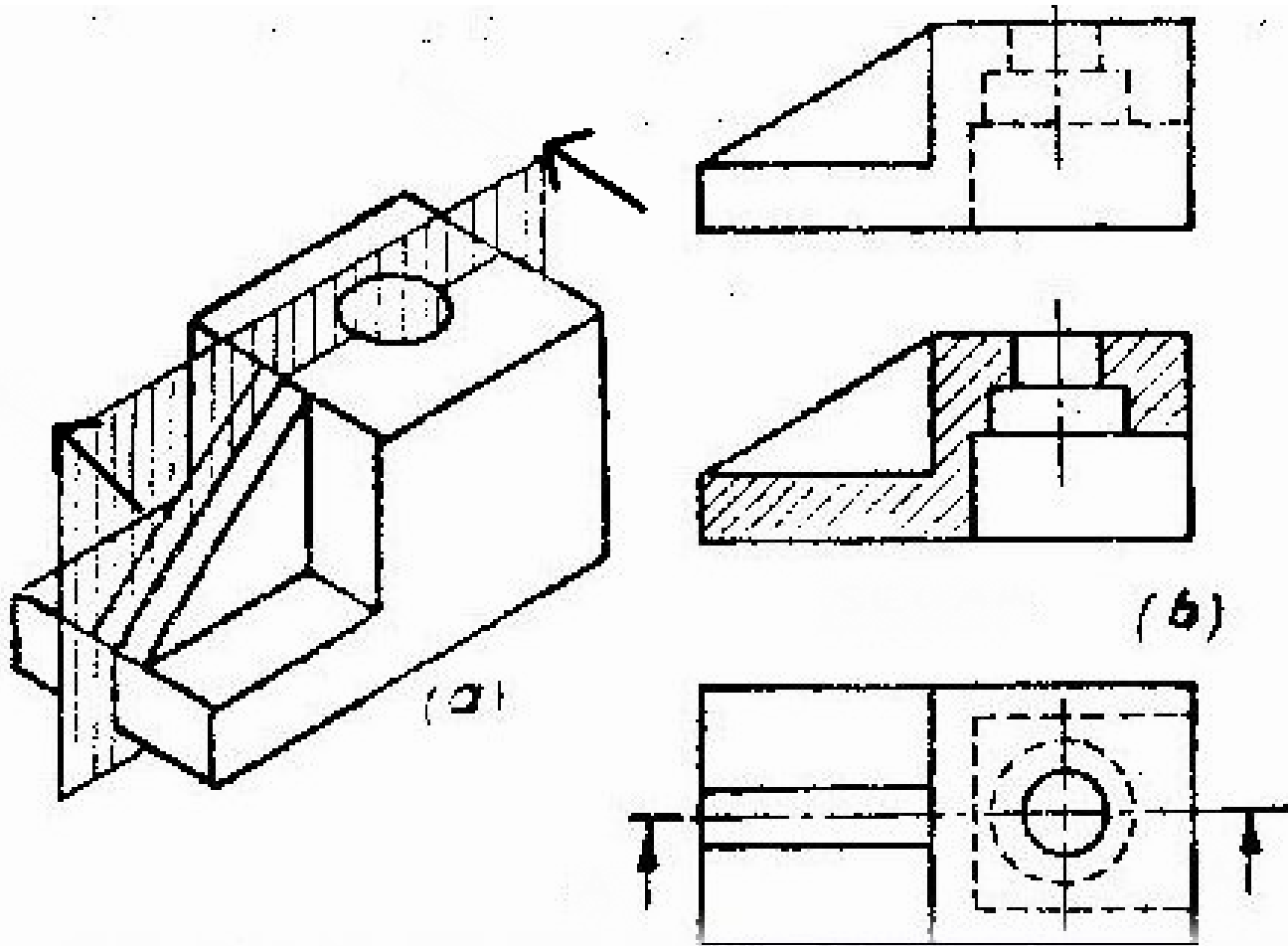


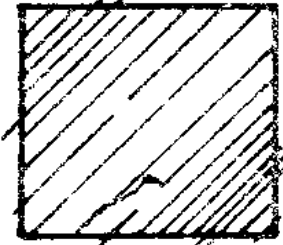
ISO rep.



