

Techniques of Geometric constructions

To construct the shape that mentioned in the previous lectures, we have to know some principle and procedures of geometric construction.

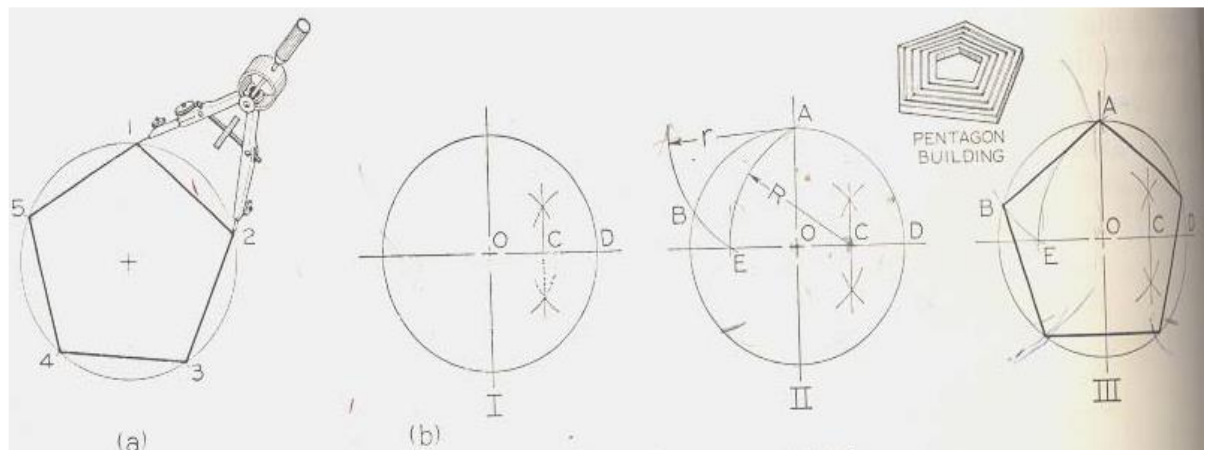
5- How to Draw a Pentagon.

Given: the locations of the pentagon centre and the diameter that circumscribe the pentagon.

Step 1: Bisect radius **OD** at **C**.

Step 2: with **C** as center and **CA** as radius, strike arc **AE**. With **A** as center, and **AE** as radius, strike arc **EB**.

Step 3: Draw line **AB**, then set off distances **AB** around the circumference of the circle, and draw the sides through these points.



