Engineering Drawing (21011)

1st Semester

Civil Technology

Providan-2022

Presented By

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Objectives

- To develop the ability to use various drawing instrument & materials.
- To enable in constructing and using various type of scale in drawing.
- To provide the ability to construct various geometrical figure.
- To enable to adopt various symbols used in drawing.
- To Understand the orthographic and isometric projection.

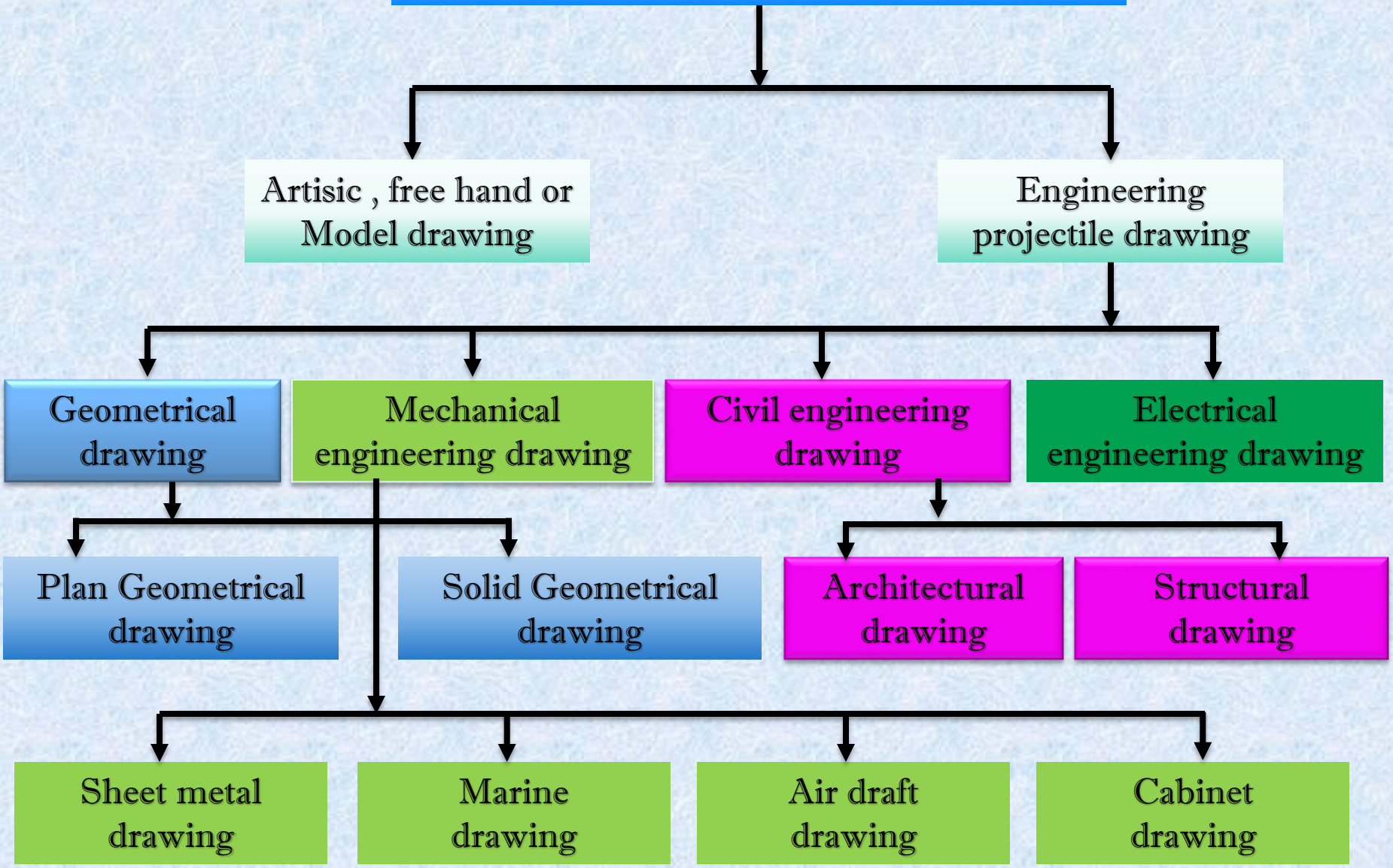
Contents

- Introduction
- Classification
- Drawing Instrument and Materials
- Lettering Numbering and Title Strip
- Alphabet of Lines and Dimensioning
- Construction of Scale
- Geometrical Construction & Conic Section
- Symbols
- Isometric Projection

Introduction

A drawing is a graphic representation of a real thing ,an idea or a proposed design for construction later.

Classification of drawing



❑Drawing Instrument and Materials

There are different type drawing instrument:

- ❑Pencil
- ❑Drawing Board and stand
- ❑Drawing table and stool
- ❑Drawing sheet
- ❑ Tracing paper
- ❑Tracing cloth
- ❑ T-square
- ❑Set-square
- ❑ Divider

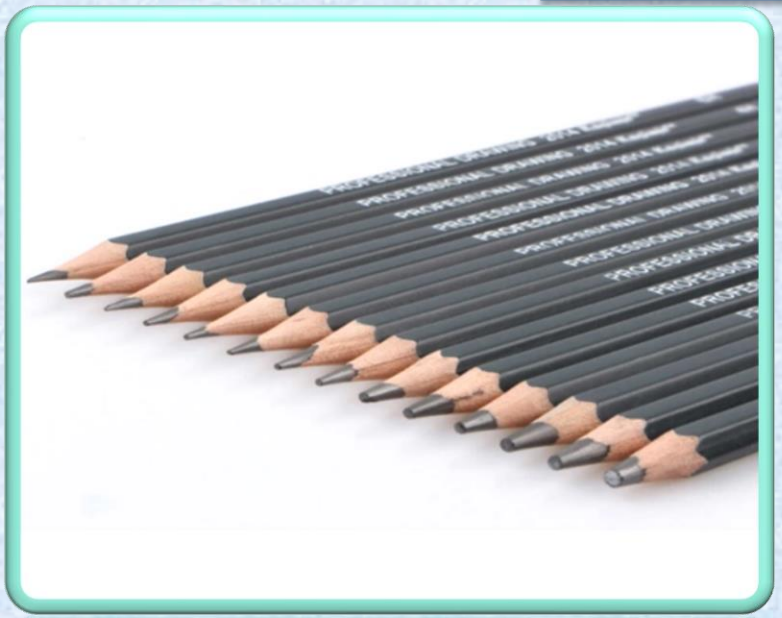
❑Drawing Instrument and Materials

- ❑Bow pencil or Compass
- ❑ Scale
- ❑Diagonal Scale
- ❑French curve or Irregular curves
- ❑Protractor
- ❑ Eraser or Rubber
- ❑Board pin
- ❑ Board clip
- ❑ Scotch tape

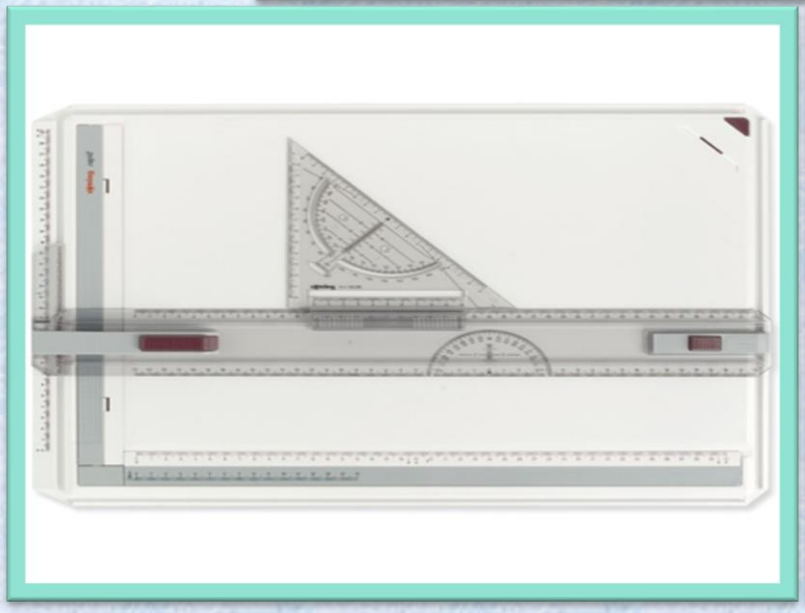
❑Drawing Instrument and Materials

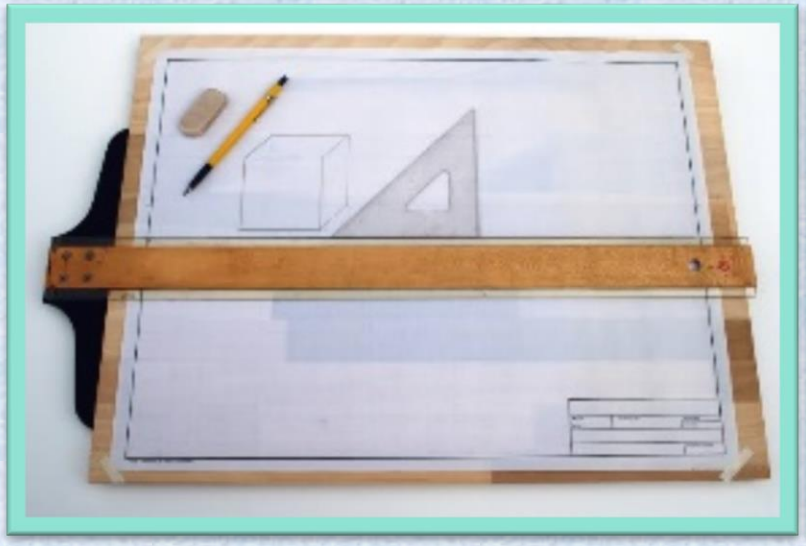
- ❑Pencil sharpener
- ❑ Sand Paper
- ❑Duster cloth
- ❑Drawing ink
- ❑Instrument box
- ❑Lining pen
- ❑ Bow pen
- ❑Drafting pen

