

# Isometric

- Learn Isometric Drawing from

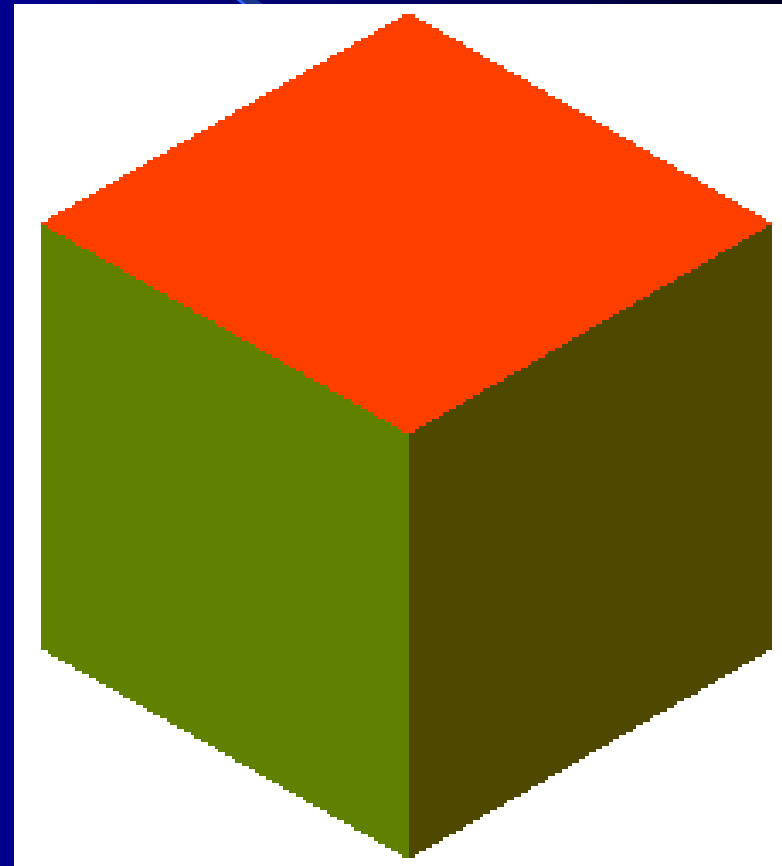
**Dr.A.R.Bapat**



# Isometric

## **Definition:**

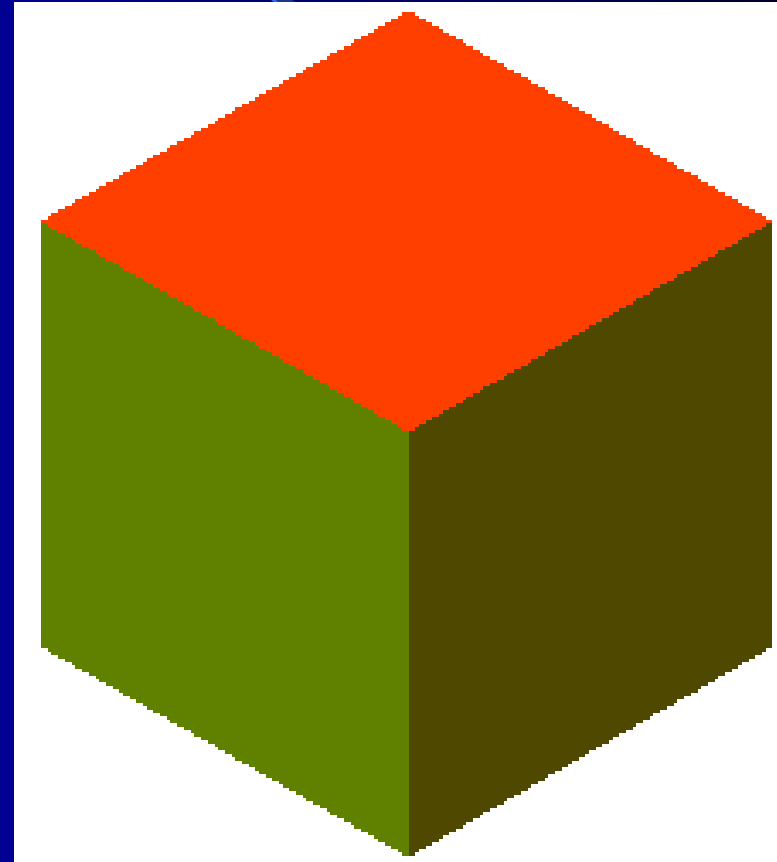
When a cube is placed on one of its corner on ground with solid diagonal perpendicular to V.P., The front view obtained is known as **Isometric Projection** of the cube.



# Isometric Axes, Lines & Planes:

Careful Observation of the Isometric Projection of the cube shows that:

- i) All faces are equally inclined to V.P.
- ii) All lines representing edges of cube are parallel to one or the other of three lines and are also equally foreshortened.



# Isometric Axes, Lines & Planes:

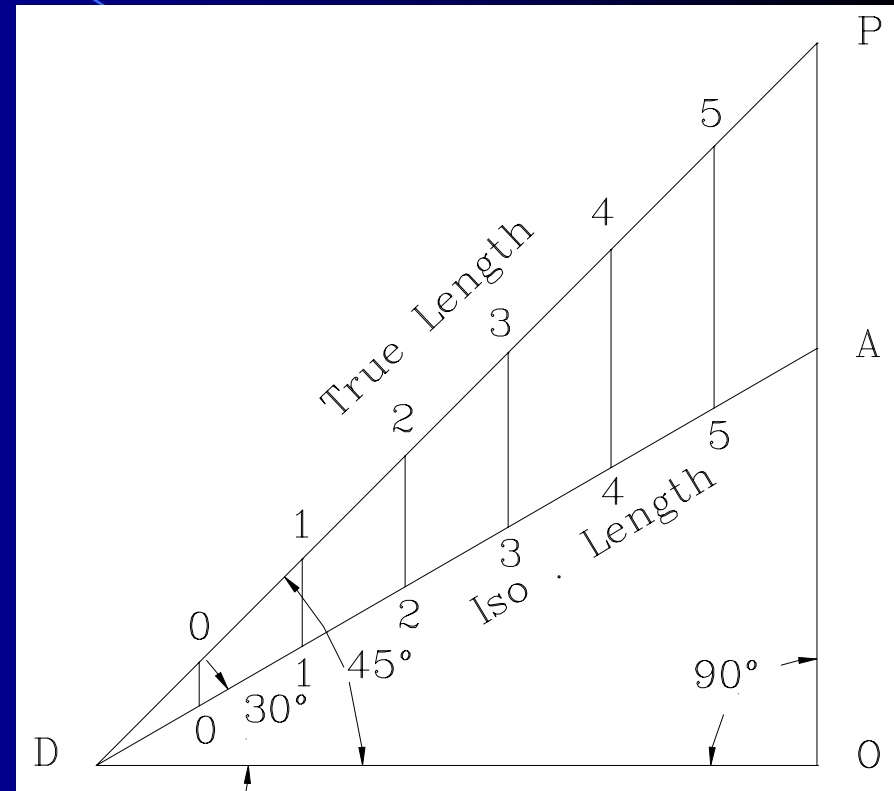
- **The ratio, Isometric Length / True Length = 9/11 approx.**
- **It is necessary that while drawing Iso. Projections, true lengths should be converted to Iso. Length.**
- **Iso. Projection: All lengths should be converted to Iso. Length i.e.  $9/11 * \text{True Length}$ , except the radius of the sphere.**
- **Iso. View: For simplicity actual/True lengths are considered and the radius of sphere is taken as  $11/9 * \text{radius}$ .**

# Iso metric Scale

➤ For drawing Iso. Projection, Iso. Scale must be drawn so that all the true lengths can be easily converted to Iso. Length using the scale.

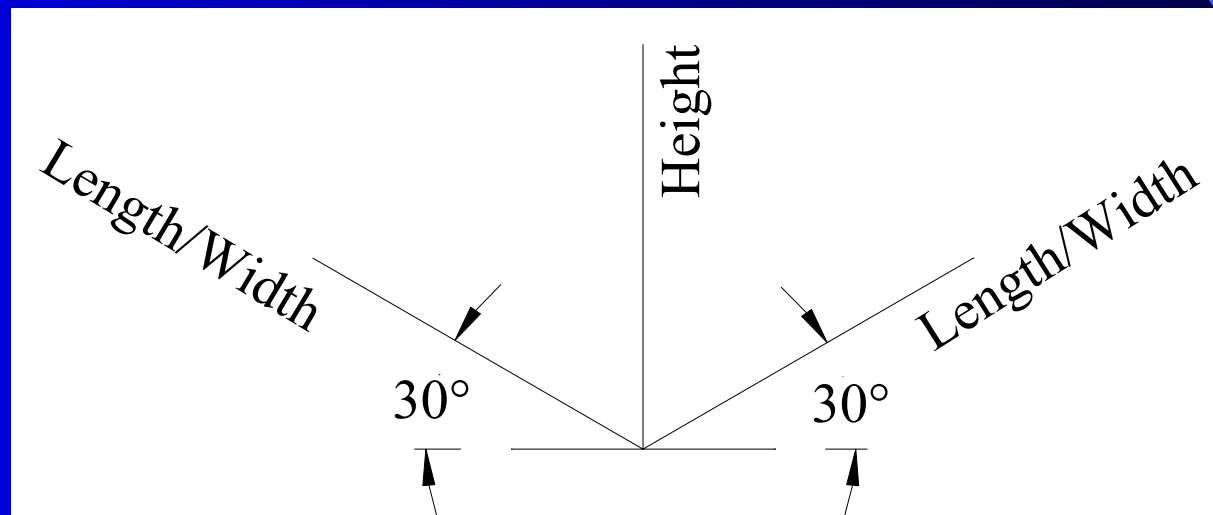
➤ For this draw two lines inclined at  $30^\circ$  &  $45^\circ$  to horizontal.

➤ On  $45^\circ$  line mark True lengths and to obtain Iso. Lengths project these lengths on  $30^\circ$  as shown.



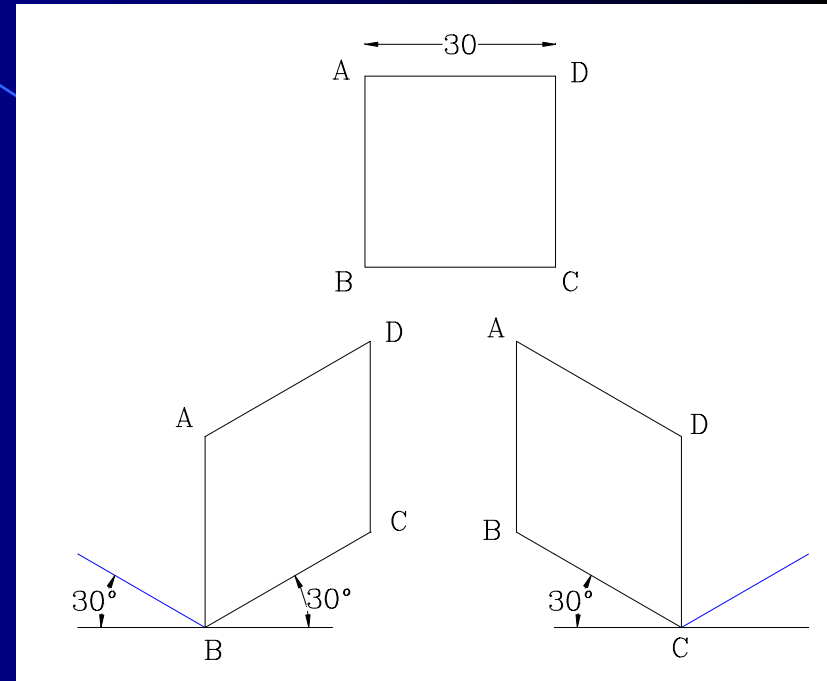
# Three Isometric Axis

- There are three Axis in Isometric Drawing. Two inclined at  $30^{\circ}$  and the one is vertical.
- On  $30^{\circ}$  axis the length or width can be drawn and the height is shown on vertical axis or parallel to vertical axis.



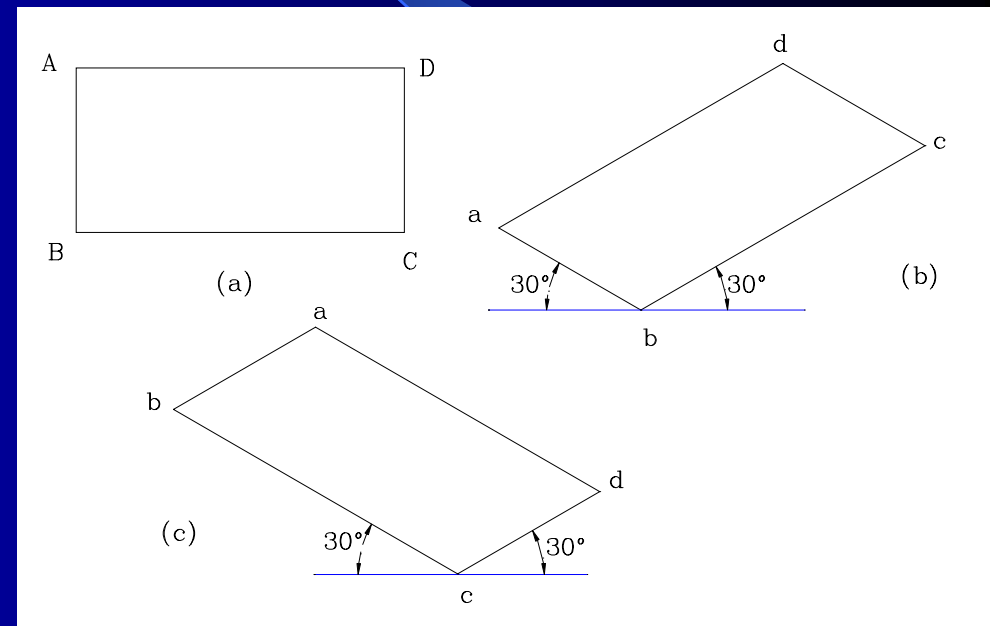
## To draw Isometric of 30 mm square plate. The F.V. as given.