6- How to draw a Square

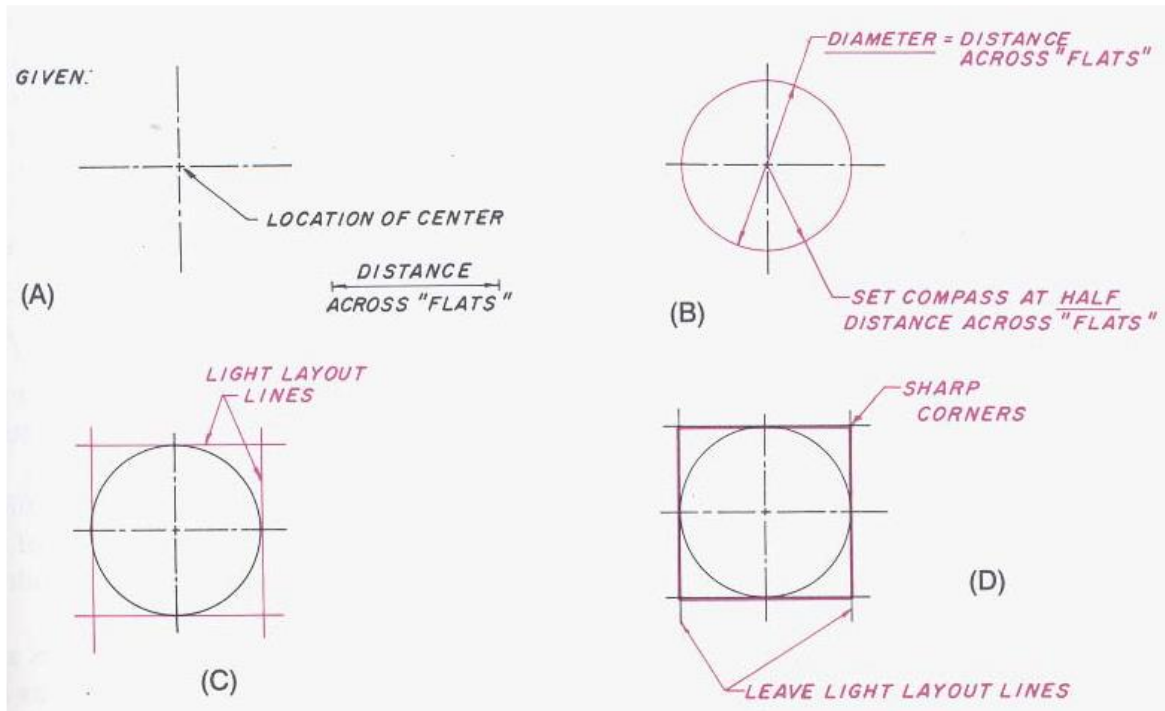
Method-A

Given: the locations of the centre and the required distance across the sides of a square.

Step 1: lightly draw a circle with a diameter equal to the distance around the sides of the square. Set the compass at half required diameter.

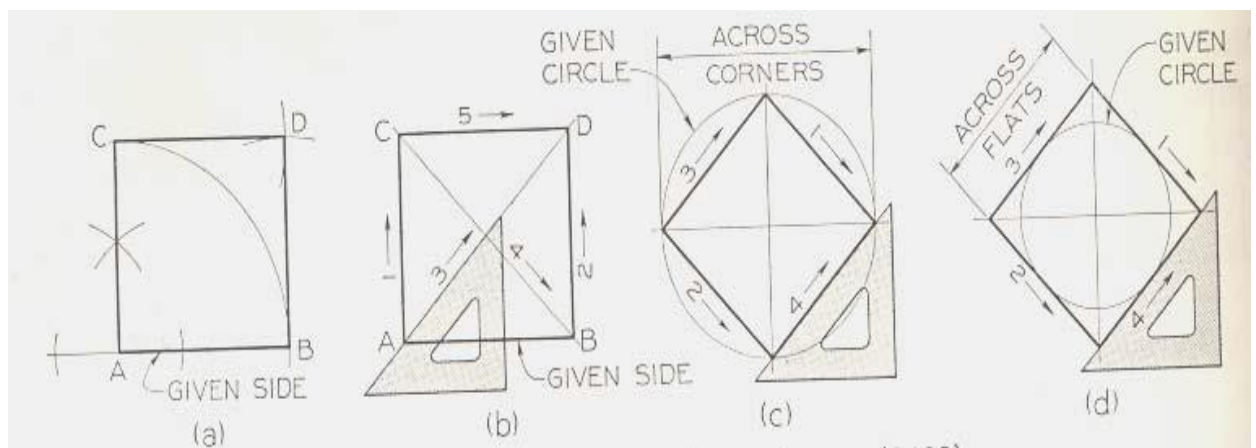
Step 2: using triangles, lightly complete the square by constructing tangent lines to the circle. Allow the light construction lines to project from the square, without erasing them.

Step 3: check to see that there are four equal sides and, if so, darken in the actual square using the correct line thickness.



Method-B

Given one side **AB**. Through point **A**, draw a perpendicular. With **A** as a center, and **AB** as radius, draw the arc to intersect the perpendicular at **C**. with **B** and **C** as centers, and **AB** as radius, strike arcs to intersect at **D**. Draw **CD** and **BD**.