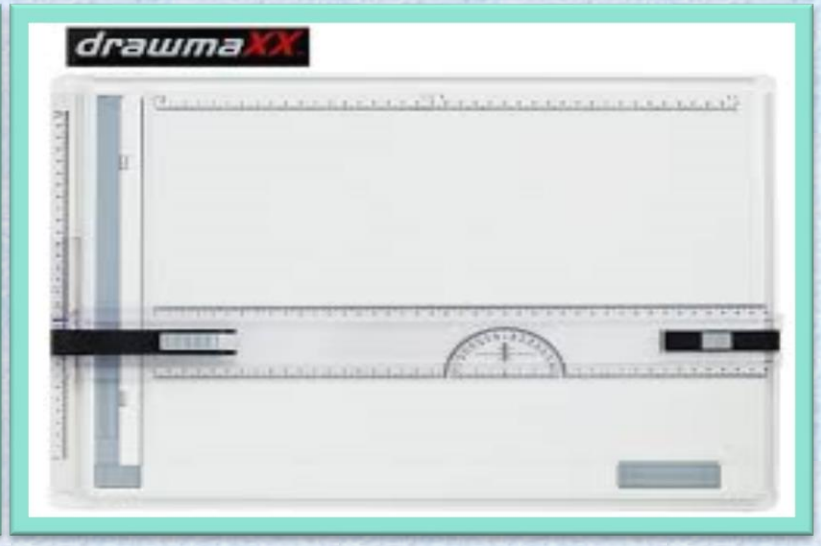
❑ *Pencil*



❑ Drawing Board and stand

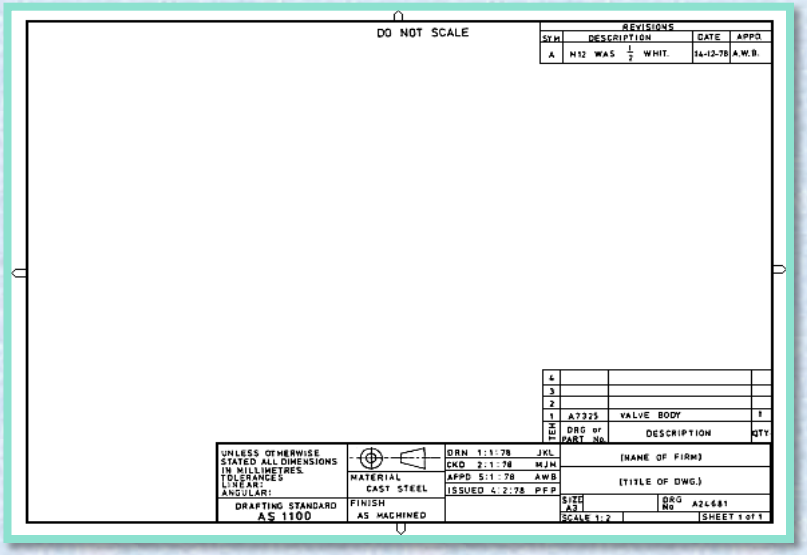


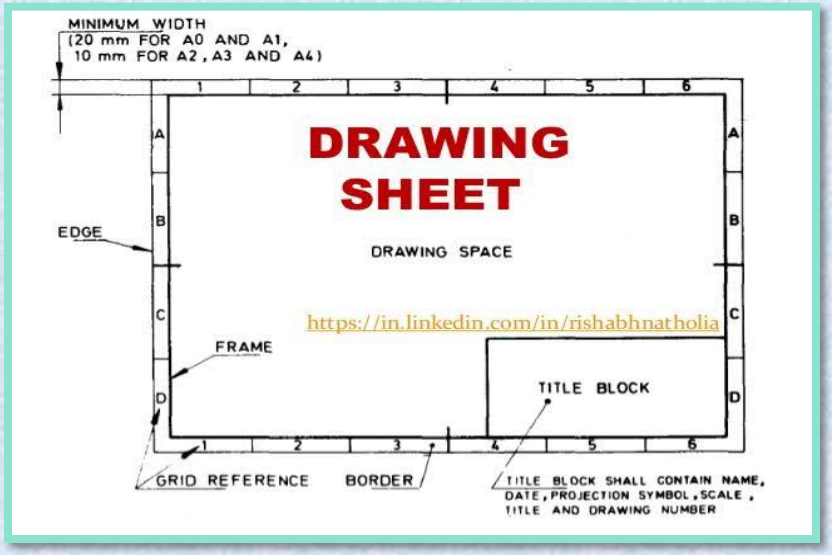


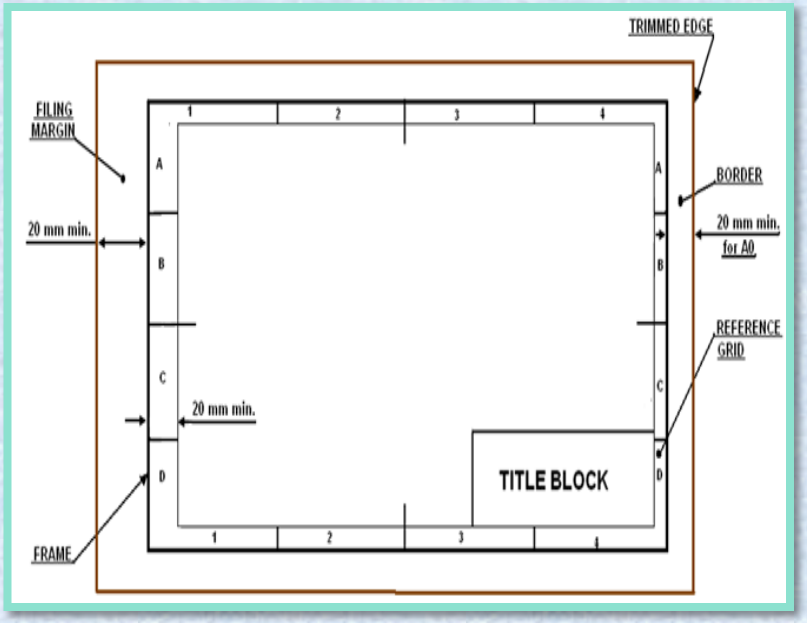


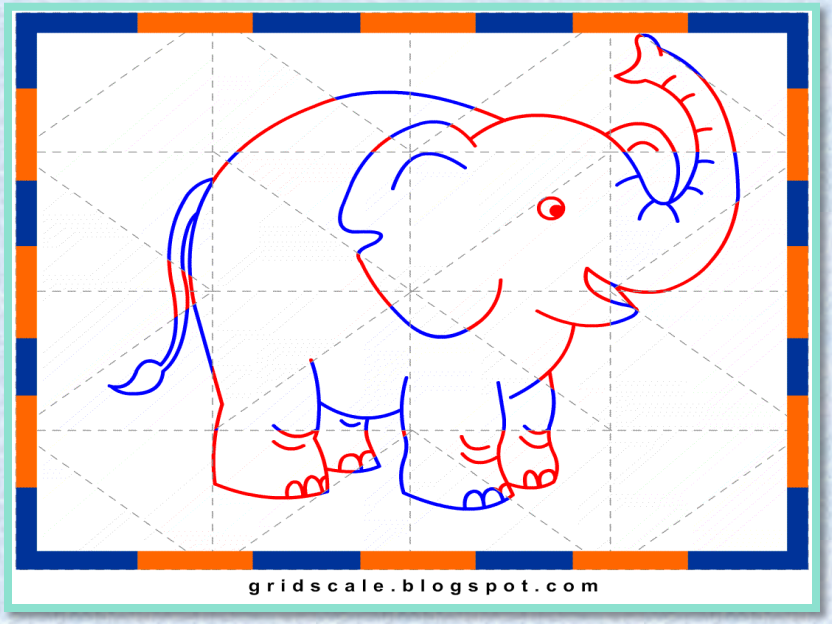
❑ Drawing Board and stand

❑ Drawing sheet

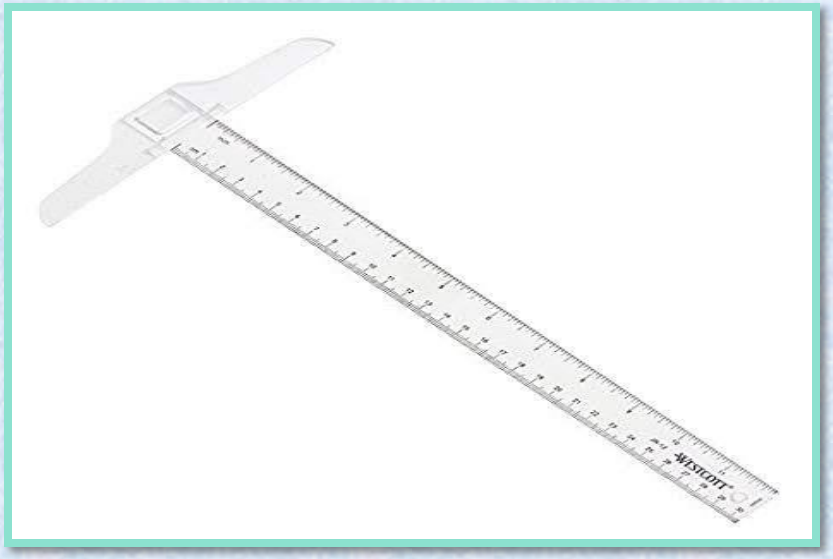




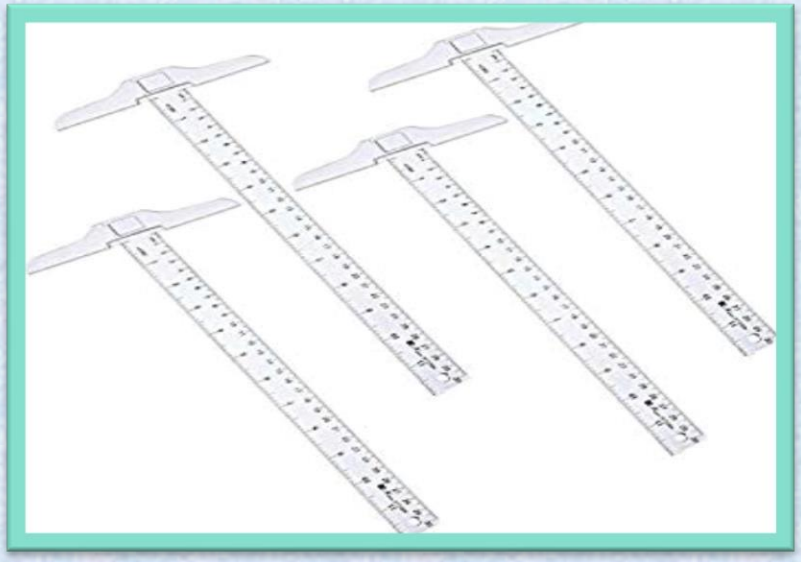


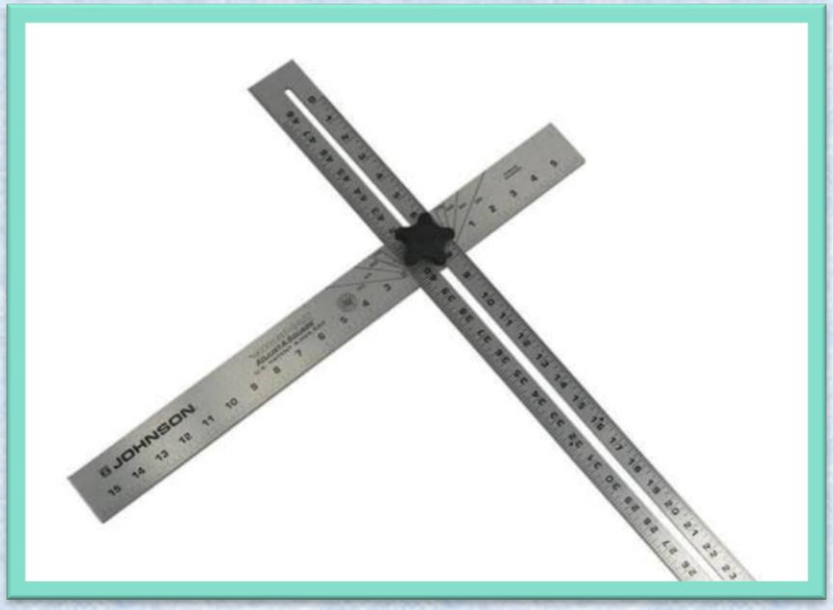


❑ T-square

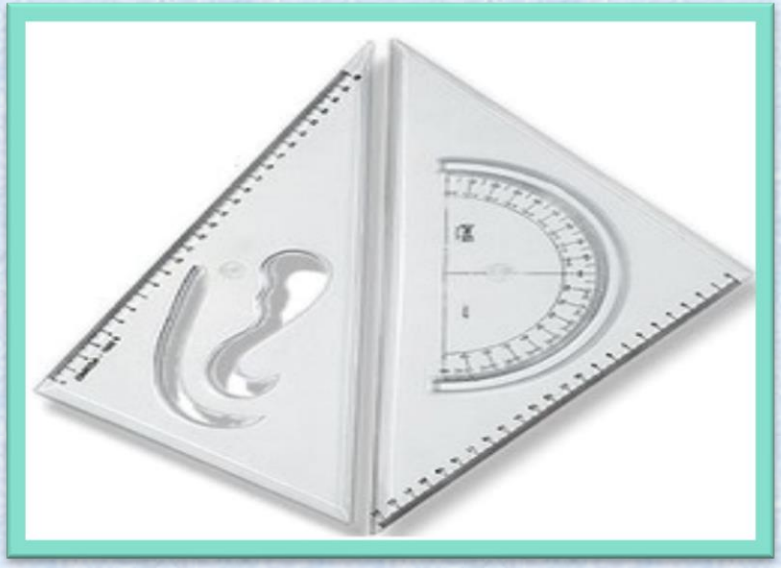


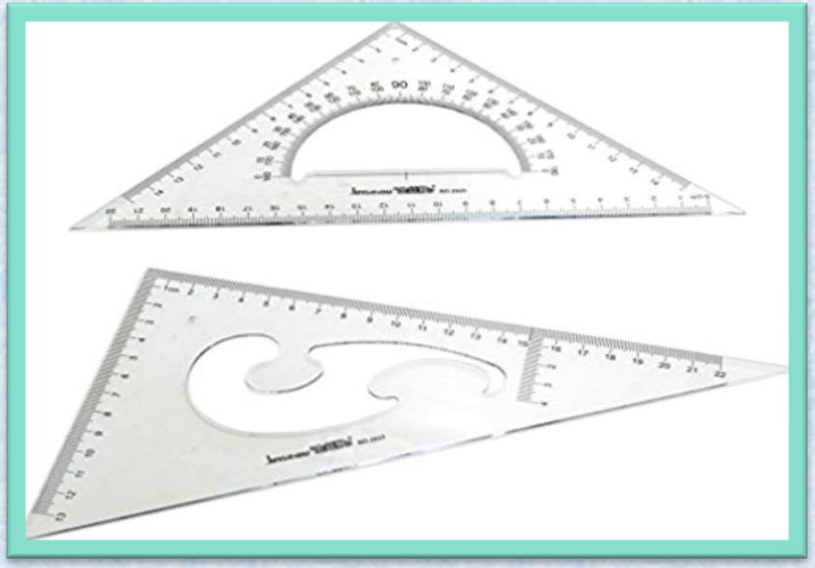
❑ T-square

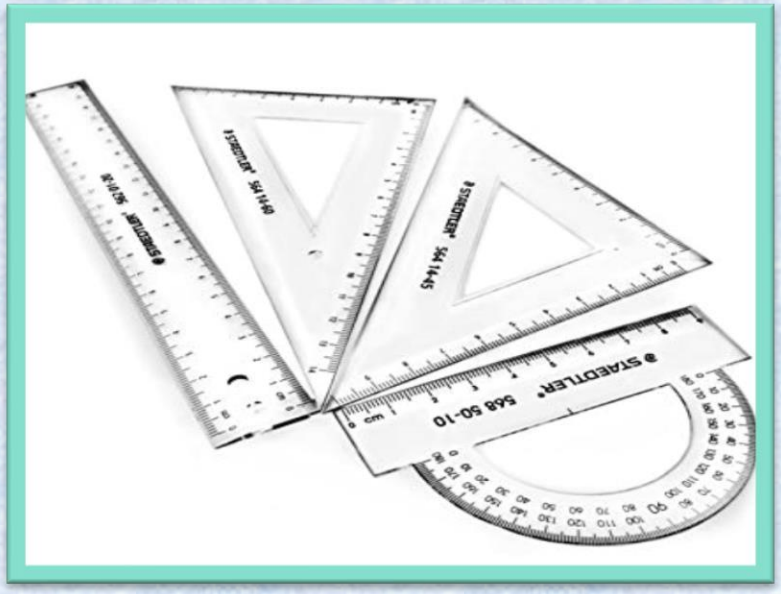


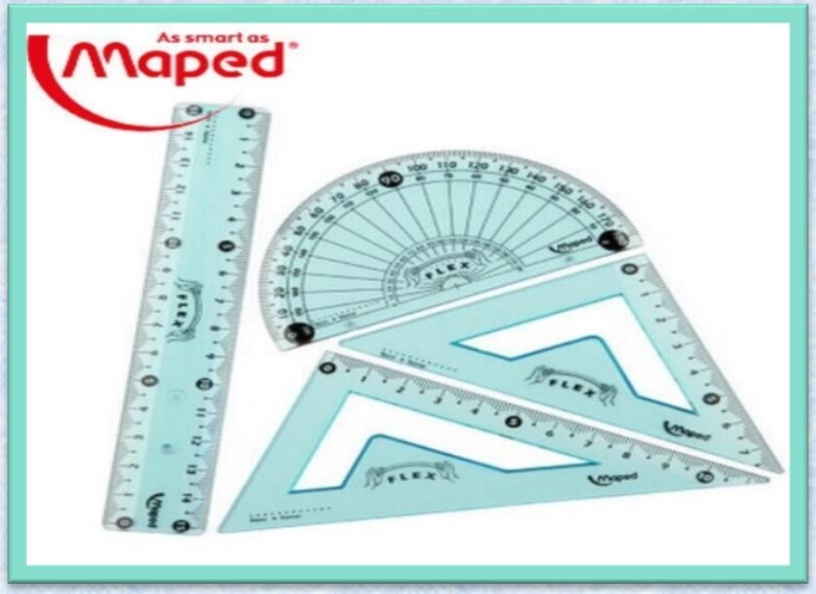


❑Set-square



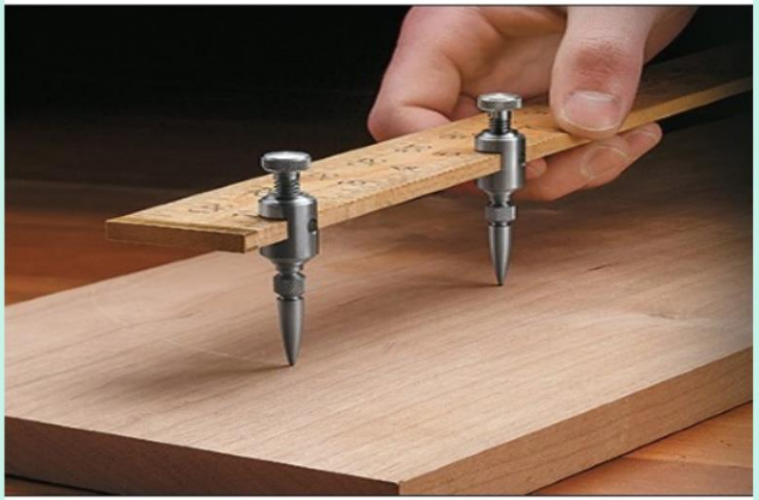


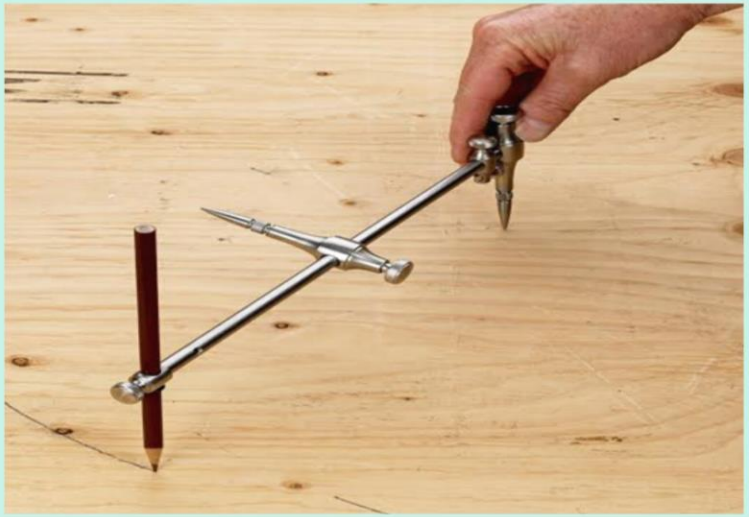




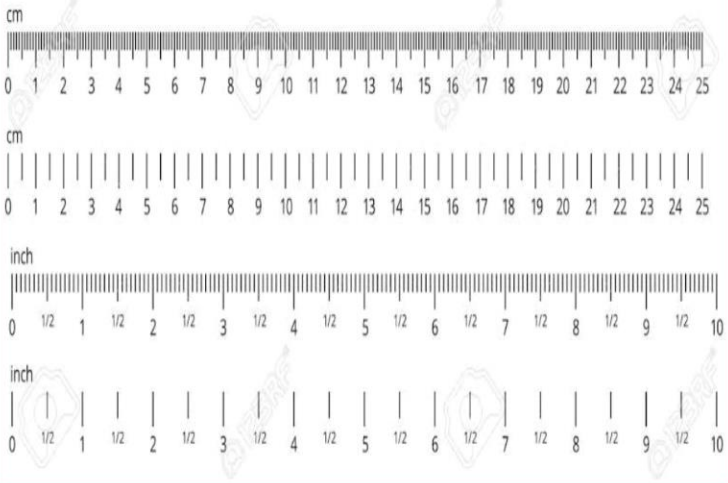
❑ *Divider*

❑ *Bow pencil or Compass*





❑ Scale


cm
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
cm
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
inch
0 1/2 1 1/2 2 1/2 3 1/2 4 1/2 5 1/2 6 1/2 7 1/2 8 1/2 9 1/2 10
inch
0 1/2 1 1/2 2 1/2 3 1/2 4 1/2 5 1/2 6 1/2 7 1/2 8 1/2 9 1/2 10

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❑Diagonal Scale

Draw the line AC of convenient length at right angles to plain scale AB. Divide it into 10 equal parts. Join BC. From each tenth point on line AC draw lines parallel to AB till they meet line BC. Then line 1–1 represent $\frac{1}{10}$ th of AB, 6–6 represent $\frac{6}{10}$ th of AB and so on. Figure 11.8 shows the construction of diagonal scale with RF = $\frac{1}{500}$ and indicates 62.6 m.

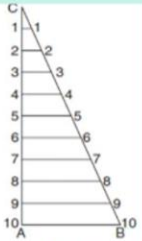


Fig. 11.7

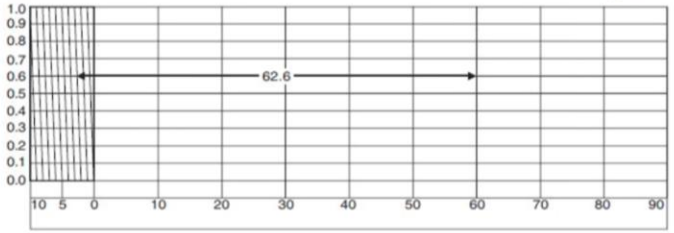


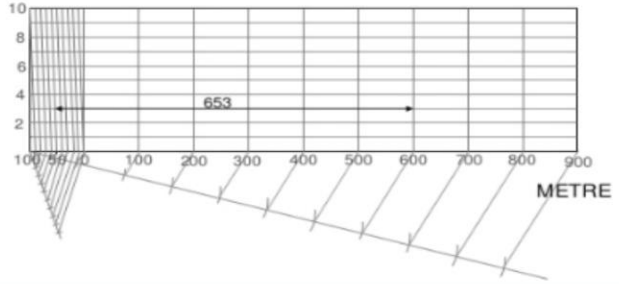
Fig. 11.8. Diagonal scale

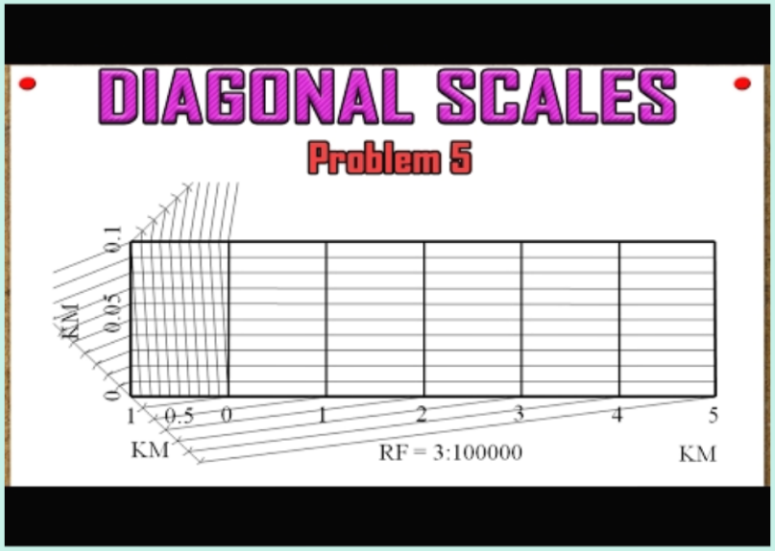
Problem 7: Construct a diagonal scale of R.F. = 1/6250 to read up to 1 kilometre and to read metres on it. Show a length of 653 metre on it.

R.F = $\frac{1}{6250}$, Max. Length = 1 km

L.O.S.= R.F.x Max. Length in cm = $\frac{1}{6250}$ X 1X 10^5 cm = 16 cm

Hint: As the maximum length is 1 km, the line should be divided in to 10 equal parts, so as to represent a division of 100 m





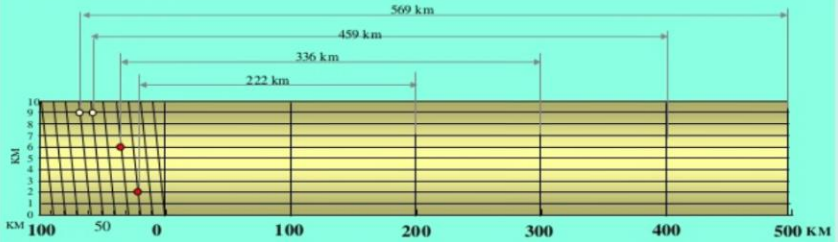
PROBLEM NO. 4 : The distance between Delhi and Agra is 200 km. In a railway map it is represented by a line 5 cm long. Find it's R.F. Draw a diagonal scale to show single km. And maximum 600 km. Indicate on it following distances. 1) 222 km 2) 336 km 3) 459 km 4) 569 km

DIAGONAL SCALE

SOLUTION STEPS: RF = 5 cm / 200 km = 1 / 40, 00, 000

Length of scale = 1 / 40, 00, 000 X 600 X 10^5 = 15 cm

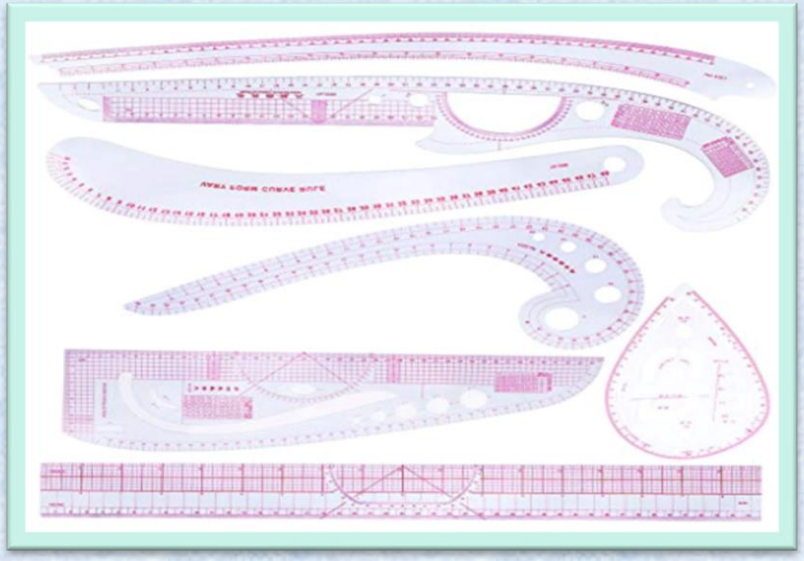
Draw a line 15 cm long. It will represent 600 km.Divide it in six equal parts.(each will represent 100 km.) **Divide** first division in ten equal parts.Each will represent 10 km.**Draw** a line upward from left end and mark 10 parts on it of any distance. **Name** those parts 0 to 10 as shown.Join 9th sub-division of horizontal scale with 10th division of the vertical divisions. **Then** draw parallel lines to this line from remaining sub divisions and complete diagonal scale.

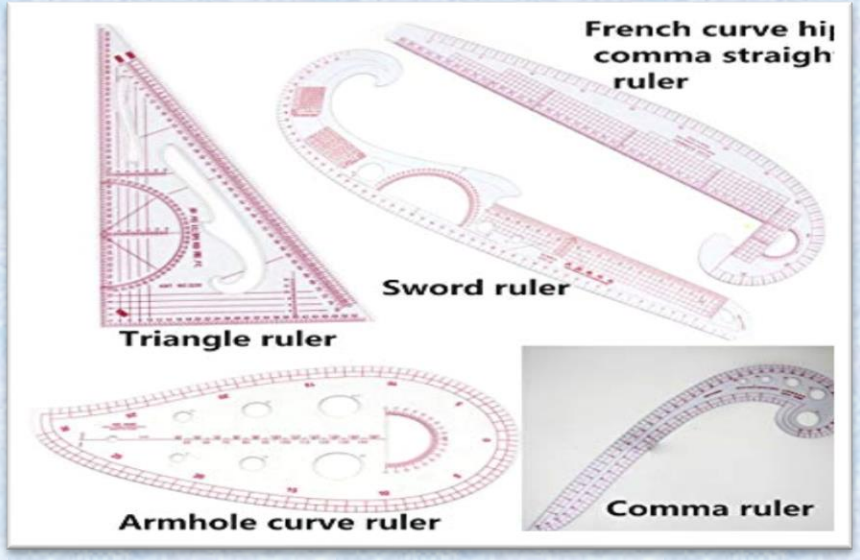


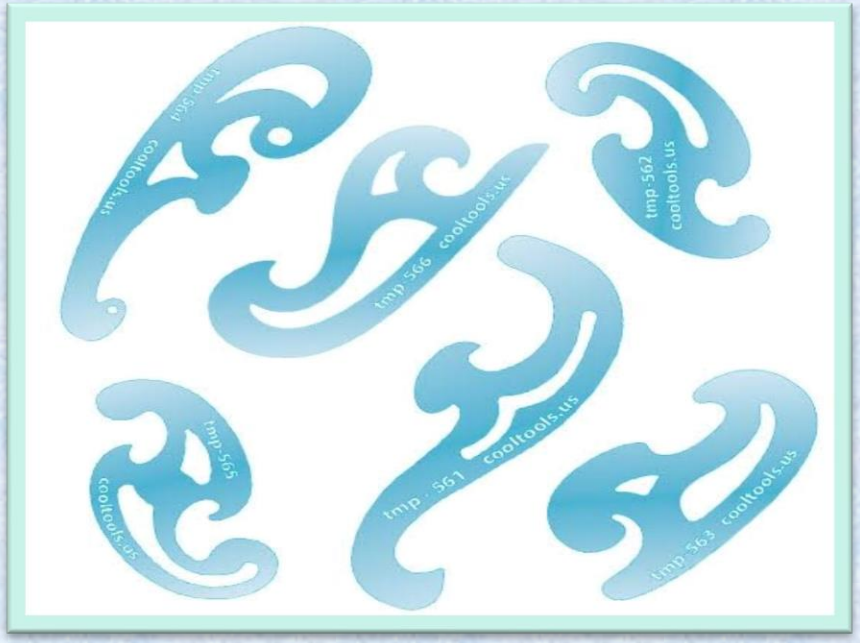
R.F. = 1 / 40,00,000

DIAGONAL SCALE SHOWING KILOMETERS.

