



SNS COLLEGE OF TECHNOLOGY



(An Autonomous Institution)

19MEB202- Computer Aided Machine Drawing



Tables



10 millimetres (mm) = 1 centimetre (cm)

10 centimetres (cm) = 1 decimetre (dm)

10 decimetre (dm) = 1 metre (m)

10 metres (m) = 1 decametre (dam)

10 decametre (dam) = 1 hectometre (hm)

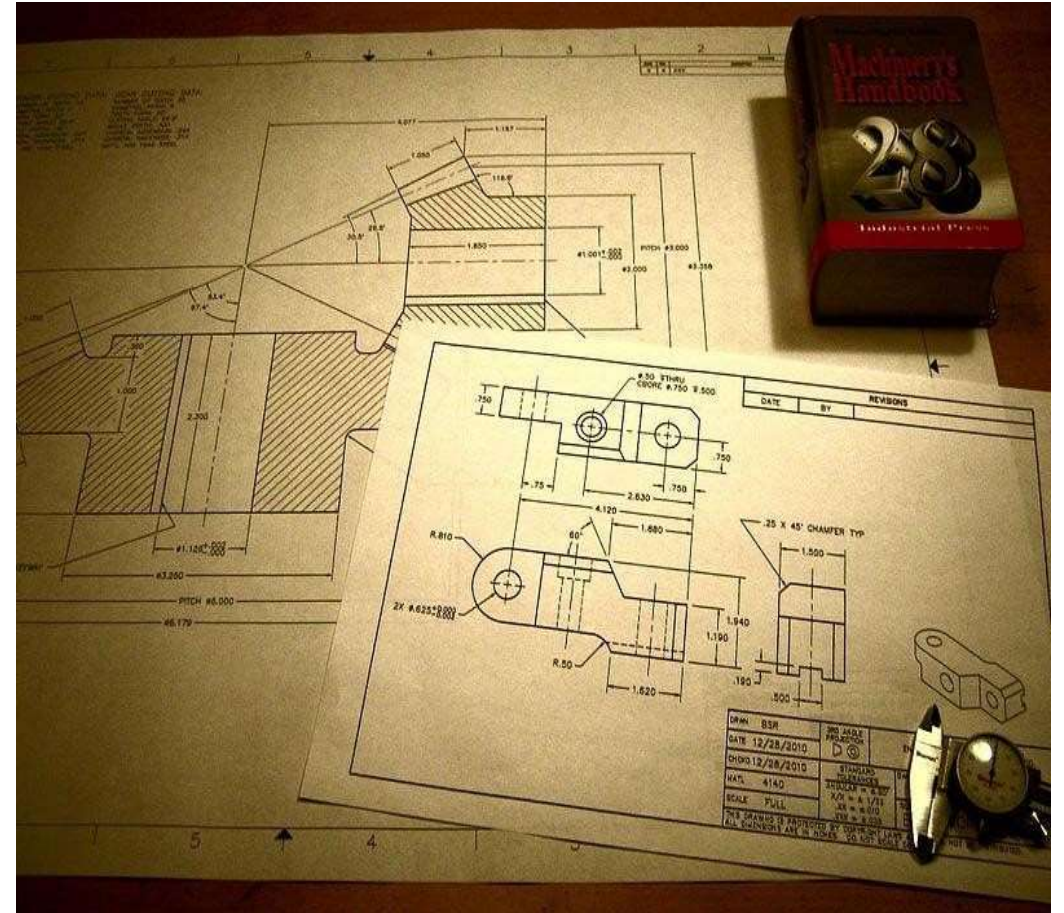
10 hectometres (hm) = 1 kilometre (km)

1 hectare = 10,000 m²



Engineering drawings

- An Engineering Drawing is a drawing which clearly defines and communicates a design of a part or a component or a view to other person
- It is the **Universal Language** of Engineers
- The ability to read drawing is the most important requirement of all technical people in any profession





Drawing Instrument and Aids

The Instruments and other aids used in drafting work are listed below:

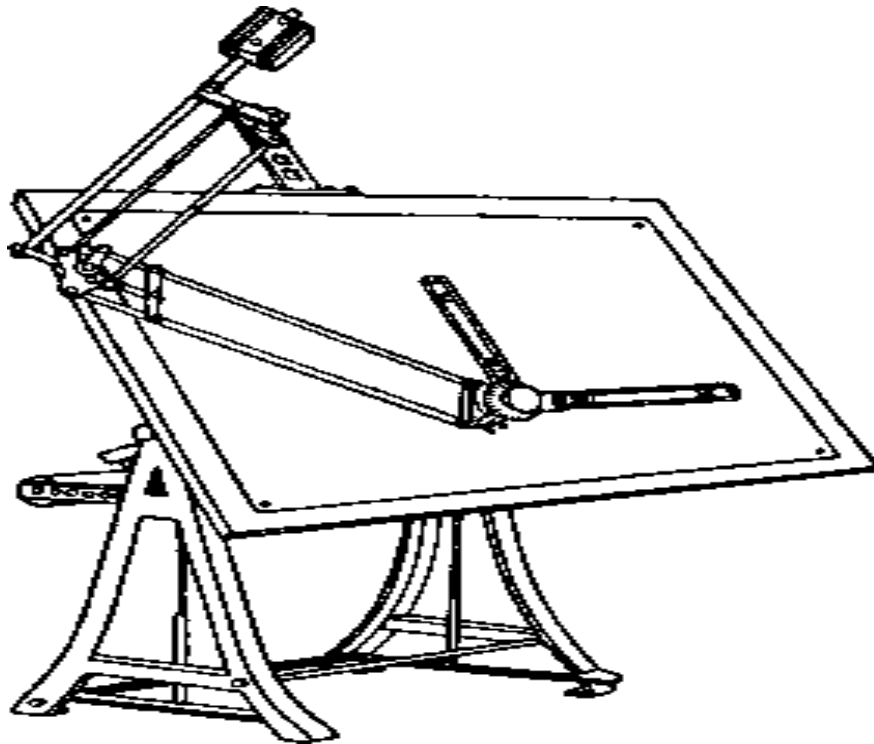
1. Drawing board
2. Mini drafter
3. Instrument box
4. Set squares
5. Protractor
6. Set of scales
7. French curves
8. Drawing sheets
9. Pencils
10. Templates





Drawing Board

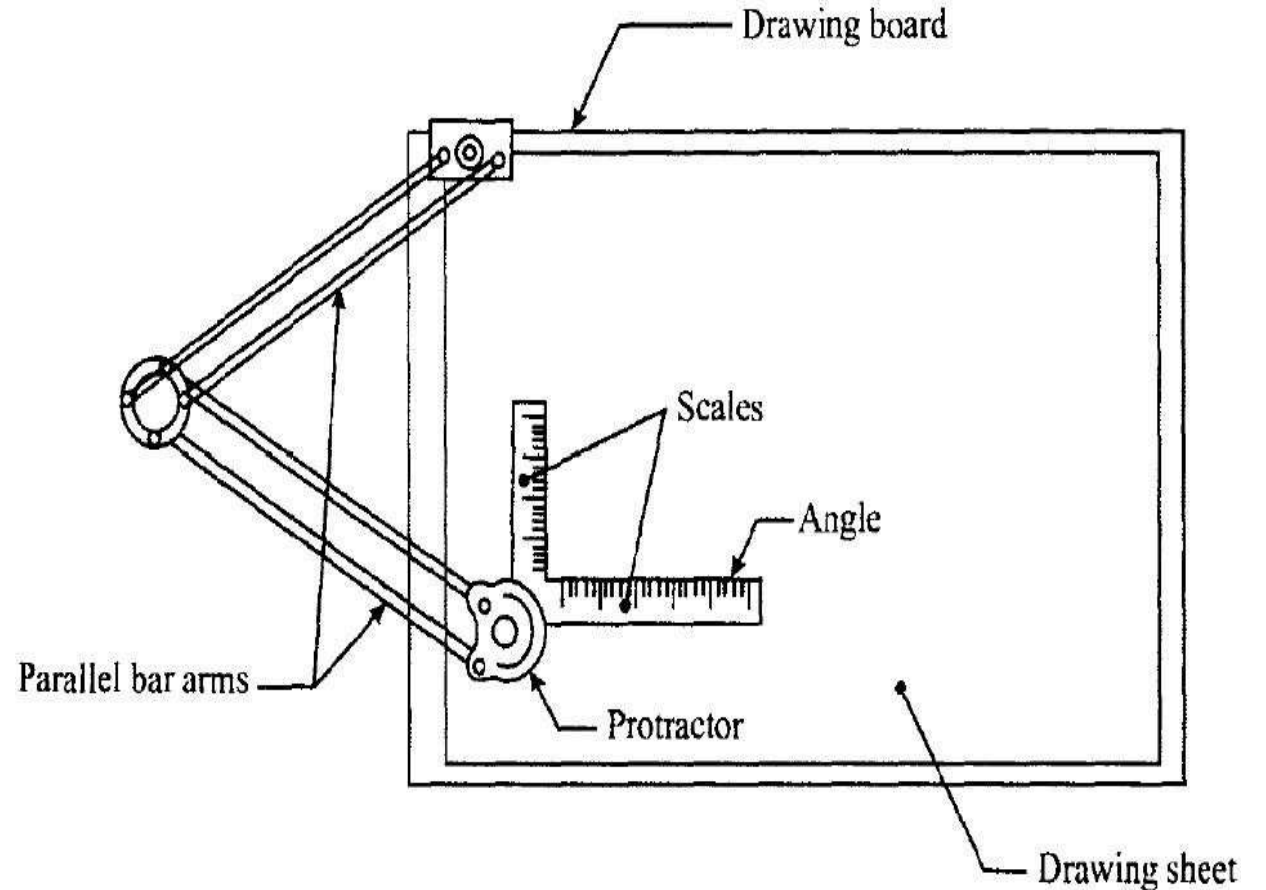
- seasoned softwood of about 25 mm thick with a working edge for T-square or Mini-drafter
- Standard size depends on the size of the drawing sheets used





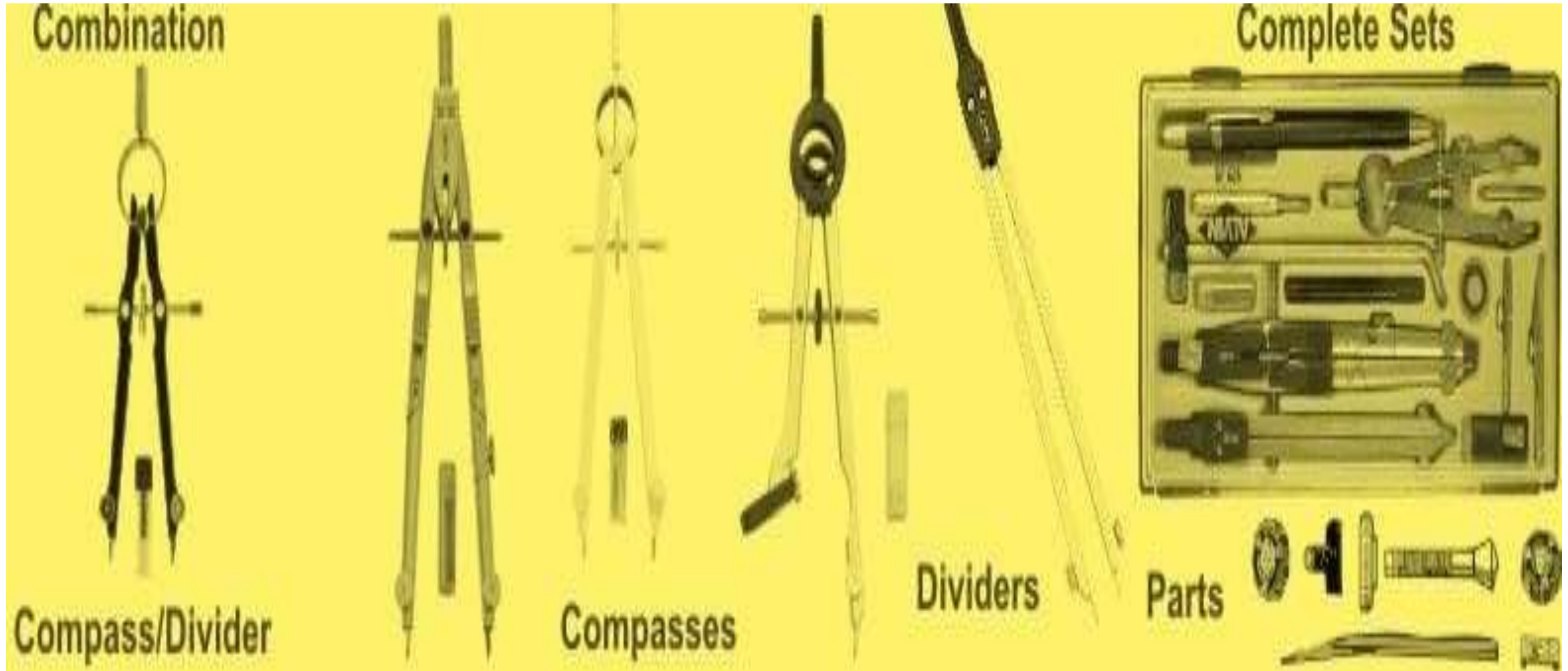
Mini-drafter

- Two parallel bars hinged and form a link
- Combined use of T-square, protractor, set-square
- drawing horizontal, vertical and inclined lines, parallel and perpendicular lines and for measuring lines and angles.