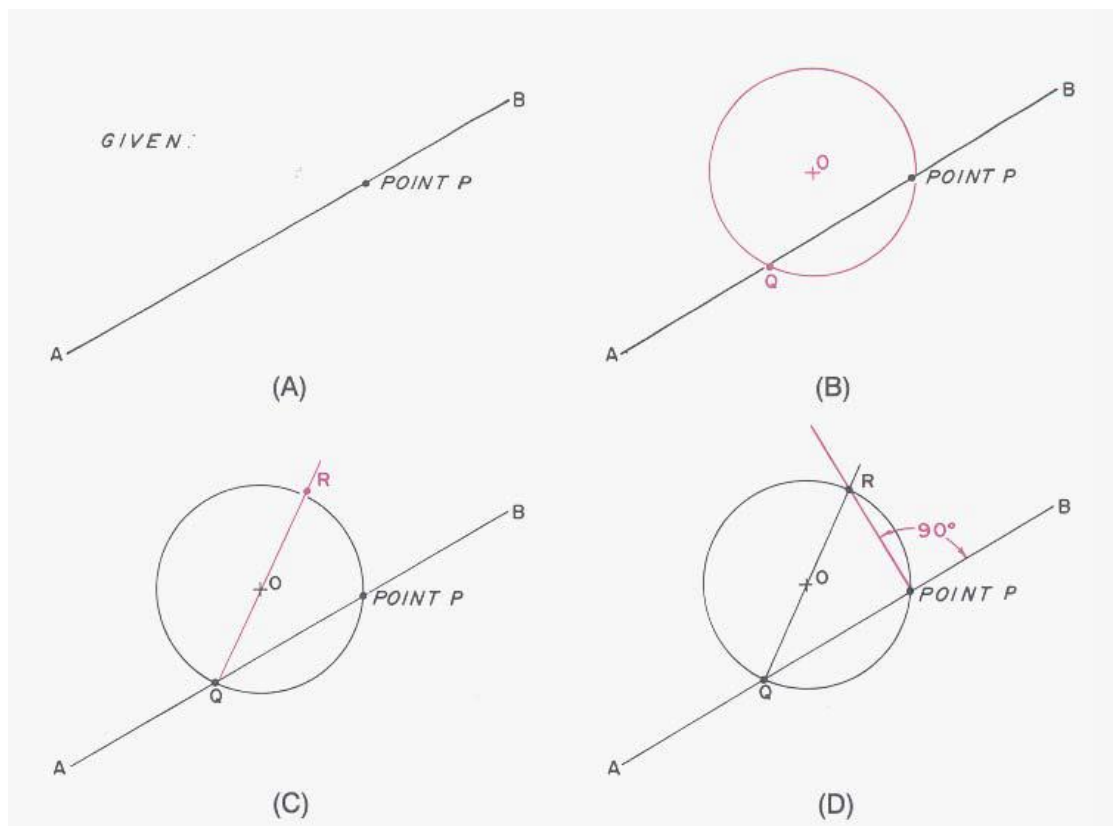
7- How to draw a perpendicular to a line at a point

Given: Line A-B with point P on the line.

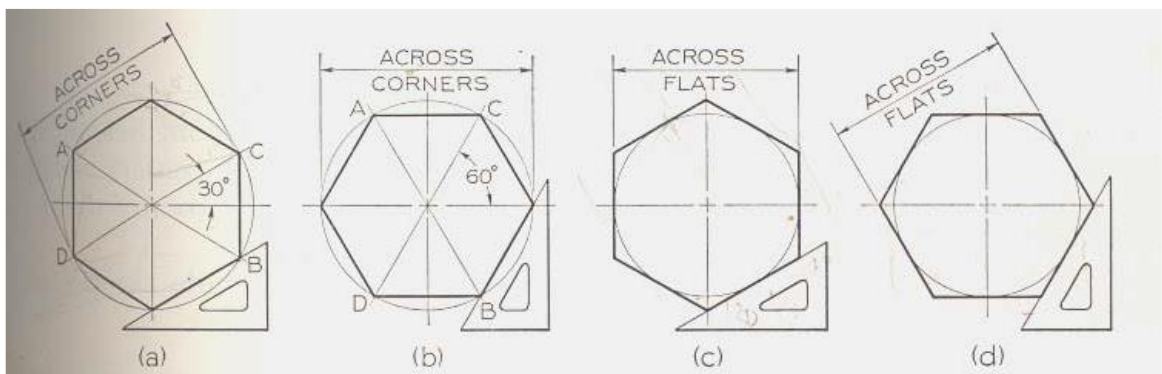
Step 1: swing an arc of any convenient radius whose center **O** is at any convenient location Not on line **A-B**, but positioned to make the arc cross line **A-B** at points **P** and **Q**.