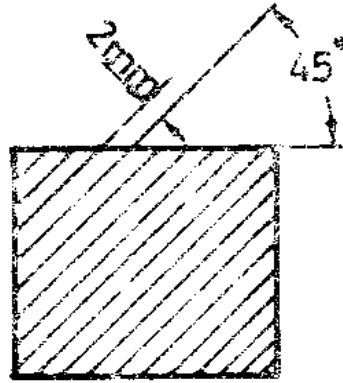
Section Lines: Cross-Hatching Lines

Full Sectional View





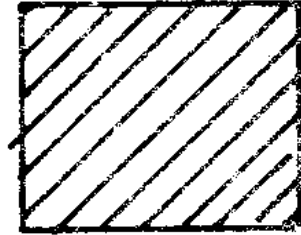
(a)
Incorrect



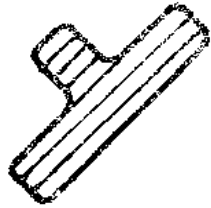
(b)
correct



(c)
Incorrect



(d)
Incorrect



poor practice

(e)



preferred



Poor practice

(f)

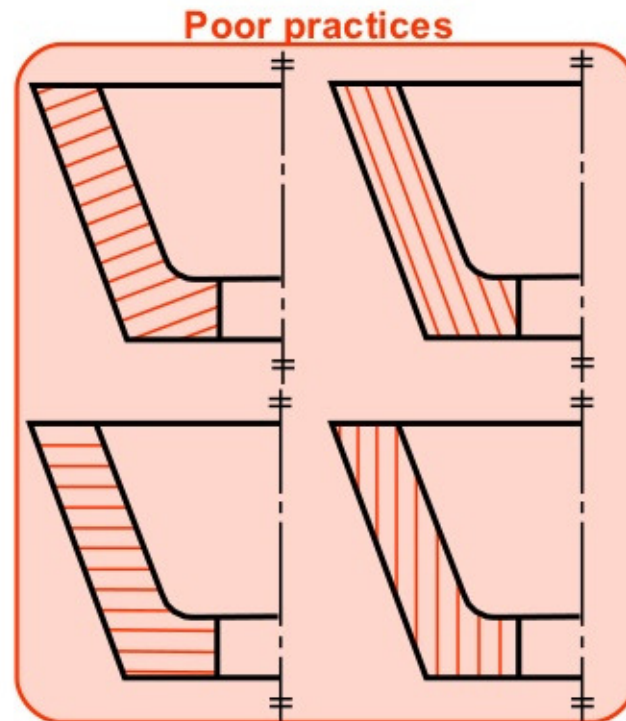
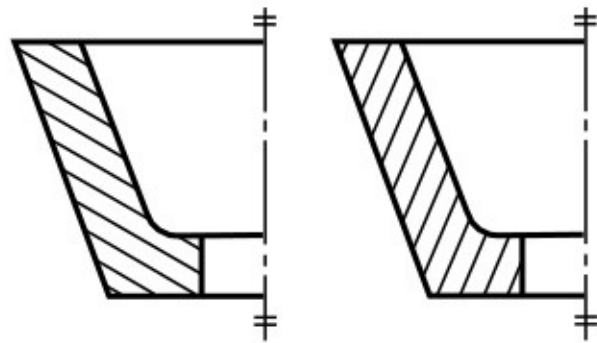