Instrument box



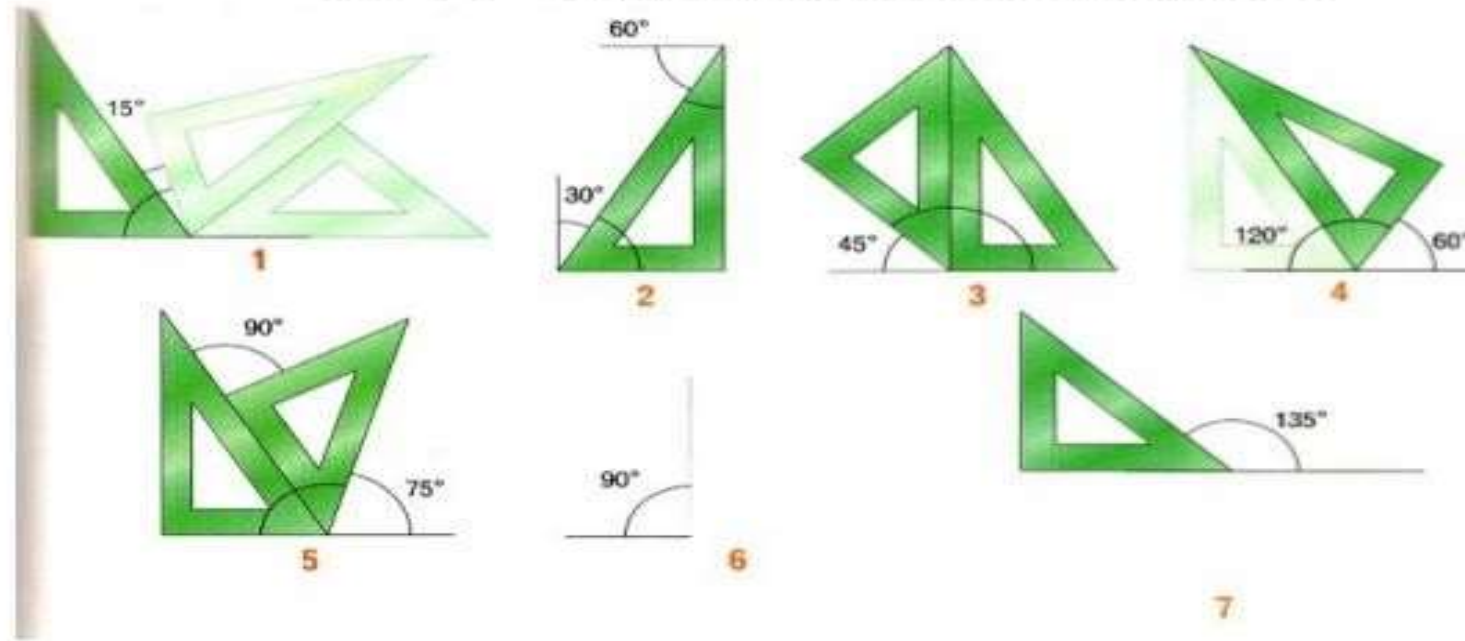


Set Squares



How to use drawing tools

Drawing angles: we can get 15° , 30° , 45° , 60° , 75° , 90° , 120° , 135° ...angles by combining the 30° , 45° , 60° and the 90° angles from the set squares





Clips & Adhesive Tapes





Protractor, Scales, & Erasers



TECHNICAL DRAWING TOOLS



Compass



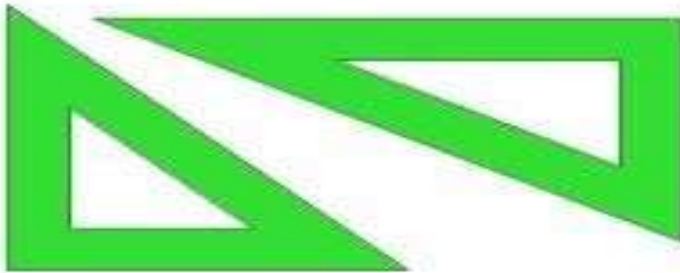
Eraser



Propelling pencil



Leads



Set Square rules



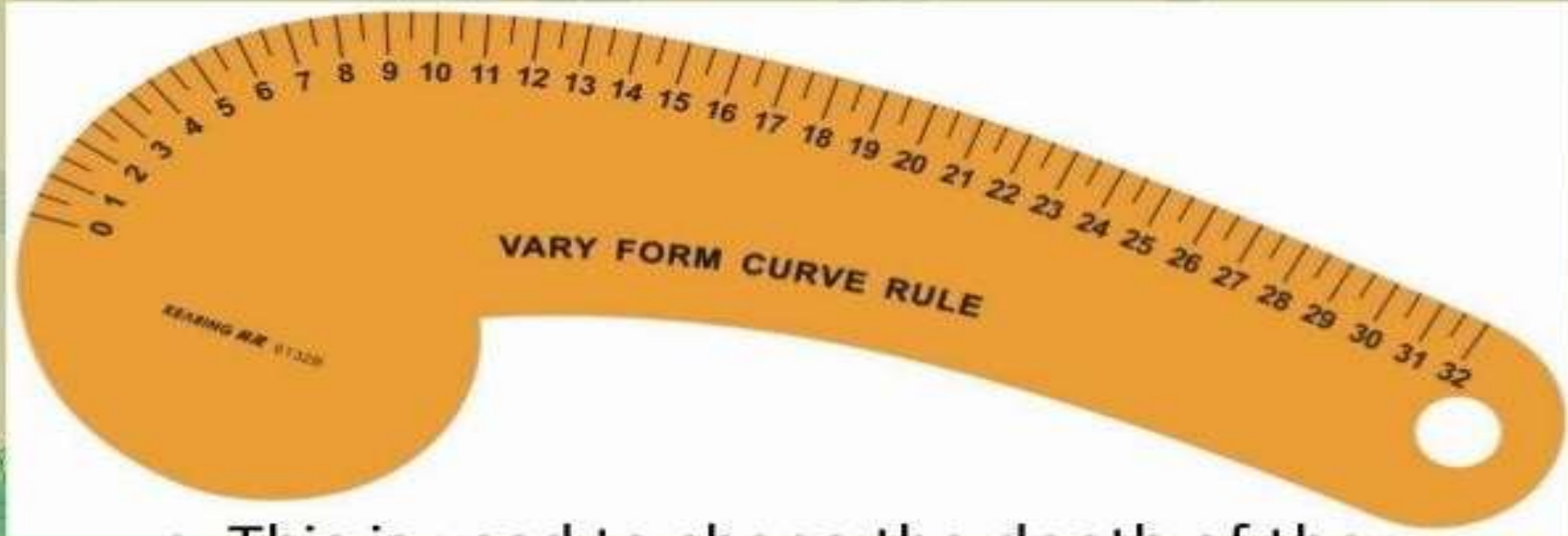
Protractor

Ruler





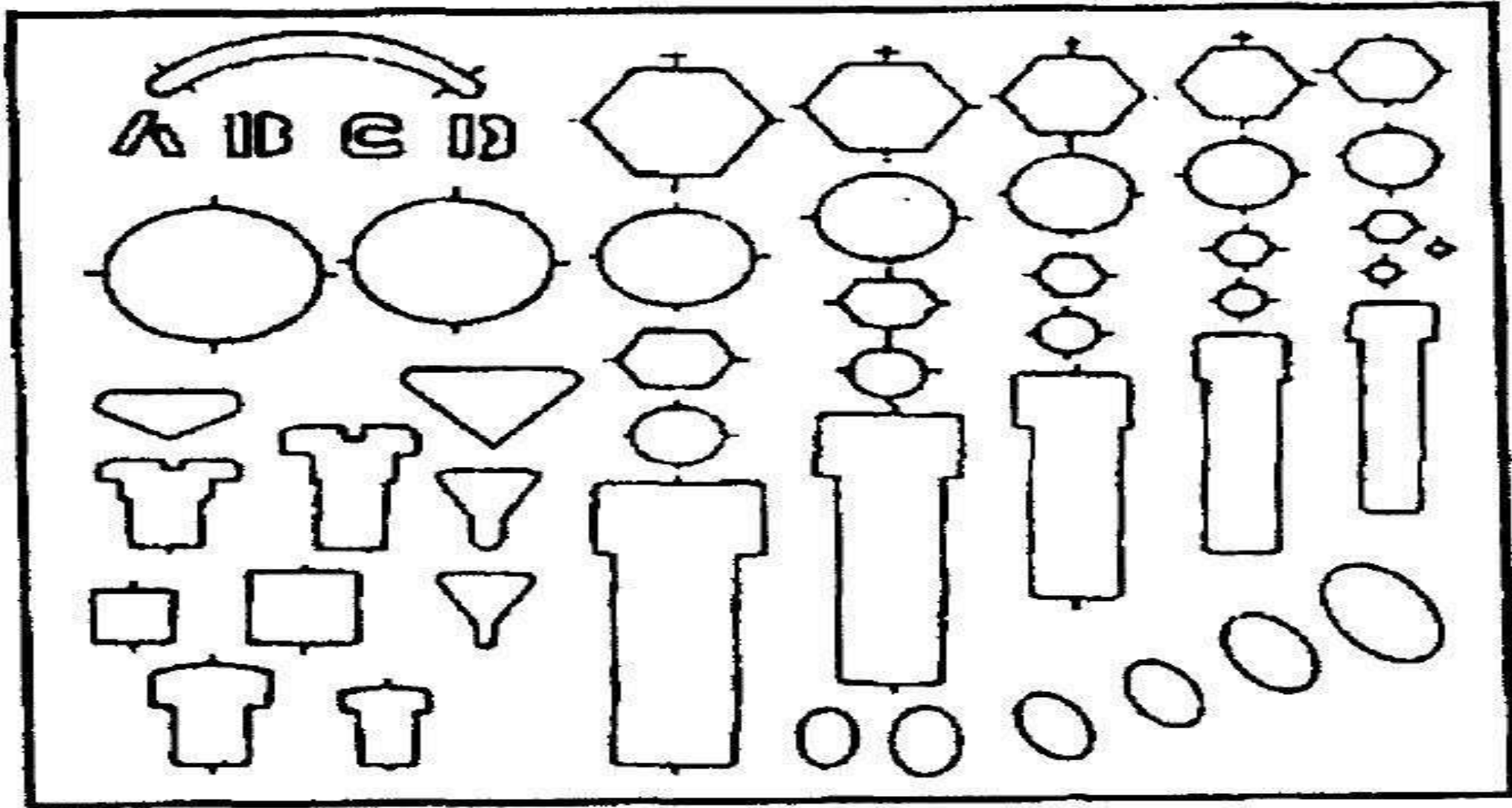
FRENCH CURVE



- This is used to shape the depth of the neck hole and armhole of the pattern.

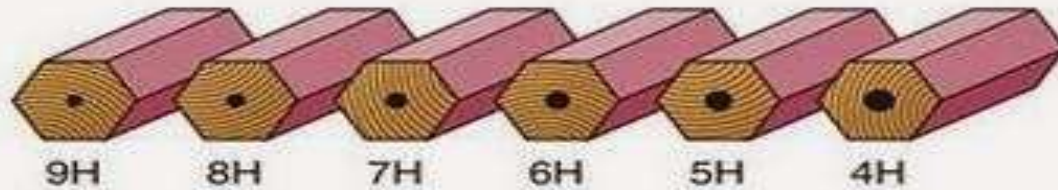


Template



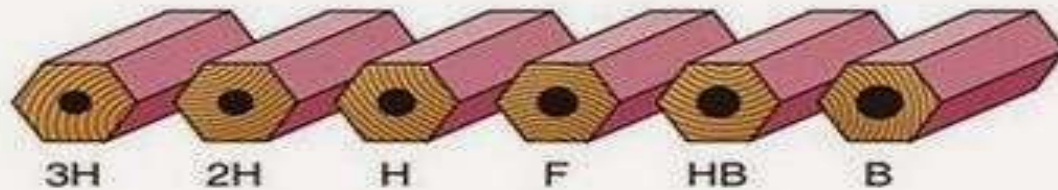


Pencil Grades



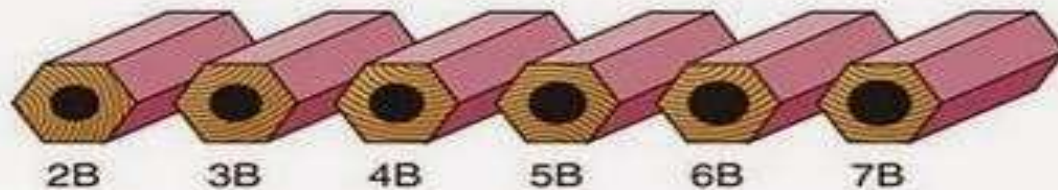
HARD

The hard leads are used for construction lines on technical drawings.



MEDIUM

The medium grades are used for general use on technical drawings. The harder grades are for instrument drawings and the softer for sketching.



SOFT

Soft leads are used for technical sketching and artwork but are too soft for instrument drawings.



Pencils



- Different grades and hardness were available
- According to the hardness or softness of the lead is mentioned by 3H, 2H, H, HB, B, 2B, 3B, etc.,