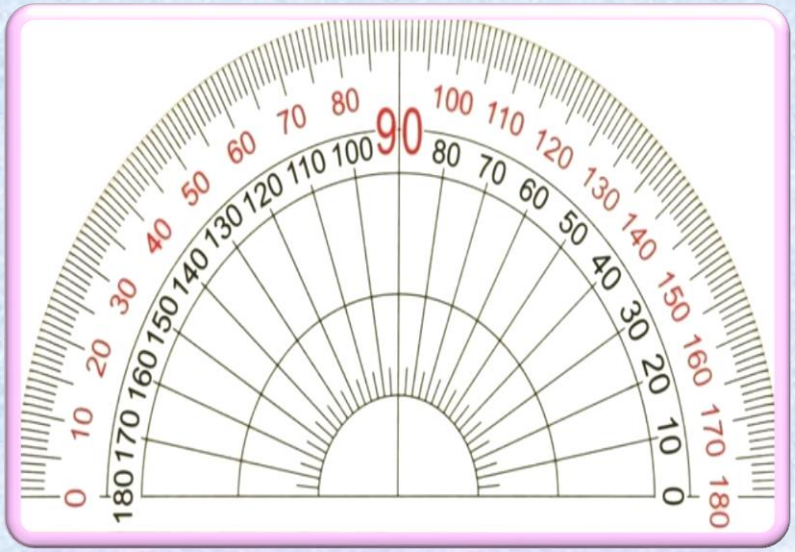
❑French curve or Irregular curves

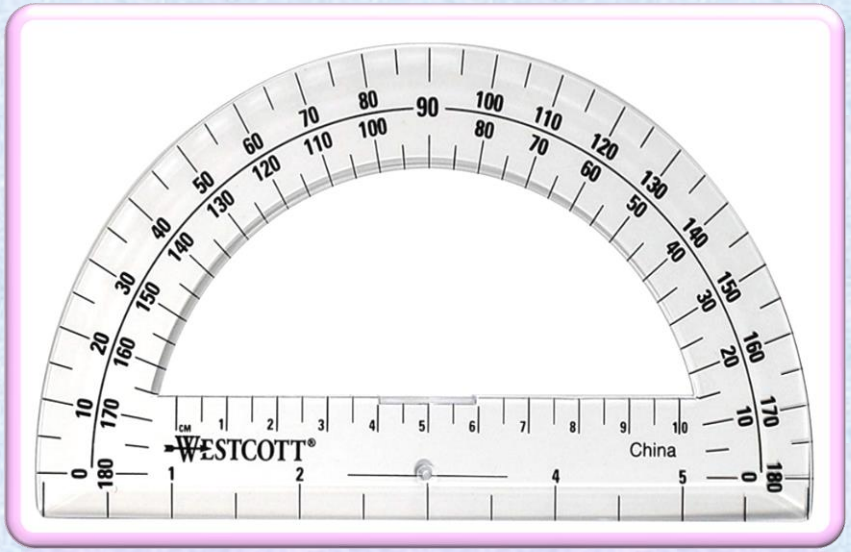


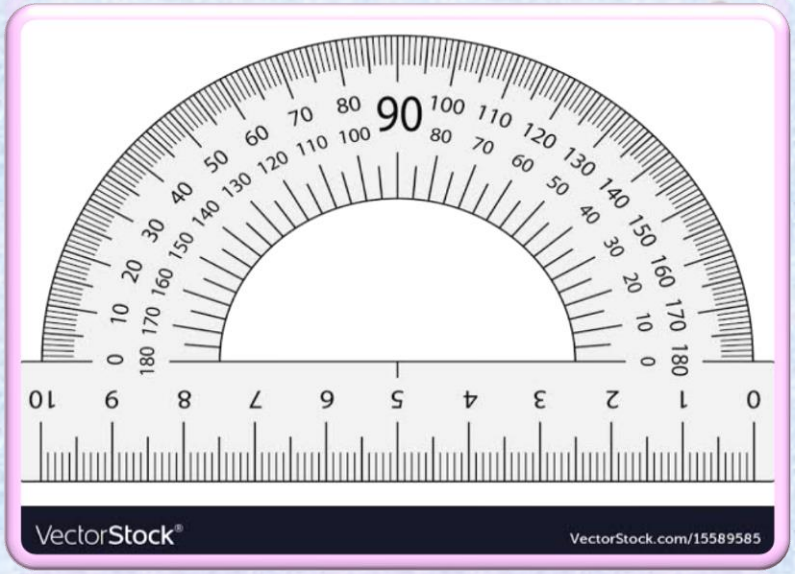


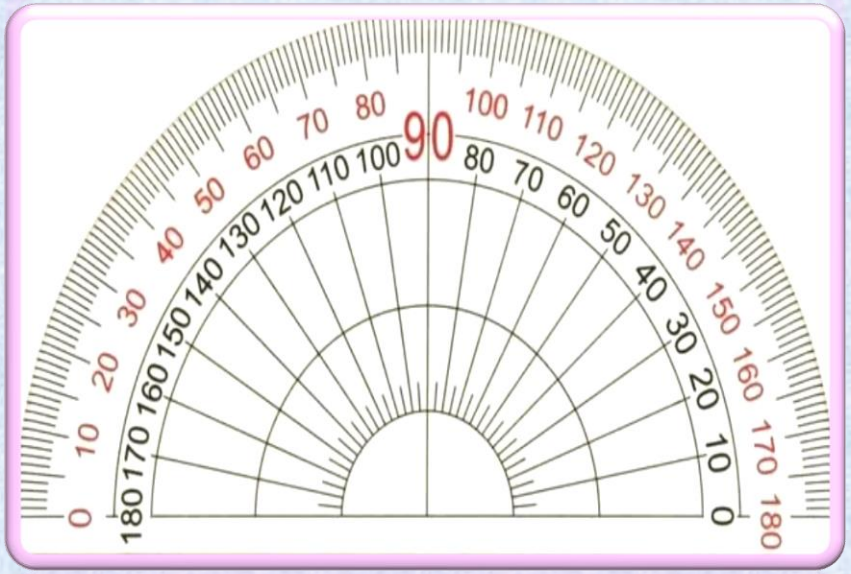


❑Protractor

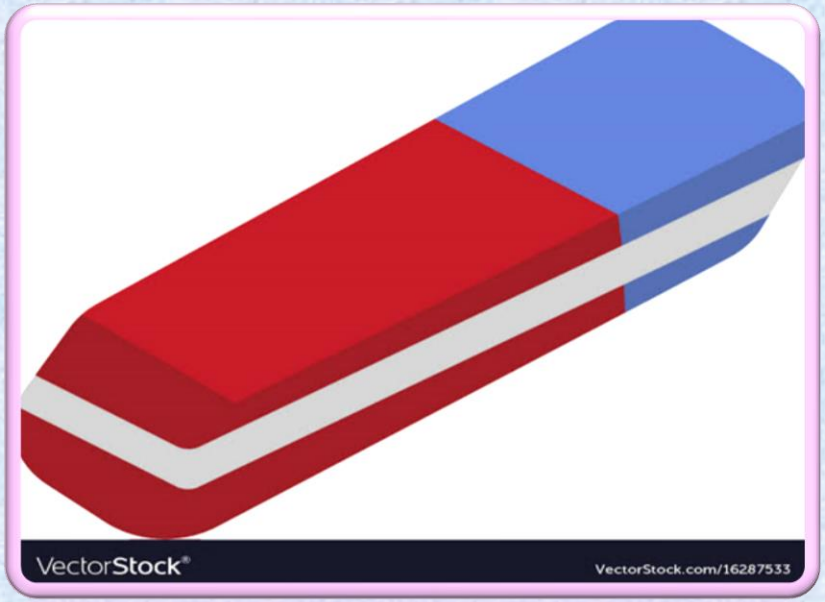




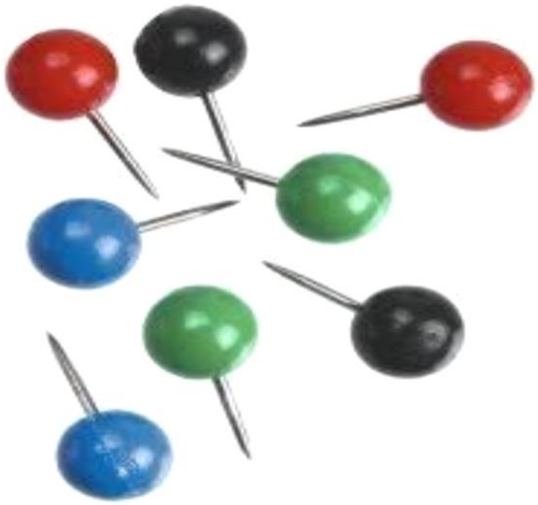




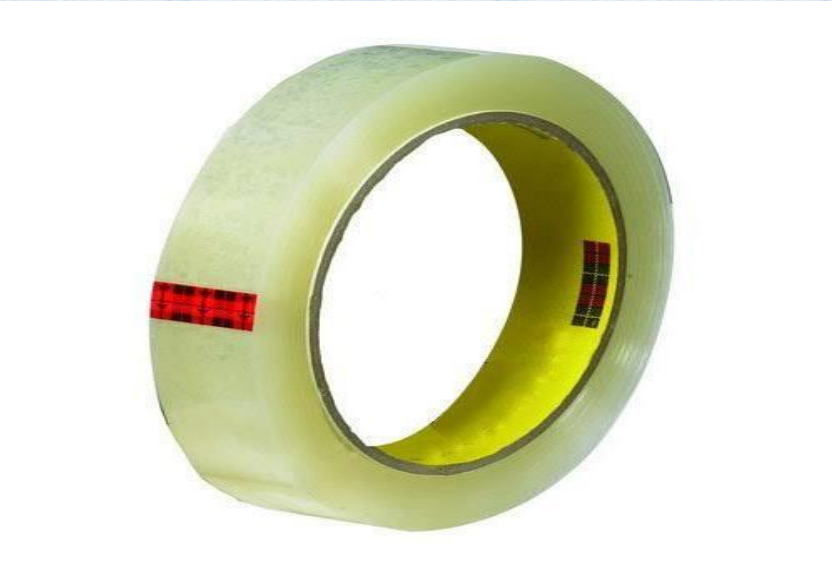
❑Eraser or Rubber



❑Board pin



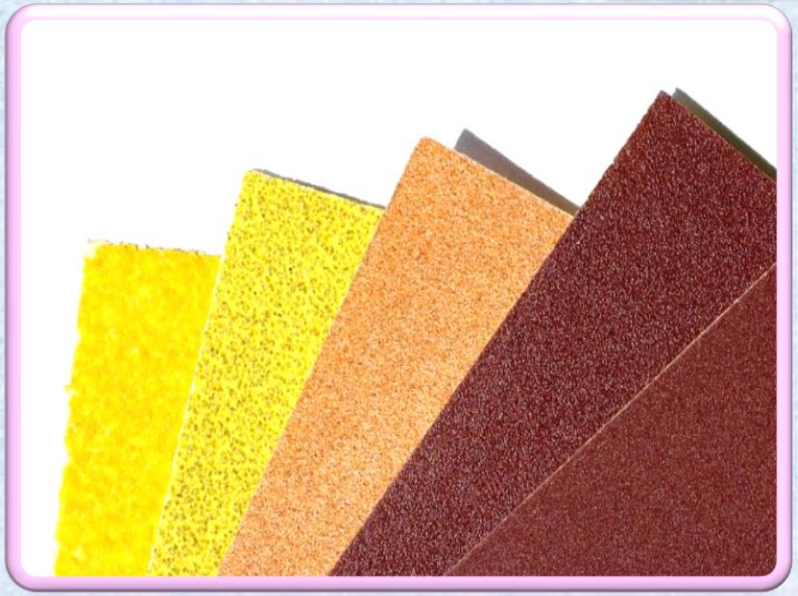
❑Scotch tape

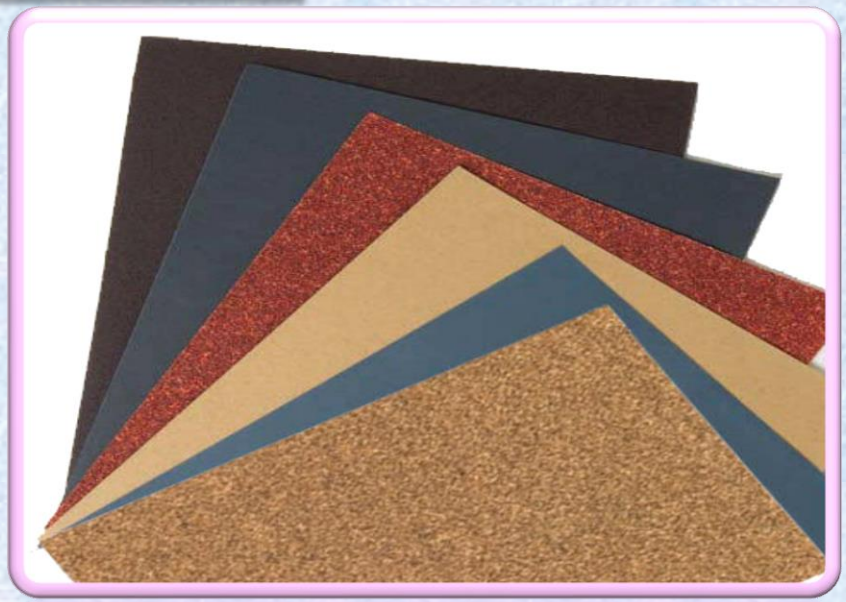


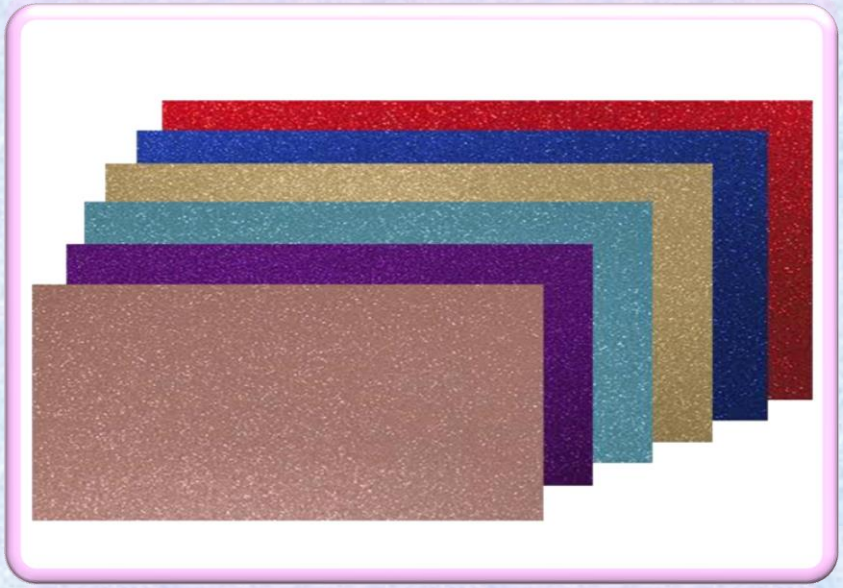
❑Scotch tape

❑Pencil sharpener

❑Sand Paper



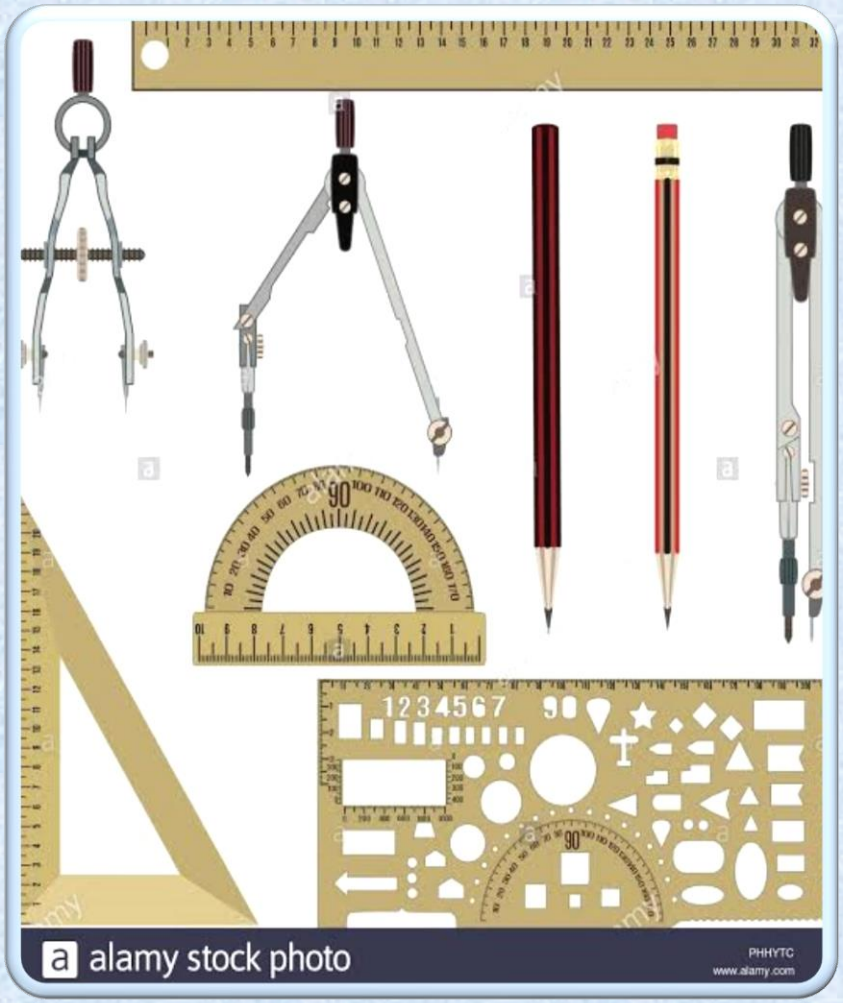




❑Duster cloth

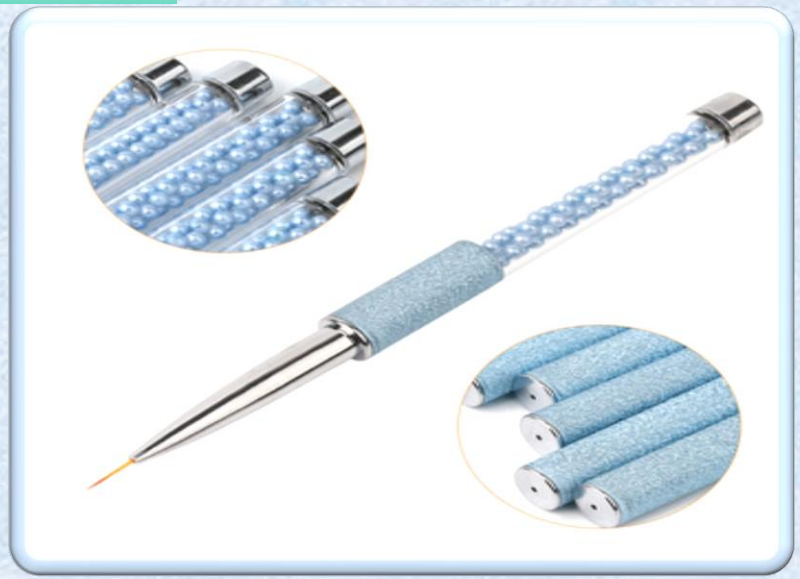