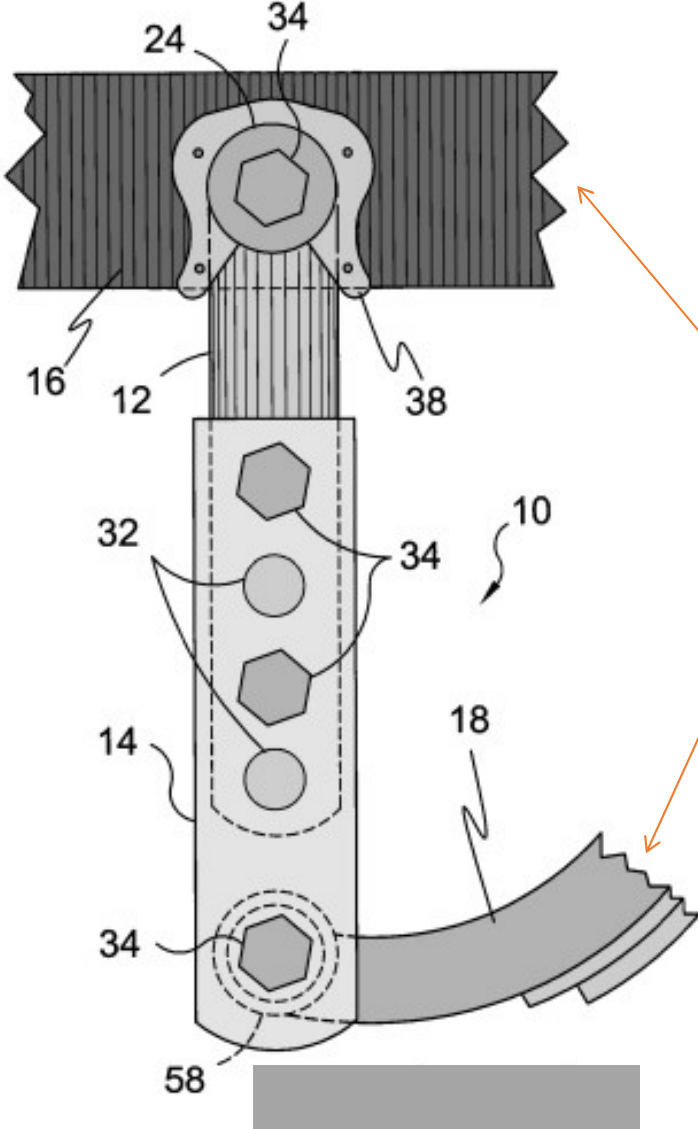
Preferred.

Section lining : Recommended practice 2

- It **should not** run *parallel* or *perpendicular* to contour of the view.

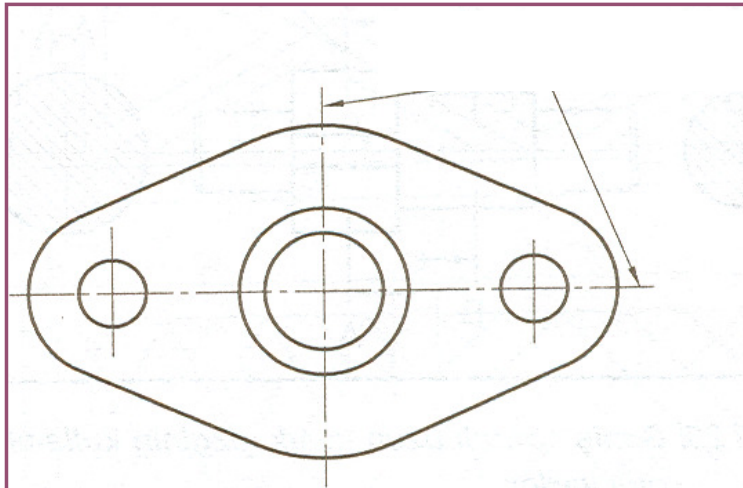
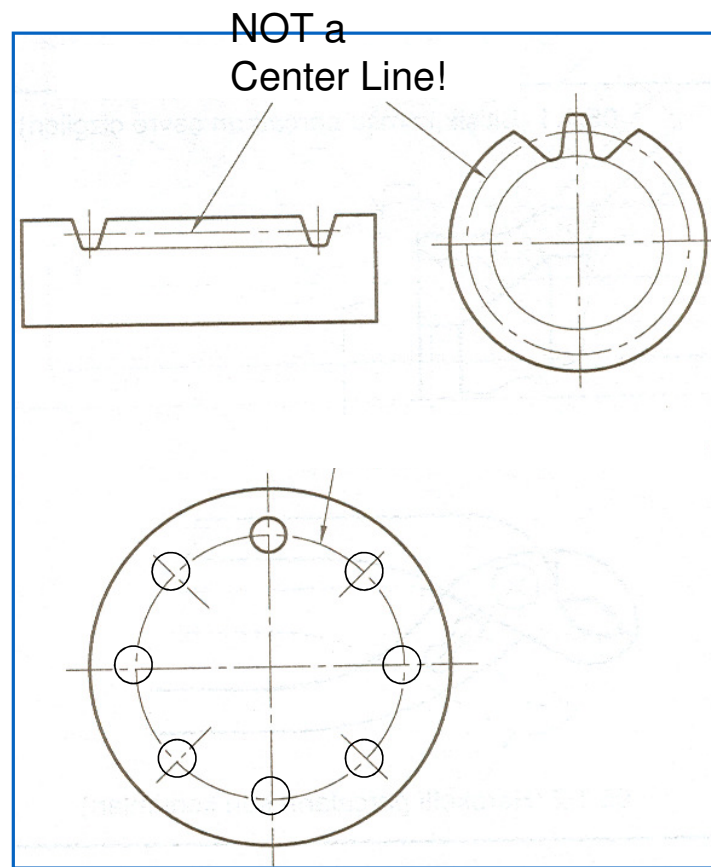
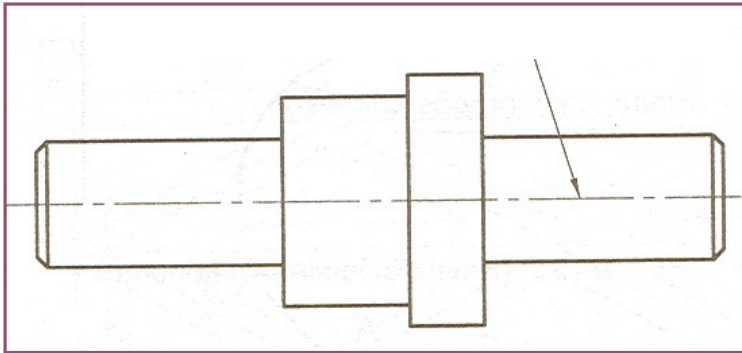
Examples