Drawing Sheet



Designation

A0

A1

A2

A3

A4

Dimension in mm

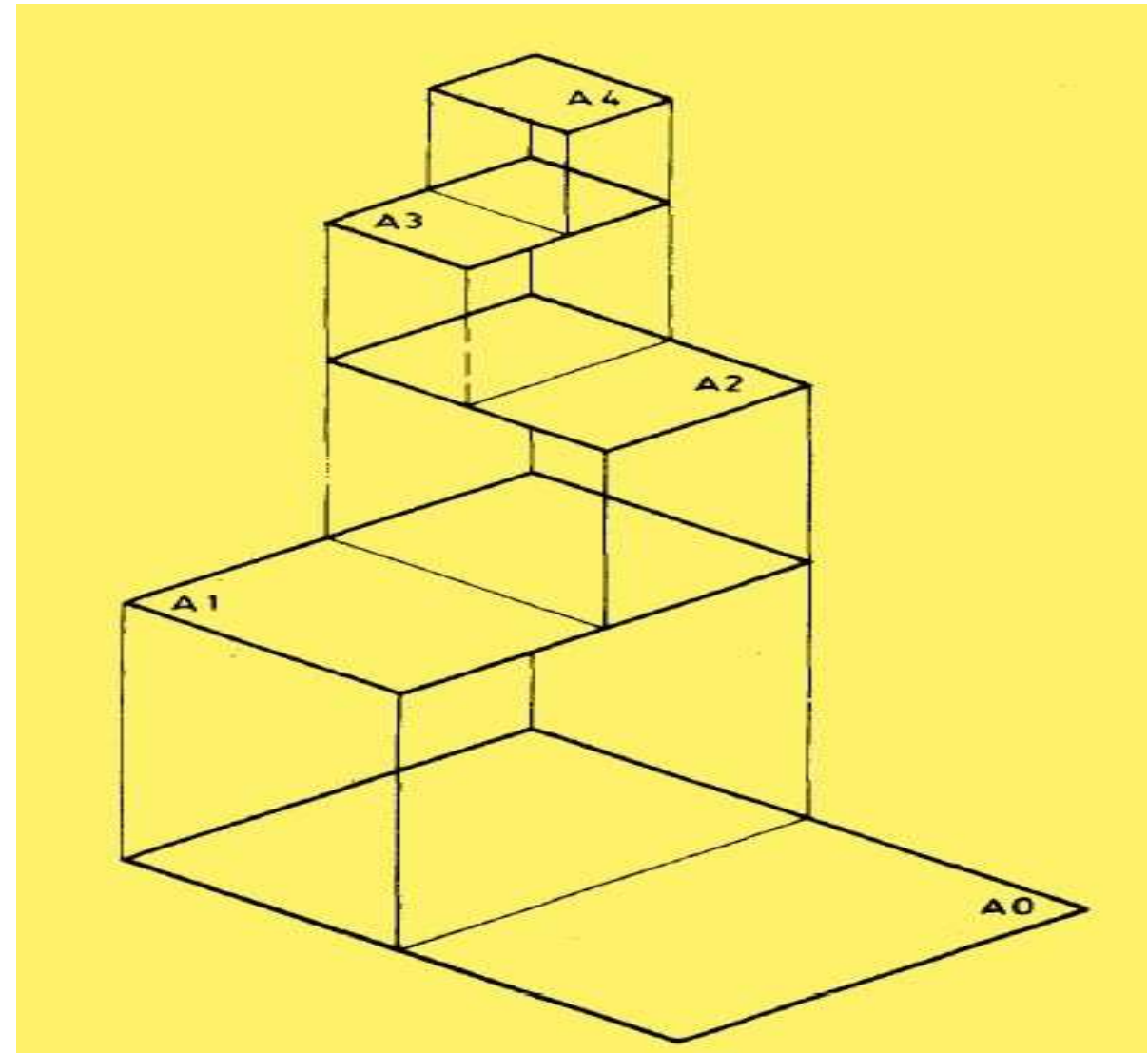
841 X 1189

594 X 841

420 x 594

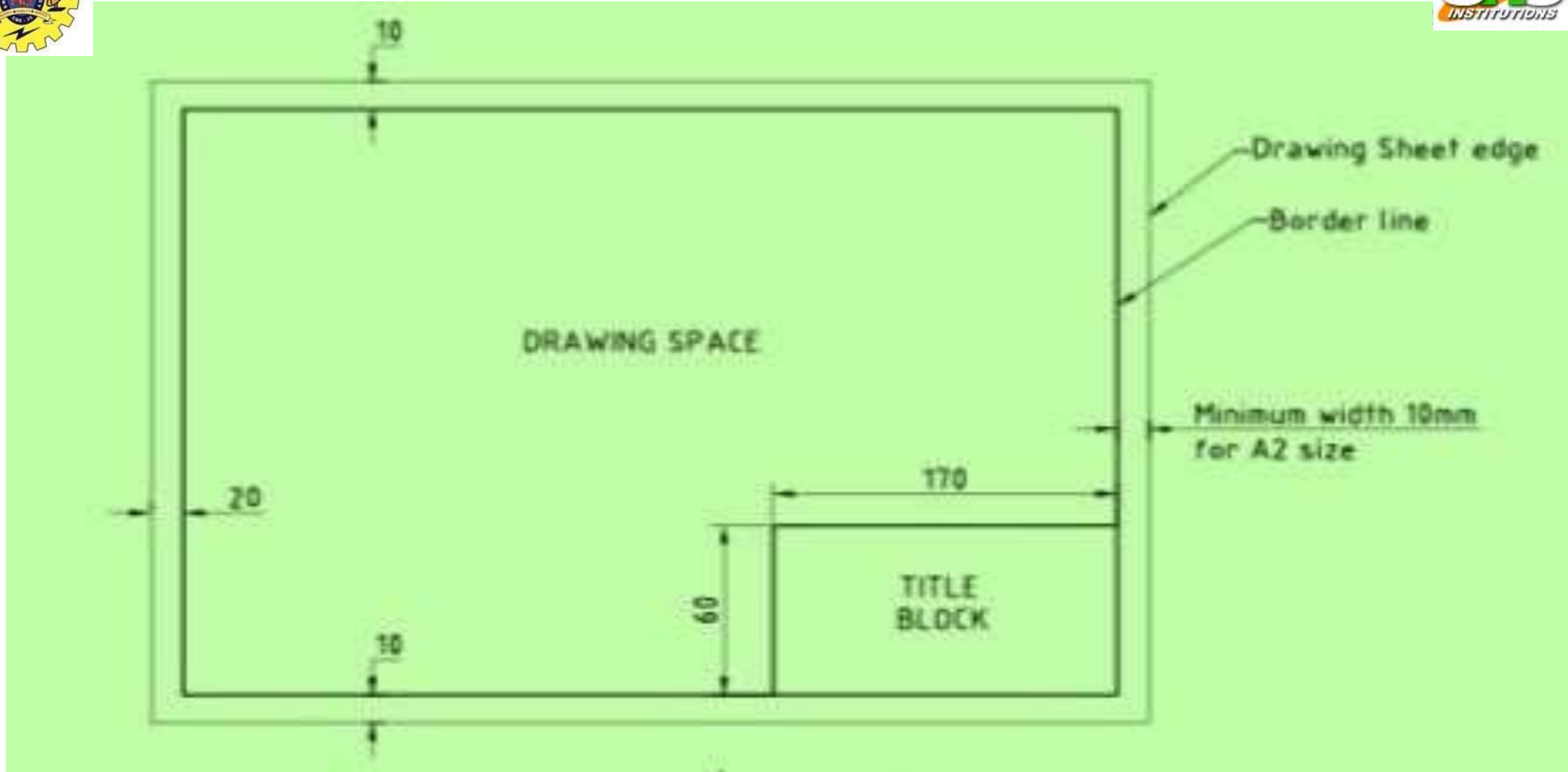
297 X 420

210 x 297





Drawing Sheet





Title Block



	DATE	SIGN	COLLEGE NAME	
STD.			COLLEGE NAME	
FAIR			COLLEGE NAME	
COMP.			SHEET NAME	
STUDENT NAME			SHEET NAME	
SEMESTER			SHEET NAME	
ENROLLMENT NO.			SYMBOL	DRG. NO.
SCALE				