- Draw three isometric axes, two inclined at  $30^\circ$  to horizontal and one vertical.
- Mark point B at the intersection of these axes. Mark point C on one of the axis inclined at  $30^\circ$  to horizontal at a distance equal to BC.
- Mark point A on vertical axis at a distance equal to BA.
- Draw parallel lines to the isometric axes from points C and A (from point C draw line parallel to vertical axis and from point A draw line parallel to BC) to meet in point D.
- The point D can also be marked by drawing parallel line to vertical axis from point C equal to length BA. Similarly, line AD also can be marked.
- Join BCDA which is the required isometric view of the square.
- Similarly Fig. (c) show the isometric view of the square drawn in direction of the other sloping axis.



# To Draw Isometric of rectangle the face of which is parallel to H.P.

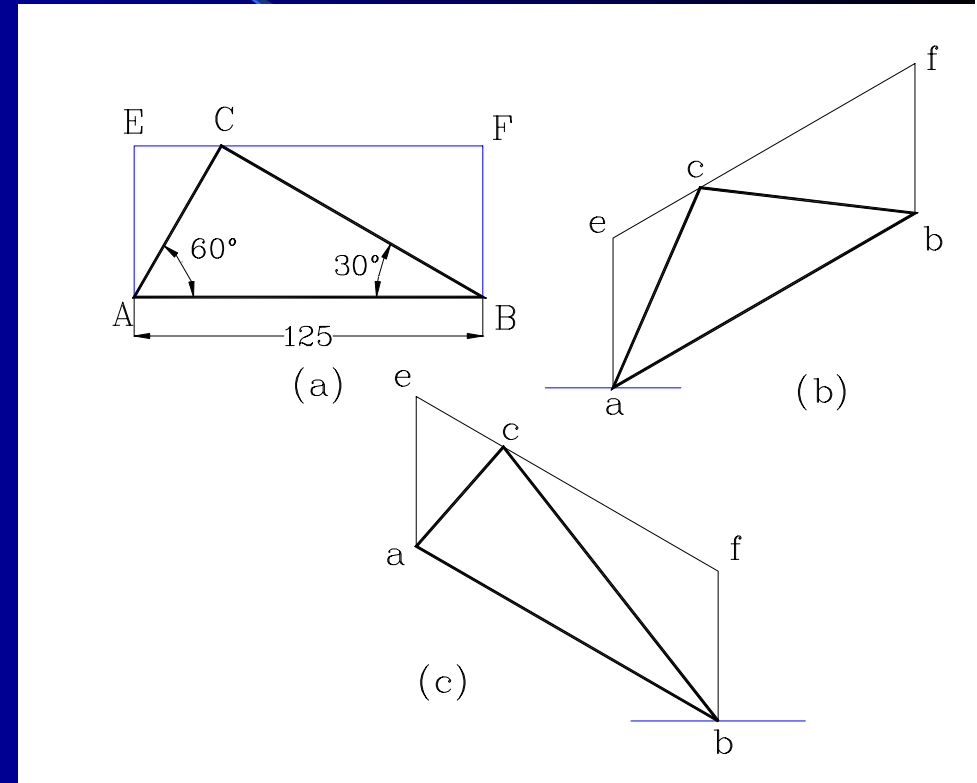
- Draw horizontal line and mark  $30^\circ$  axes as shown in Fig.(b). Mark point b at the intersection of the axes.
- Mark point c on sloping axis at a distance equal to BC.
- Mark point a on another sloping axis at a distance equal to BA.
- Draw parallel lines from points c and a as shown in Fig. (b) to obtain point d. Thus abcd is the isometric view of the rectangle. On the same principles but taking c as starting point the isometric view can be drawn as shown in Fig.6(c).





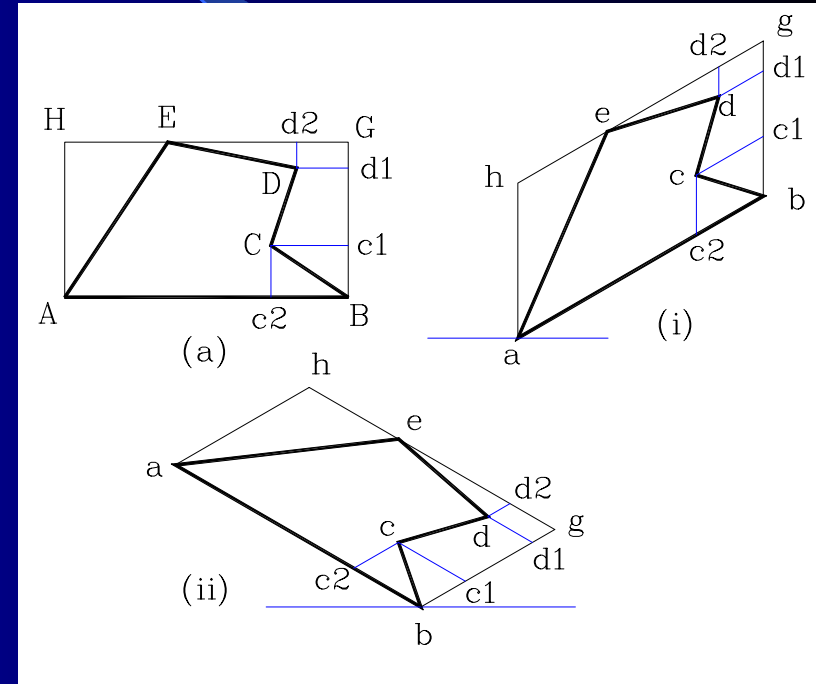
# To Draw Isometric view of $60^\circ$ set-square of 125 mm longest side having its surface parallel to V.P.

- The base AB is horizontal. Draw ab on sloping axis as shown in Fig. (b).
- As the angles do not increase or decrease in fixed proportion they should be drawn after determining the position of end points on isometric lines. Therefore construct a rectangle ABFE as shown enclosing the triangle.
- Draw isometric of abfe as shown. Mark point c on ef such that ec is equal to EC. Join ac and bc to complete the isometric of the triangle. The isometric in other direction is as shown in Fig. (c).



## To Draw Isometric of given Plane Figure.

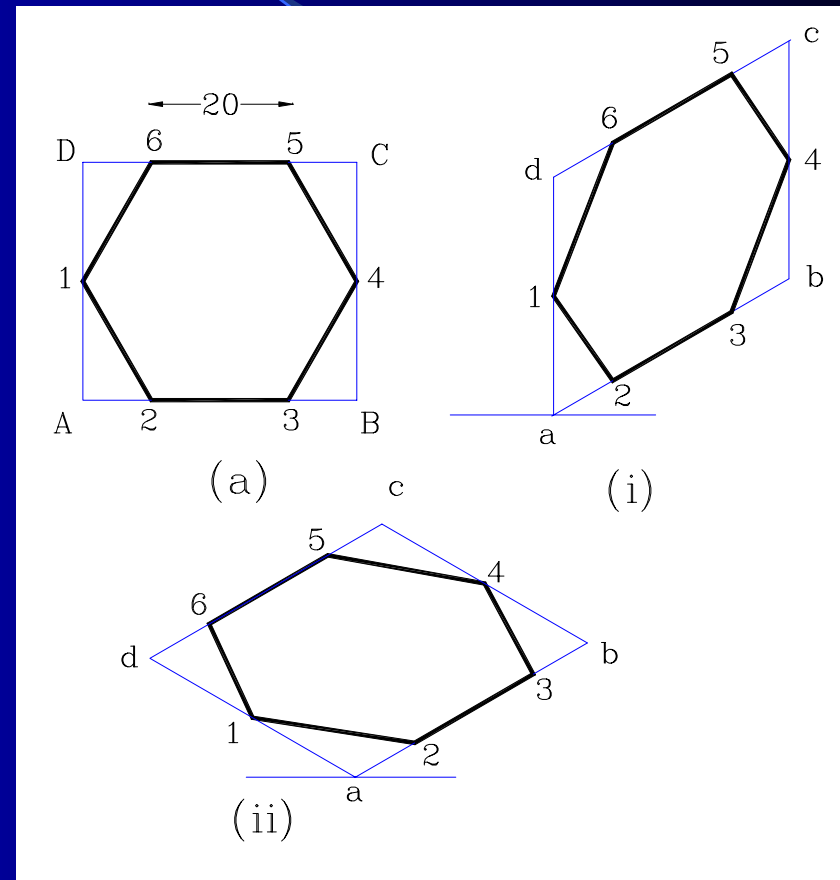
- Enclose the plane figure in a rectangle ABGH as shown in Fig. (a). Draw lines Cc1, Cc2, Dd1 and Dd2 parallel to the sides as shown in Fig. (a).
- Draw isometric of rectangle ABGH as shown in Fig. (i). Mark points c1, c2, d1, d2 and e on respective sides by taking their distances from points b, g and h.
- From points c1, c2, d1 and d2 draw parallel lines to the sides of rectangle to obtain points c and d on isometric view as explained earlier in Problem 3.
- Join points abcdea to obtain the isometric view of the plane figure when it is parallel to V.P. The isometric view can also be drawn in other direction as explained earlier in Problem 3 which is not shown here. The students may try it for practice.
- The isometric view of the plane figure is as shown in Fig. (ii) when its surface is parallel to H.P.



# To Draw Isometric of Hexagon

## i) Parallel to H.P. & ii) Parallel to V.P.

- Fig. (a) shows the hexagon. Construct rectangle ABCD to enclose the hexagon and proceed as per previous problem to obtain its two isometric views as shown in Fig. (i) and Fig. (ii) respectively.
- It may be noted that the isometric view can be drawn in other direction also.



# To Draw Isometric of Circle i) Parallel to H.P. & ii) Parallel to V.P. – Method of Points

## Method of Points:

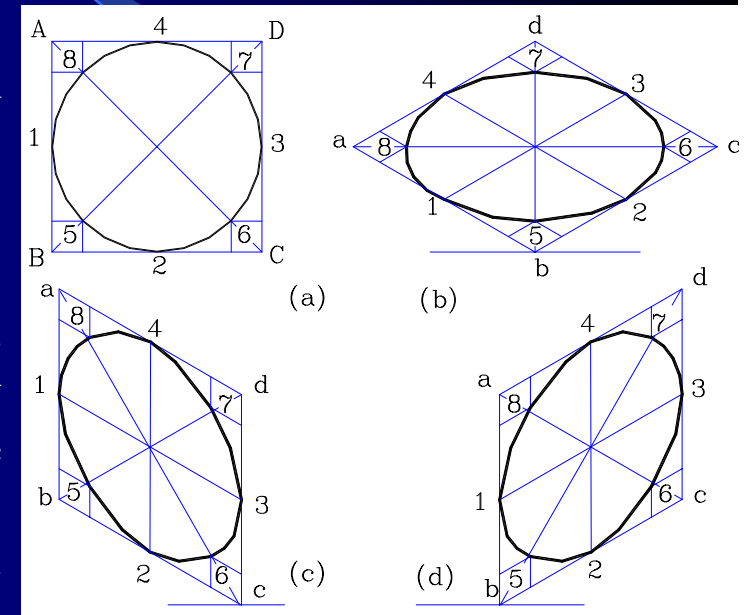
Enclose the circle in a square ABCD touching it in points 1, 2, 3, and 4.

Draw diagonals AC and BD to intersect circle in points 5, 6, 7 and 8 as shown in Fig. (i) - (a).

Draw isometric views of the square ABCD as shown in Fig.(i)-(b),(c) and (d). Mark points 1, 2, 3, and 4. Also mark points 5, 6, 7 and 8 on it as explained in previous problem. Join all points by smooth curve to obtain the isometric view of the circle.

Fig. (ii) shows the isometric projection of the circle drawn using the isometric scale.

Note that in isometric view the major axis of the ellipse is greater than the actual diameter of the circle and in isometric projection the major axis is equal to the diameter of the circle.



# To Draw Isometric of Circle – Four Centre Method

## Four Centre Method:

Draw isometric view of the square ABCD and join diagonals.

Draw perpendicular bisectors of the sides of rhombus which intersect each other on longer diagonal in points p and q as shown in Fig. (b). The angles b and d are  $120^\circ$  each.

The points p and q can also be obtained by joining points b and d with midpoints of the opposite sides and intersecting each other on longer diagonal in points p and q.

Draw arcs 1-2 and 3-4 with centres as b and d respectively.

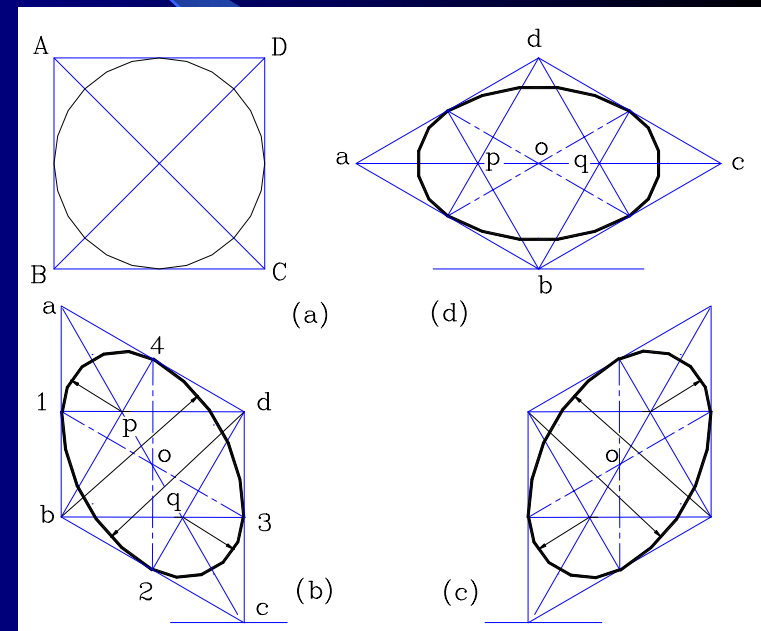
Draw arcs 1-4 and 2-3 with centres as p and q respectively to complete the required ellipse which is the isometric view of the circle as shown in Fig. (b).