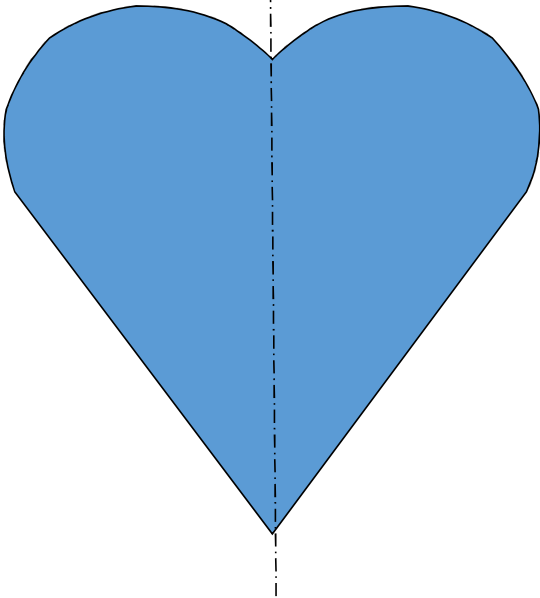
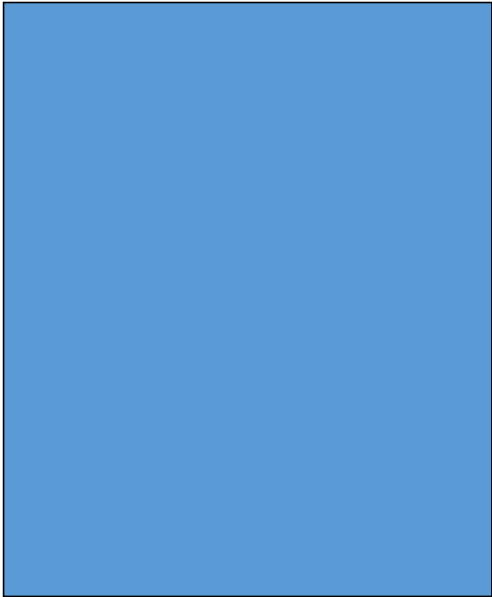