❑Instrument box

❑Instrument box



❑Lining pen

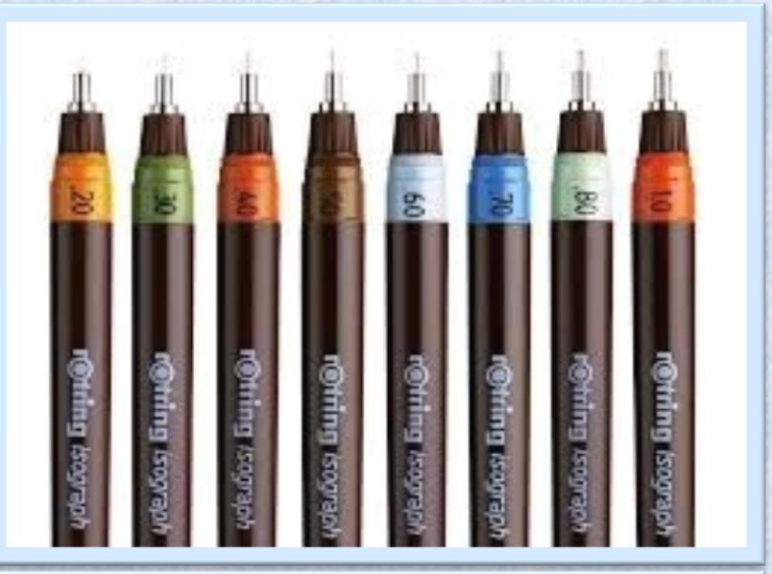
WATCH AUTO OILER



Gel Nail Brush Liner 3mm

Sharpie
ULTRA FINE POINT

❑ Drafting pen

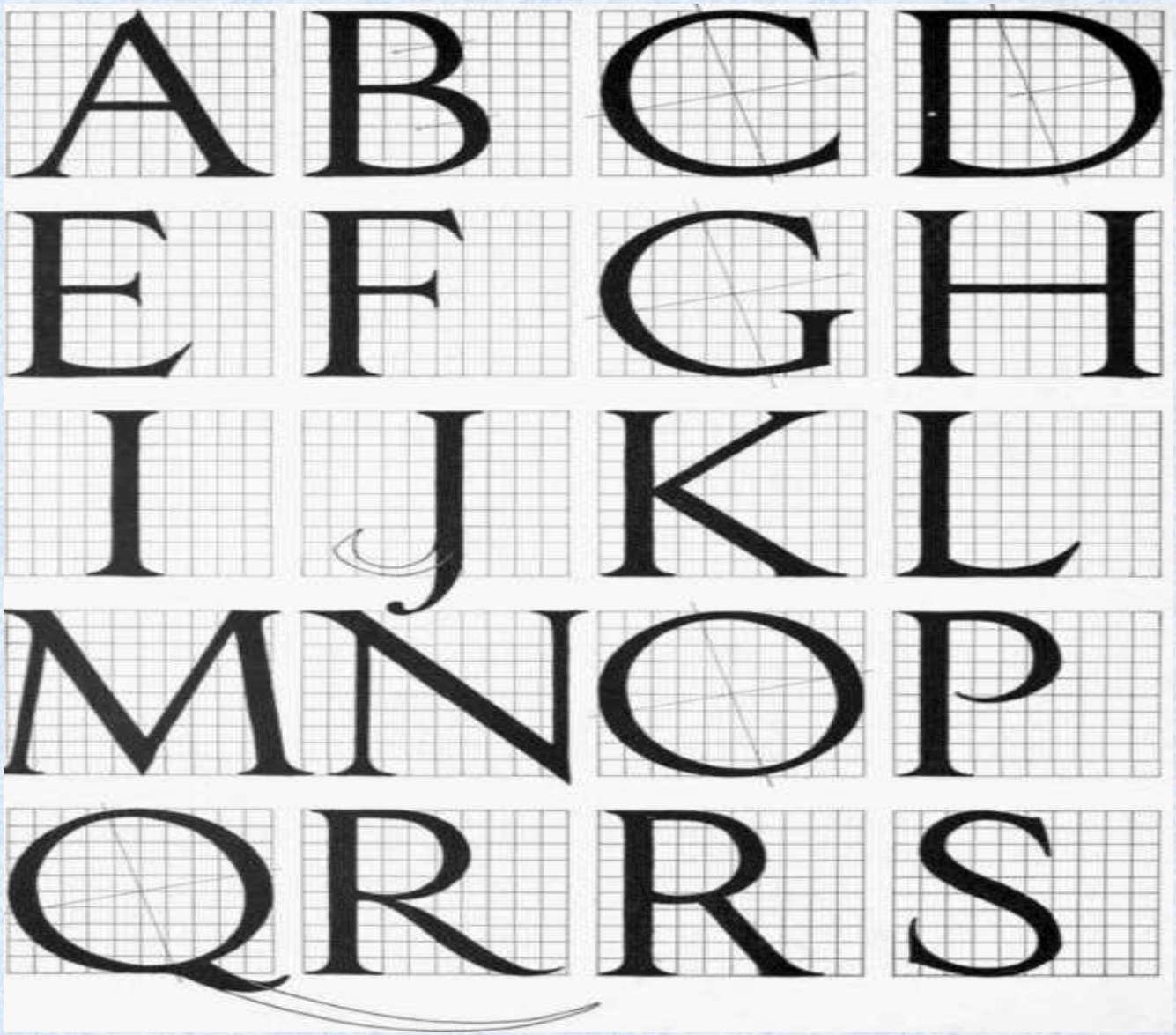


❑Lettering Numbering and Title Strip

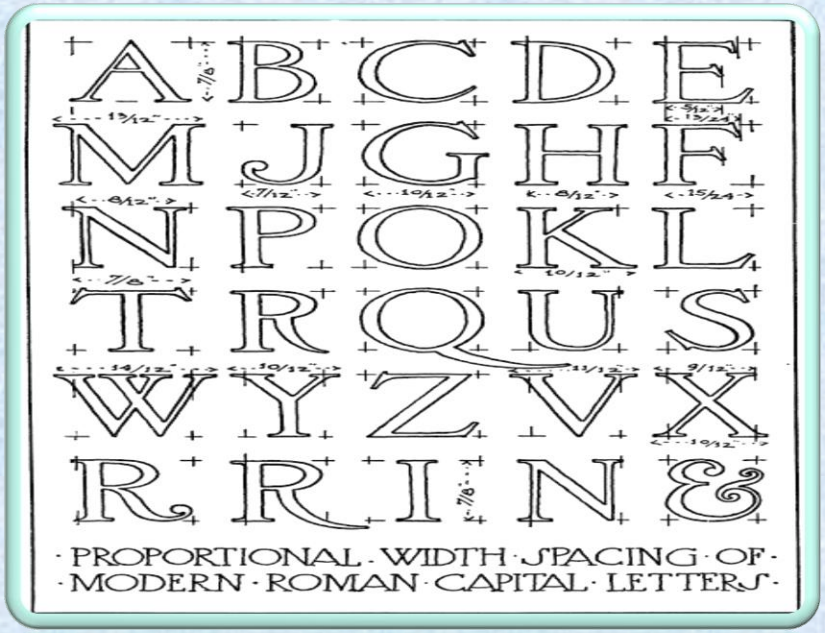
Gothic Letters:

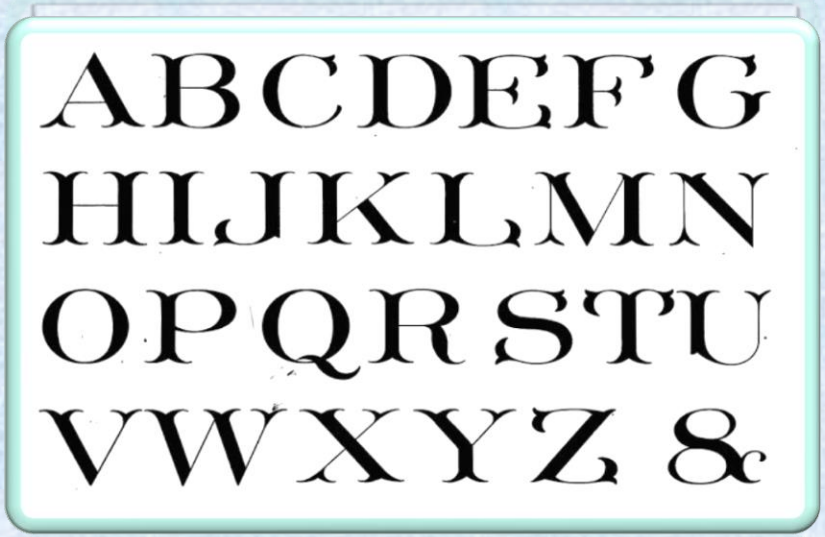
ABCDEFGHIJ
KLMNOPQRST
UVWXYZ

Old Roman Letters:

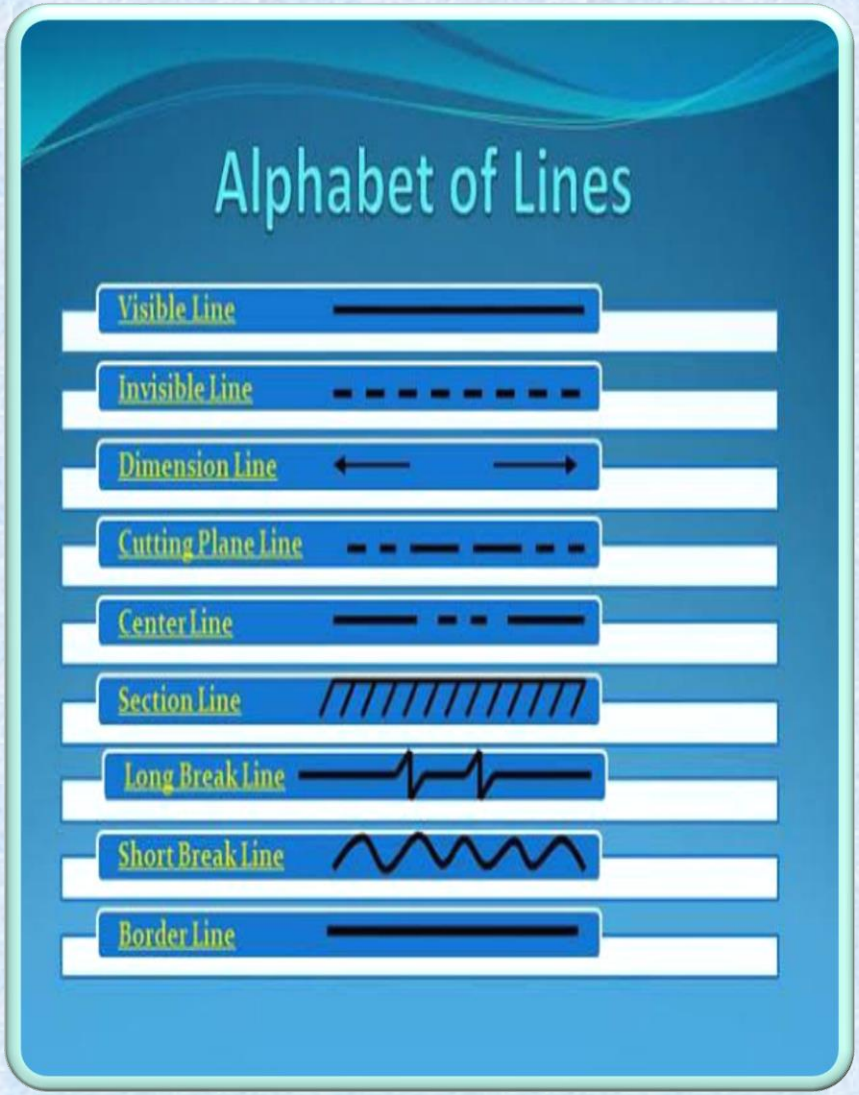


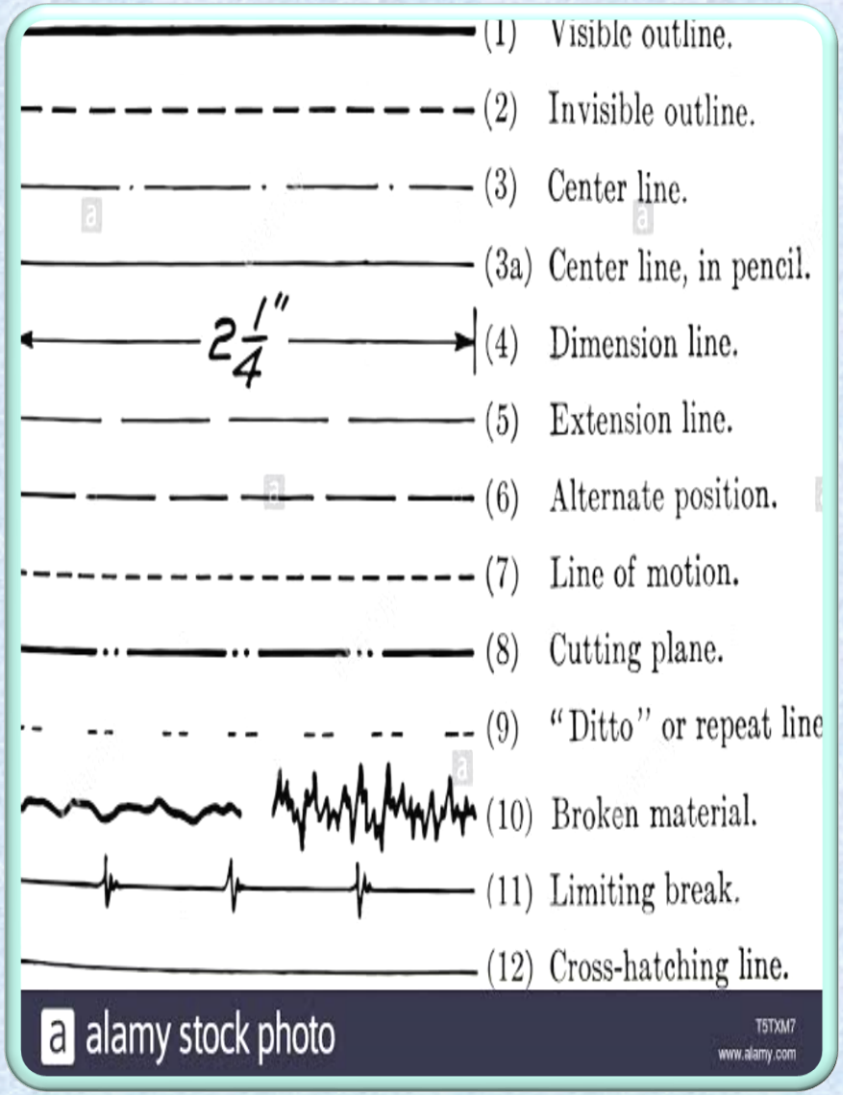
Modern Roman Letters:





❑Alphabet of Lines and Dimensioning





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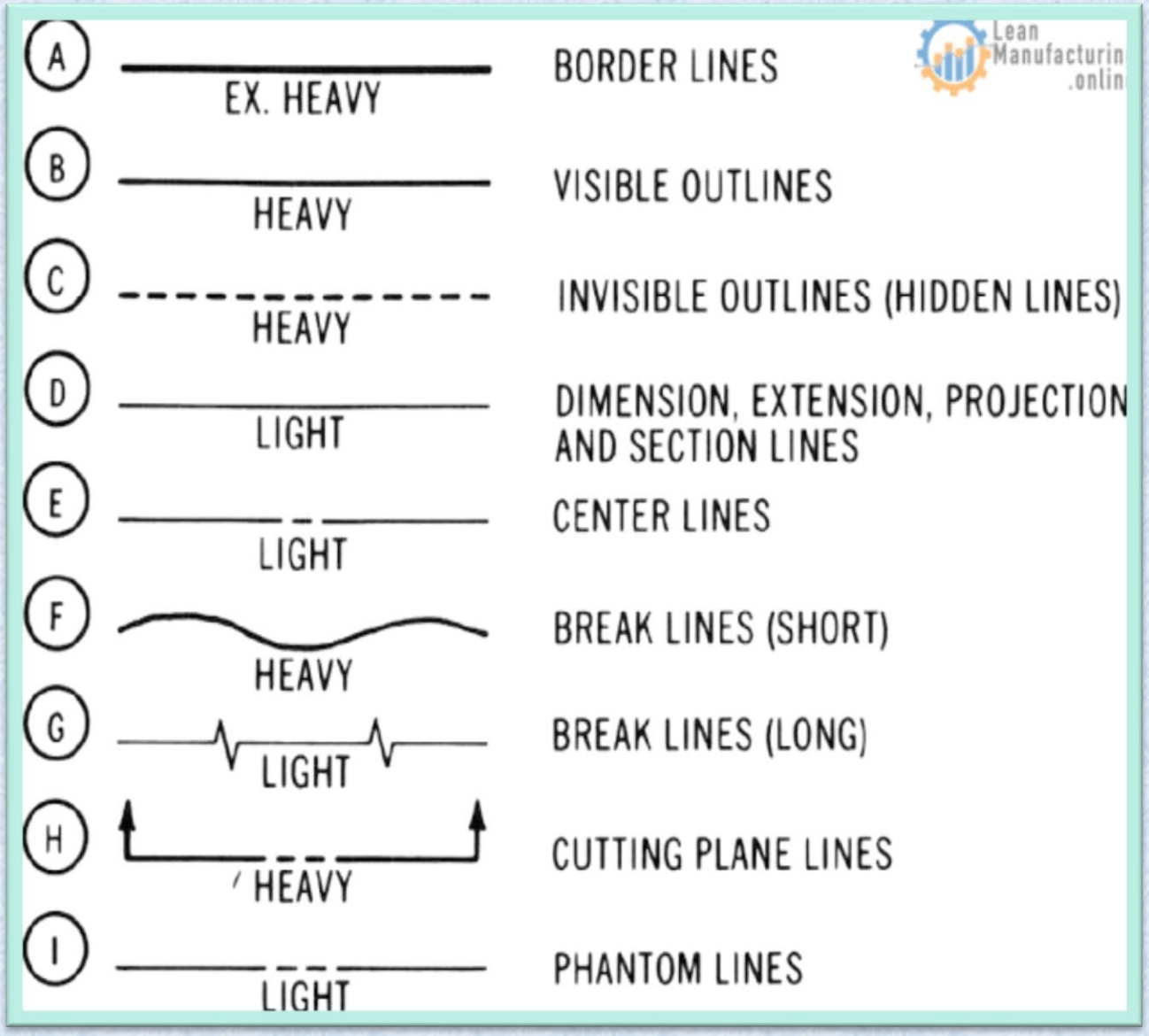