Fig.(c) shows the isometric view of circle drawn in other direction and Fig. (d) shows the isometric view of the circle when it is parallel to H.P.

It may be noted here that the ellipse obtained by using the four centre method is not a true ellipse and differs considerably in size and shape than that obtained by using method of points. It is because of the ease in construction and to avoid drawing neat freehand curves this method is generally employed.

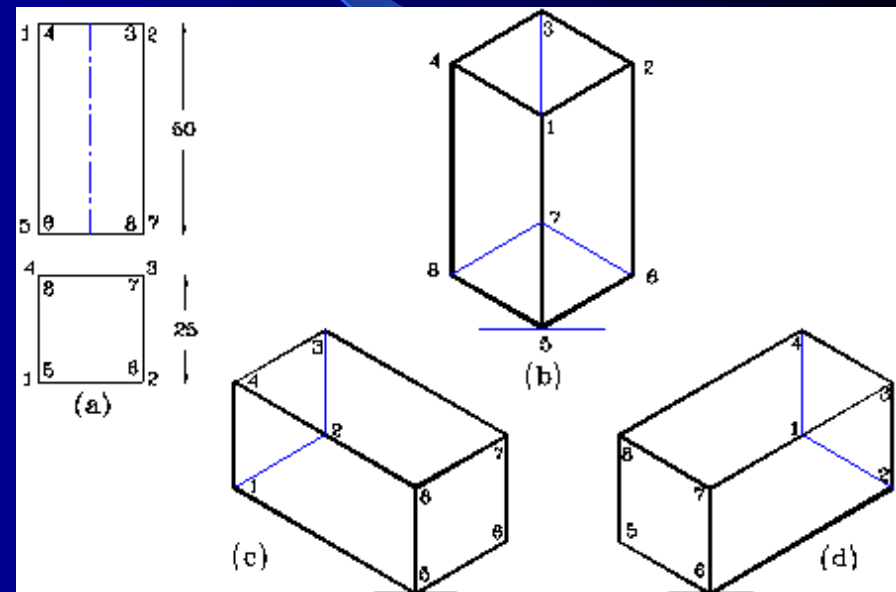
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Circle -Four Centre Method



## To Draw Isometric View of Square Prism i) Axis Vertical & ii) Axis Horizontal

- When Axis is vertical – Draw the base (Fig. b) having sides inclined at  $30^\circ$ . Mark height on vertical Axis.
- When Axis is horizontal draw the base on  $30^\circ$  & vertical axis and mark height on other  $30^\circ$  axis. (Fig. c & d)



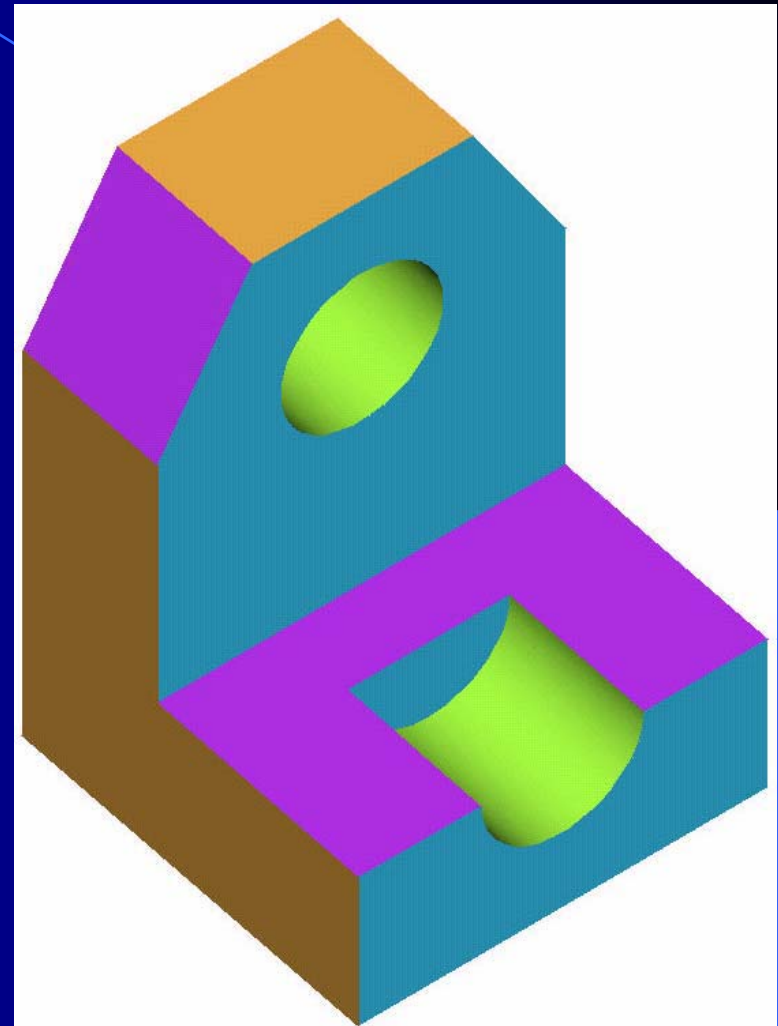
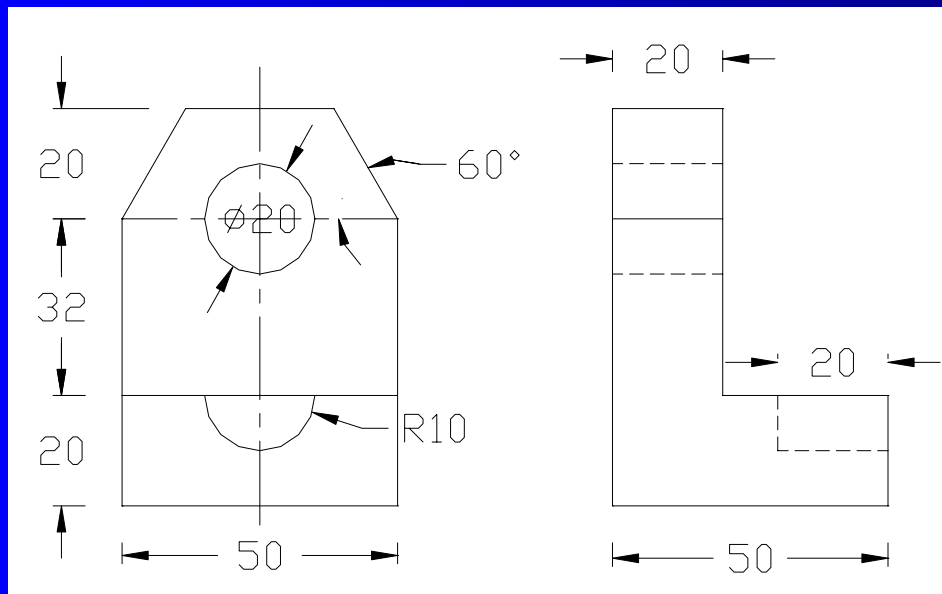
# Isometric Models

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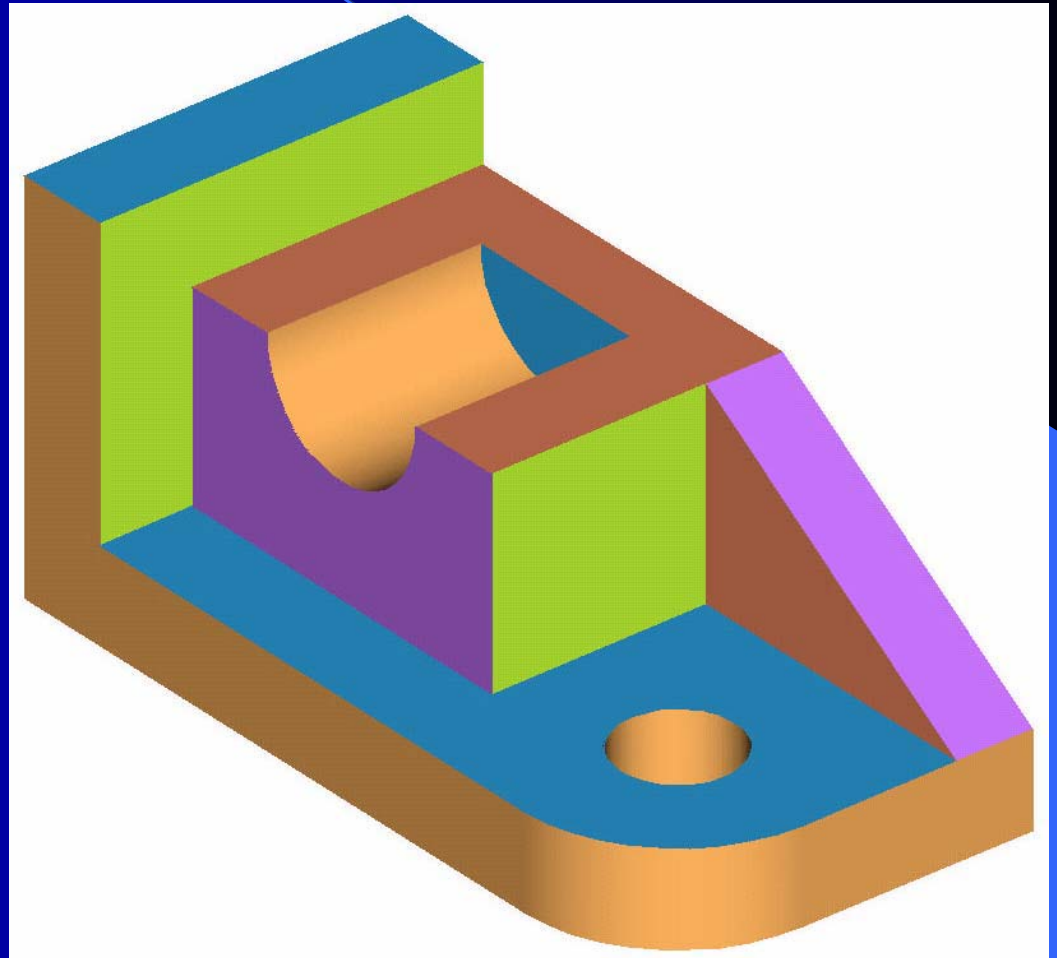
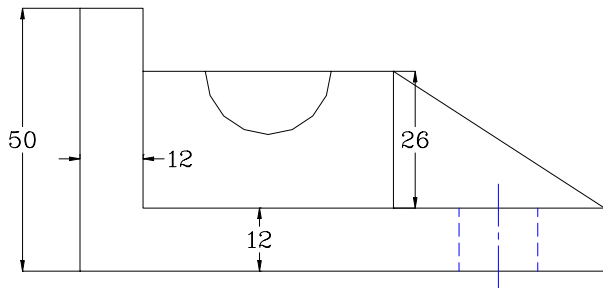
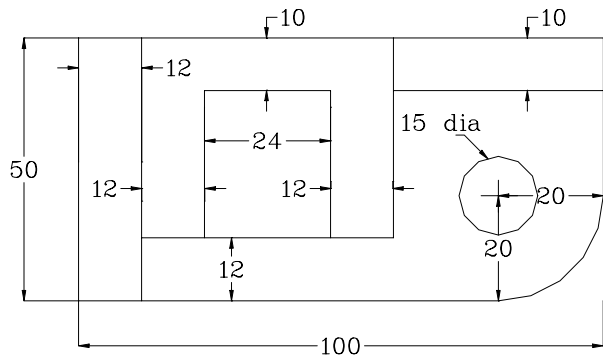
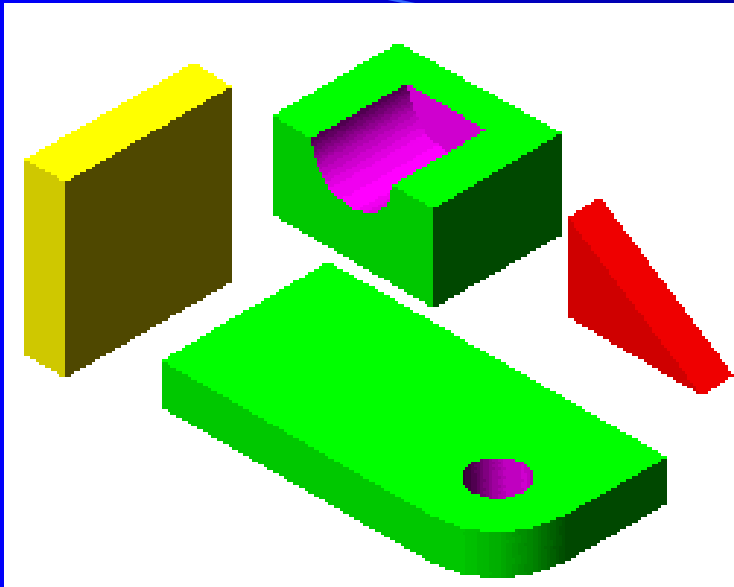
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# Model - 1