Break lines

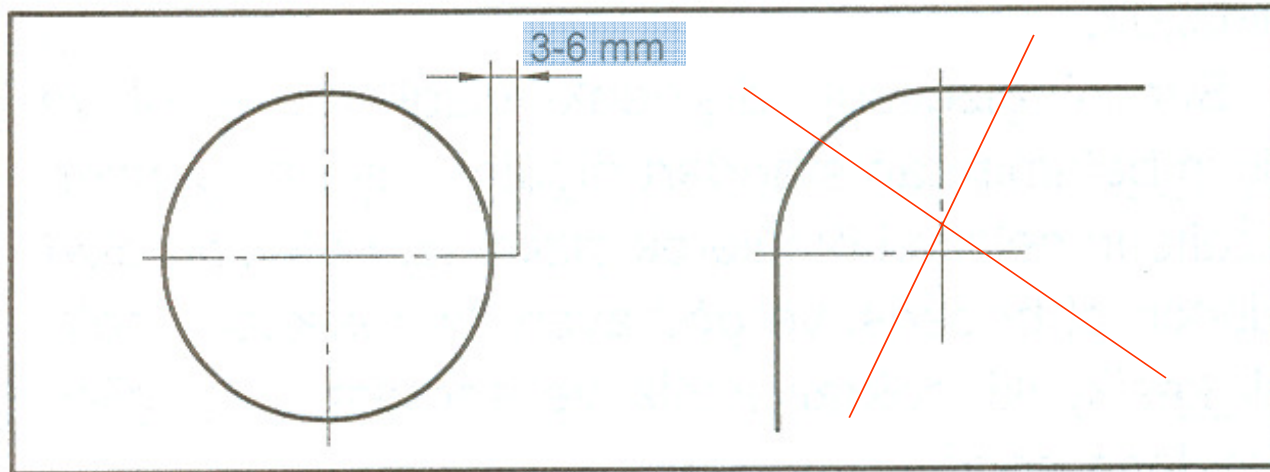
Center Line

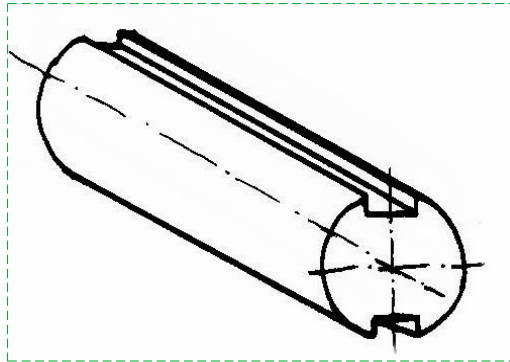


Show the axis of symmetry if the view has curved features

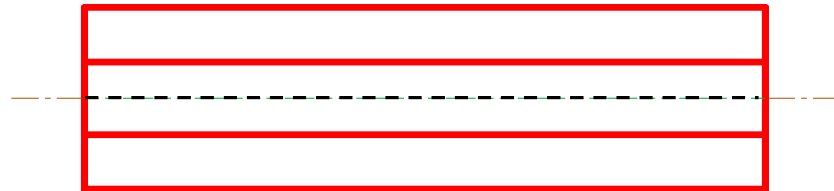
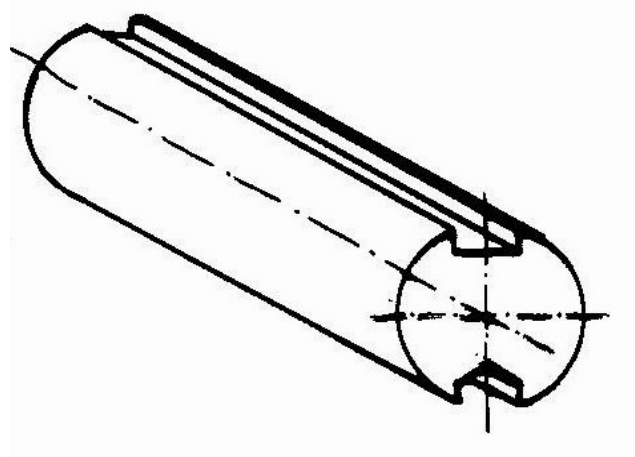