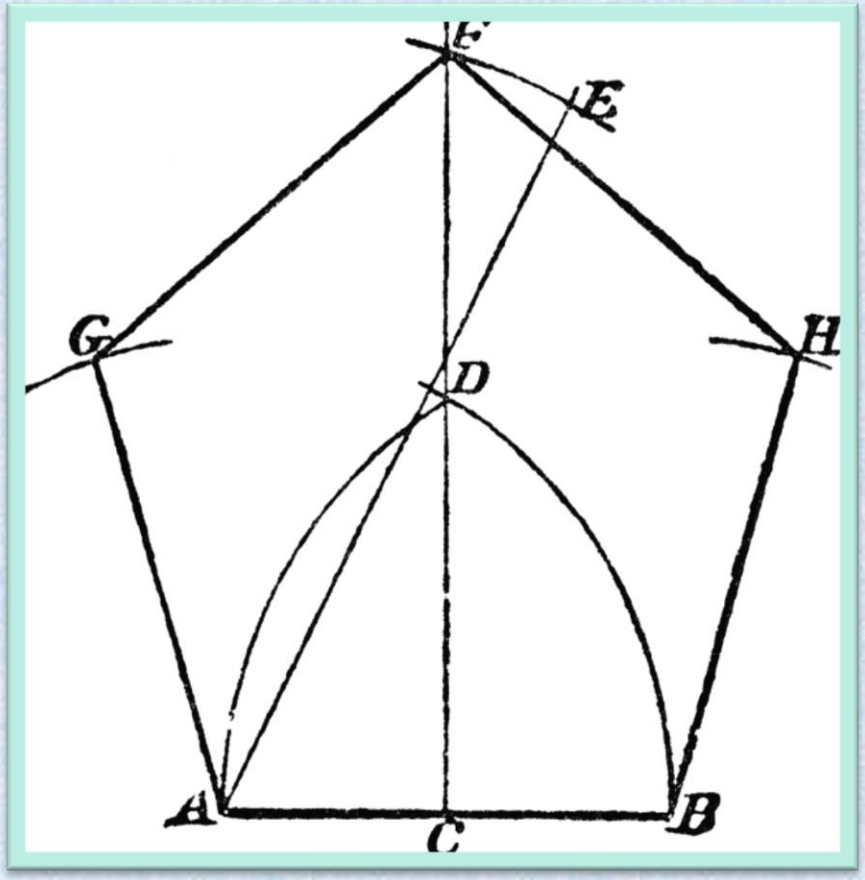
❑Description of Lines

Alphabet of Lines Test Review Key

1. Hidden lines represent an invisible edge on an object and are shown as thin, dark dashed lines.
2. What size lead (pencil) is used to draw a **section** line? .3 mm
3. Dimension lines show the length, width, and height of the features of an object and are shown as dark, thin lines.
4. What size lead (pencil) is used to draw an **object/visible** line? .7mm
5. What size lead (pencil) is used to draw a **leader** line? .3mm
6. Section lines symbolize different parts of an object or different materials from which an object is manufactured and are shown as thin "cross hatching" lines drawn at 45 degree angles.
7. Extension lines show the starting and stopping points of a dimensions and are shown as dark, thin lines.
8. What size lead (pencil) is used to draw a **center** line? .3mm
9. Cutting plane lines indicate where an imaginary cutting plane passes through an object, for viewing or sectioning purposes and are shown as thick, broken lines.
10. What size lead (pencil) is used to draw a **cutting plane** line? .7mm
11. Object or Visible lines show the outline and shape of an object and are show as thick, dark solid lines.
12. What size lead (pencil) is used to draw a **hidden** line? .5mm
13. What size lead (pencil) is used to draw an **extension** line? .3mm
14. Center lines show the middle of holes, slots, paths of rotation, circles, radius, and symmetrical objects and are shown as a thin line consisting of long and short dashes.
15. Phantom lines indicate alternate positions of moving parts, lines of motion, adjacent parts, and repetitive details and are shown as thin lines made up of long dashes alternating with pairs of short dashes.
16. What size lead (pencil) is used to draw a **break** line? .7mm (short) or .5mm (long)
17. Leader lines are used to point to a place on an object to note specific locations like diameters and fillets and are shown as thin lines with arrows at the end.
18. What size lead (pencil) is used to draw a **dimension** line? .3mm
19. Break lines are used to shorten a view, or eliminate repetitive details when an entire view is not necessary and are shown as either thick wavy freehand lines (short) or thin straight zig-zags (long).
20. What size lead (pencil) is used to draw a **phantom** line? .5mm

❑Geometrical Construction & Conic Section

To Construct a regular pentagon:



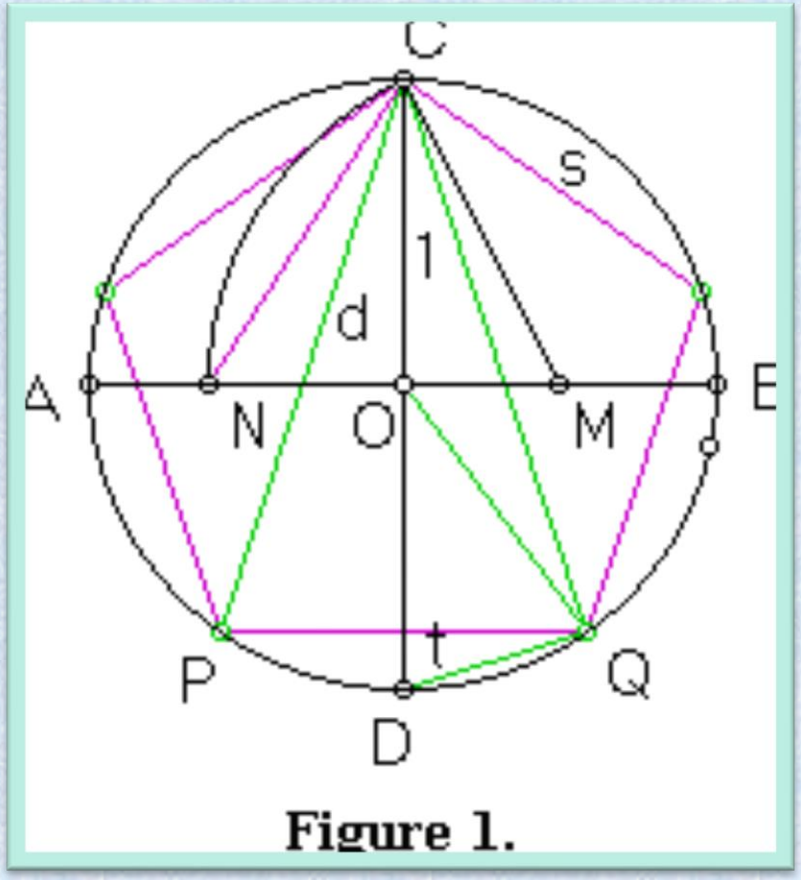
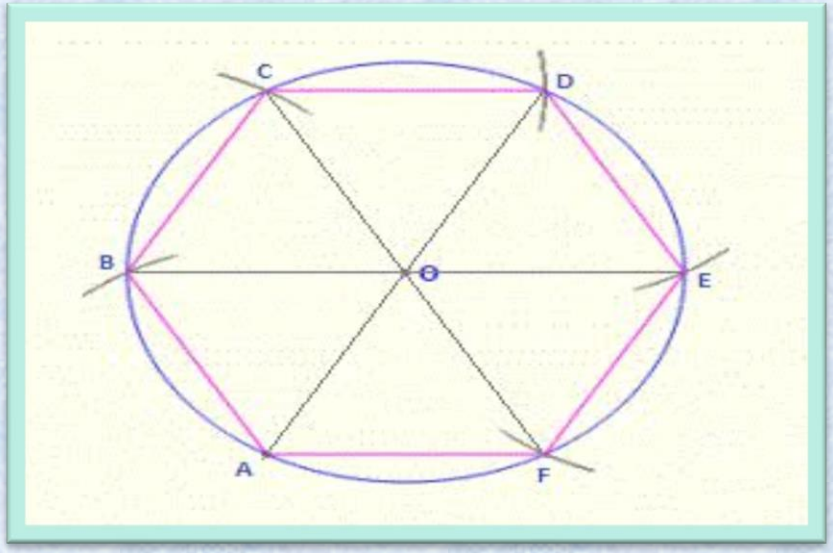
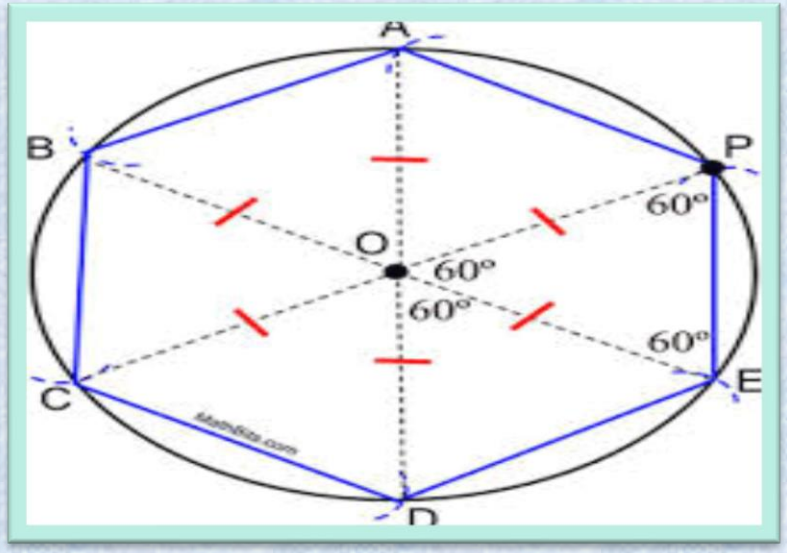
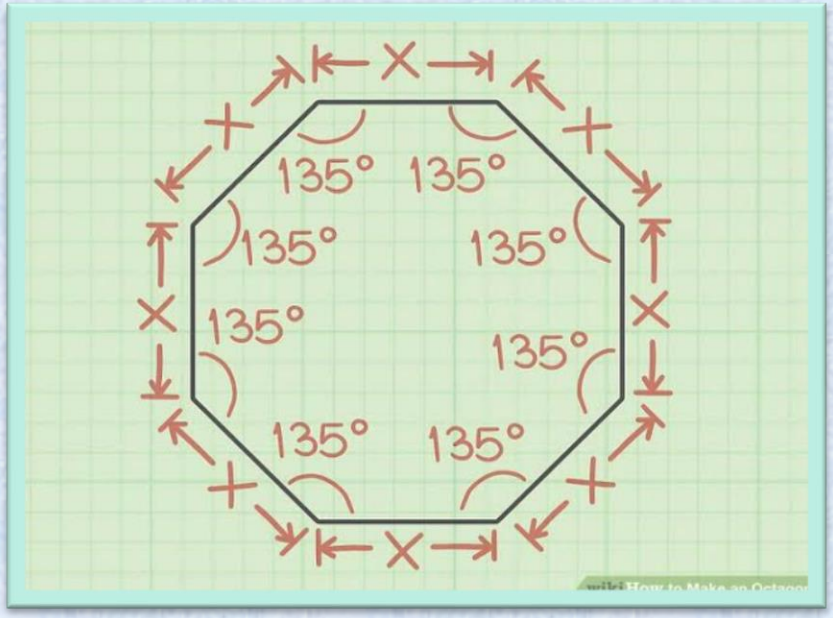


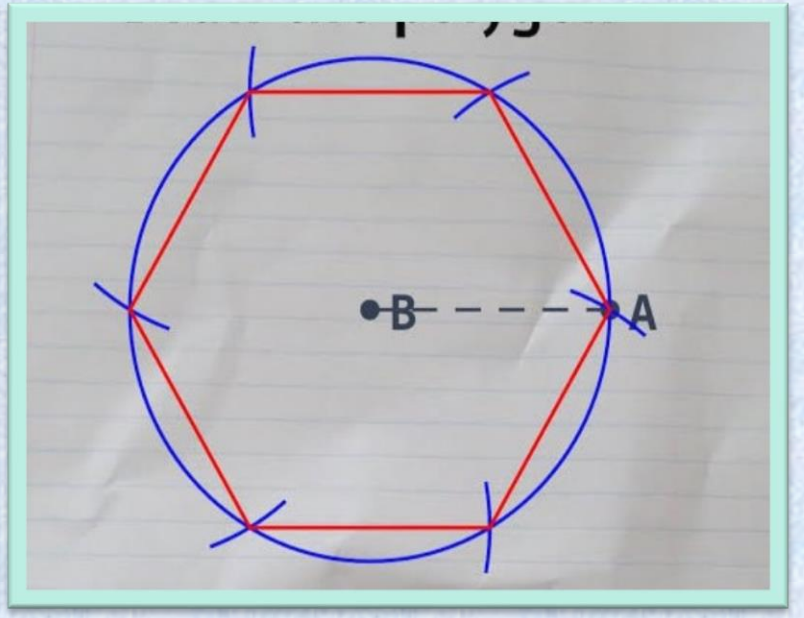
Figure 1.

To Construct a regular hexagon:

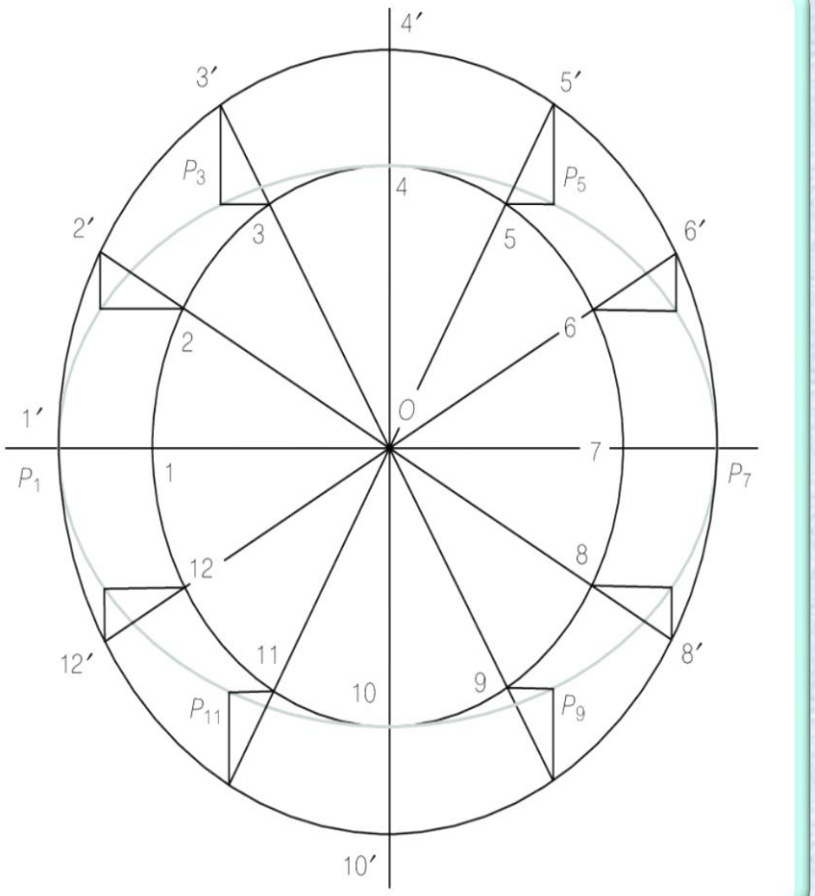


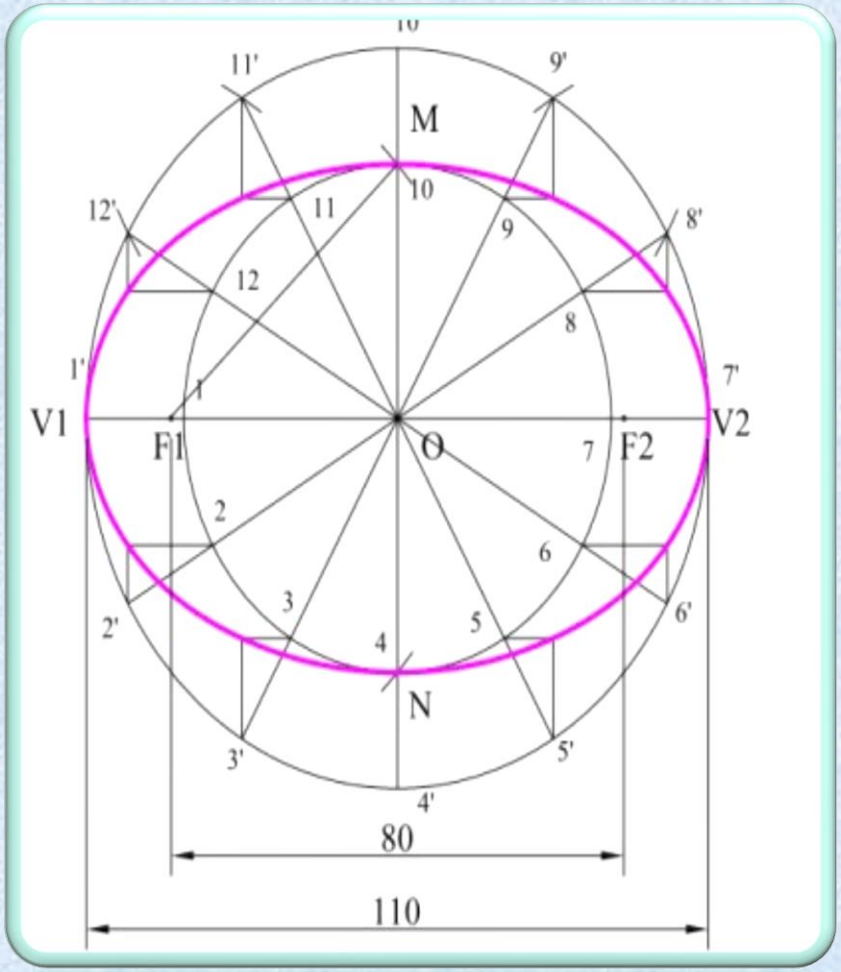




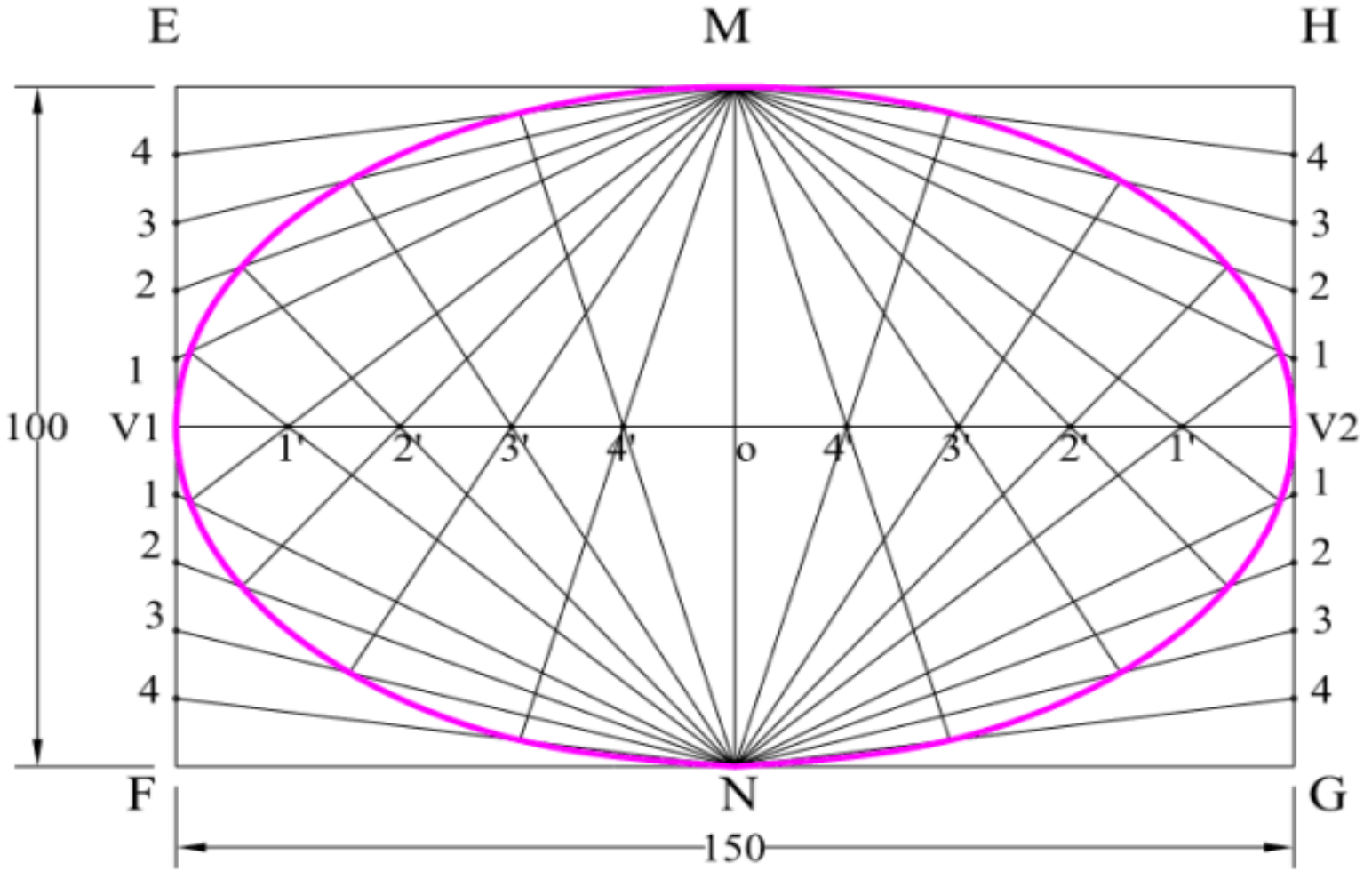


To draw an ellipse by circle method, the major and minor axes being given:

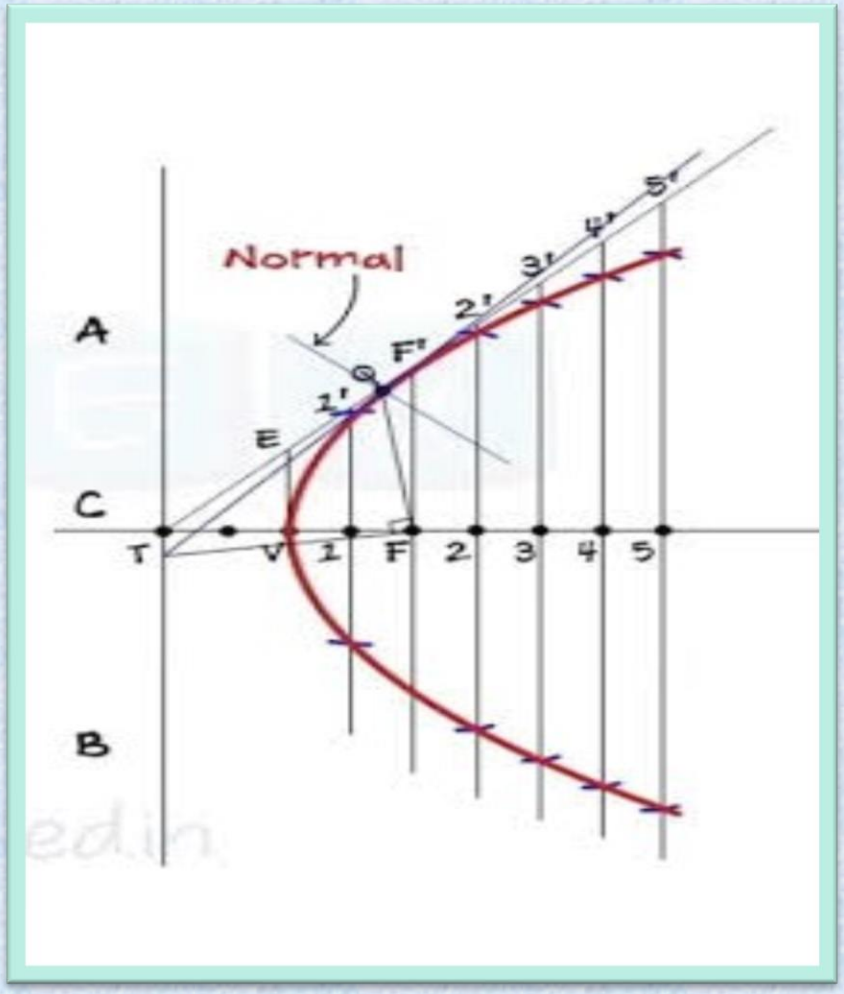


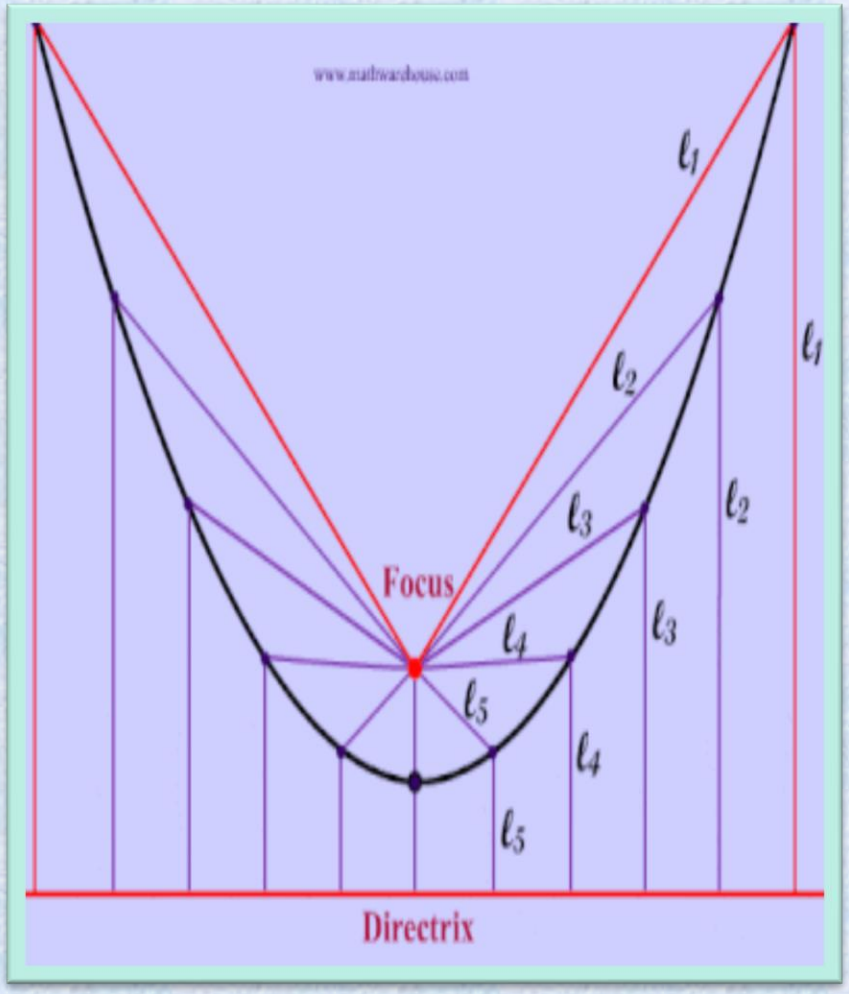


To draw an ellipse by parallelogram method, the major and minor axes being given:



To draw a parabola,the focus and directrix being given:



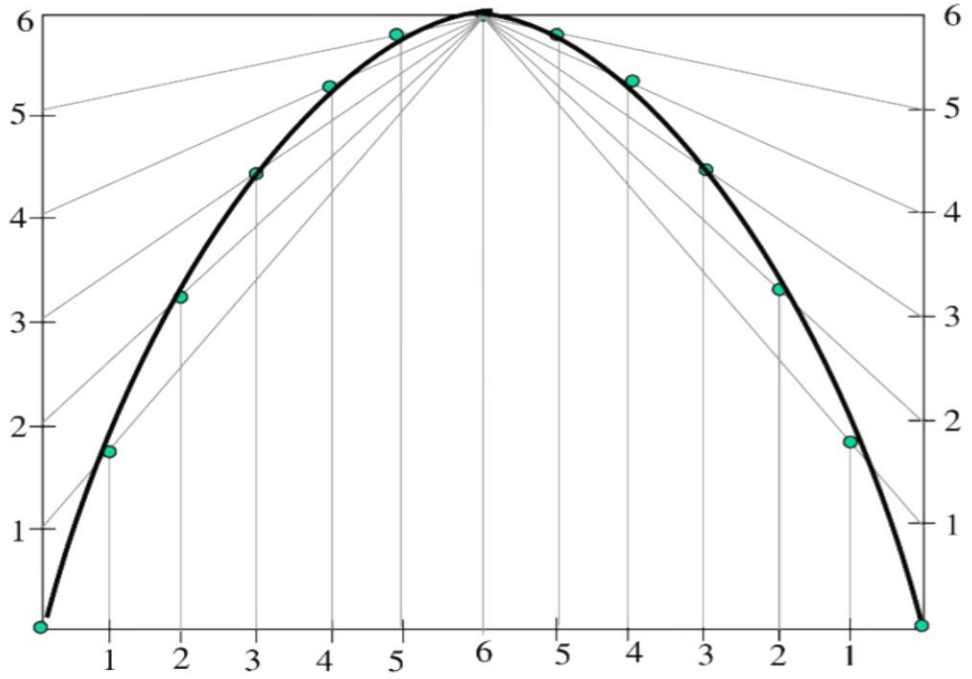


To draw a parabola,the abscissa and ordinate being given:

PROBLEM 7: A BALL THROWN IN AIR ATTAINS 100 M HIEGHT AND COVERS HORIZONTAL DISTANCE 150 M ON GROUND. Draw the path of the ball (projectile)-

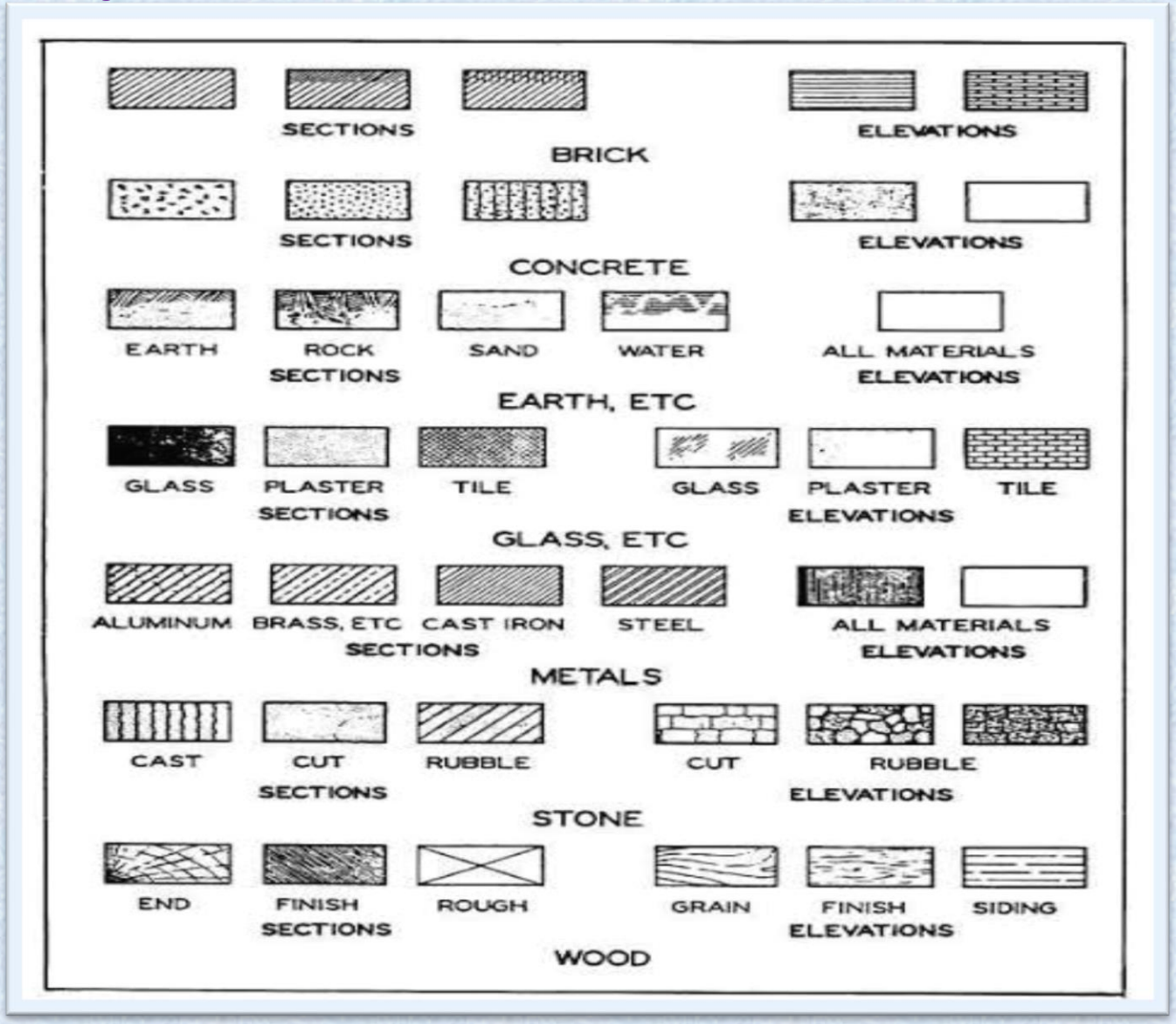
PARABOLA
RECTANGLE METHOD

STEPS:
1. Draw rectangle of above size and divide it in two equal vertical parts
2. Consider left part for construction. Divide height and length in equal number of parts and name those 1,2,3,4,5& 6
3. Join vertical 1,2,3,4,5 & 6 to the top center of rectangle
4. Similarly draw upward vertical lines from horizontal1,2,3,4,5 And wherever these lines intersect previously drawn inclined lines in sequence Mark those points and further join in smooth possible curve.
5. Repeat the construction on right side rectangle also.Join all in sequence. **This locus is Parabola.**

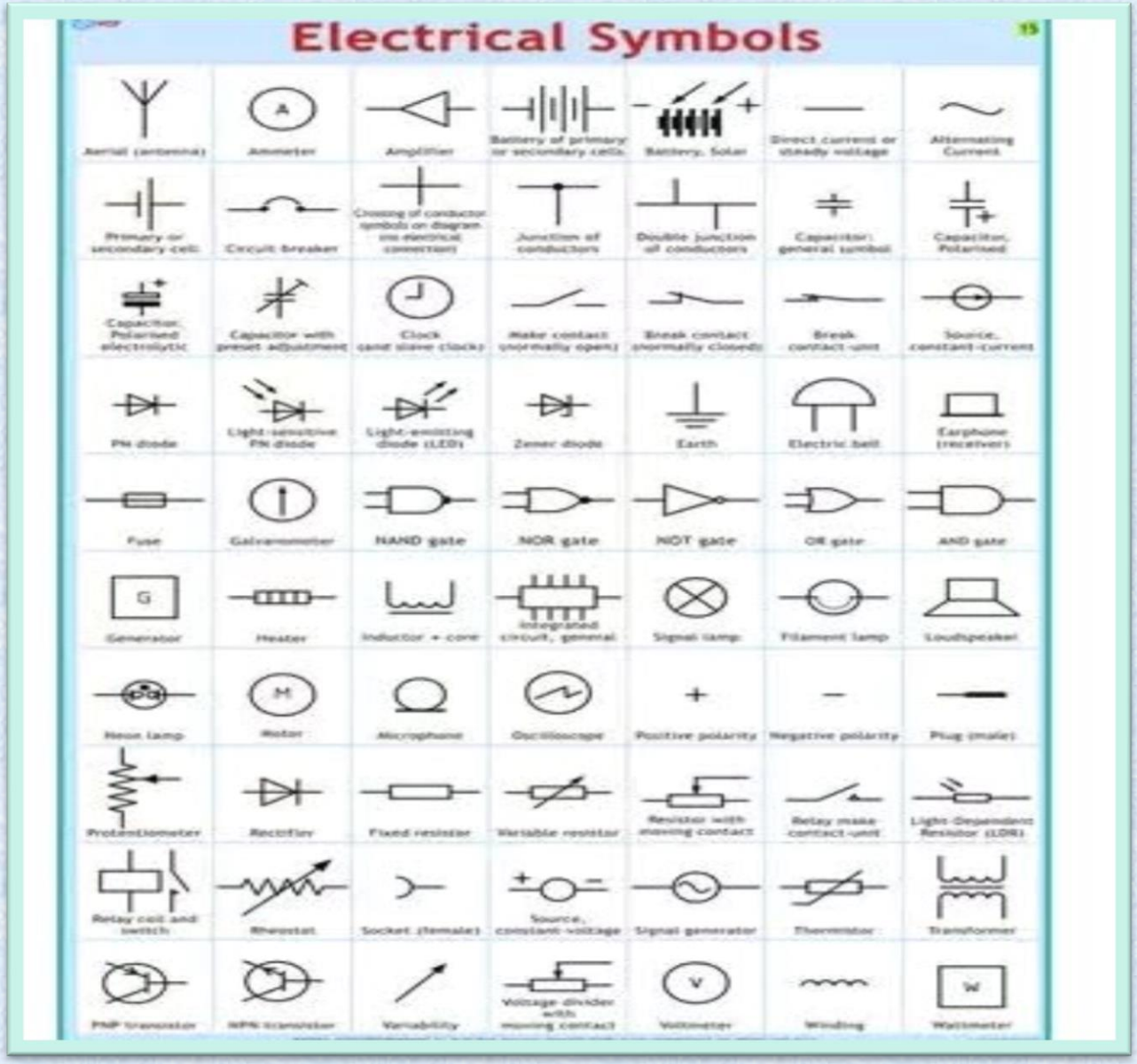


❑Symbols

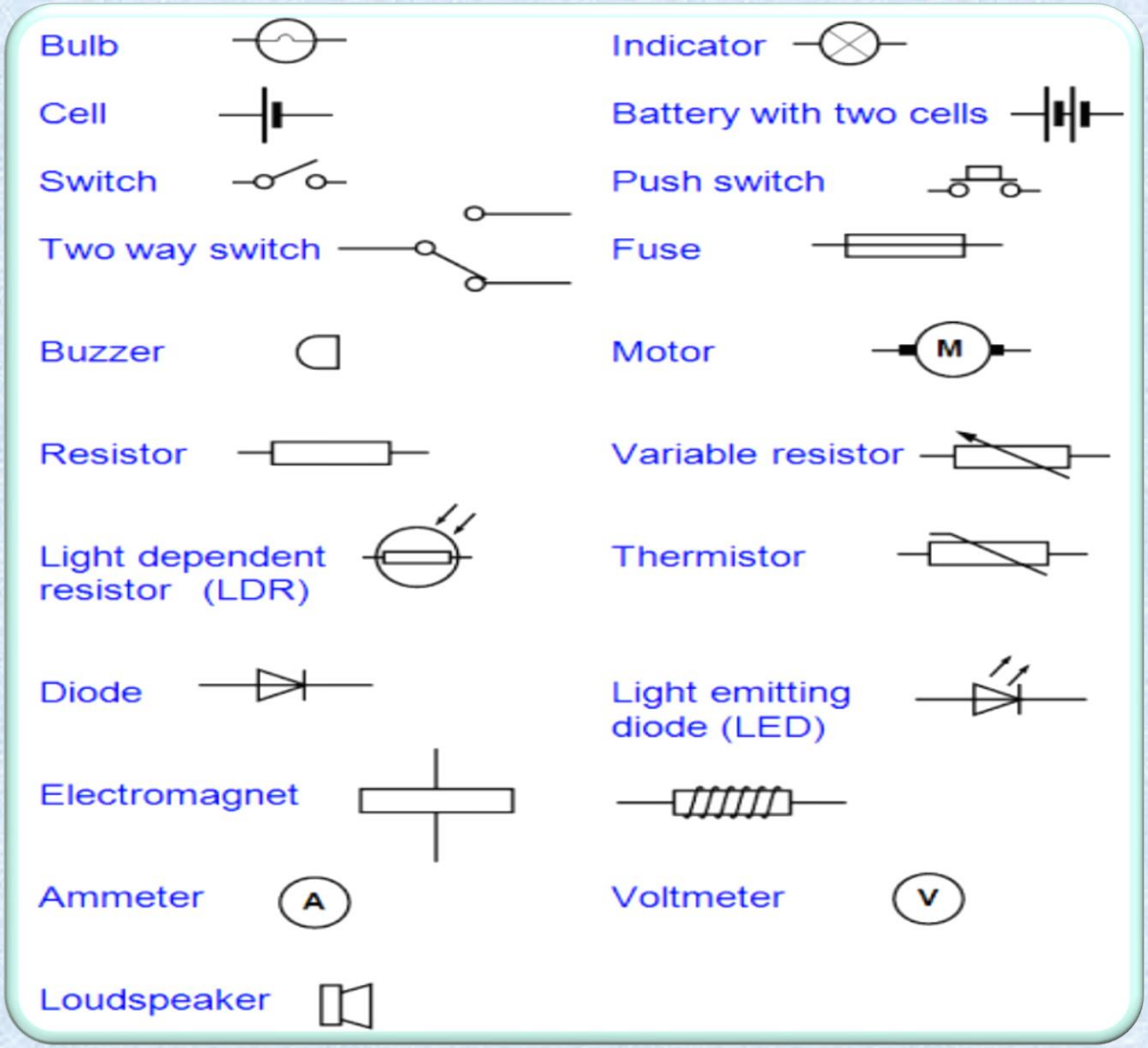
Architectural symbols:



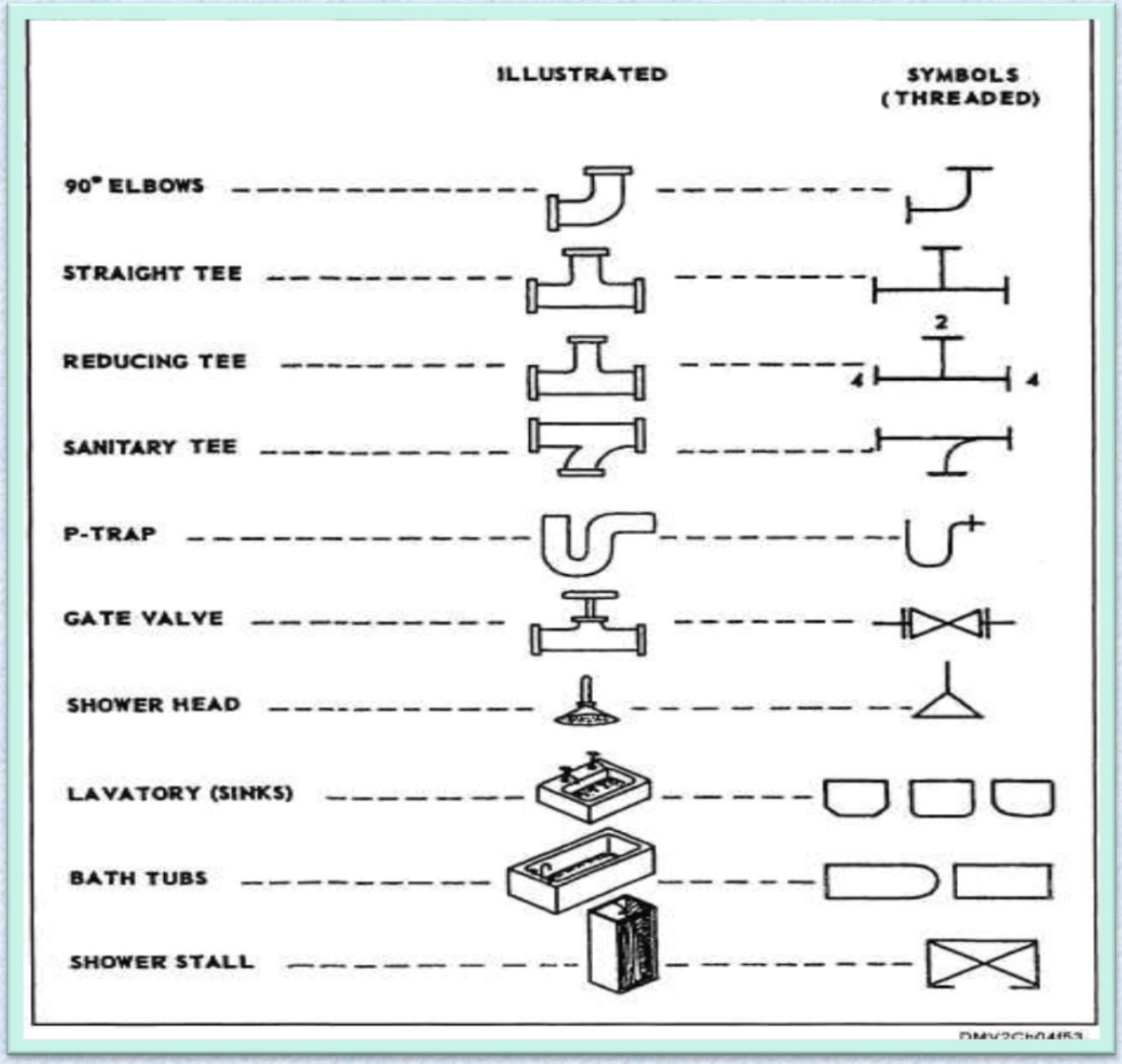
Electrical symbols:



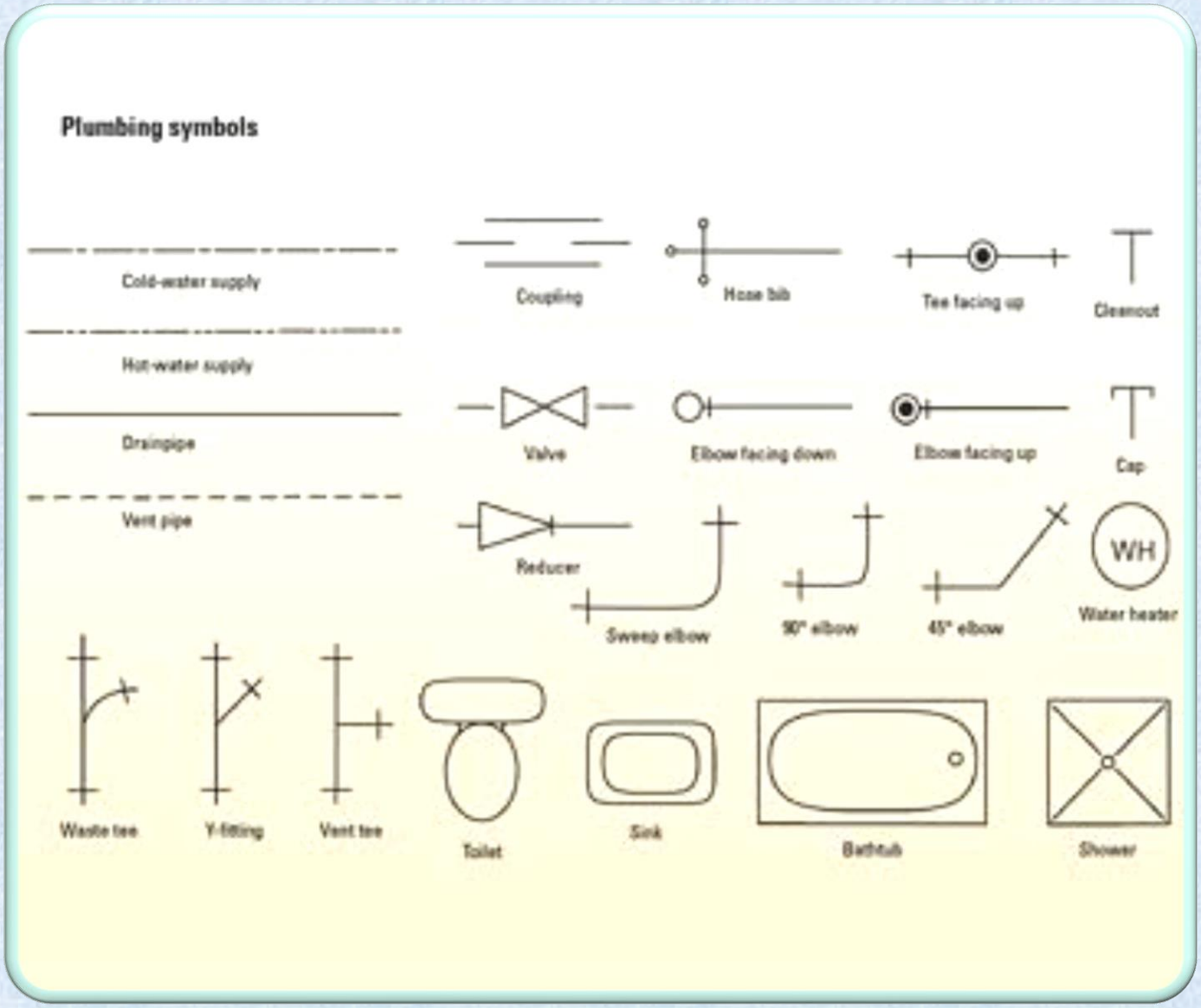
Electrical symbols:



Plumbing symbols:

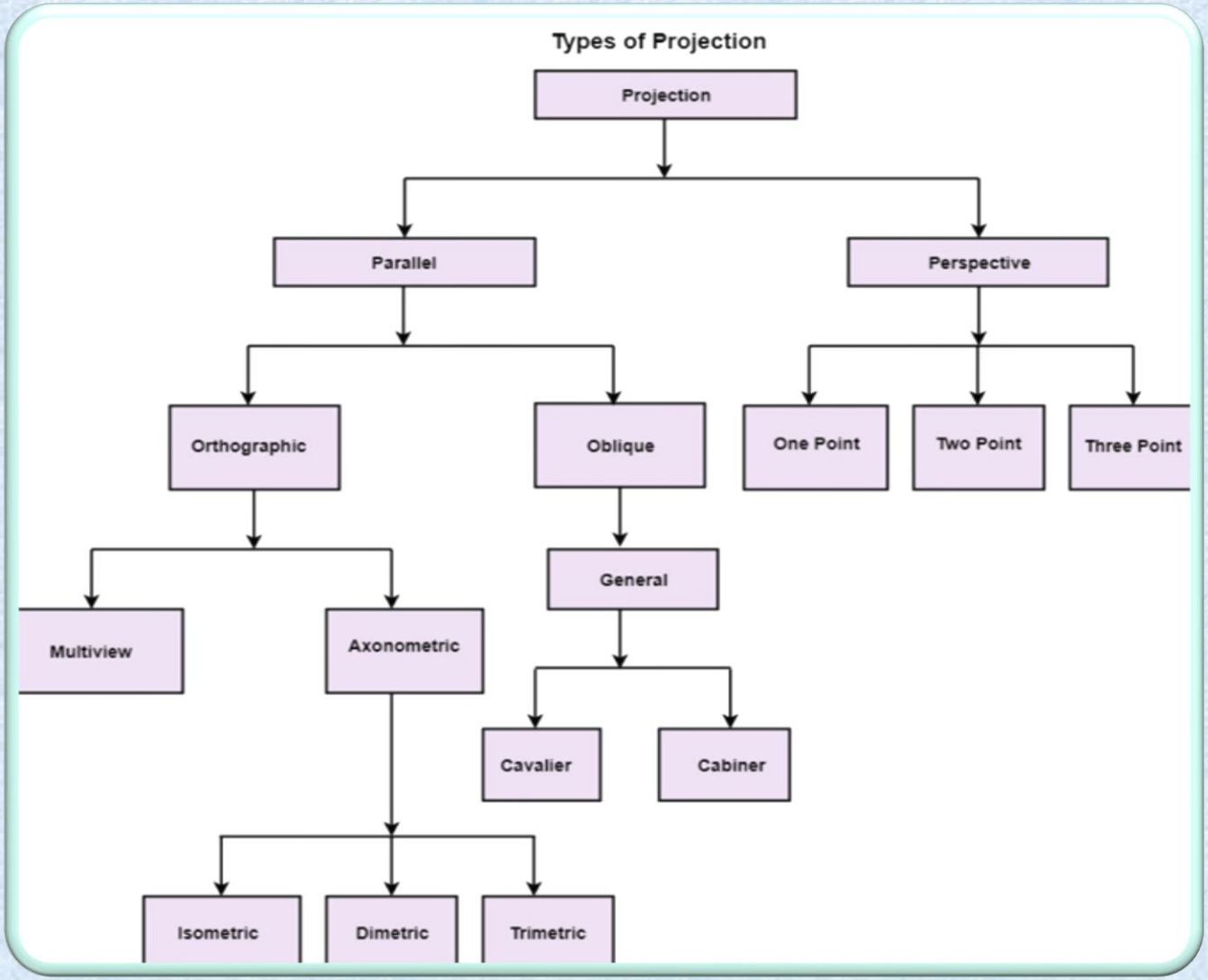


Plumbing symbols:

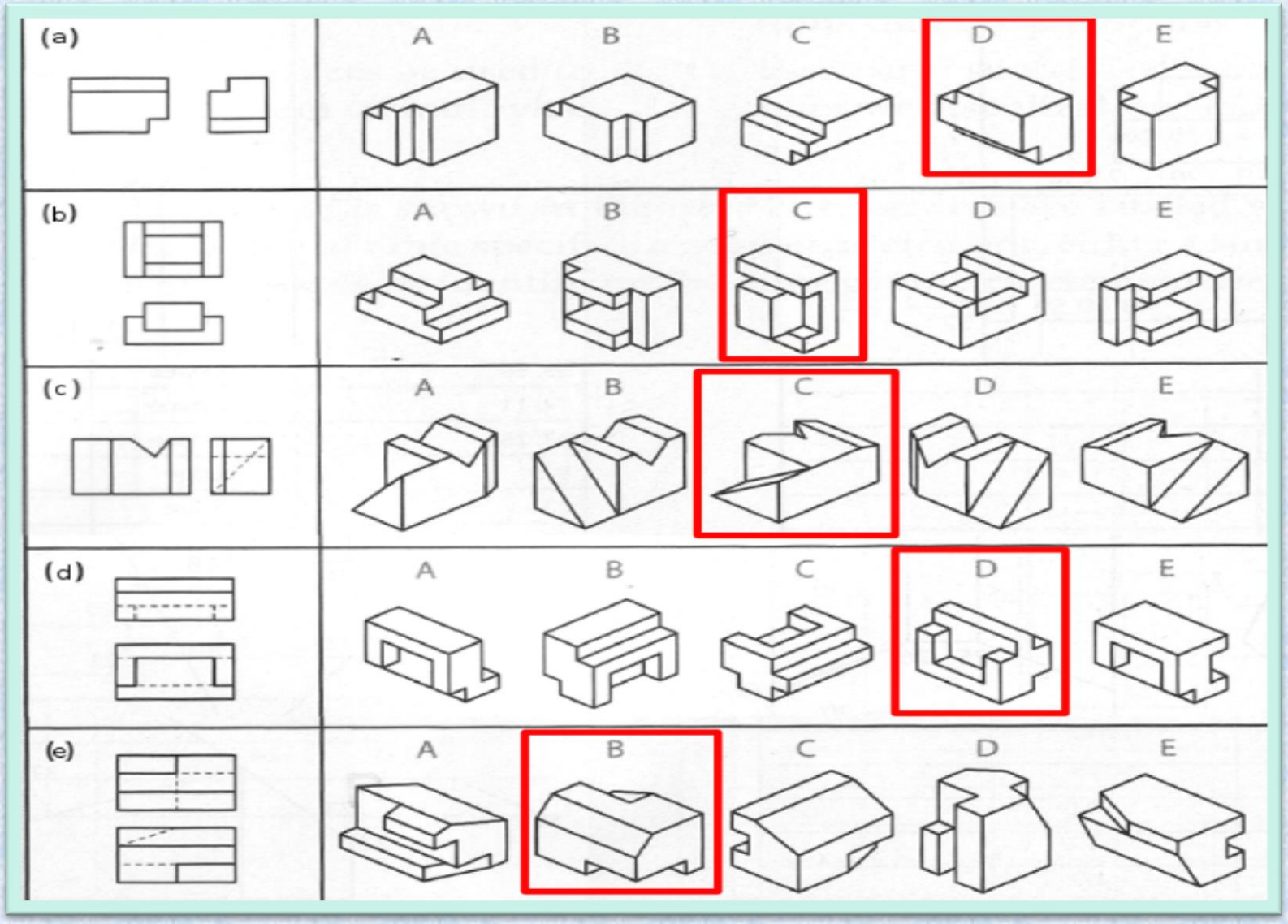


❑Projection

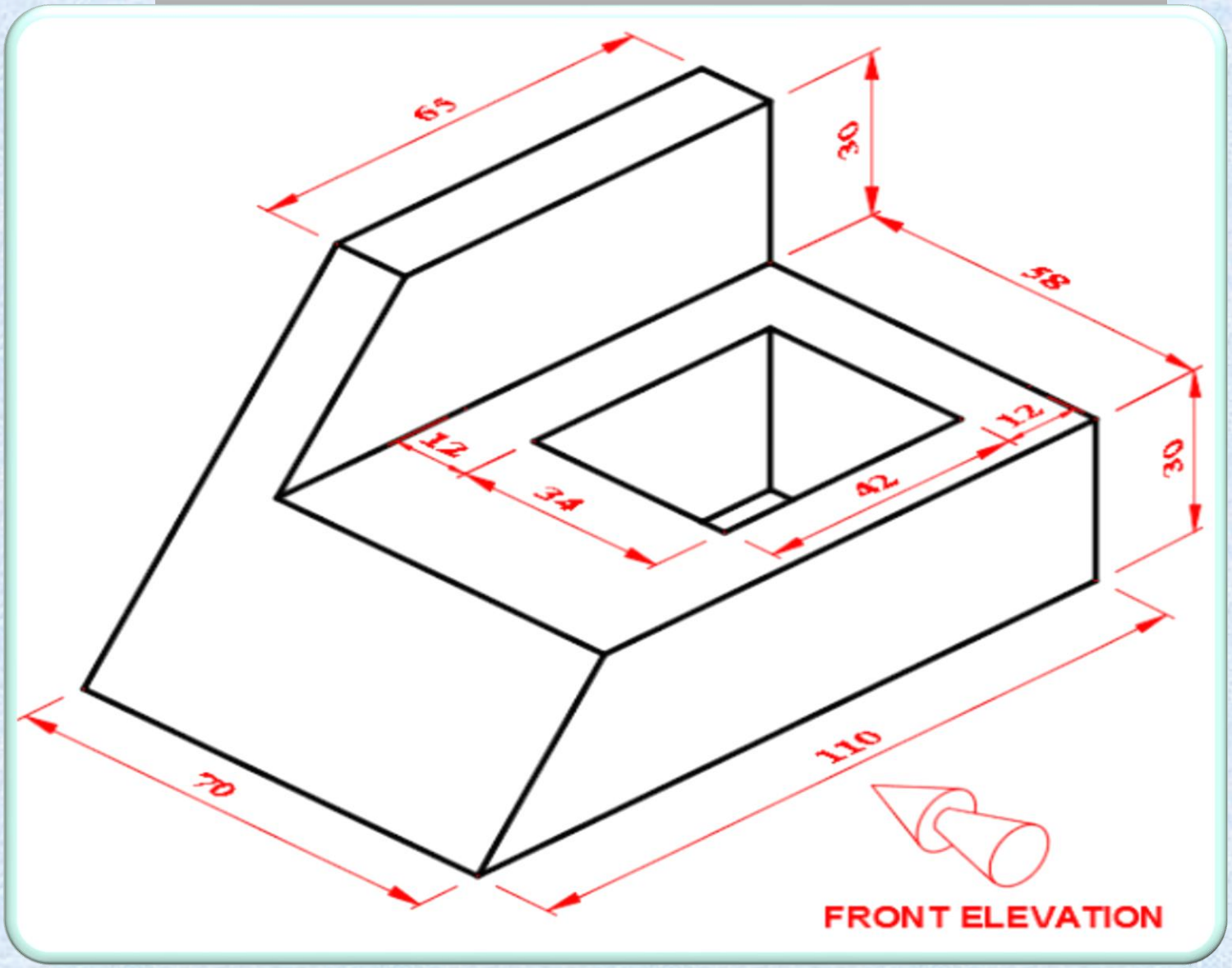
❑*Classification of Projection:*



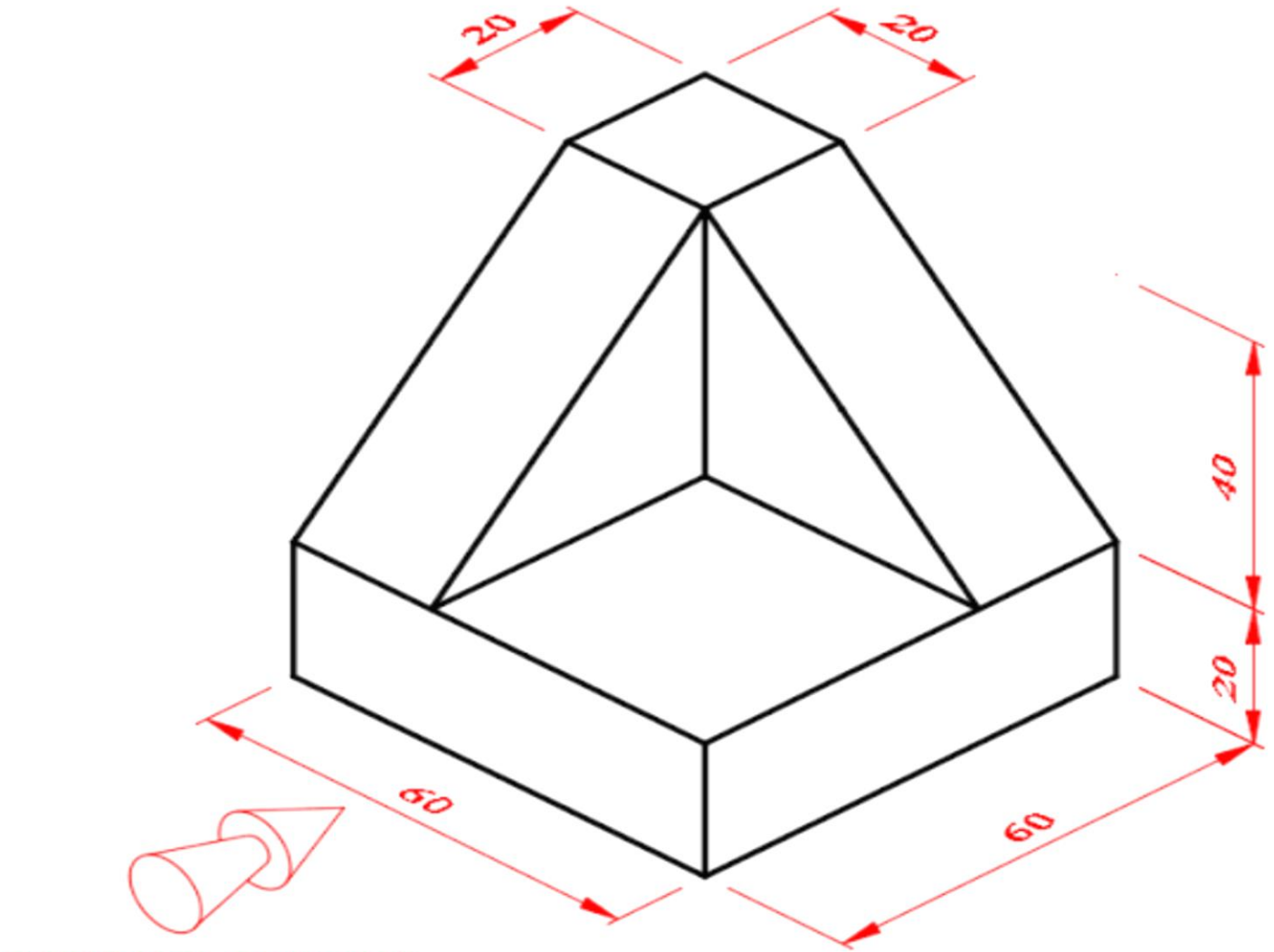
❑Different Orthographic Projection



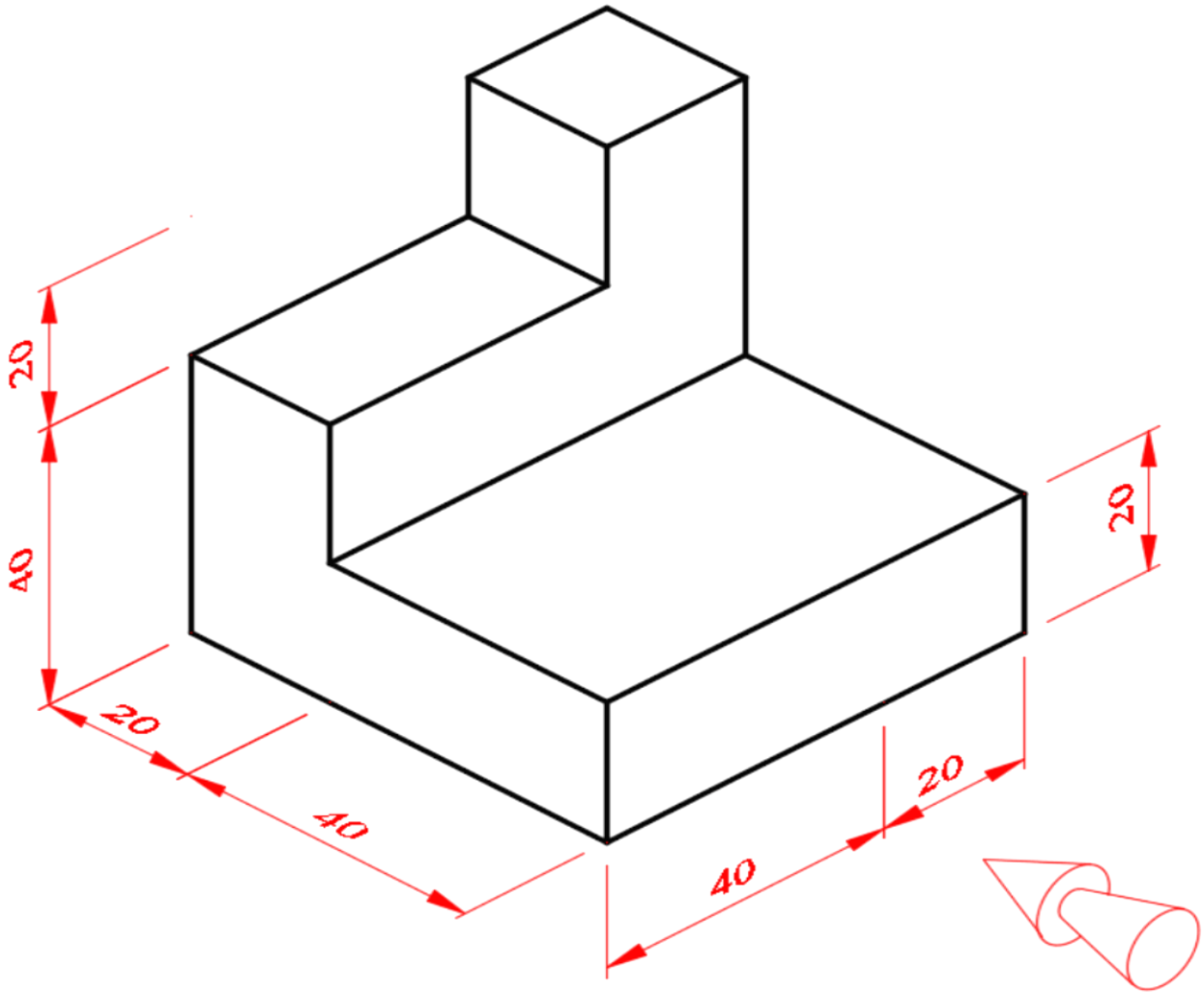
❑Different Orthographic Projection



❑Different Orthographic Projection



❑Different Orthographic Projection



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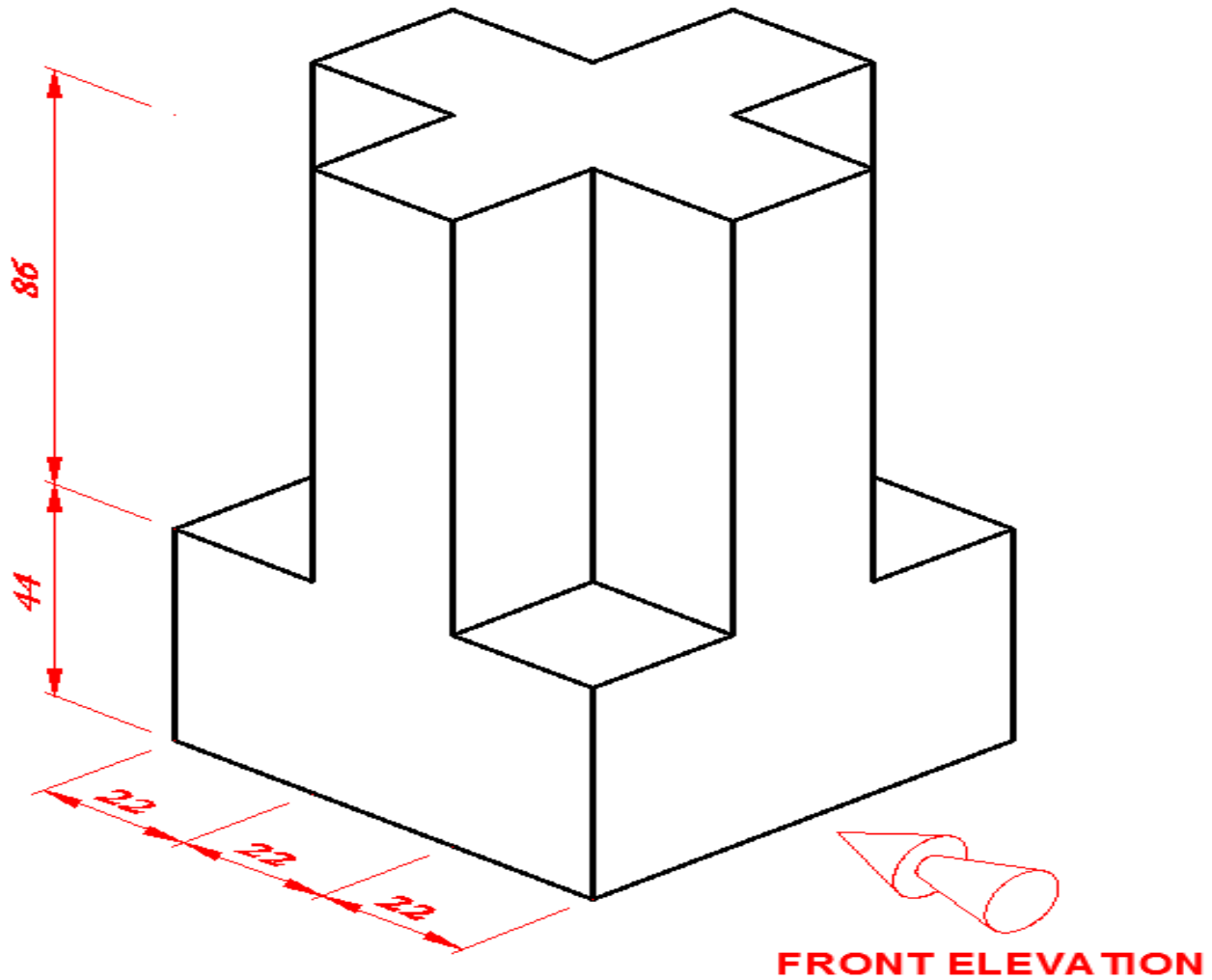

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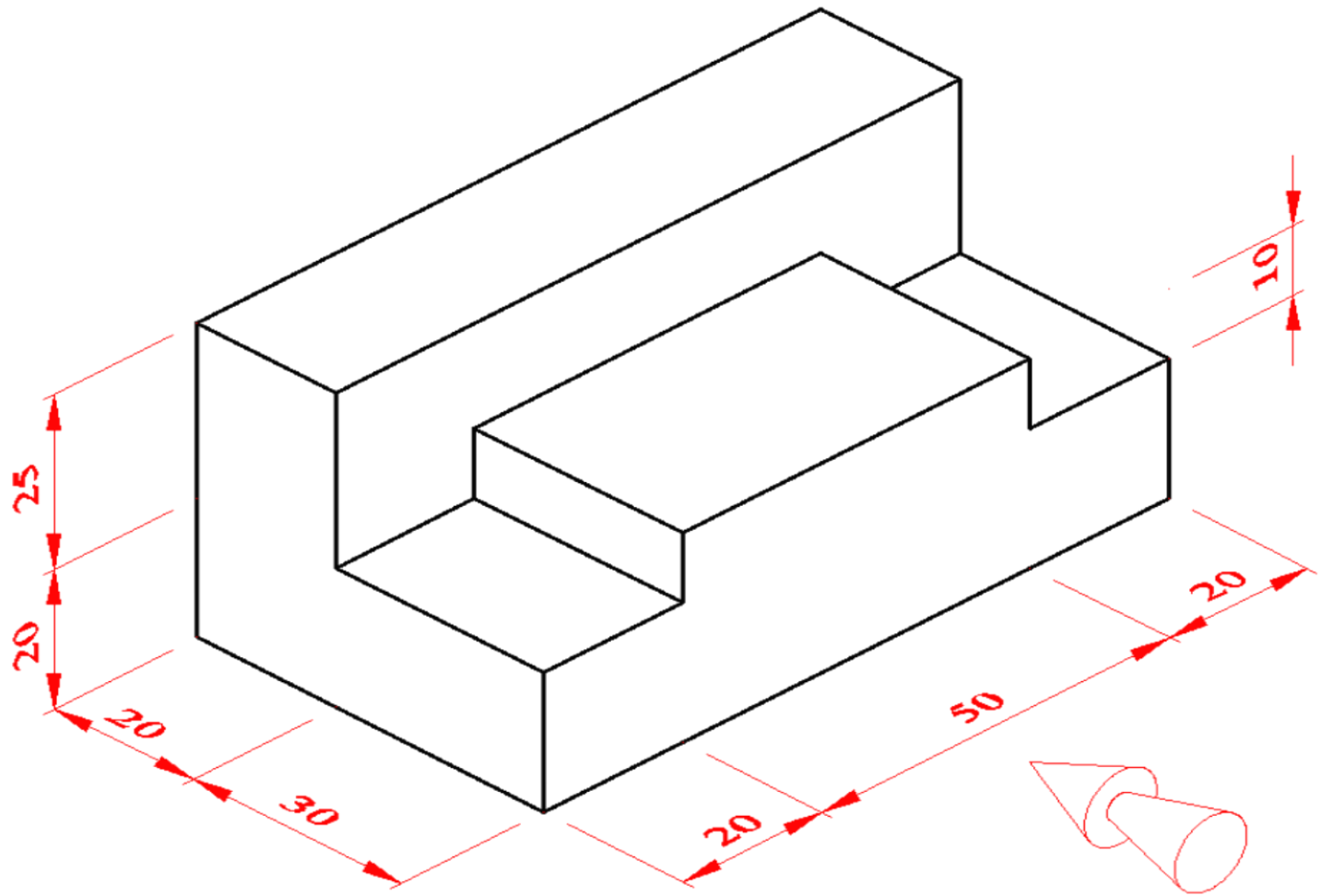

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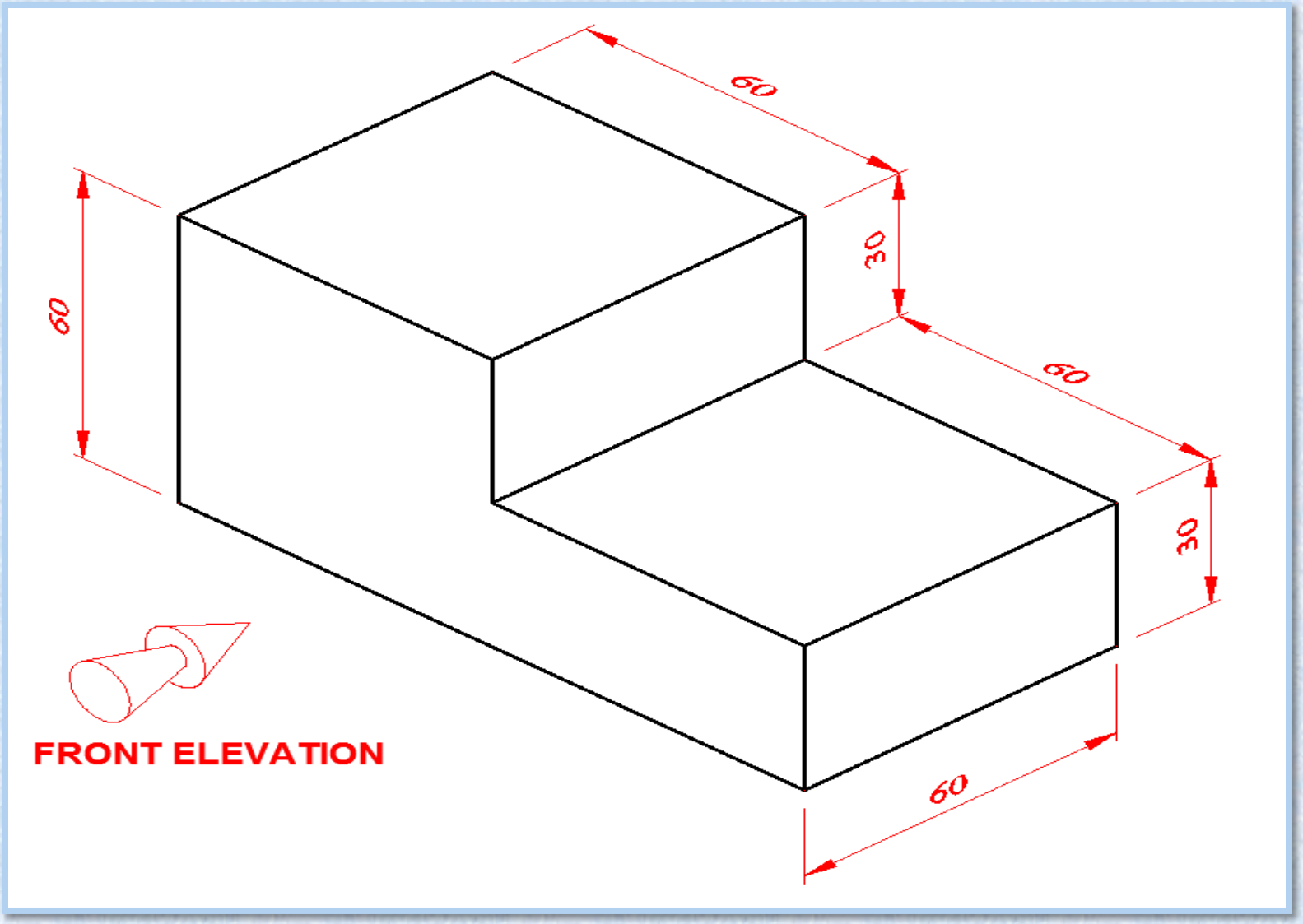
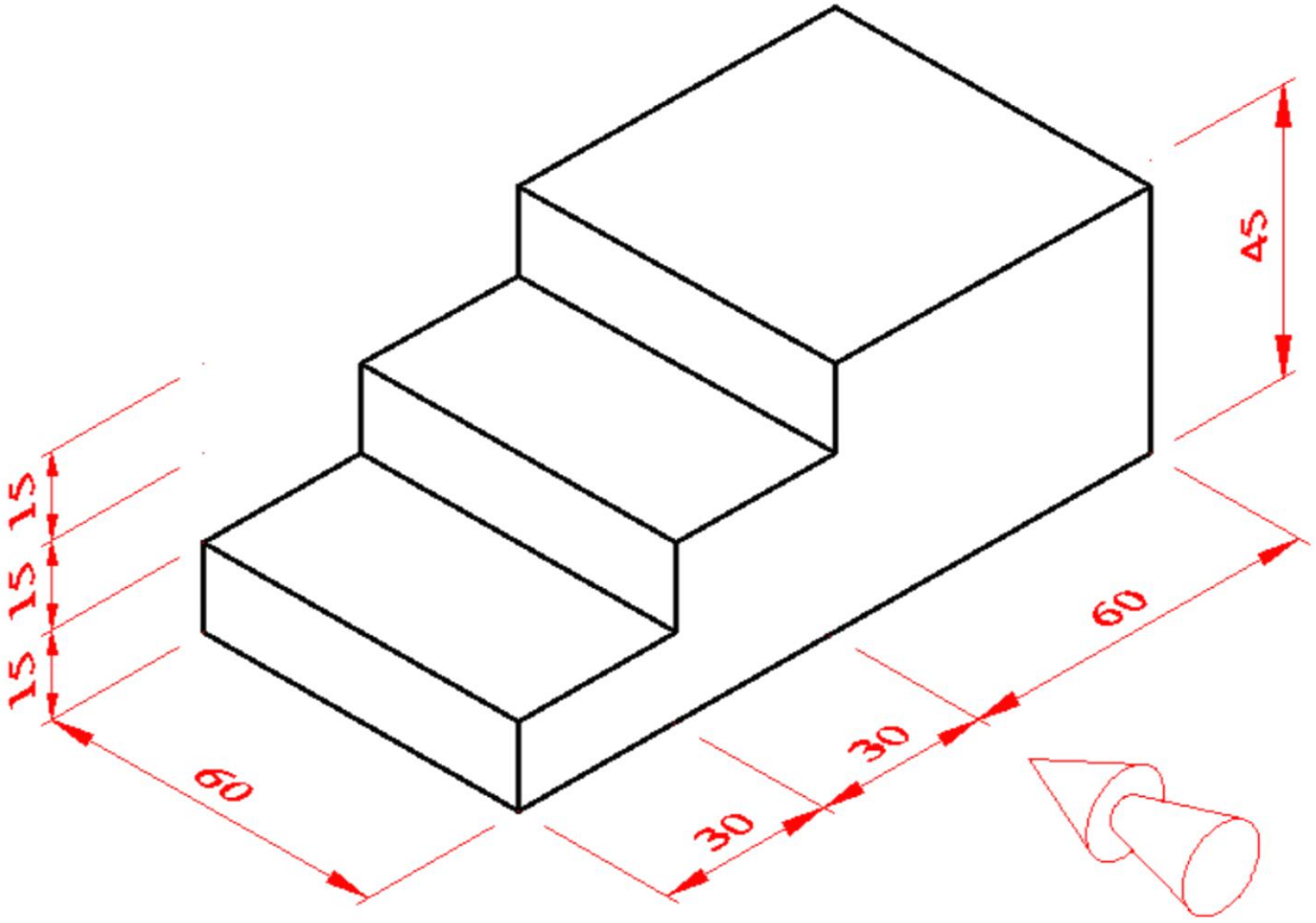


❑Different Orthographic Projection



❑ Recommendation:

This type of drawing are very much enjoyable & important for us. But a minimum errors are occurred for working deffects during drawing period. To decreasing error we need poper attention in working session. Although this topic/subject are very much important & necessary for our practical life. We have vary much enjoy of this experiment topic/subject.

Any

????

Thanks

To

All