Step 2: A line from point **Q** through center **O** intercepts the opposite side of the arc at point **R**.

Step 3: Line **R-P** is perpendicular to line **A-B** (A right angle has been inscribed in a semi circle).



8- How to draw a Hexagon (6 sides)



9- How to construct an arc tangent to an angle

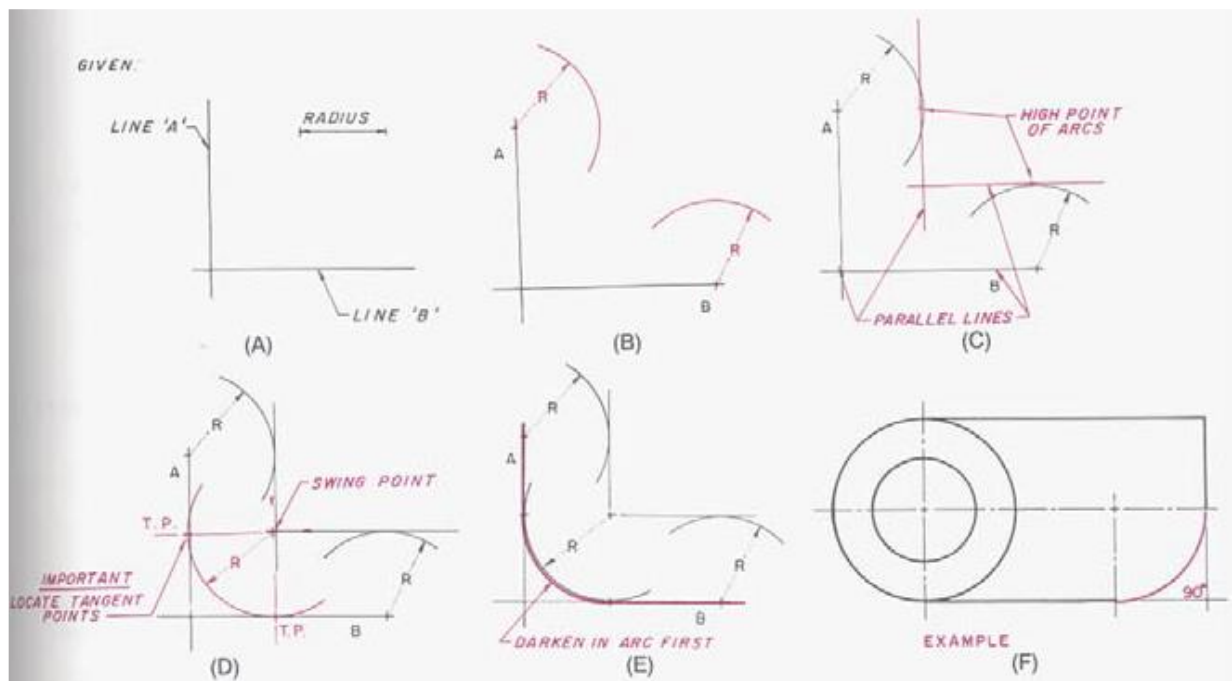
Given: A right angle, lines **A** and **B** and a required radius.