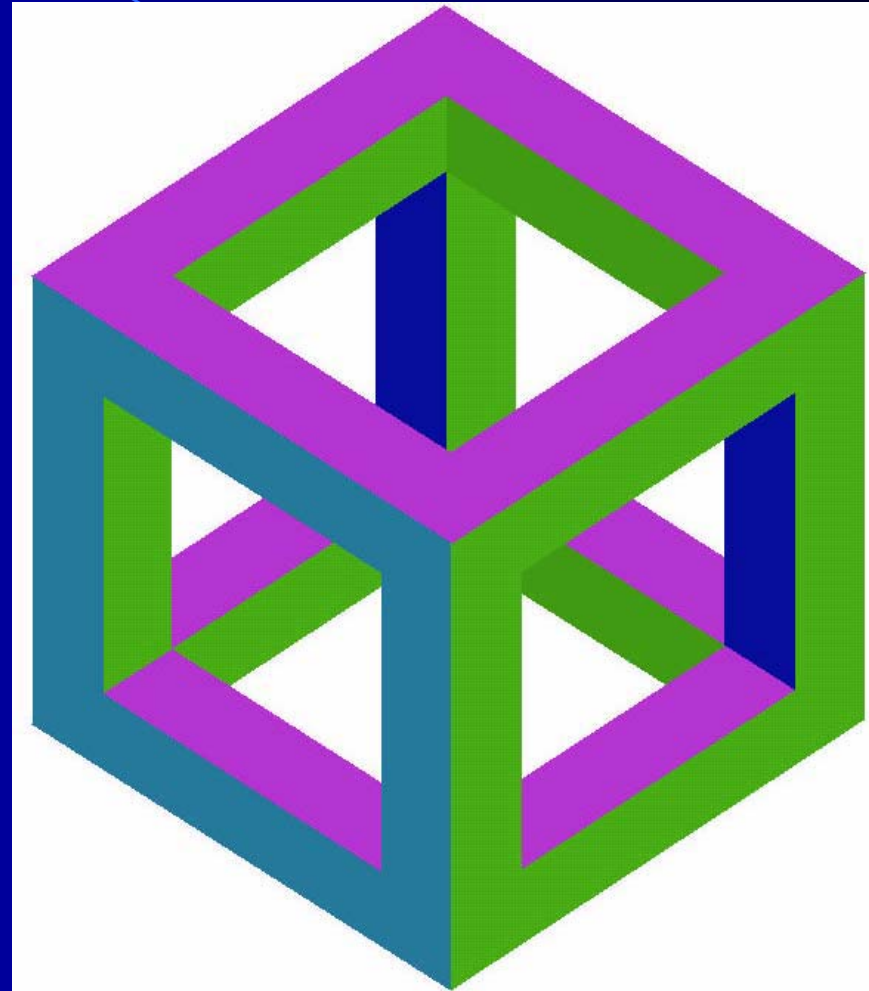
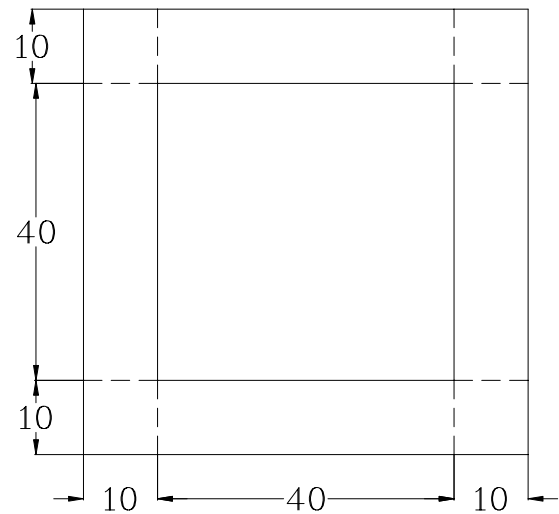
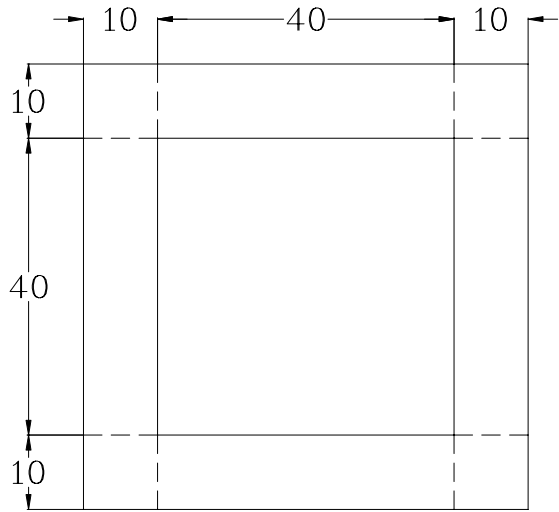
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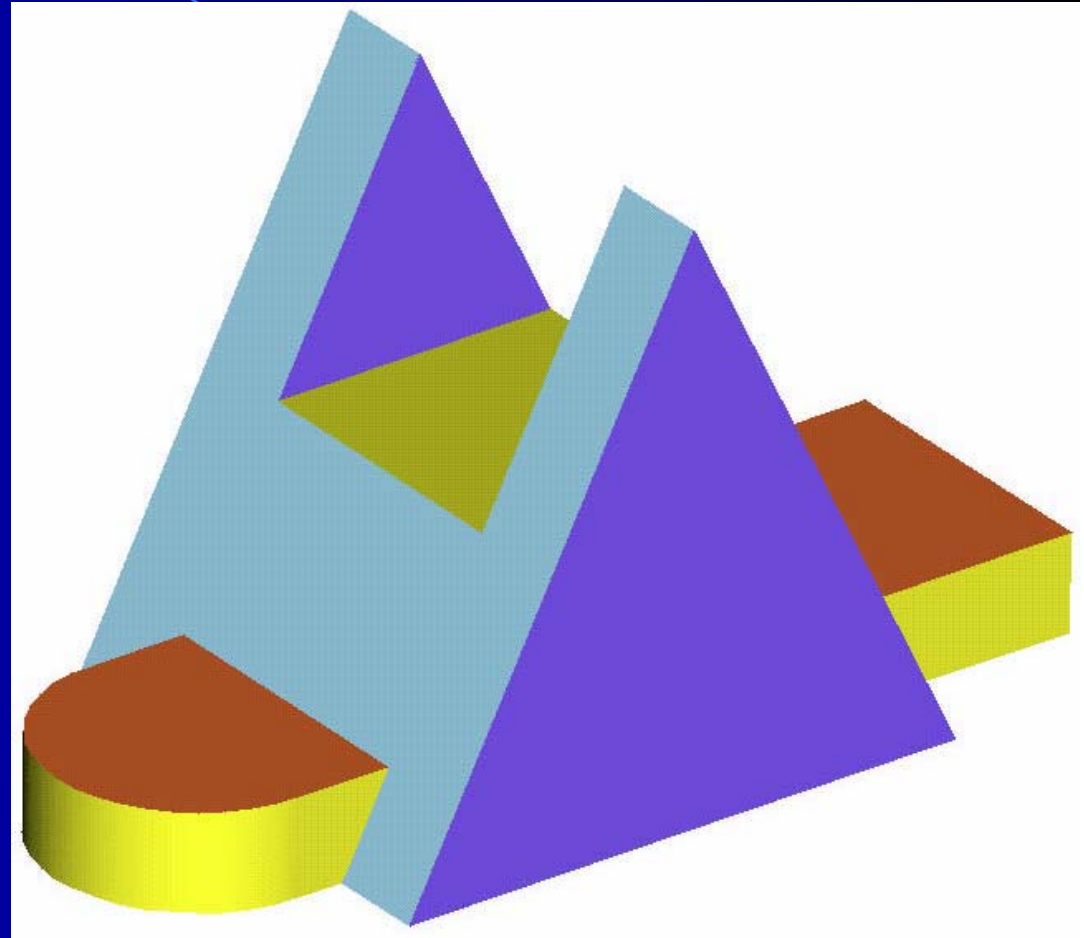
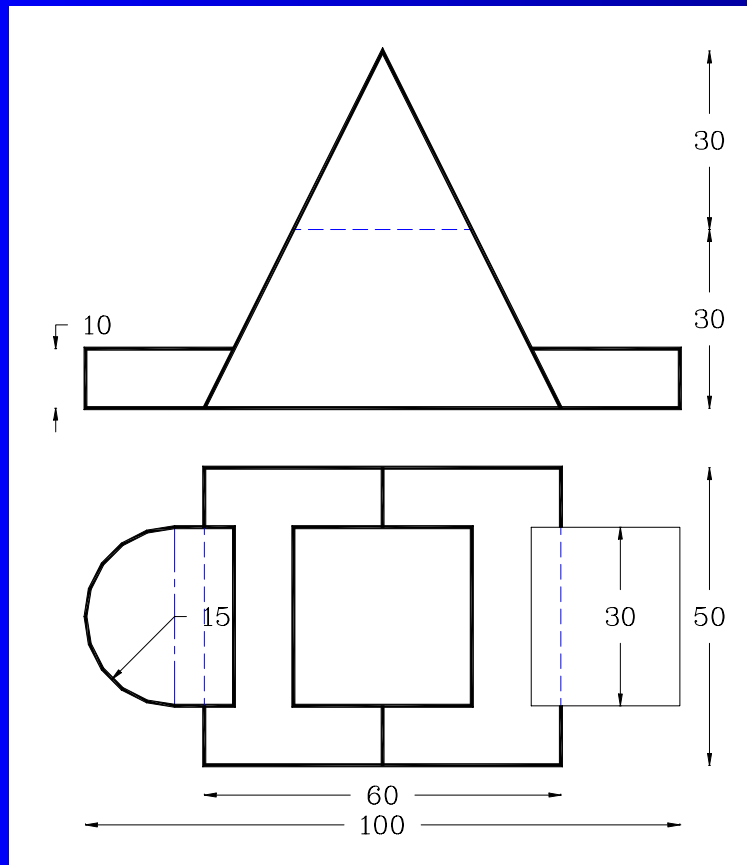
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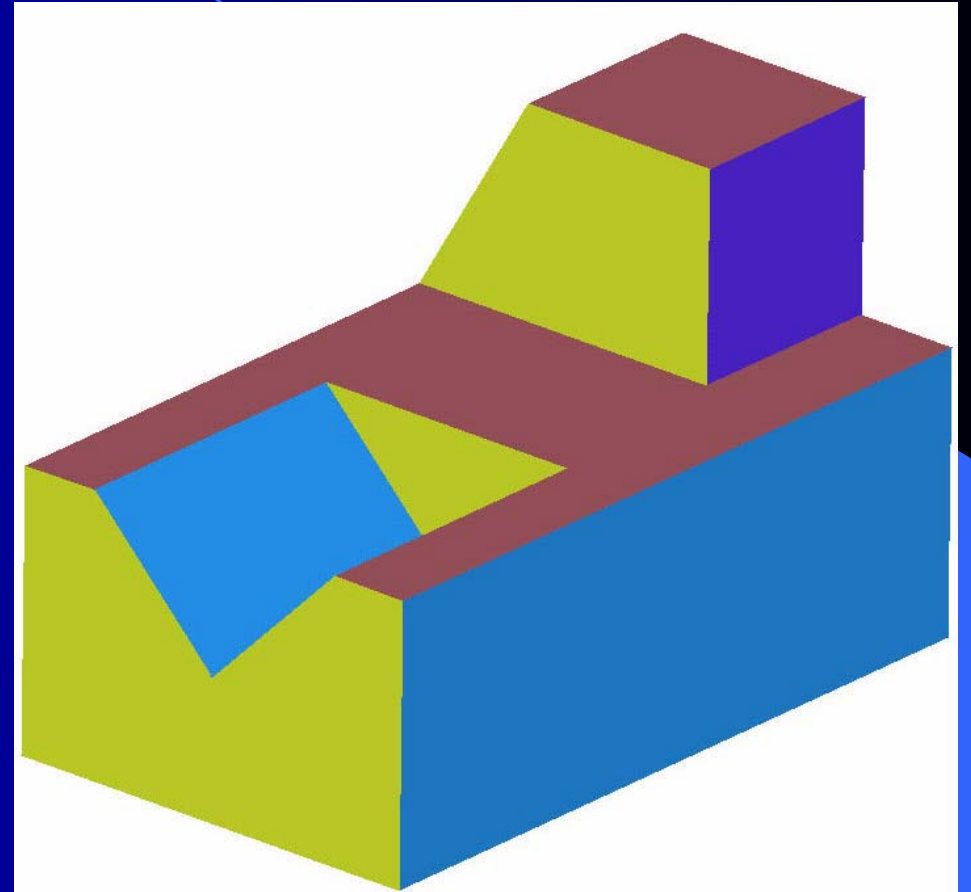
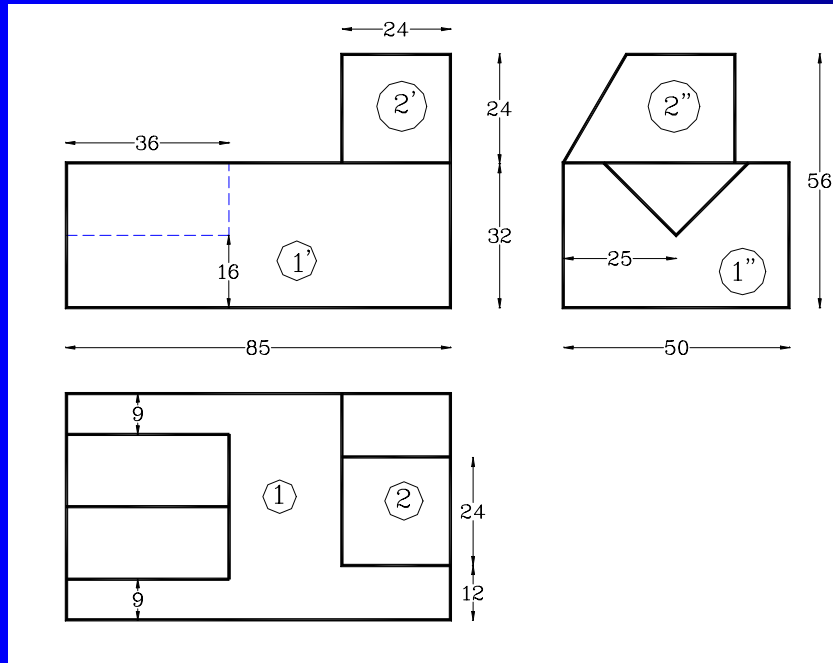
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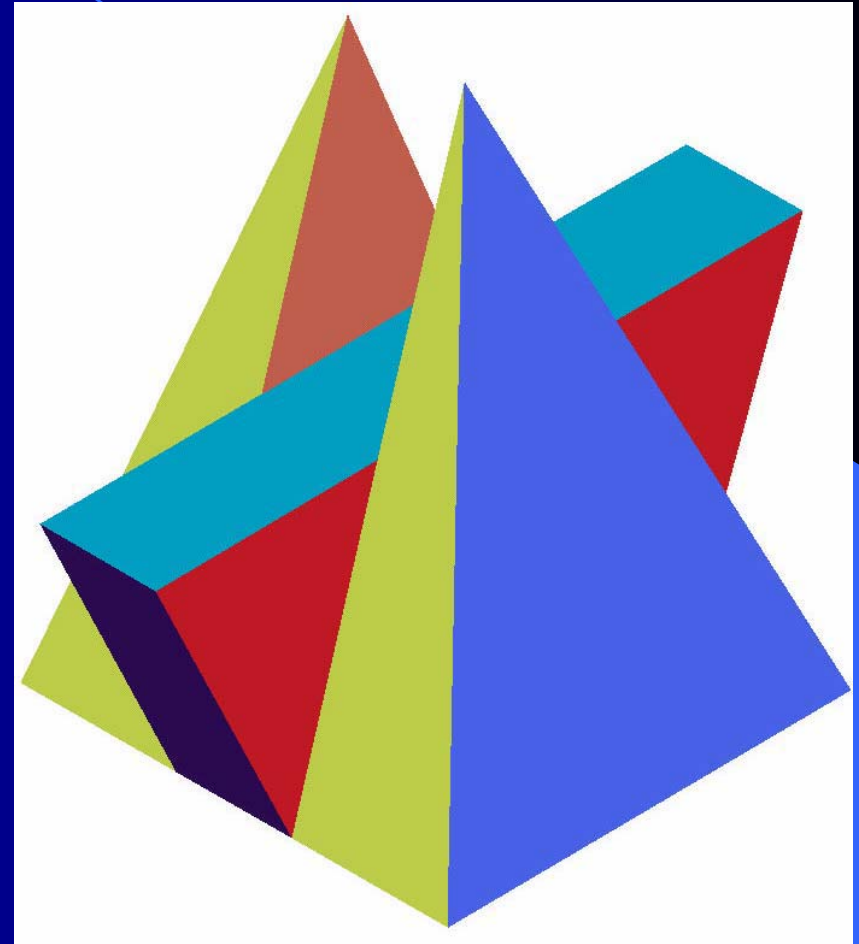