Types of Lines



Object line



Hidden line



Center line



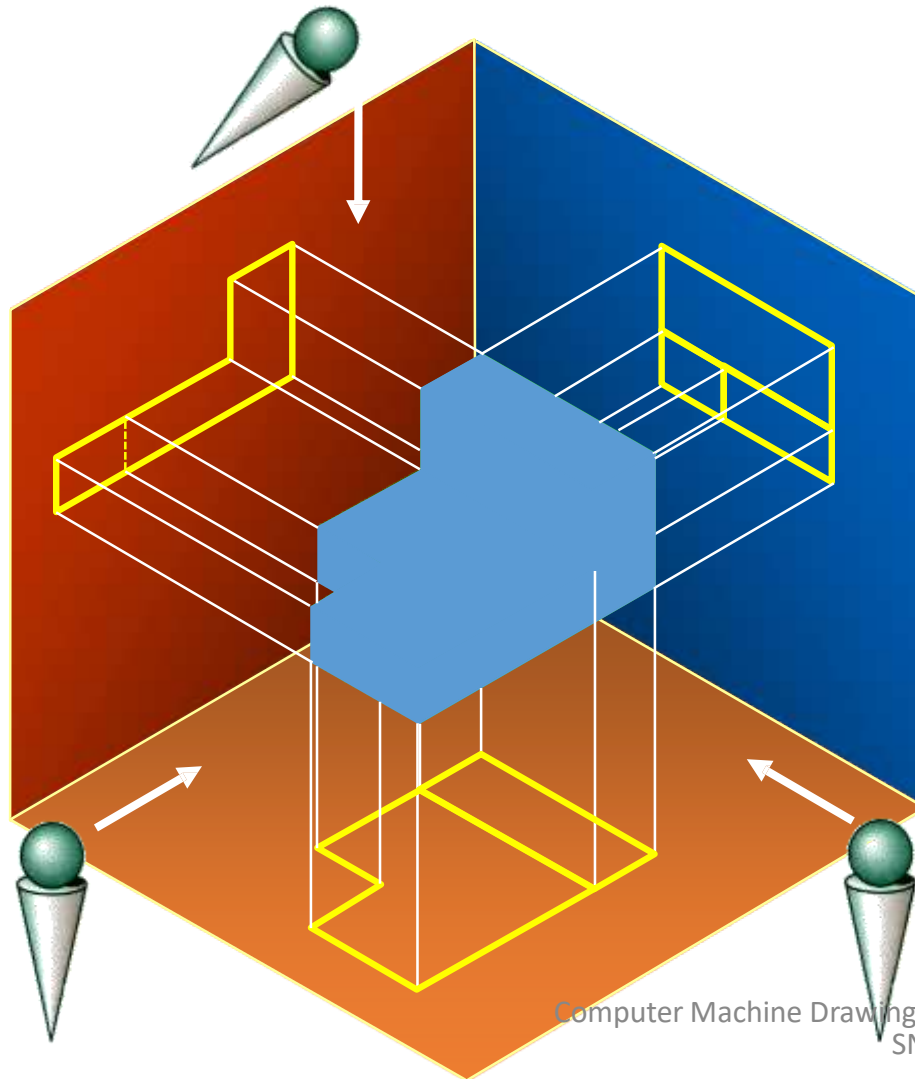
Dimension line



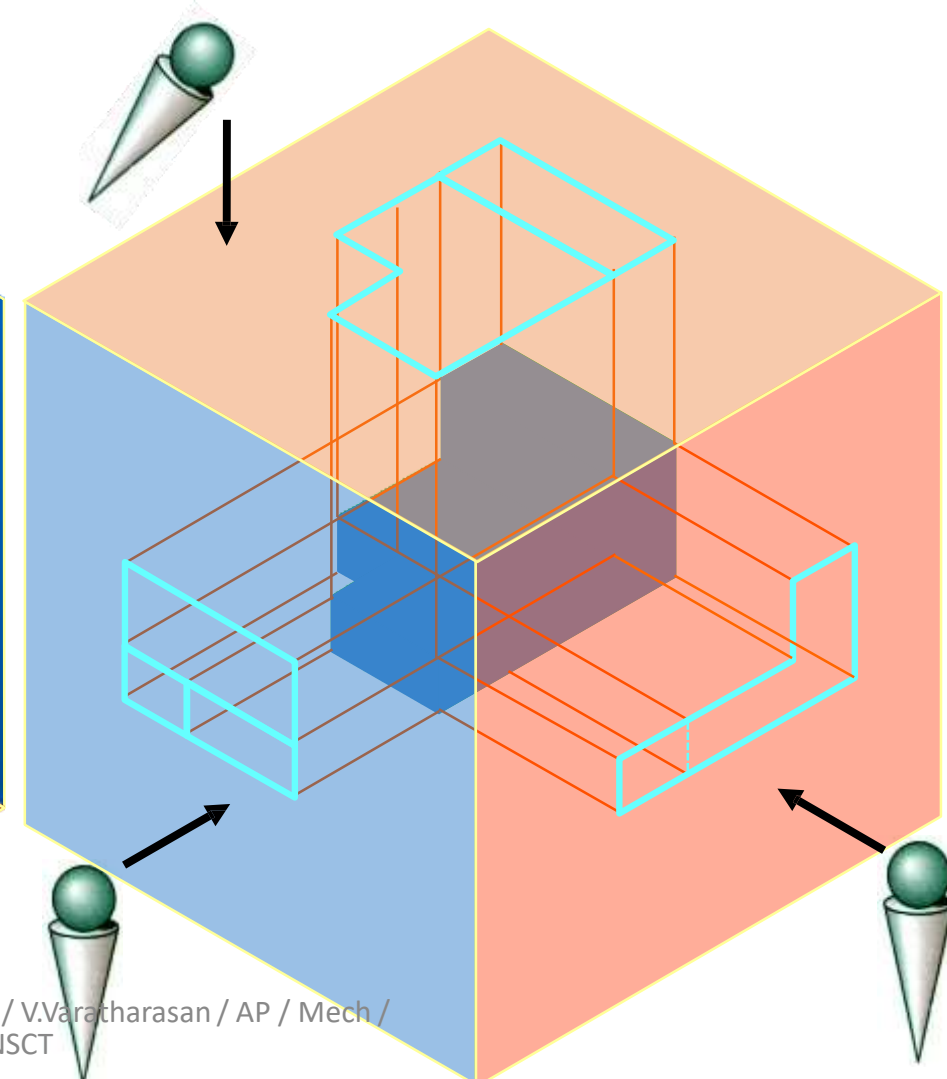
ORTHOGRAPHIC PROJECTION



1st angle system



3rd angle system

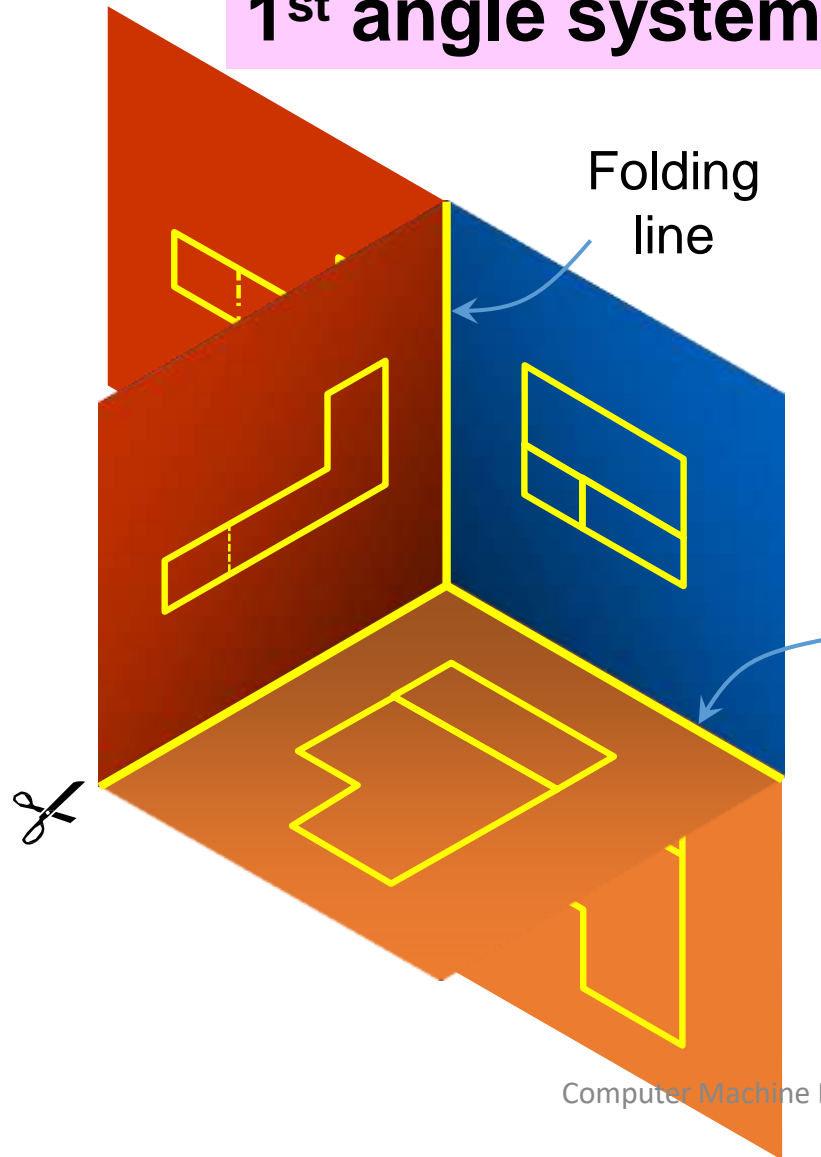




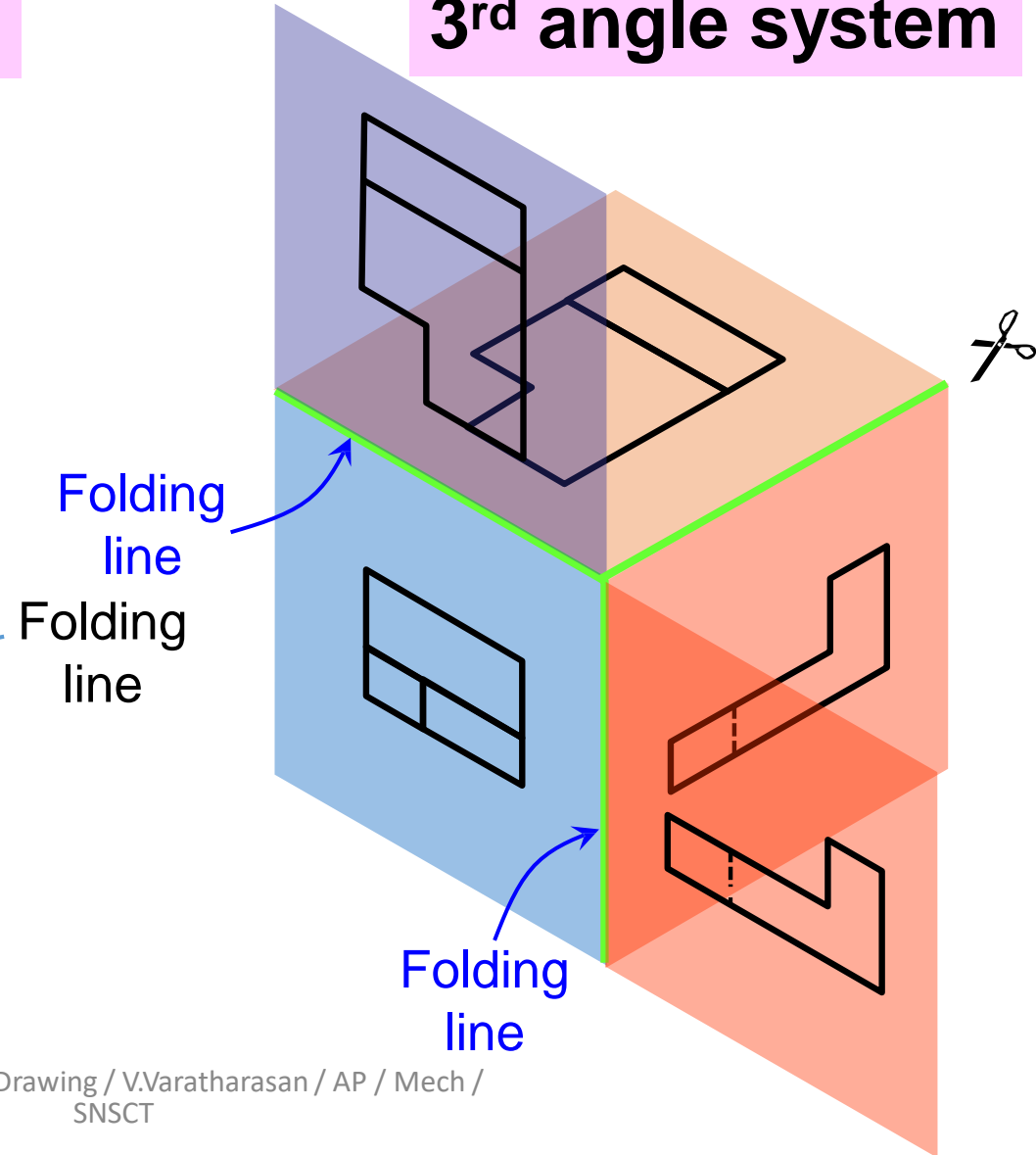
ORTHOGRAPHIC VIEWS



1st angle system



3rd angle system



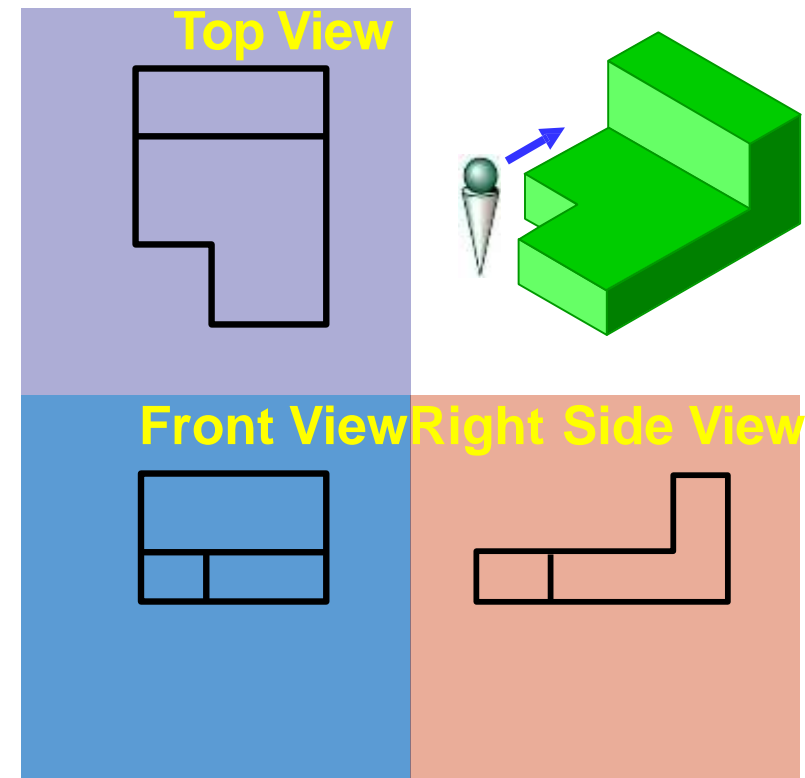
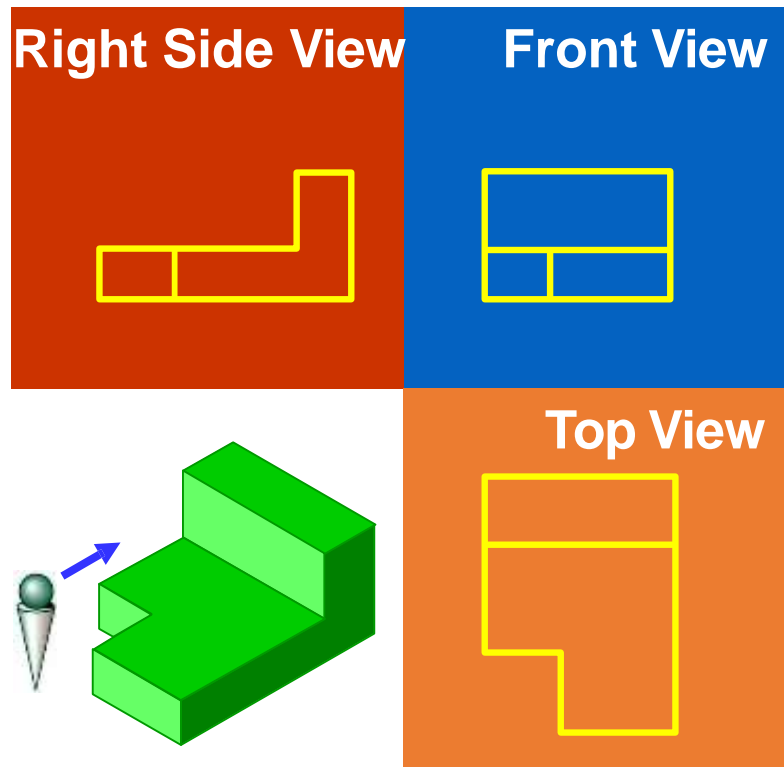


ORTHOGRAPHIC VIEWS



1st angle system

3rd angle system

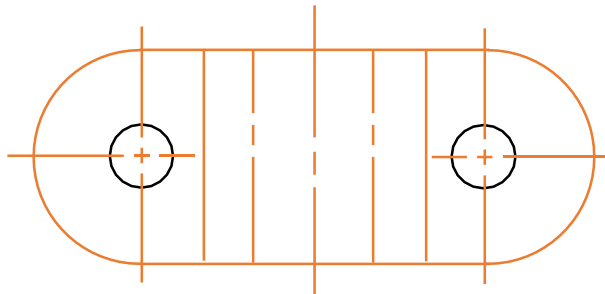
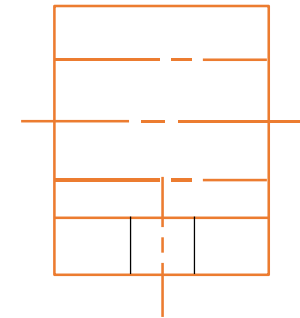
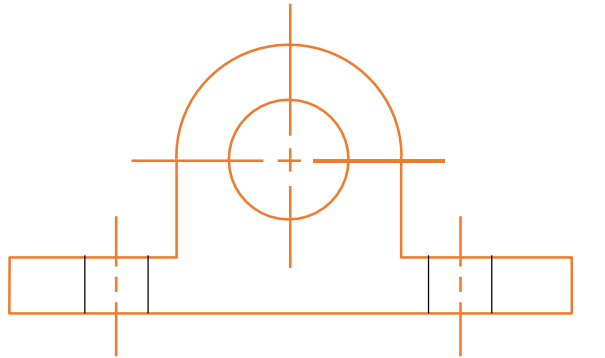
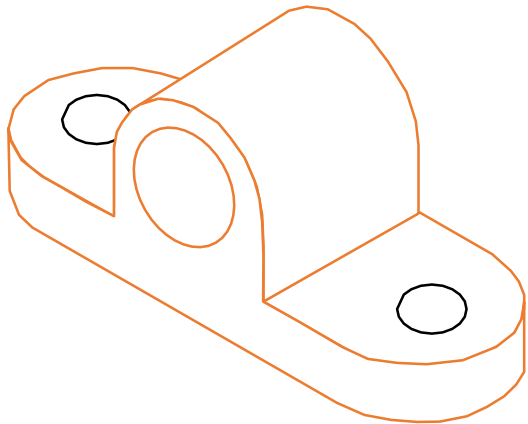