Step 1: Set the compass at the required radius and, out of the way, swing a radius from line **A** and one from line **B**.

Step 2: from the extreme high points of each radius, construct a light line parallel to line **A** and another line parallel to line **B**.

Step 3: Where these lines intersect is the exact location of the required swing point. Set the compass point on the swing point and lightly construct the required radius. Allow the radius swing to extend past the required area. It is important to locate all tangent points (**T.P**) before darkening in.

Step 4: Check all work and darken in the radius using the correct line thickness. Darken in connecting straight lines as required. Always construct compass work first, followed by straight lines. Leave all light construction lines.

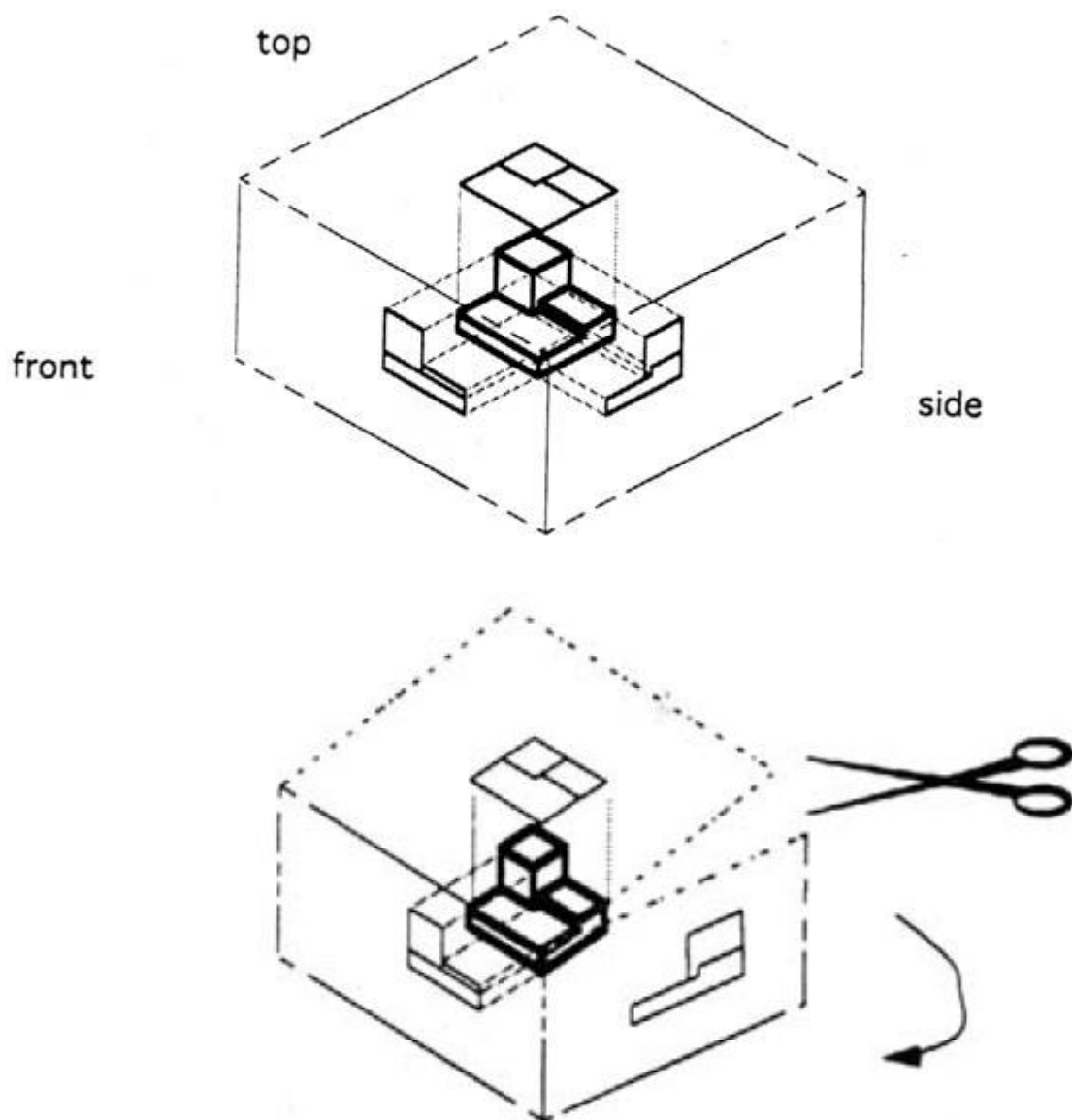


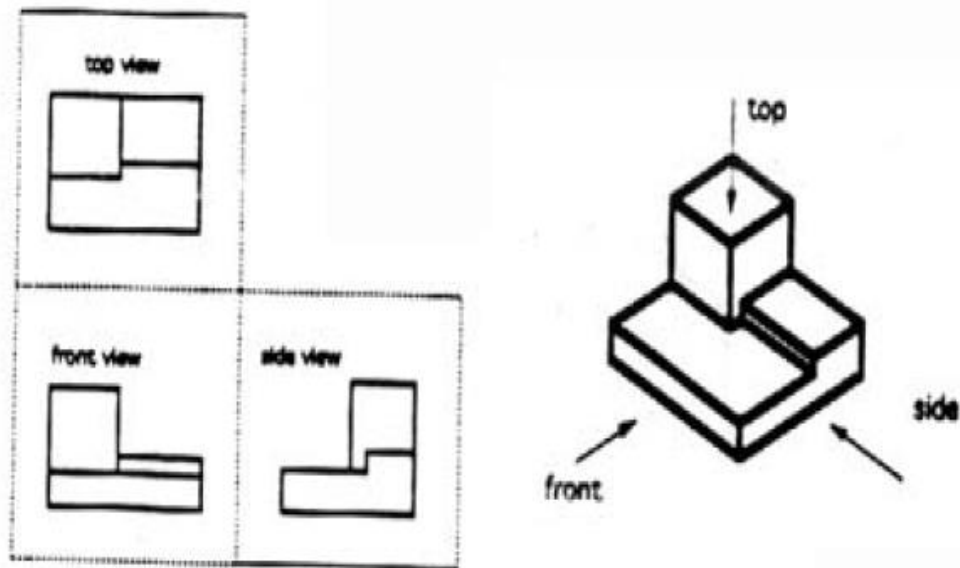
Projection

All forms of engineering and technical work require that a two-dimensional surface (paper) be used. This simple division separates single view projection (perspective and isometric) from multi view projections (orthographic)

Multi view projection

Imagine that you have an object suspended by clear threads inside a glass box, as in figure below.