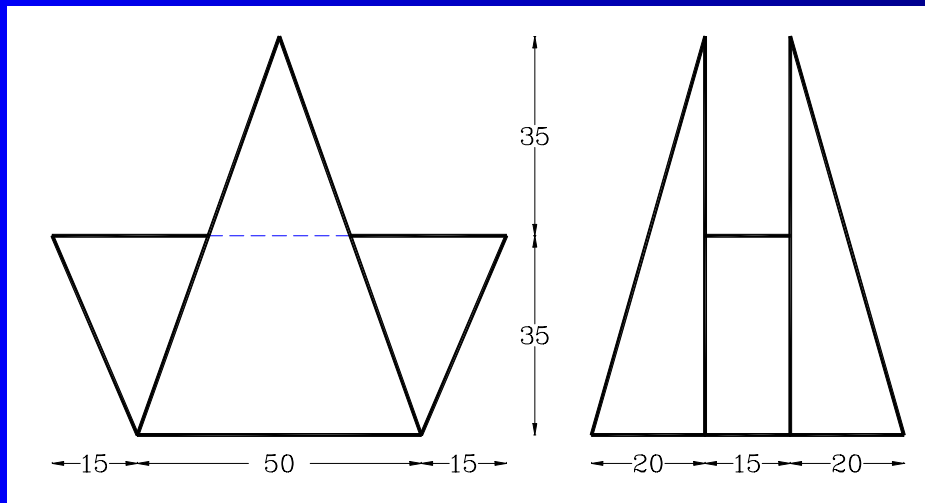
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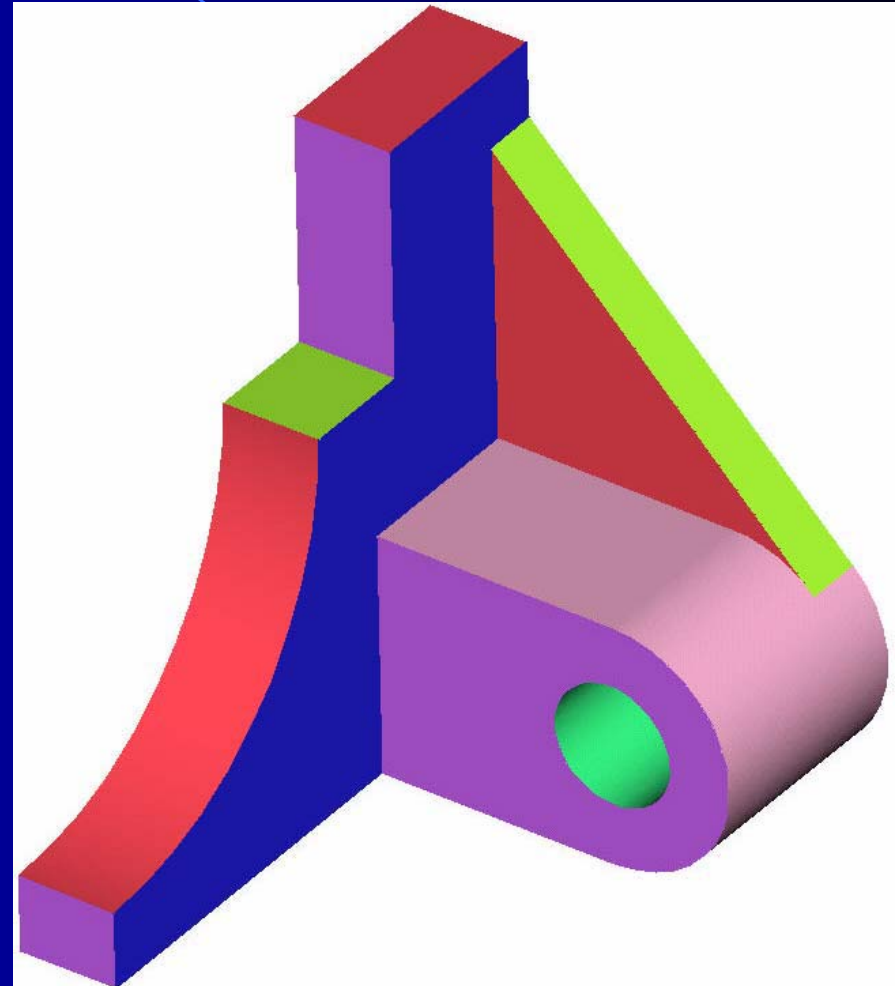
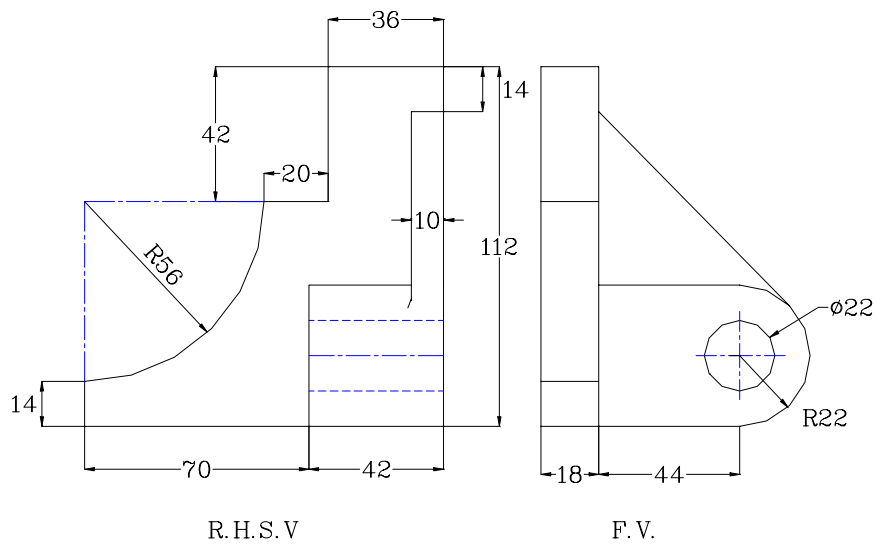
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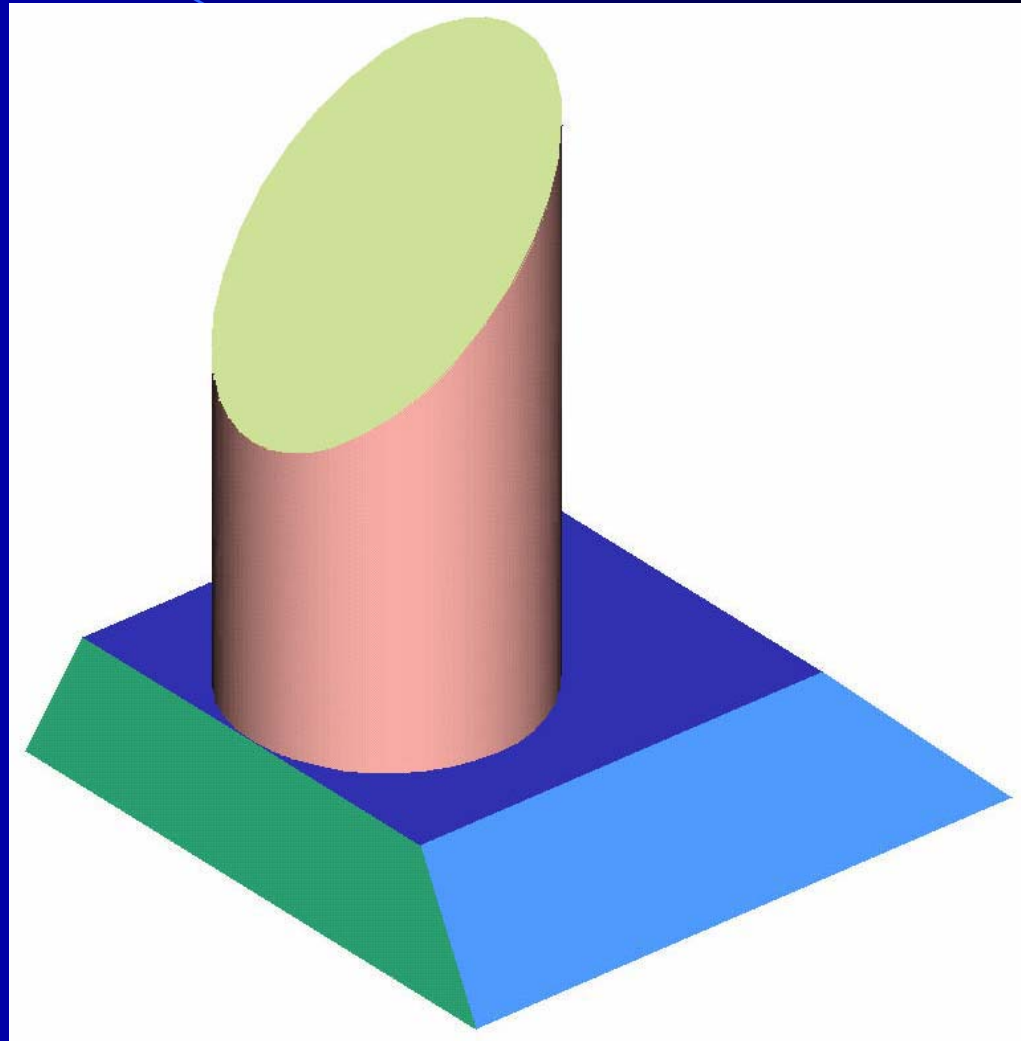
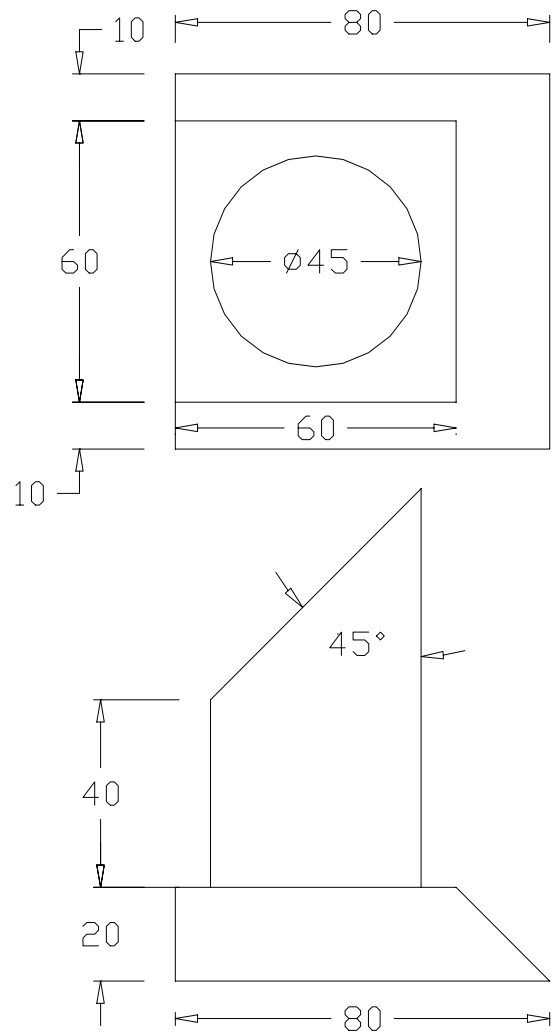
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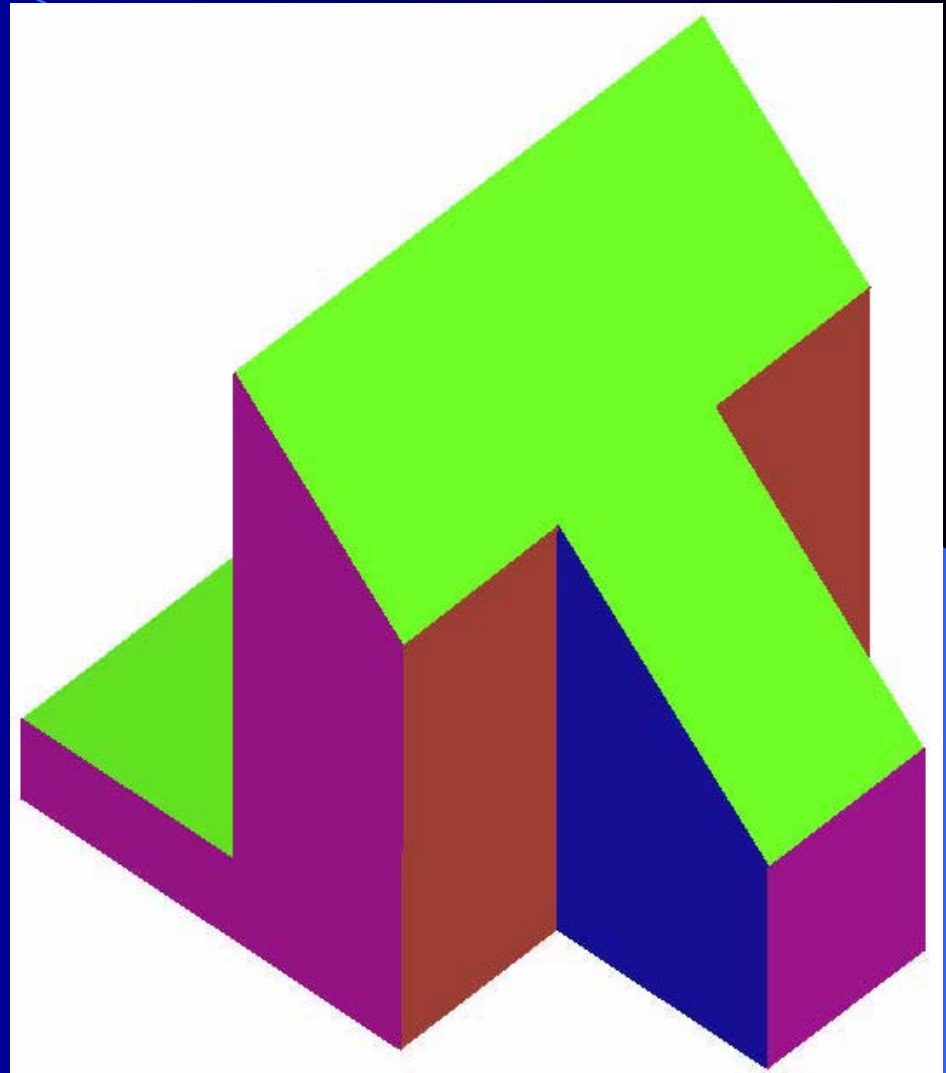
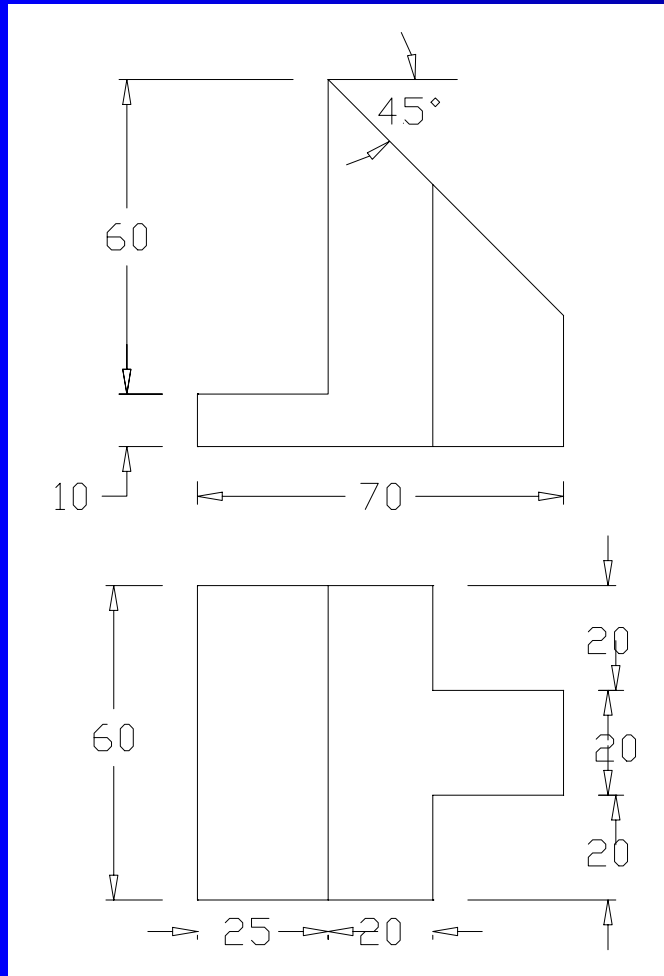
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# Model - 8