TWO-VIEW DRAWING



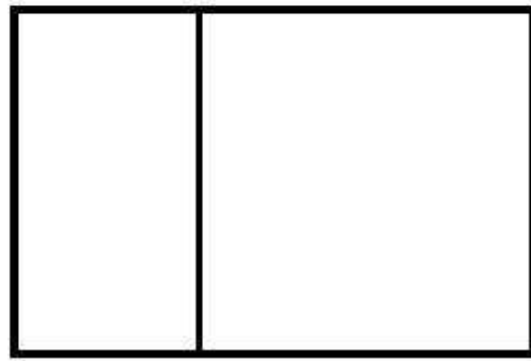
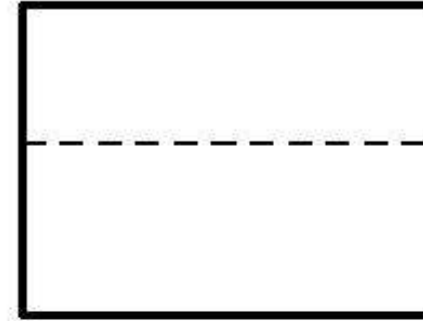
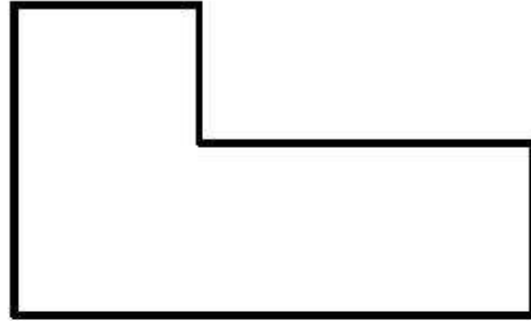
- The 3rd view has no significant contours of the object.





First Angle Projection

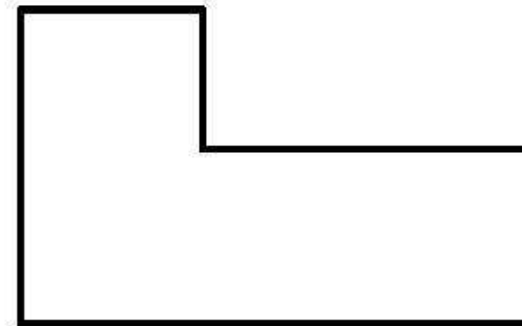
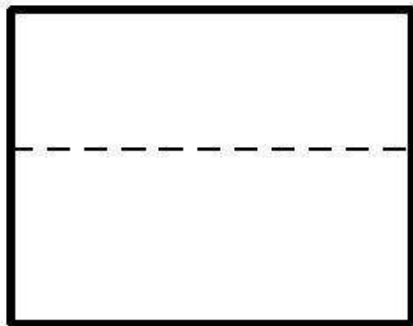
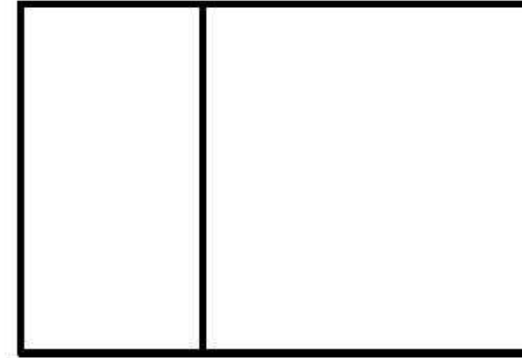
First Angle Projection





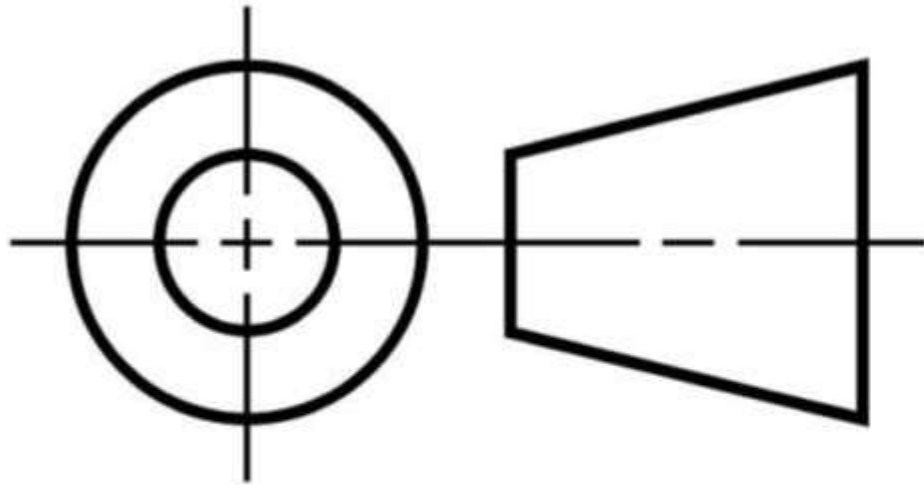
Third Angle Projection

Third Angle Projection

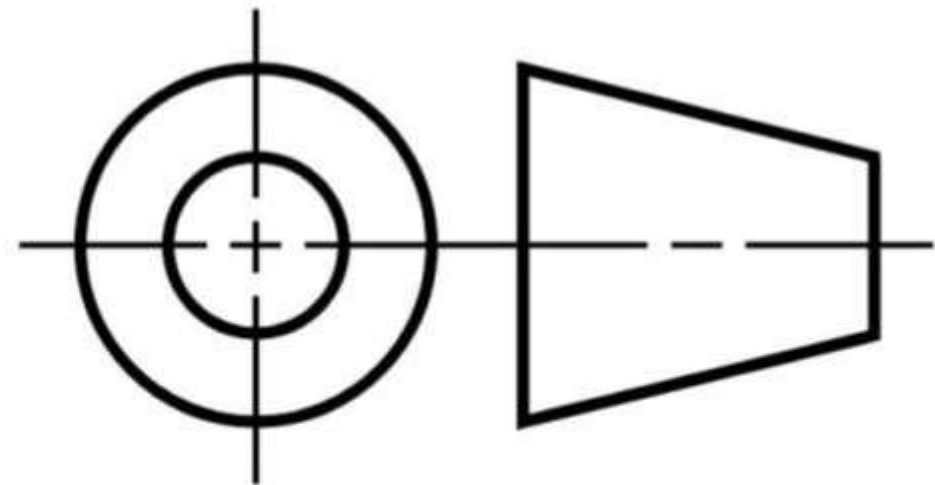




1st Angle & 3rd Angle Projection



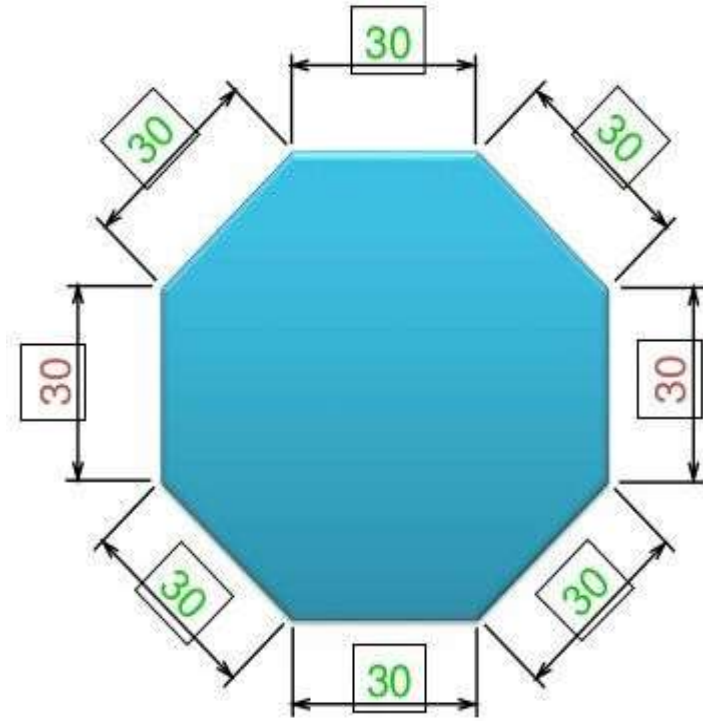
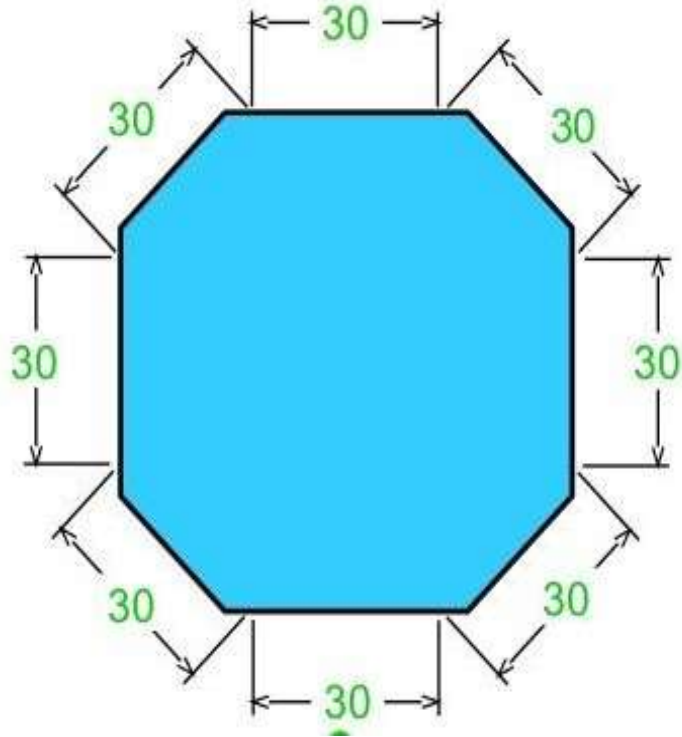
Third Angle Projection Symbol