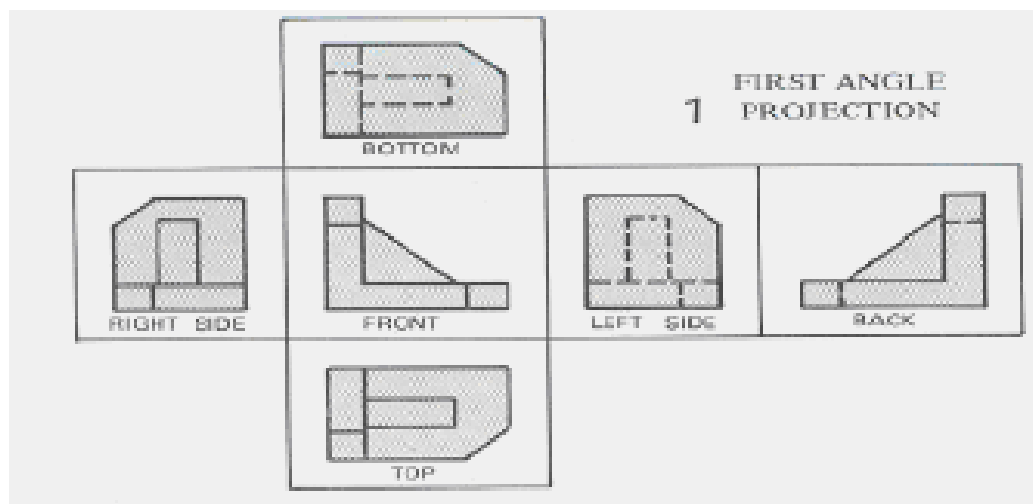


Combination of views

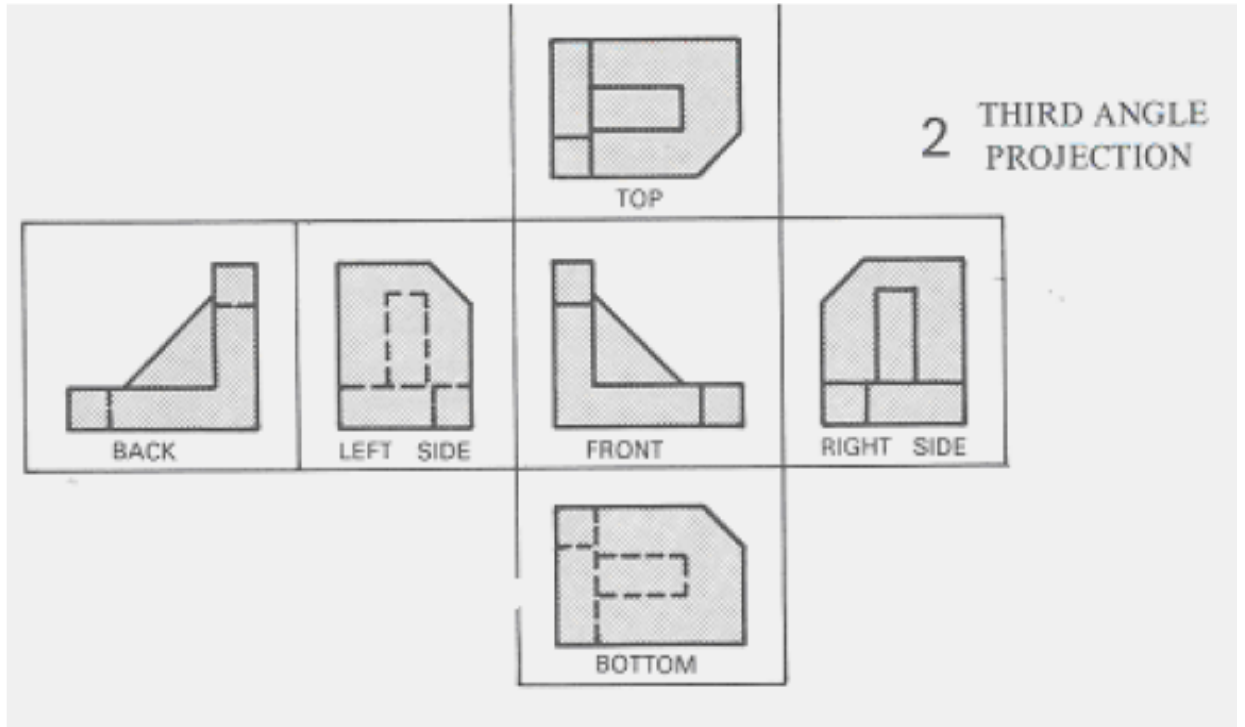
The most usual combination selected from the six possible views consists of the top, front, and right side views sometimes the left- side view helps to describe an object more clearly than the right side view.

Note/ the side view of the front face of the object is adjacent to the front view and the side view of a point will be at the same distance from the front surface as its distance from the front surface on the top view.

The six principle views of an object have previously been presented in the type of orthographic projection known as the first angle projection, the type of projection used in most foreign countries is called First angle orthographic projections.



Third angle orthographic projection.



Practice 1