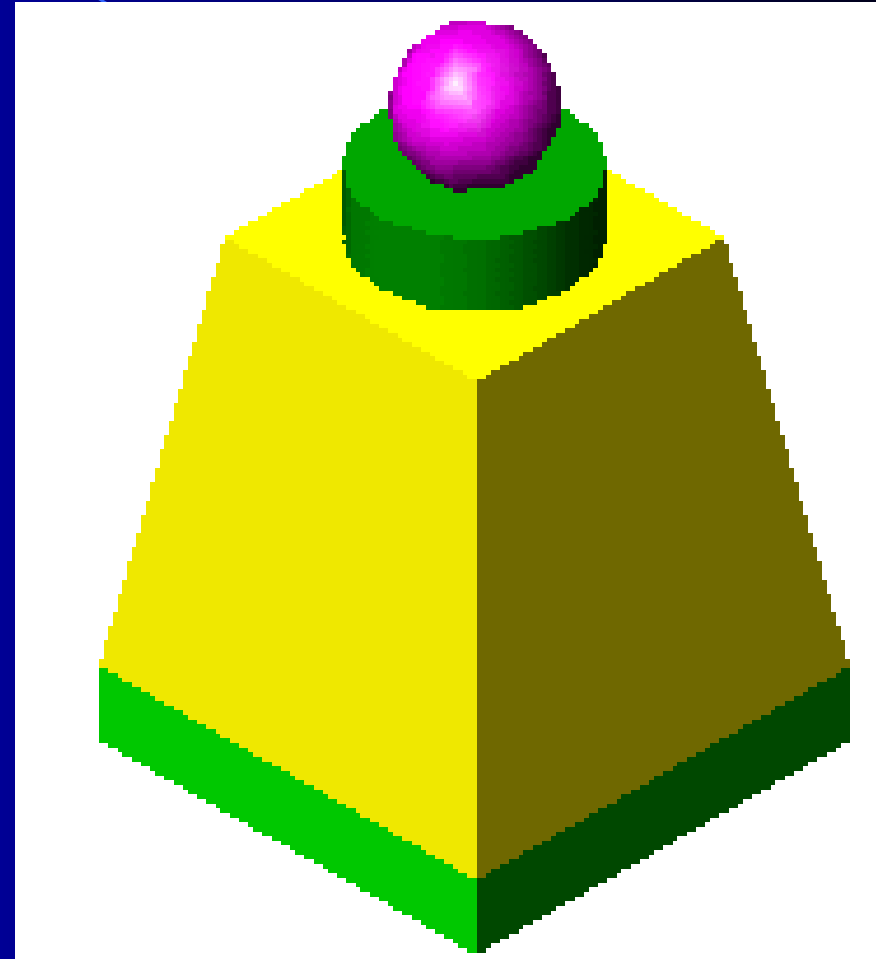
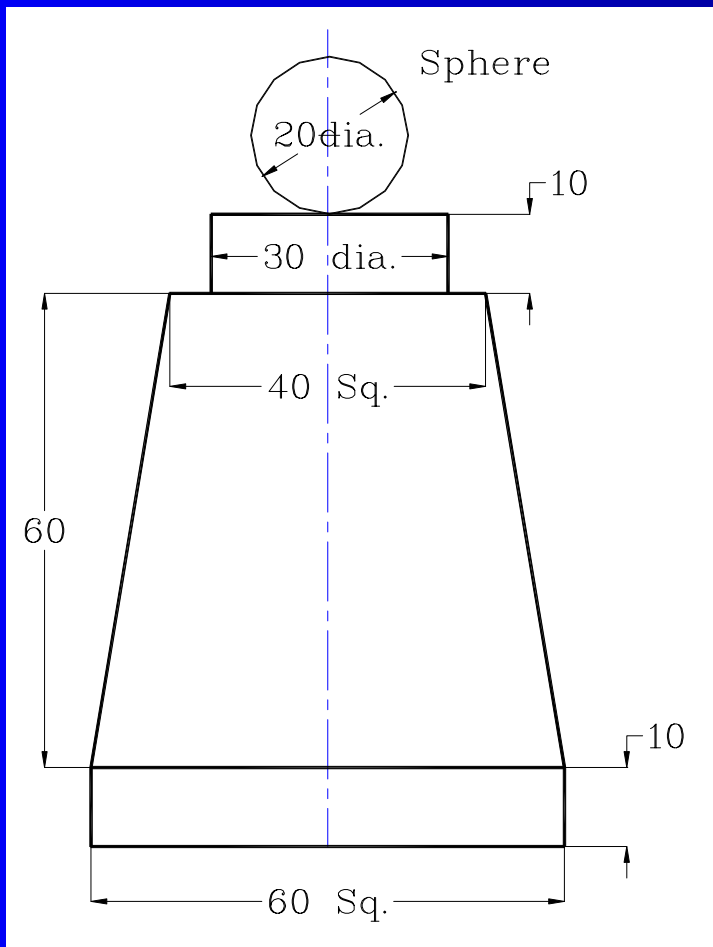