First Angle Projection Symbol

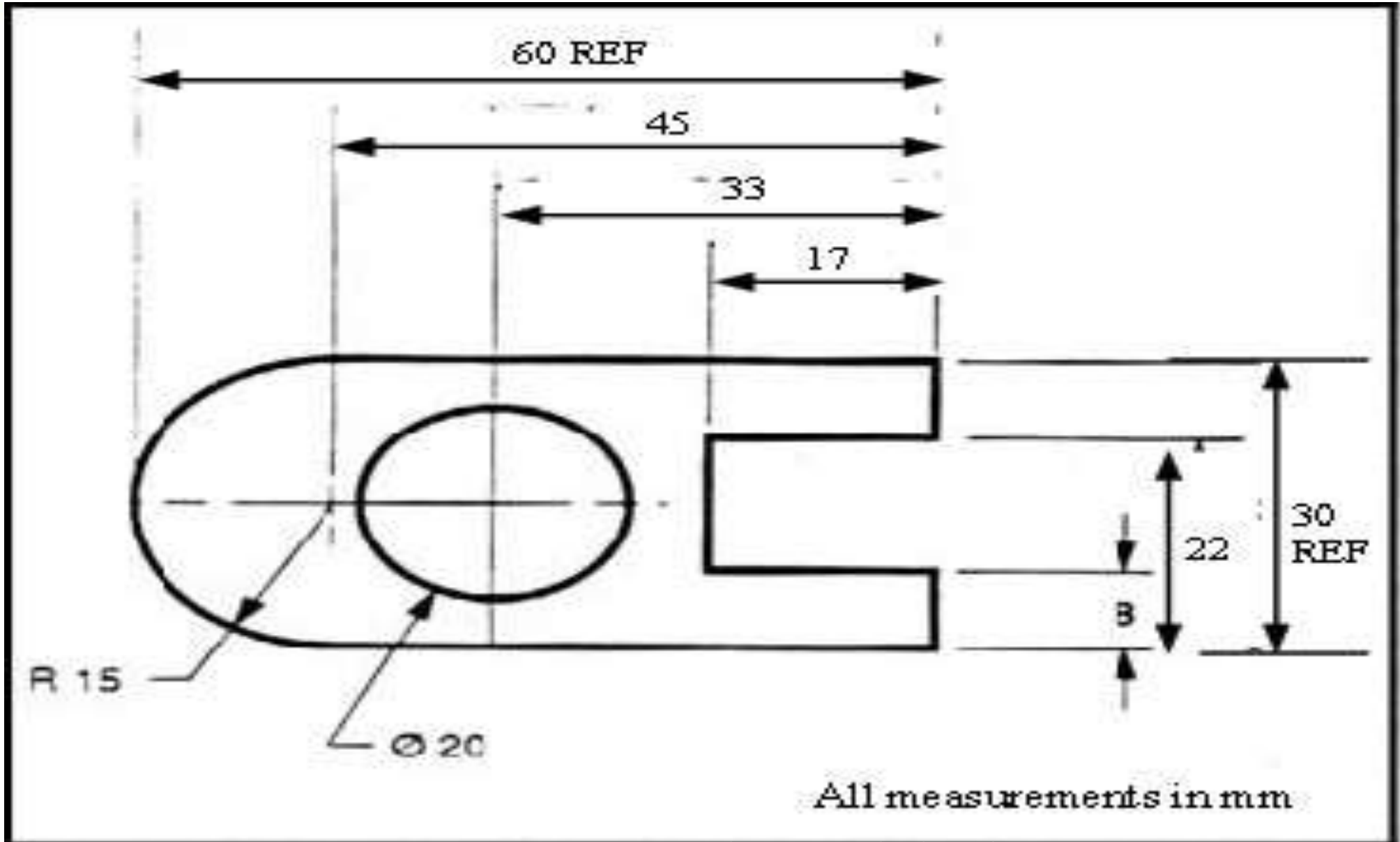


Dimensioning



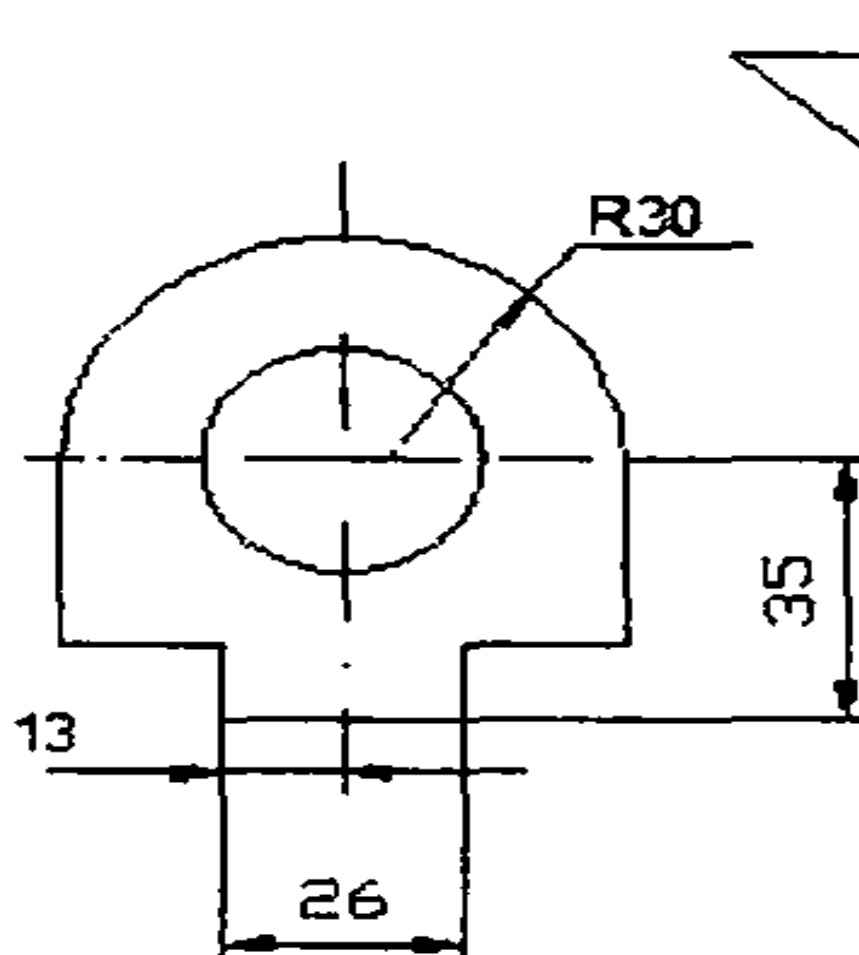


Dimensioning

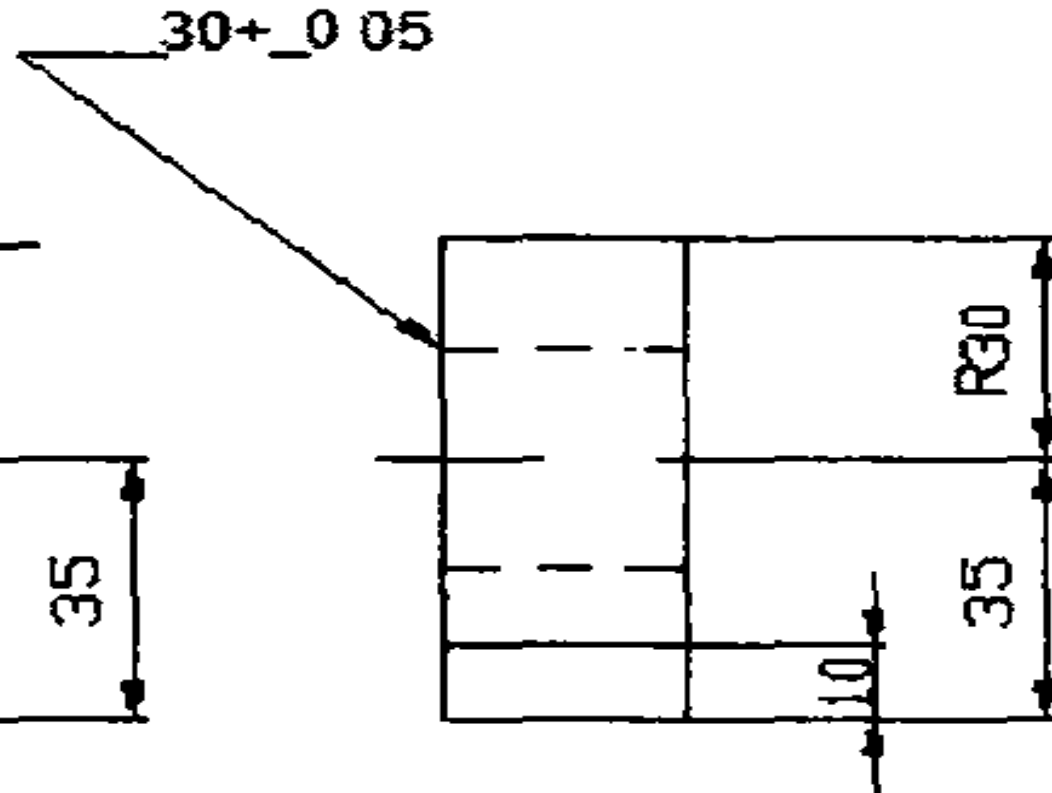




Dimensioning



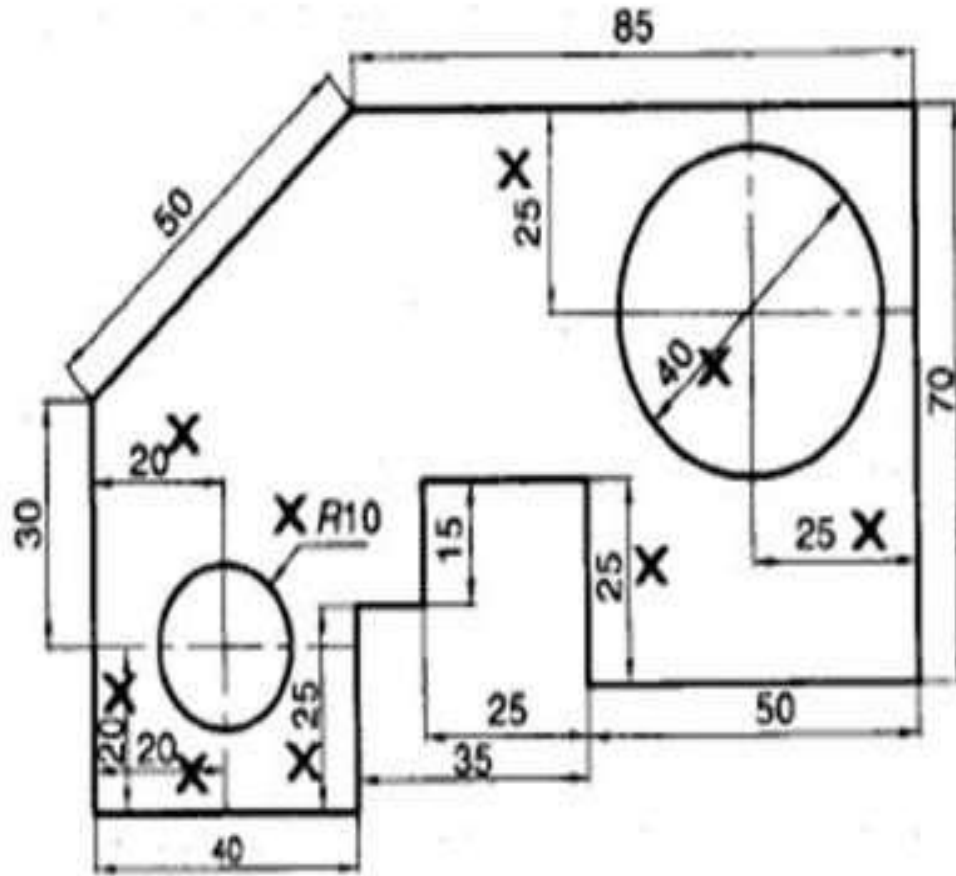
CORRECT



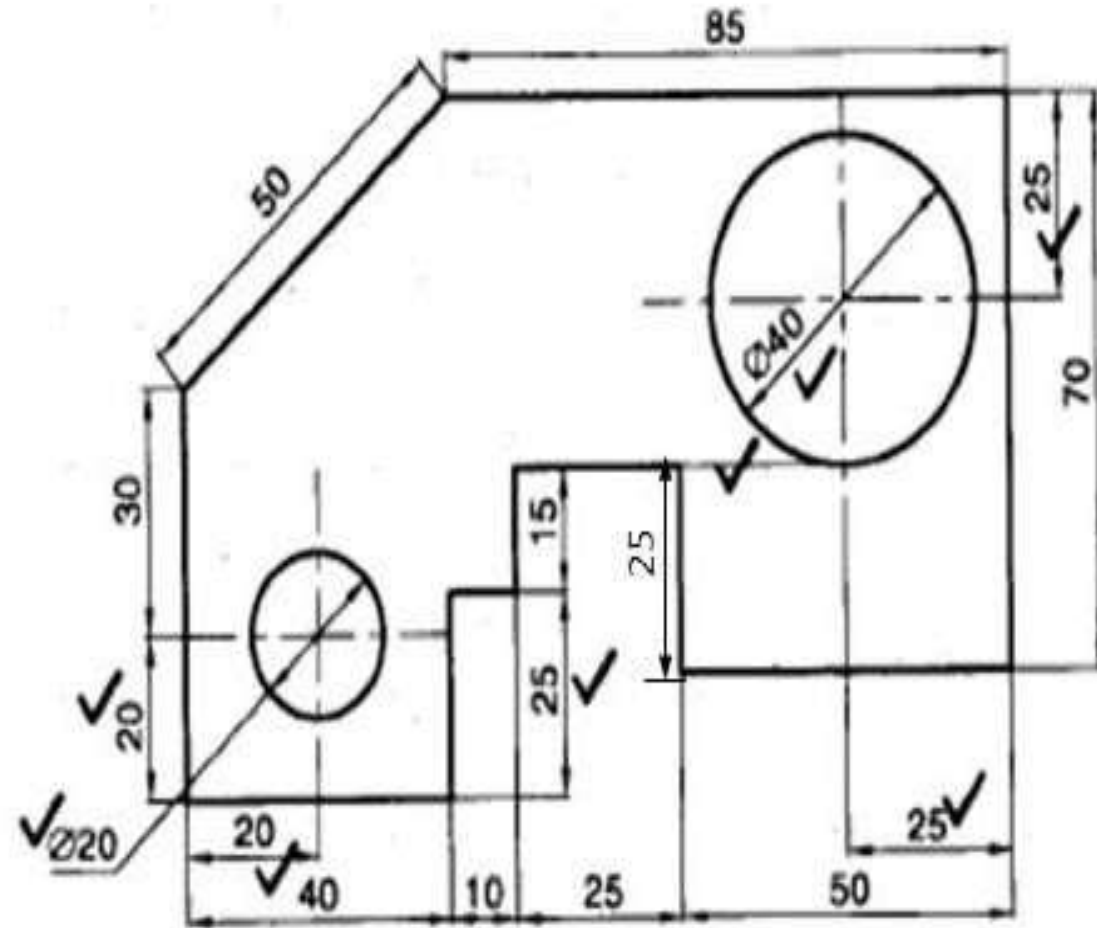
INCORRECT



Dimensioning



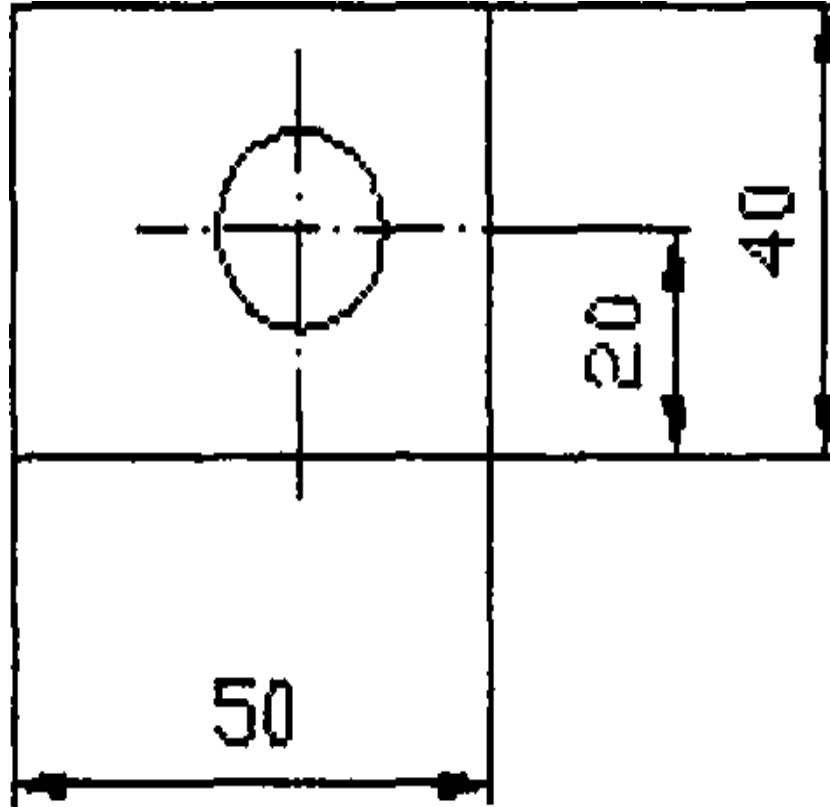
Wrong



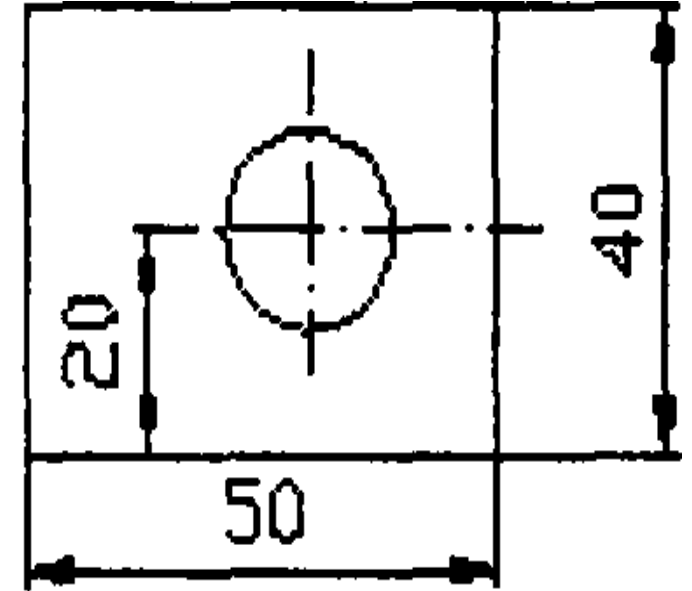
Correct



Dimensioning



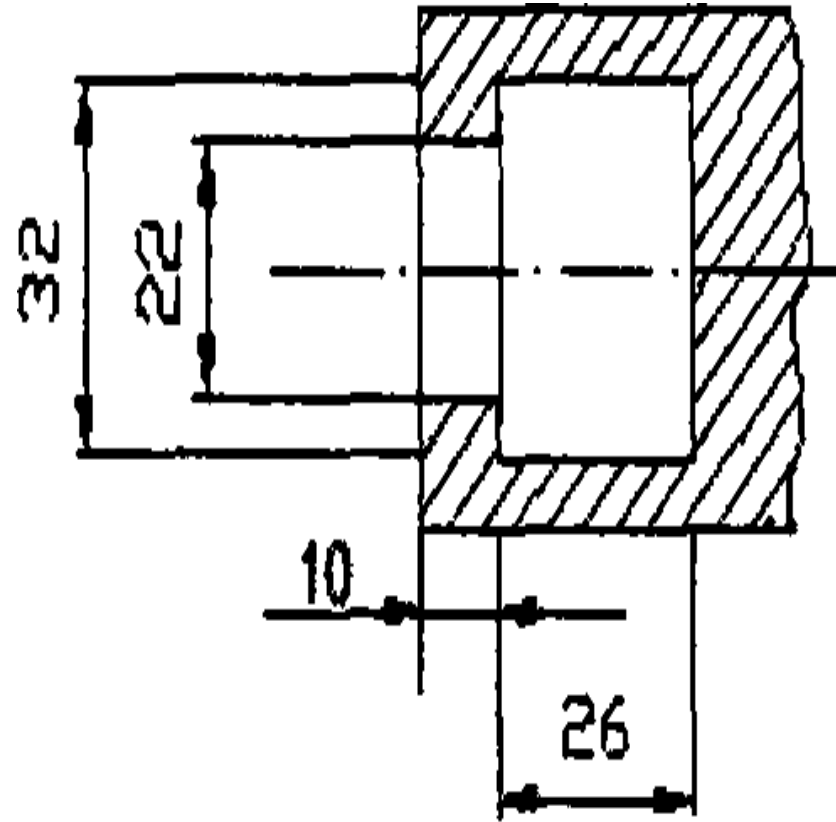
CORRECT



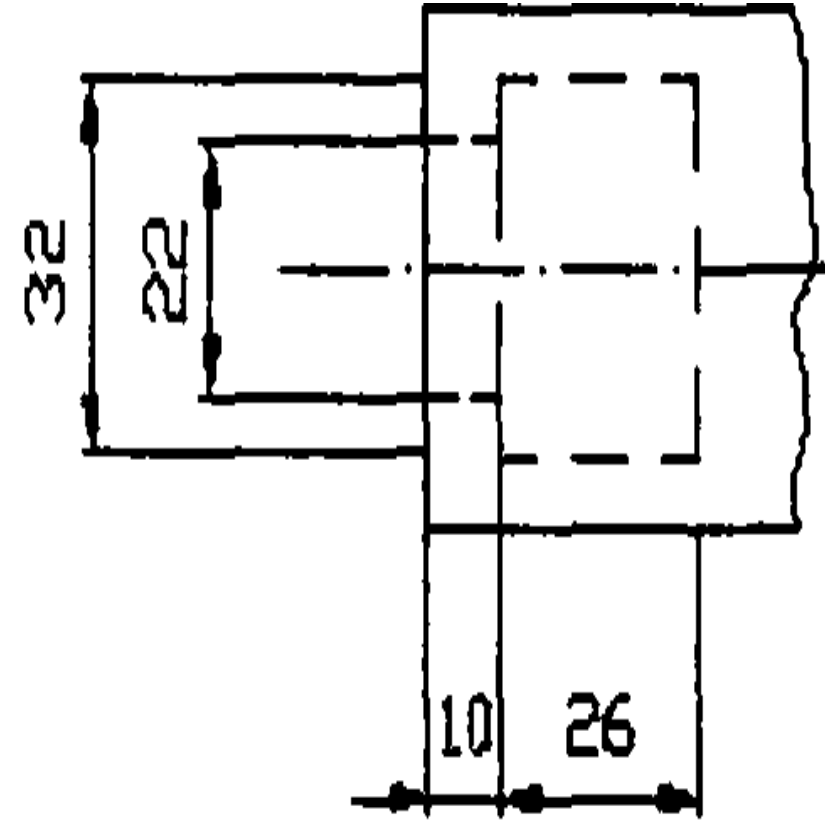
INCORRECT



Dimensioning



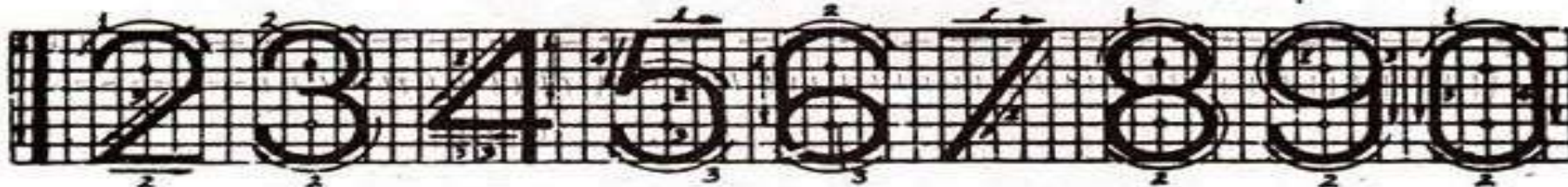
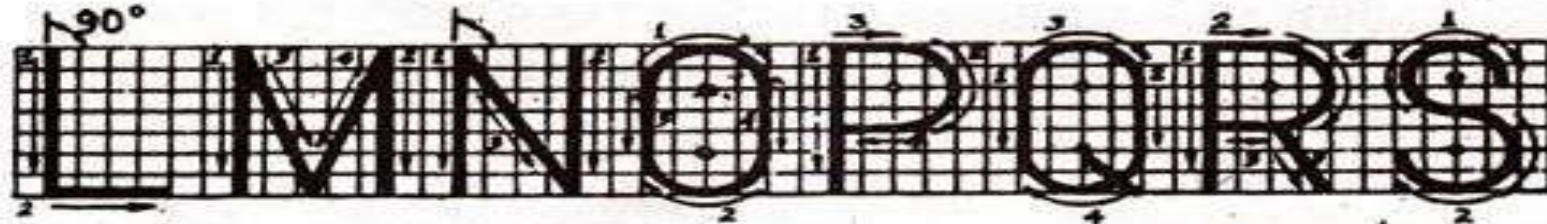
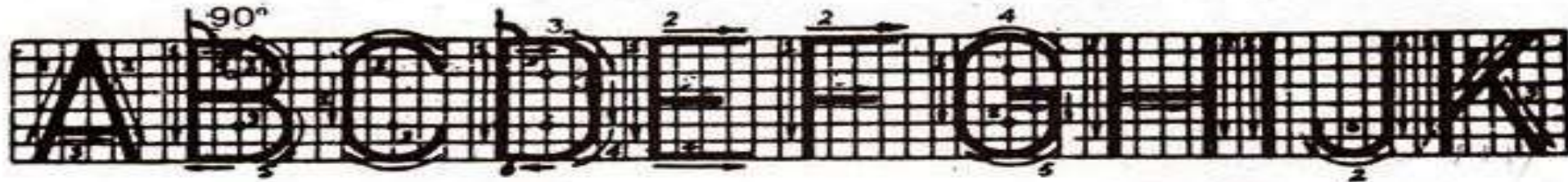
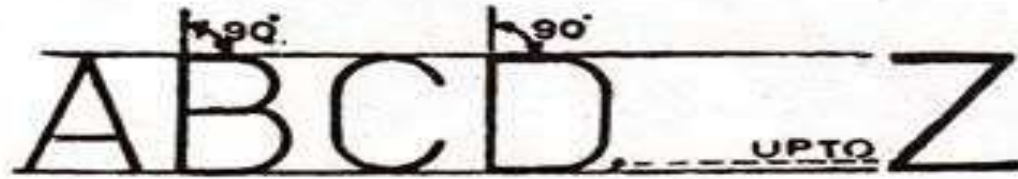
Correct