Details on Center Lines

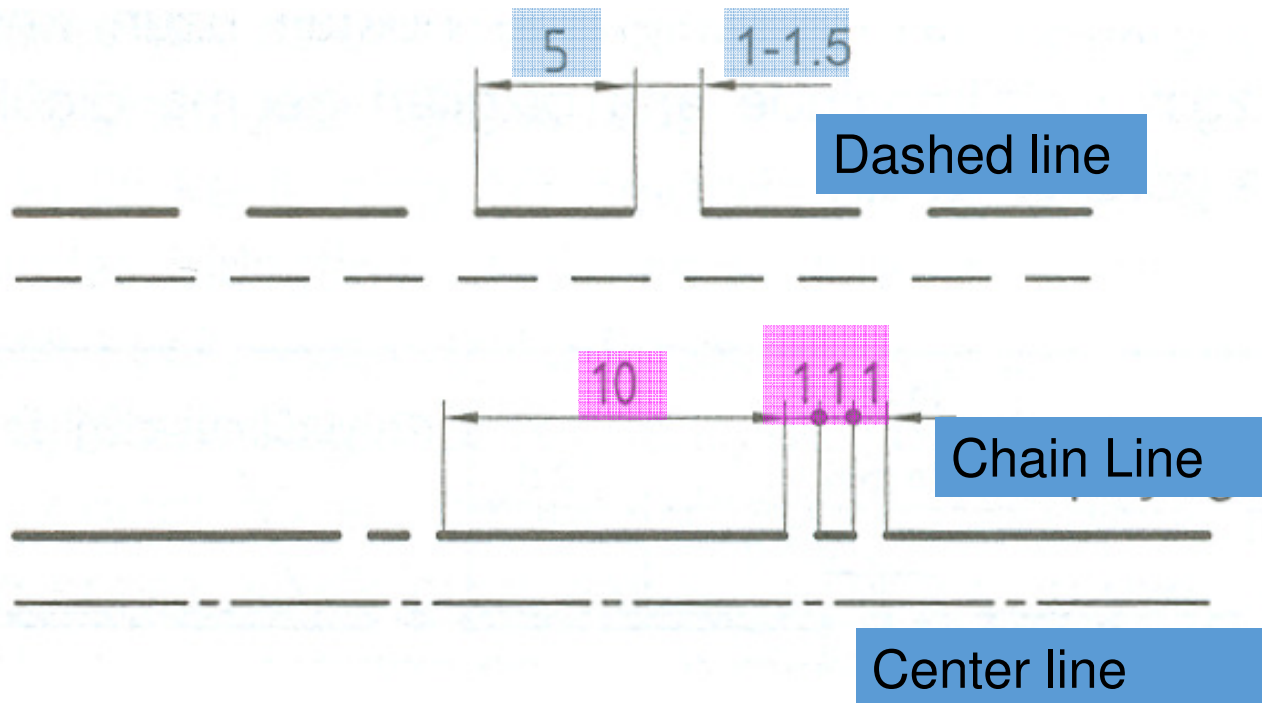


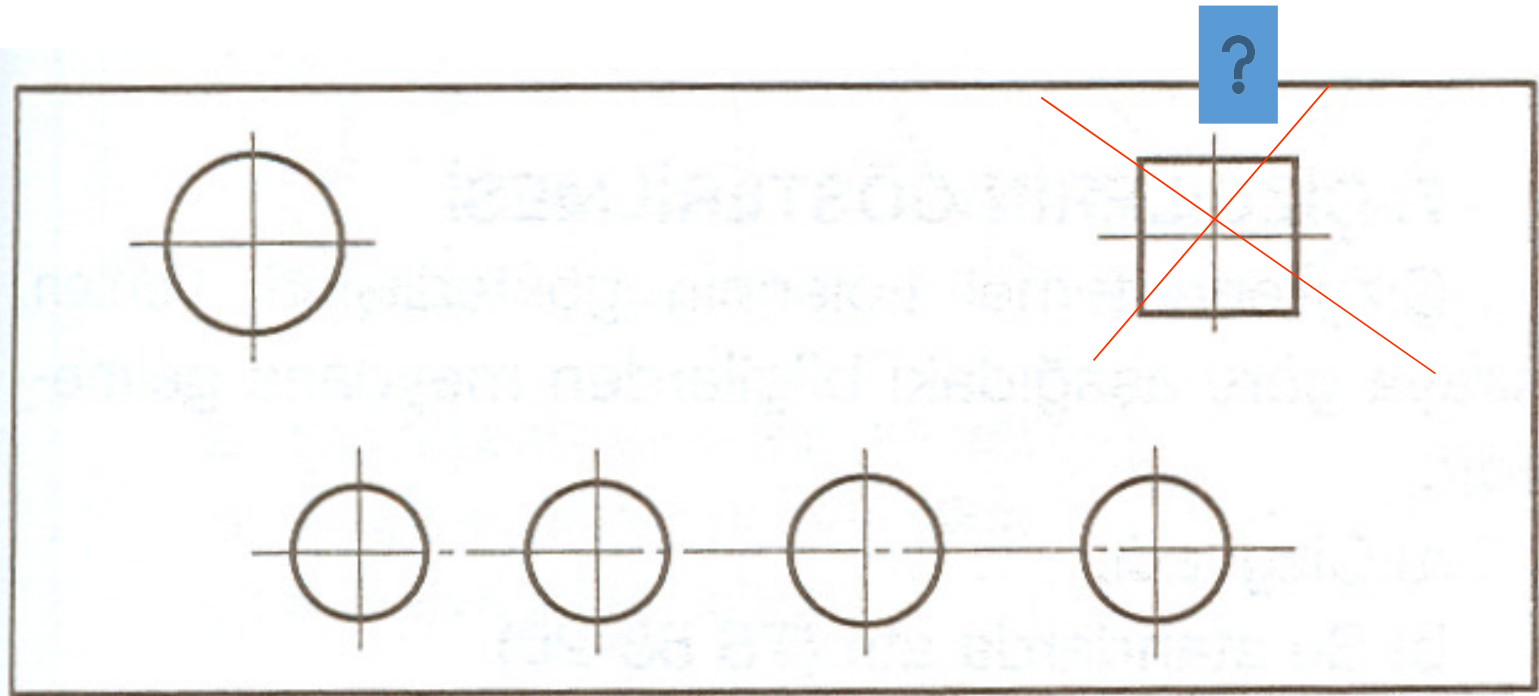


Priorities of Lines: 1. Visible Out Line 2. Hidden Line 3. Center Line