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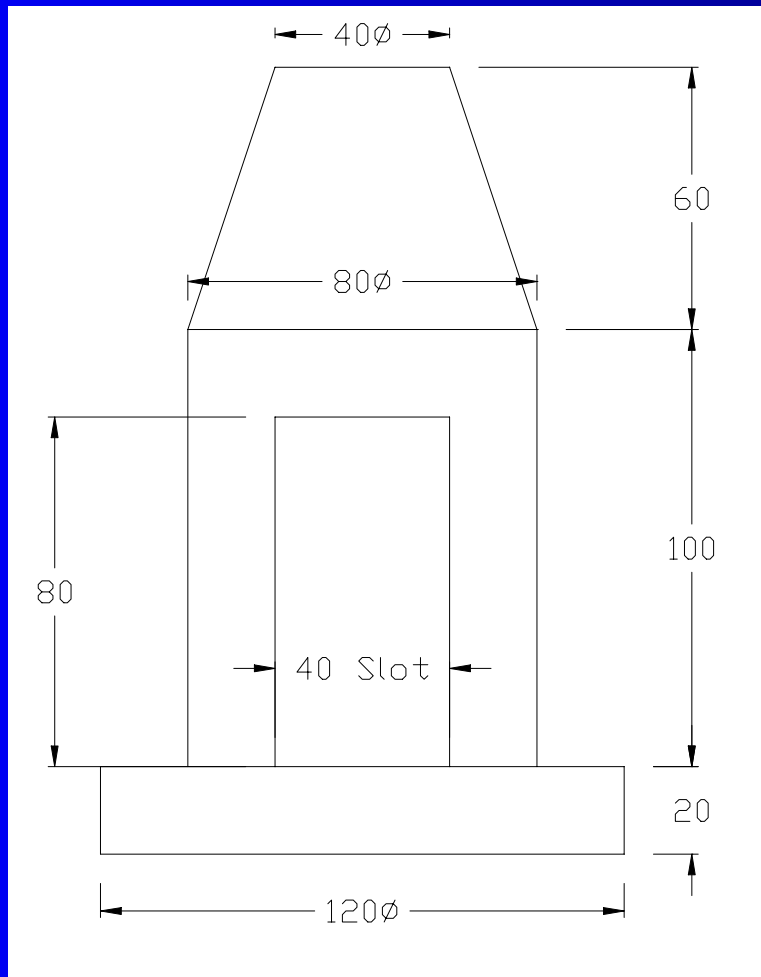