Incorrect

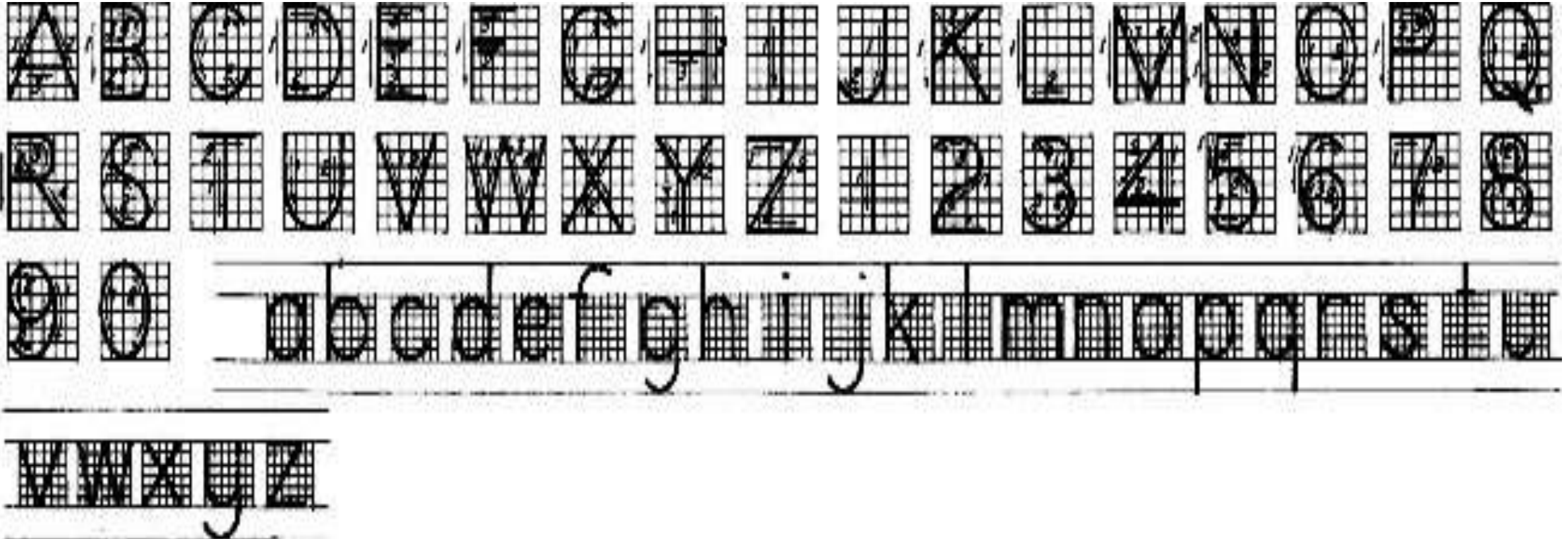


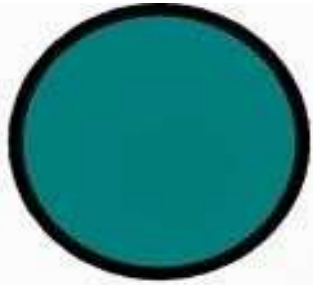
Lettering





Lettering

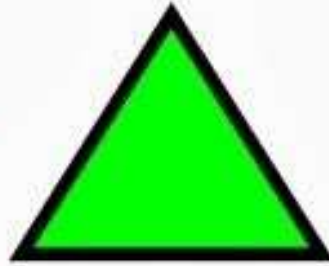




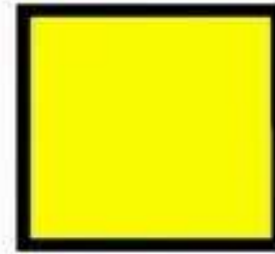
circle



oval



triangle



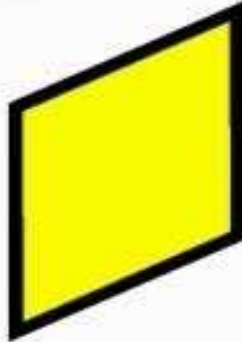
square



trapezium



diamond



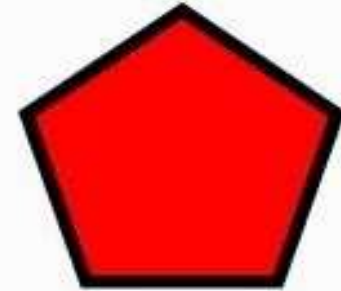
rhombus



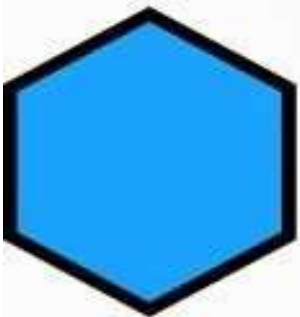
parallelogram



rectangle



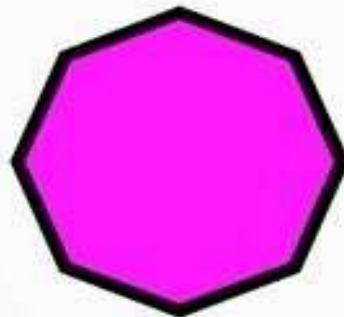
pentagon



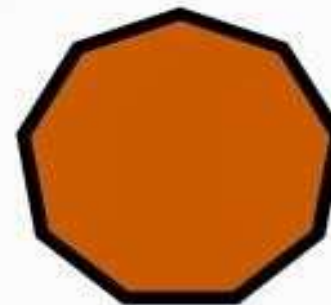
hexagon



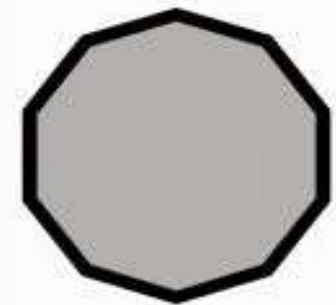
heptagon



octagon



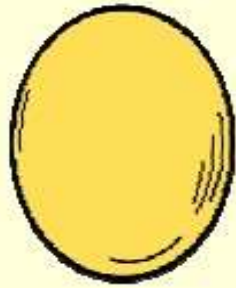
nonagon



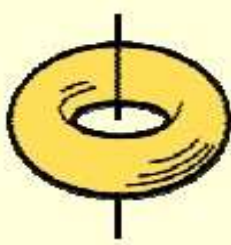
decagon



Curved surfaces



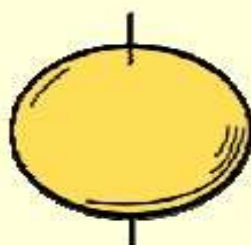
SPHERE



TORUS

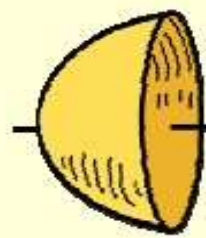


PROLATE

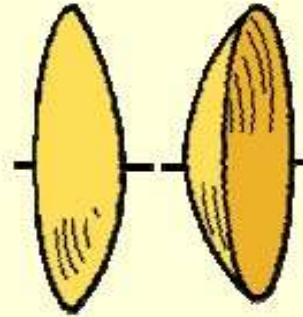


OBLATE

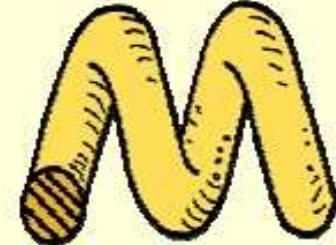
ELLIPSOIDS



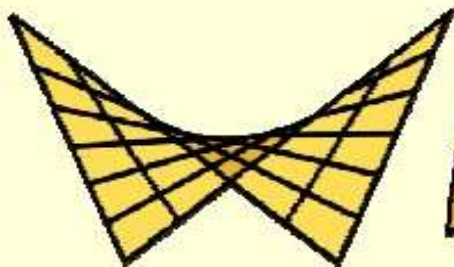
PARABOLOID



HYPERBOLOID

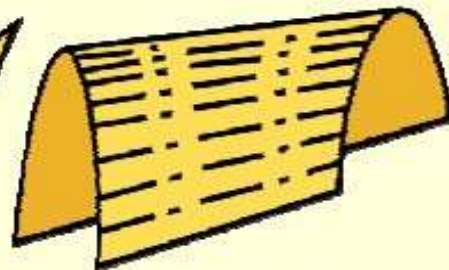


SERPENTINE

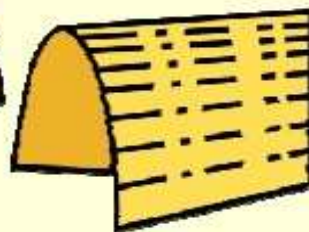


HYPERBOLIC

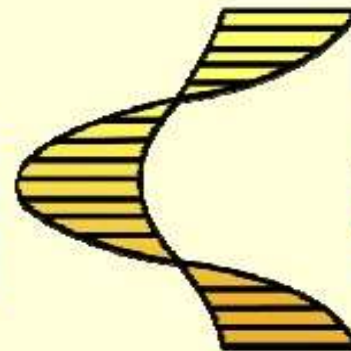
PARABOLOID



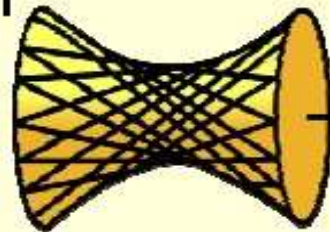
CYLINDROID



CONOID



HELICOID



HYPERBOLOID



Scales

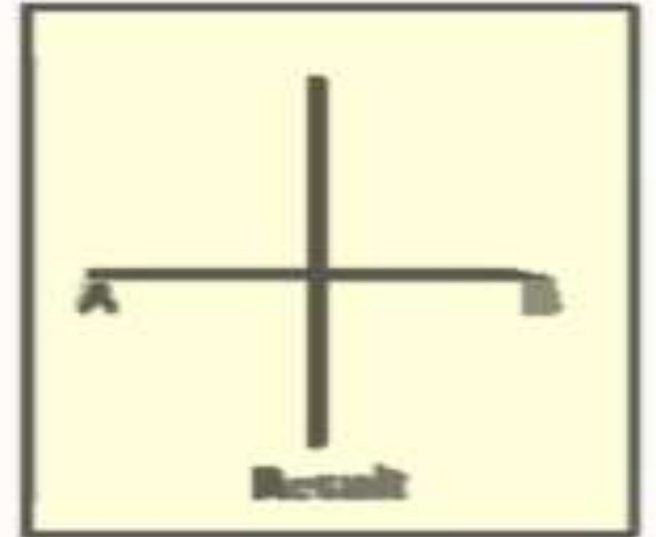
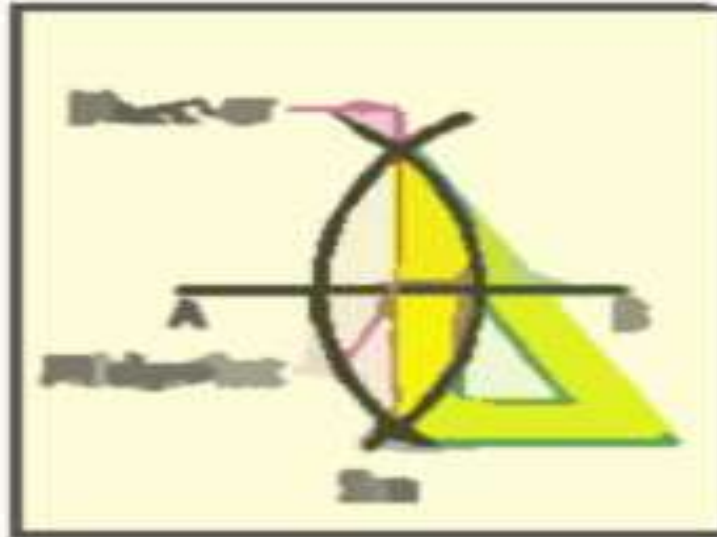
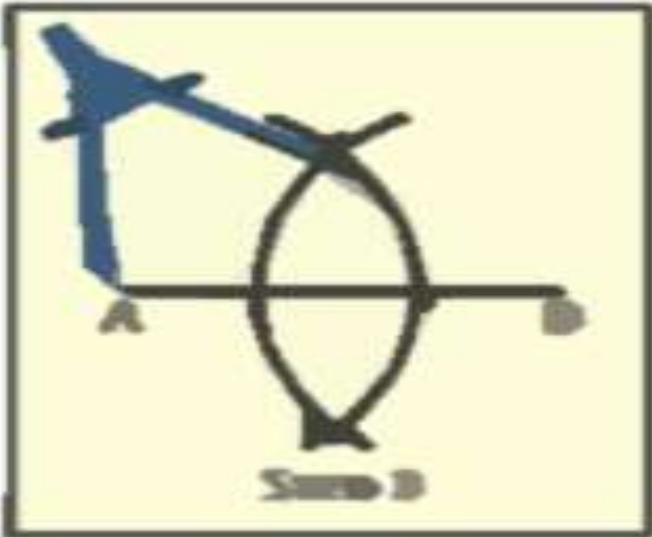
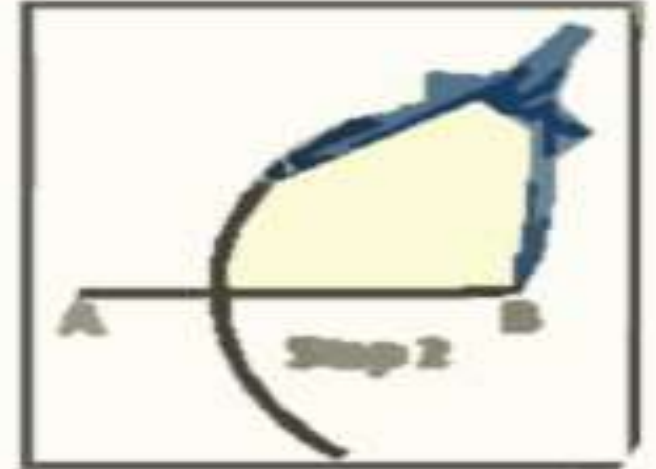
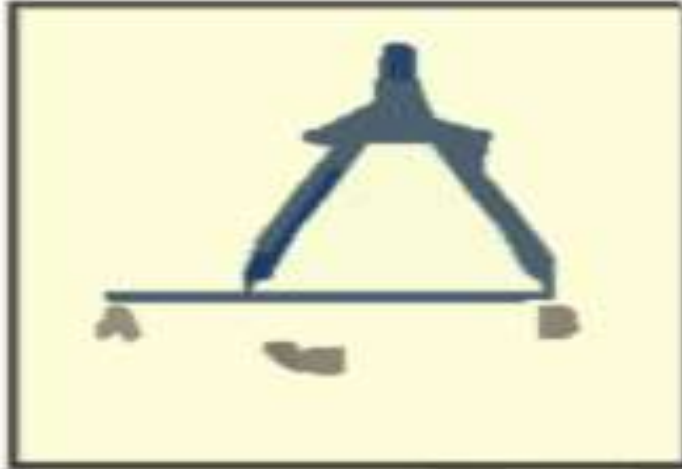
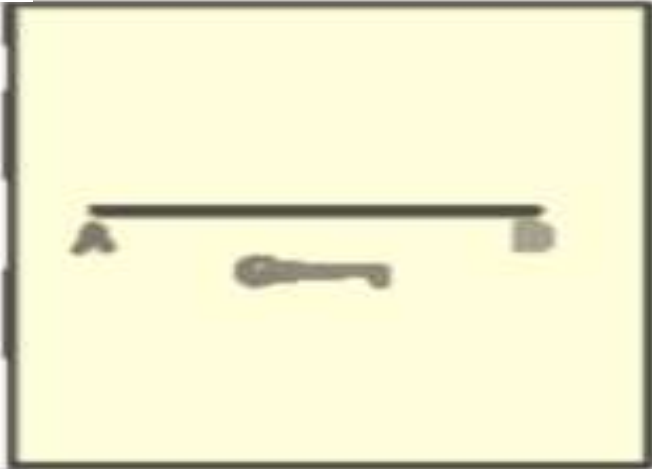


- Scale 1: 1 for full size scale
- Scale 1: x for reducing scales (x = 10,20 etc.,)
- Scale x: 1 for enlarging scales.