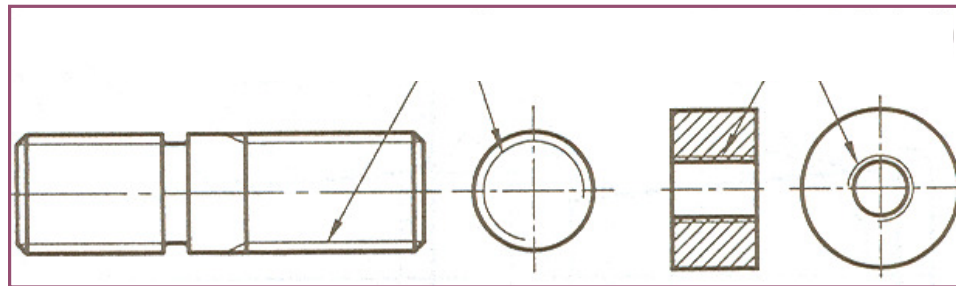
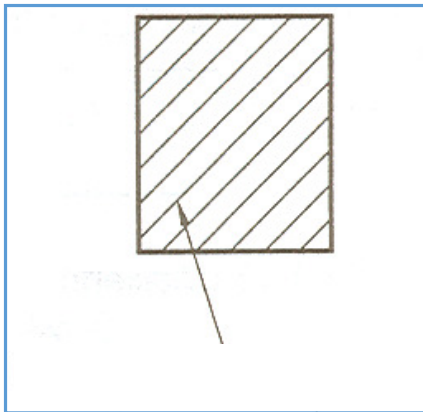
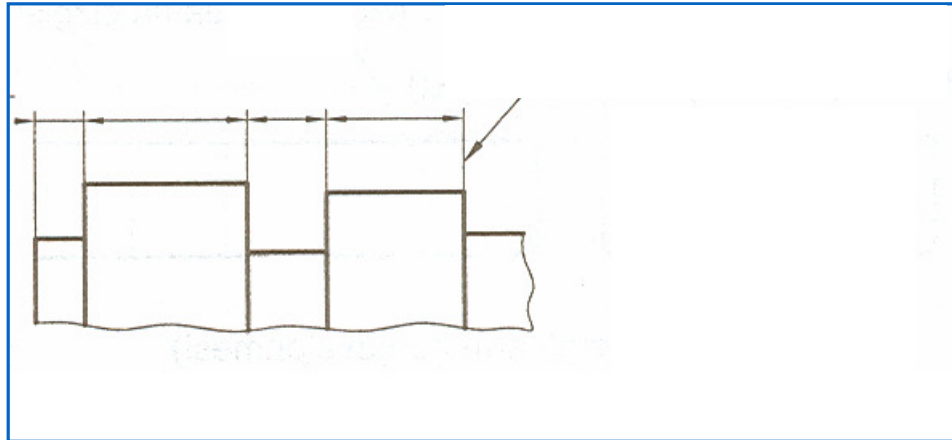
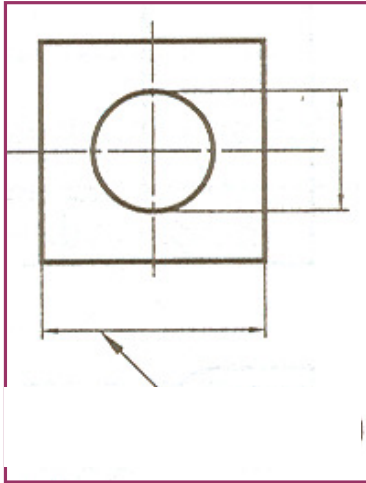


Lengths of Dashes

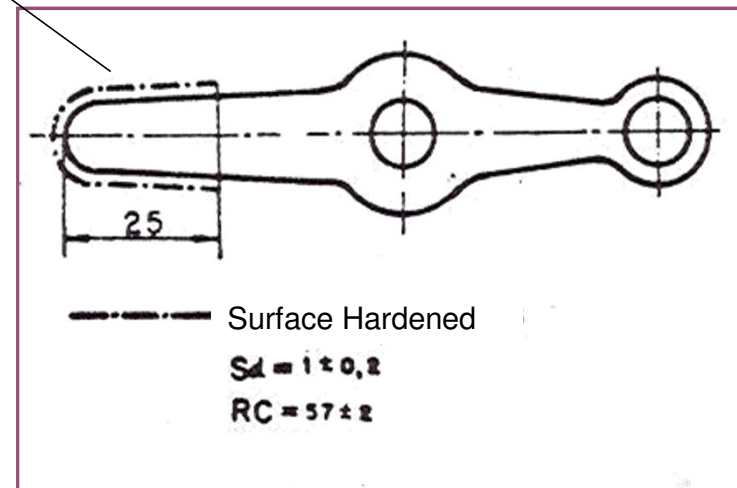
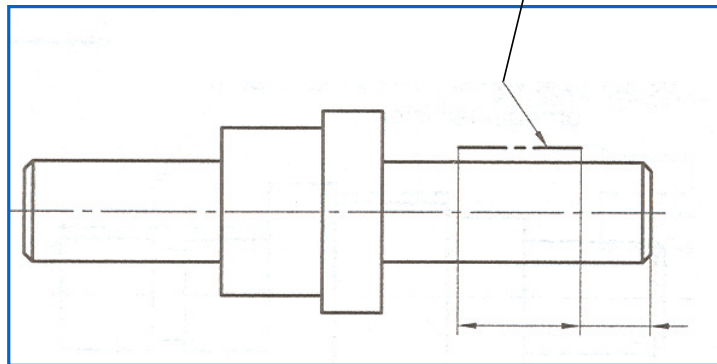




Construction Line, Extension Line, Dimension Line, Cross-Hatching Line, Guide Line



Chain Line



Line Quality

(Some details in board-pencil drawing)