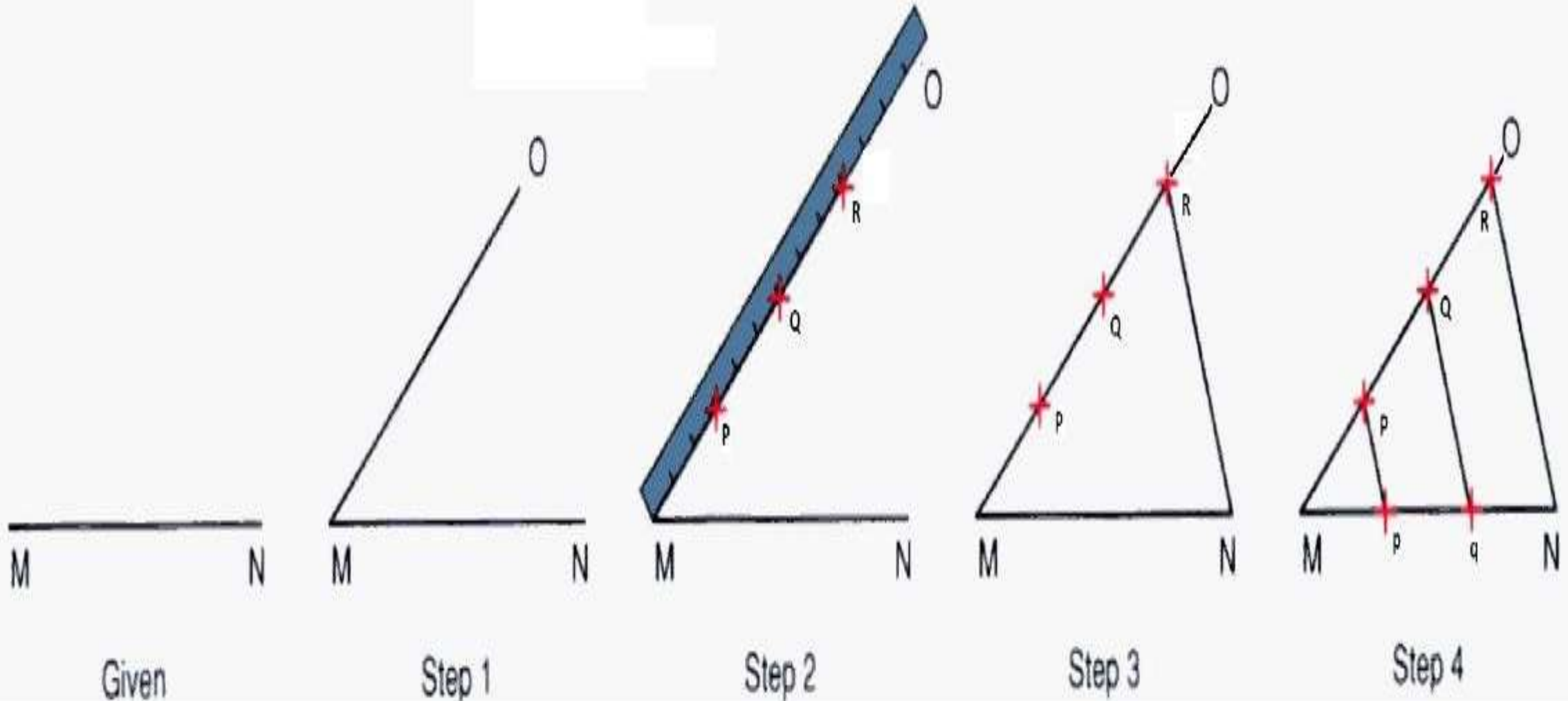


Bisecting a line



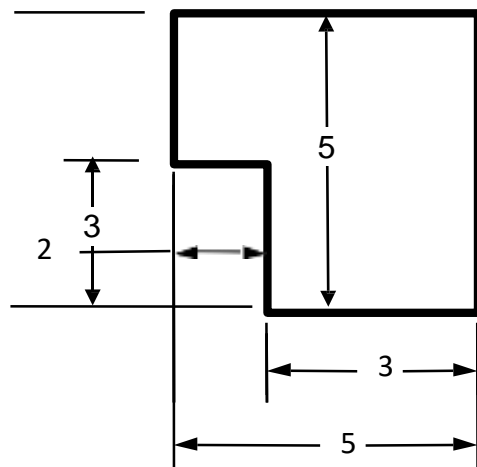
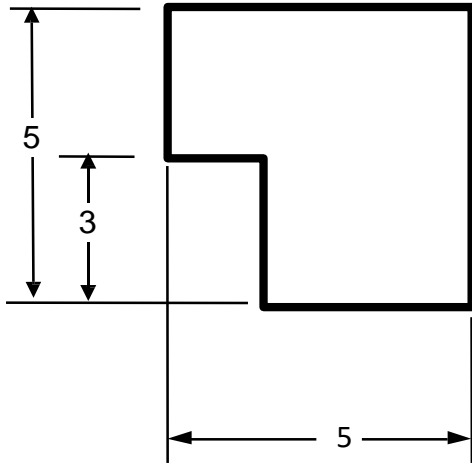


Dividing a line into equal parts





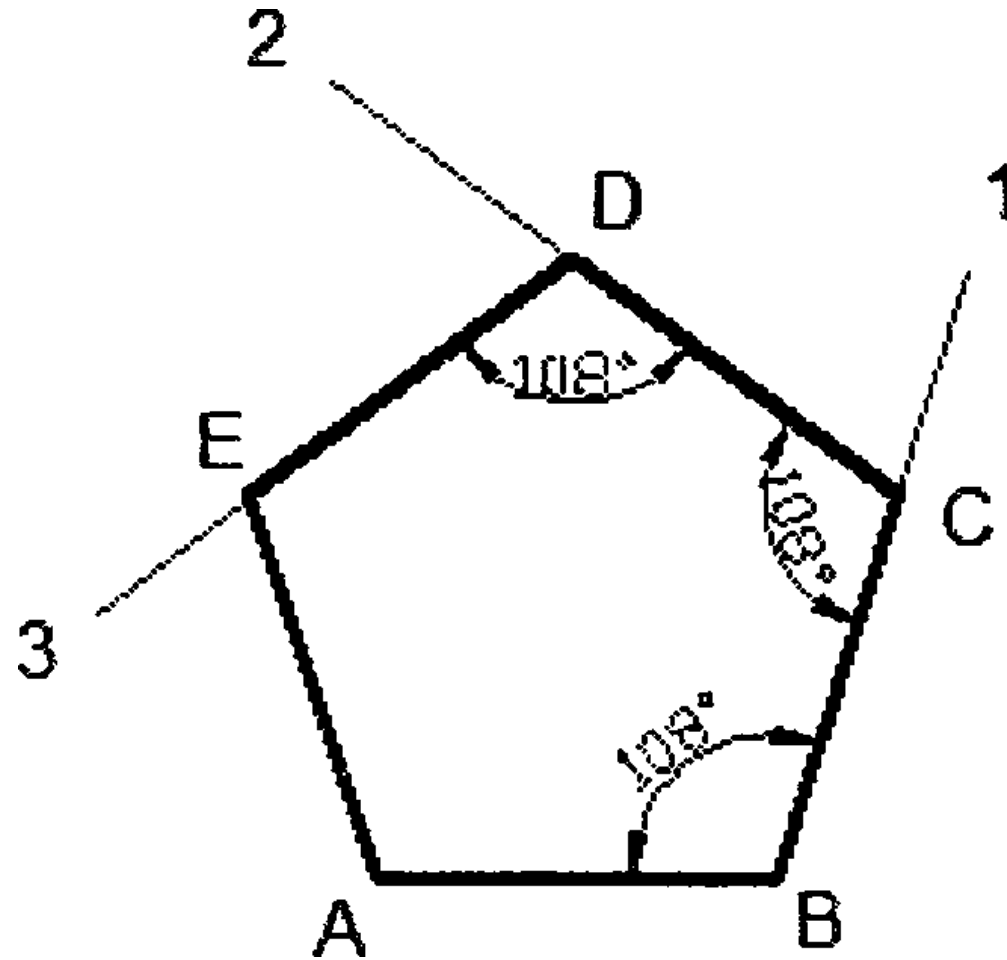
Dimensioning guidelines



- Don't over define or under define the object. [MOST IMPORTANT]
- Dimension to the visible contour or shape of the feature / Don't dimension to hidden lines.
- Don't dimension to object lines (model edges), use extension lines.
- Don't overlap a dimension and the model. Place dimensions away from the model's surface.
- Don't cross extension lines if possible.
- Group dimensions when possible unless it become difficult to read.
- Place dimensions on the side of the view were adjacent views exist (for easy referencing).

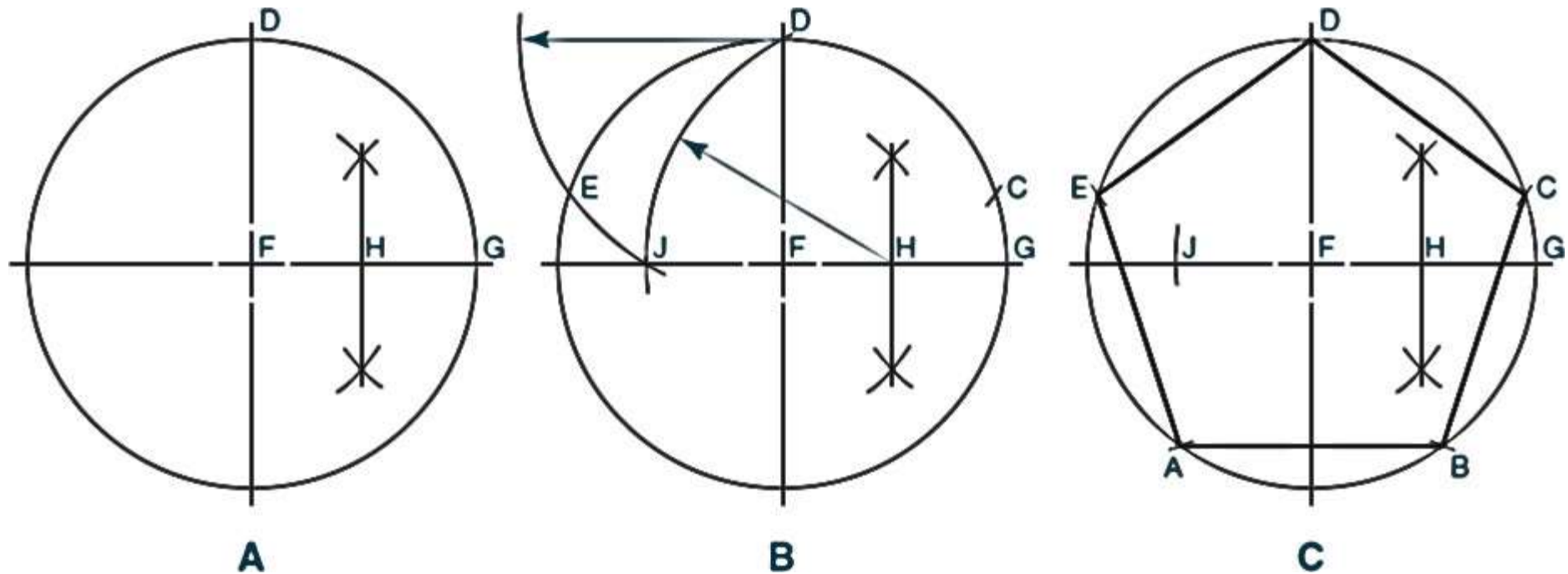


Pentagon



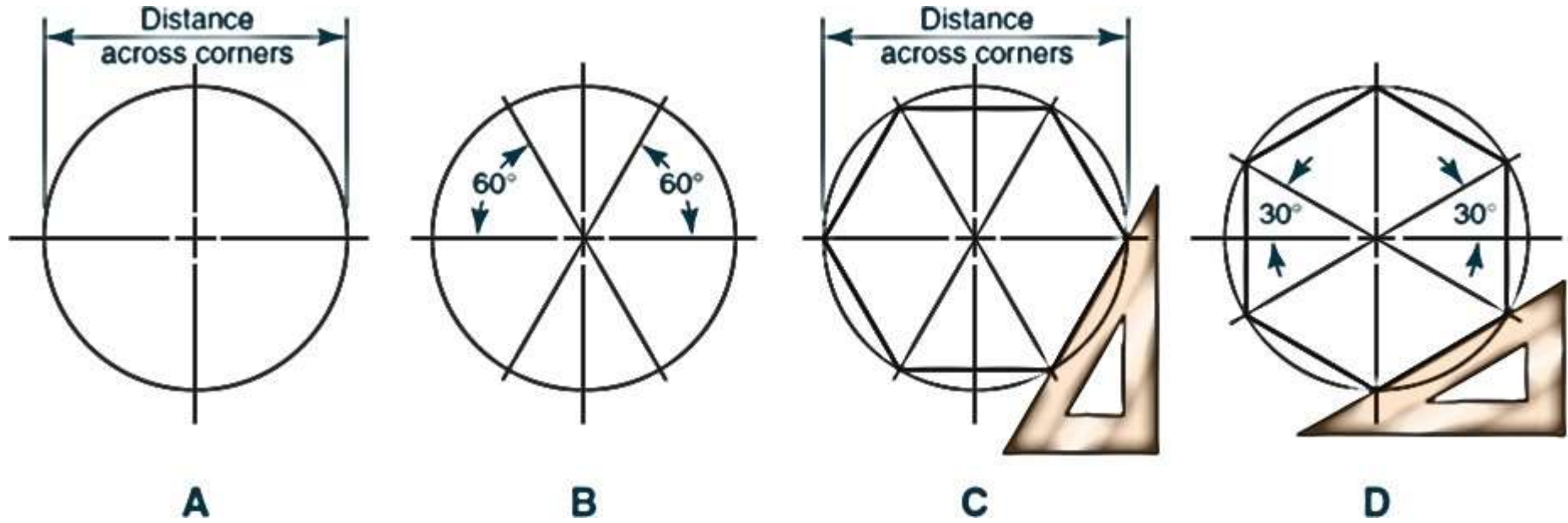


Pentagon



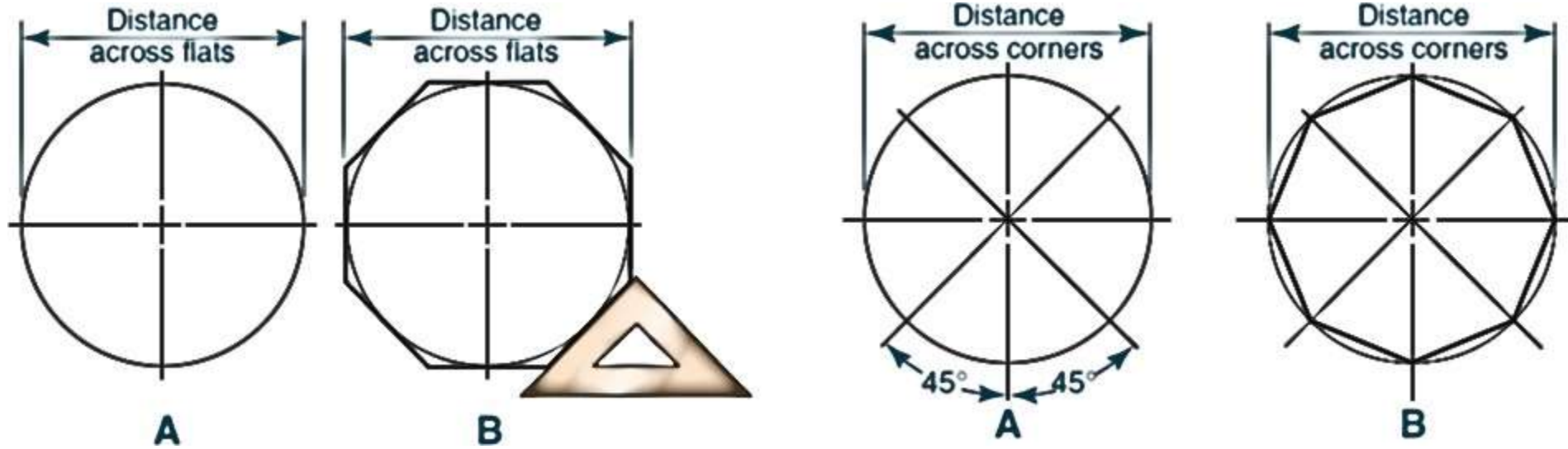


Hexagon





Octagon





Standard Code

Country	Code	Full name
India	BIS	Bureau of Indian Standards
USA	ANSI	American National Standard Institute
Japan	JIS	Japanese Industrial Standard
UK	BS	British Standard
Australia	AS	Australian Standard
Germany	DIN	Deutsches Institut für Normung
	ISO	International Standards Organization



References

- Machine Drawing, V. Gopalakrishnan
- <https://www.sanfoundry.com/engineering-drawing-questions-answers-bis-code-practice/>
- www.google.com (Images)
- www.nptel.com