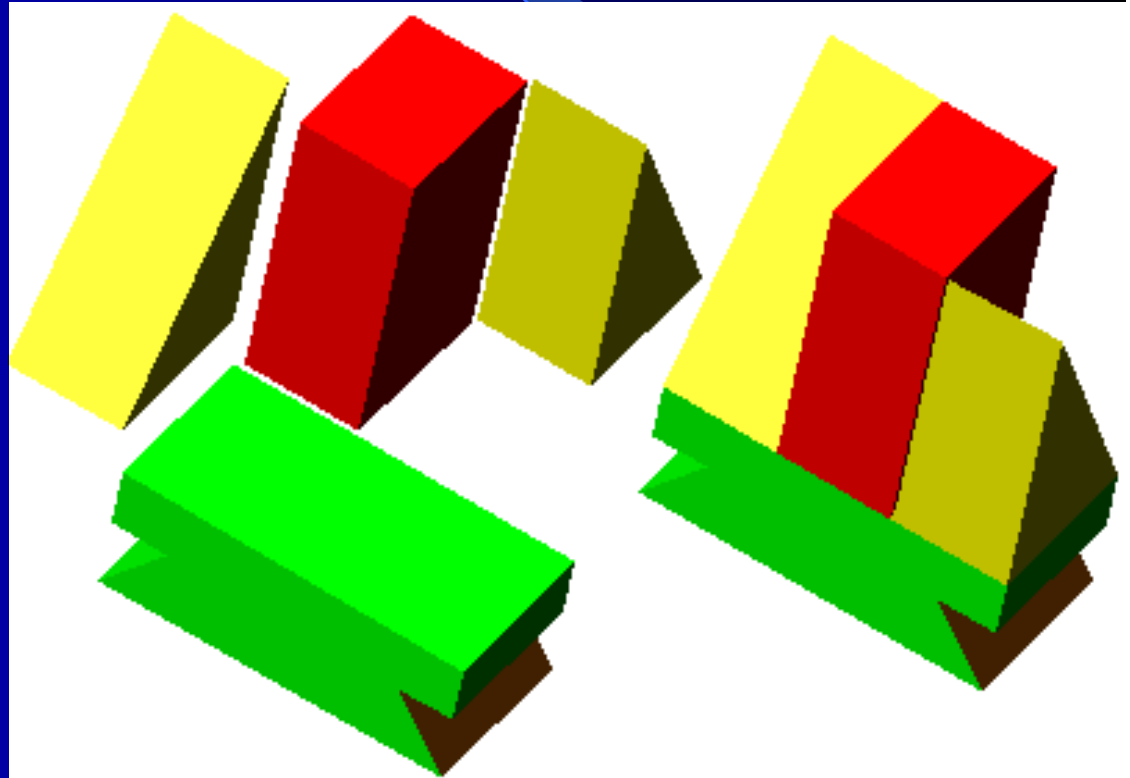
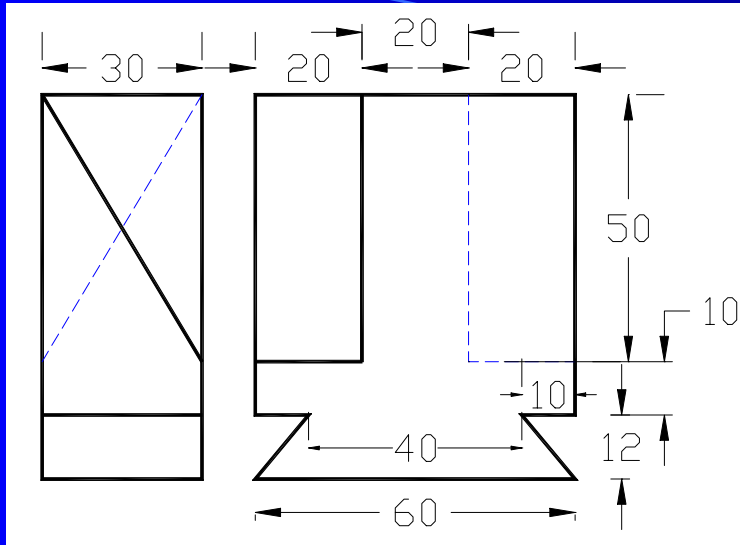
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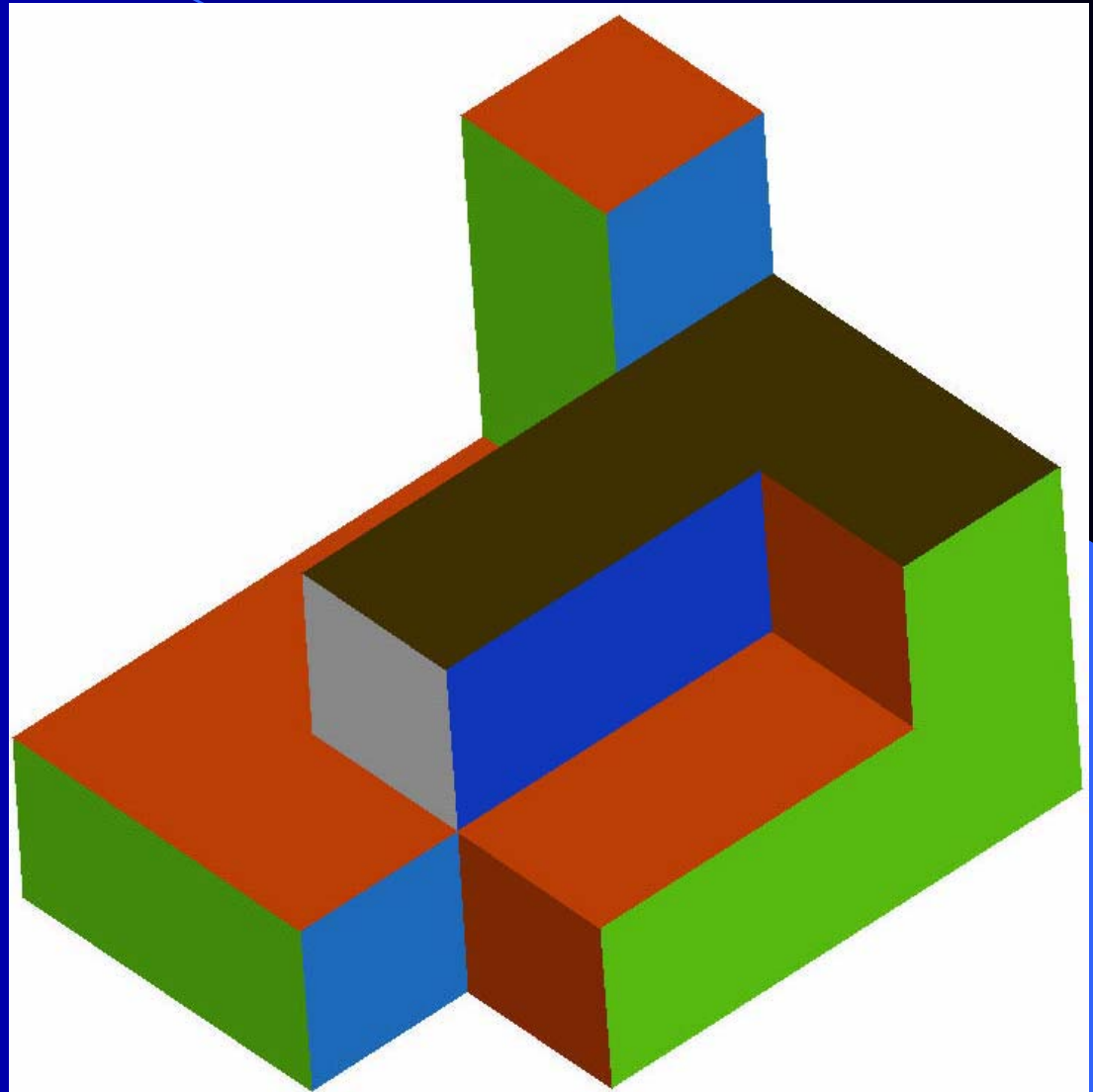
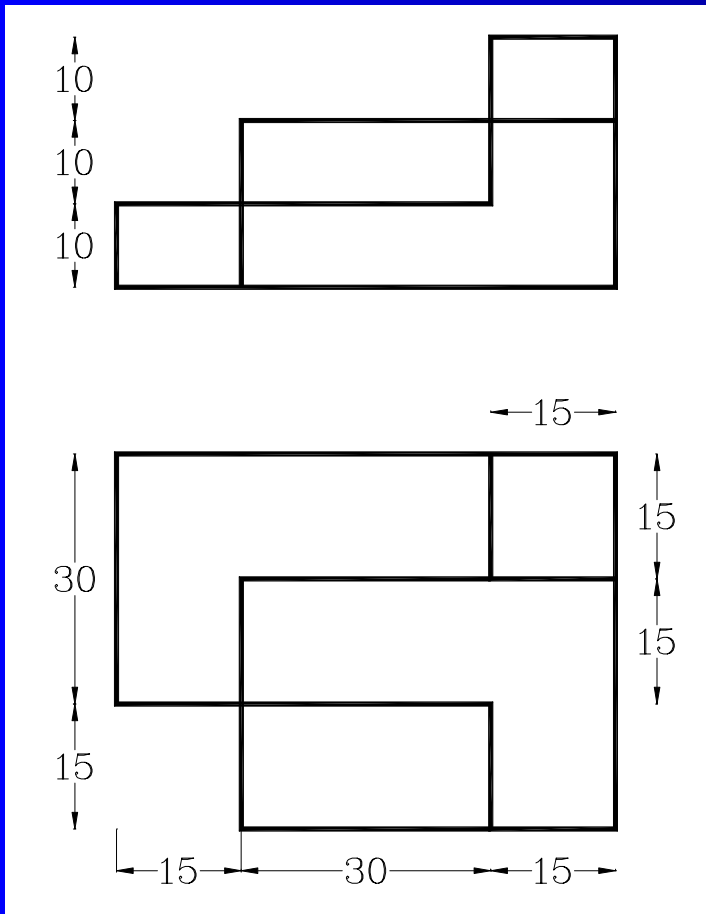
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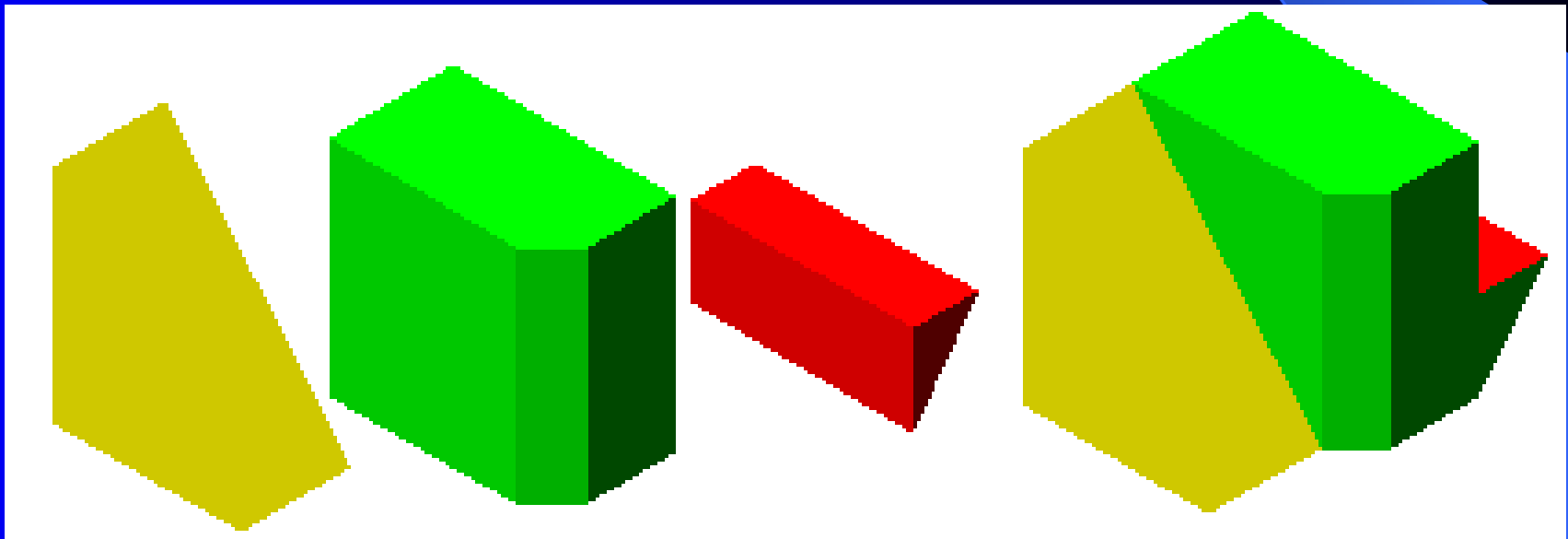
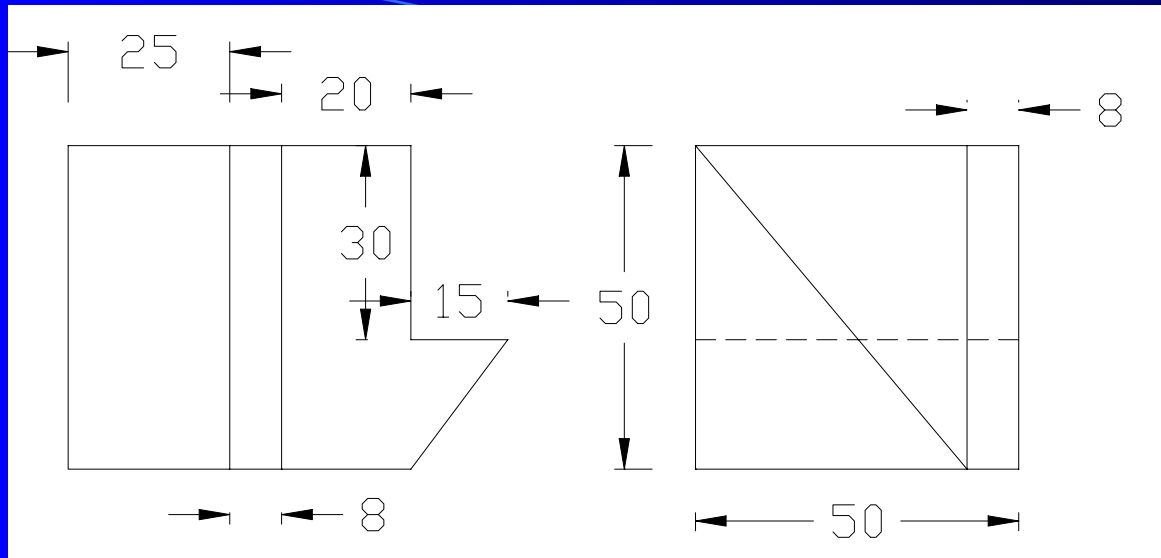
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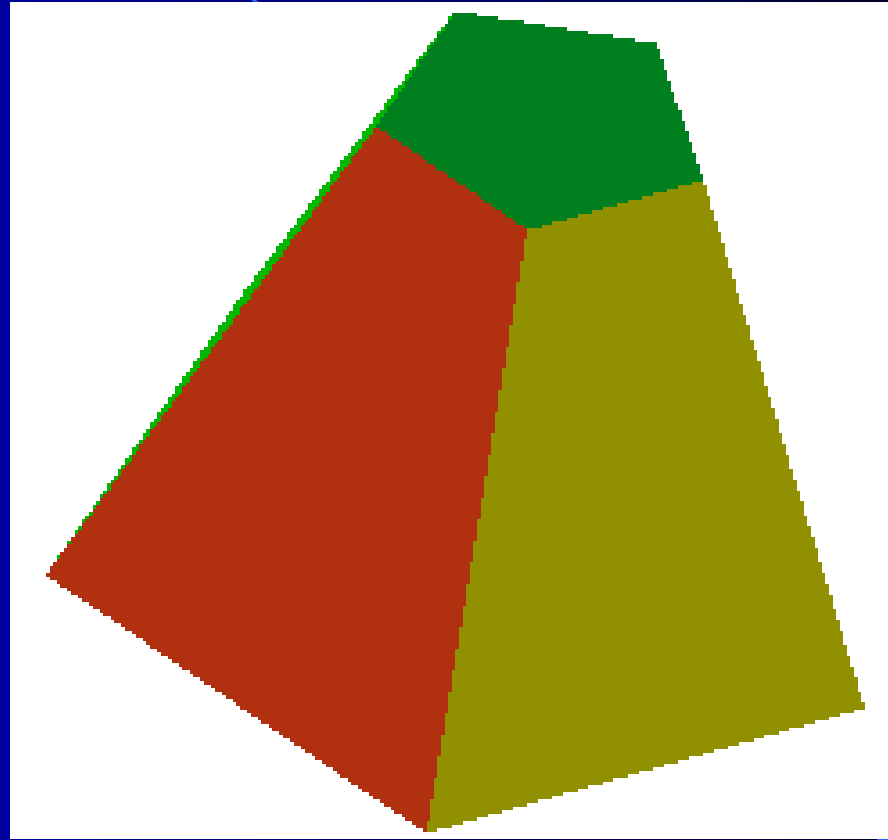
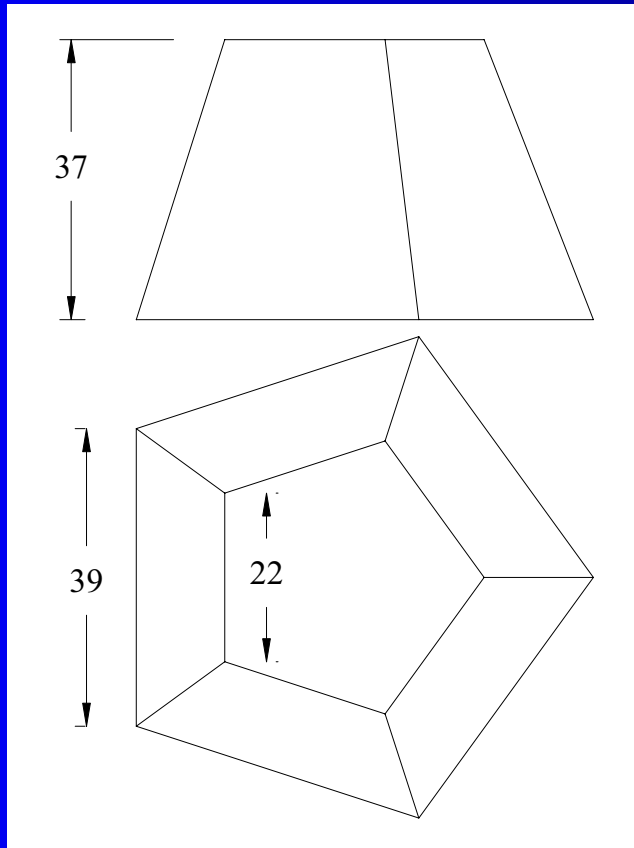
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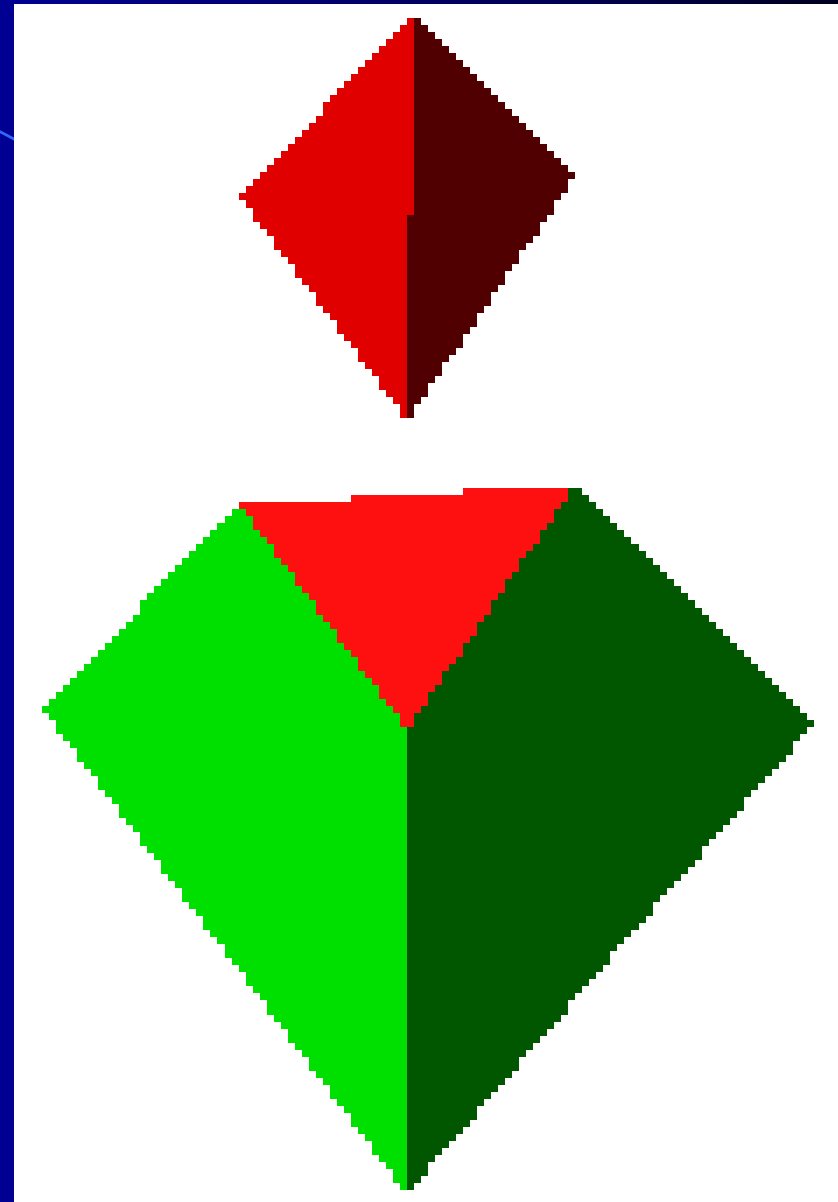
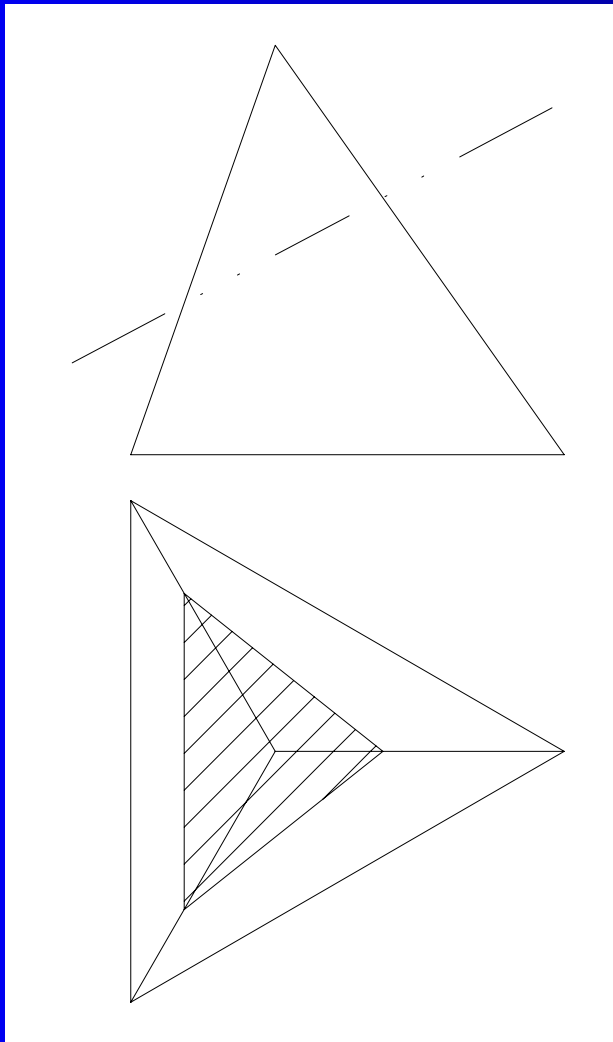
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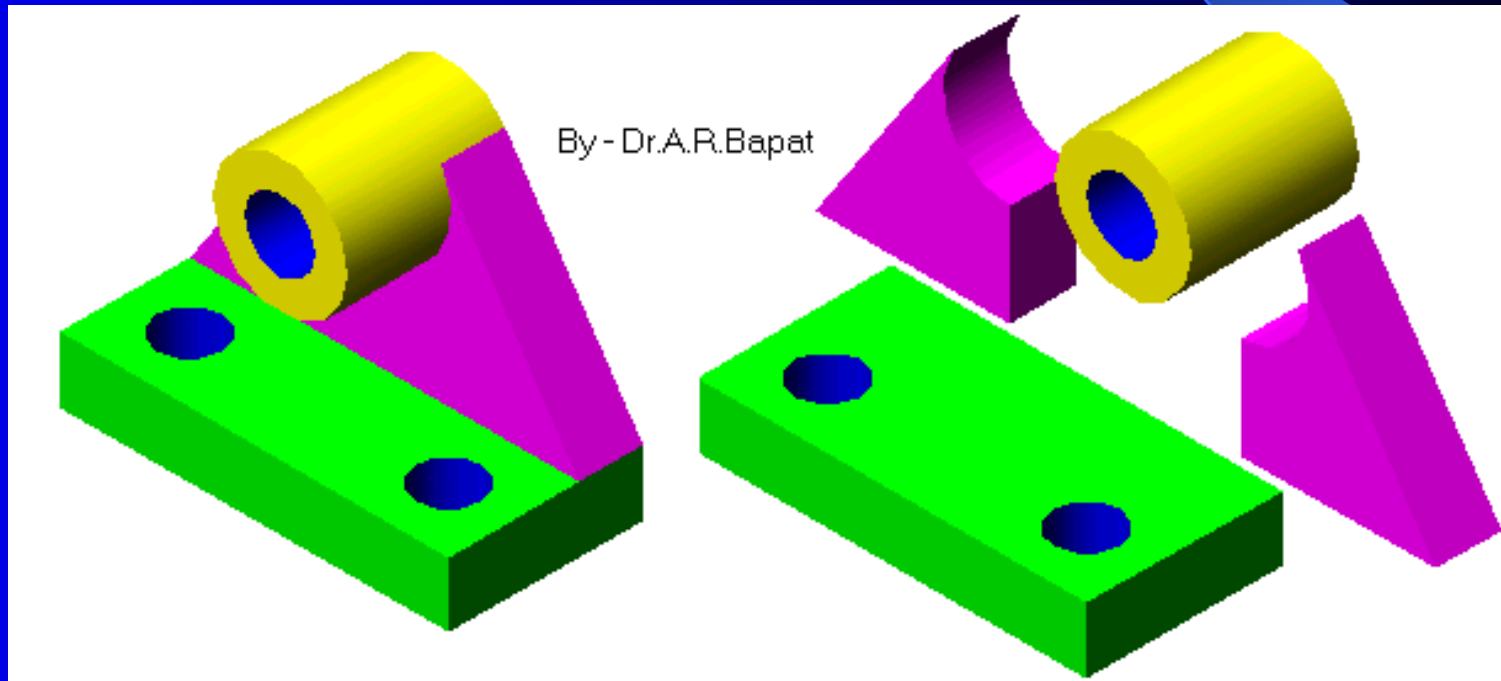
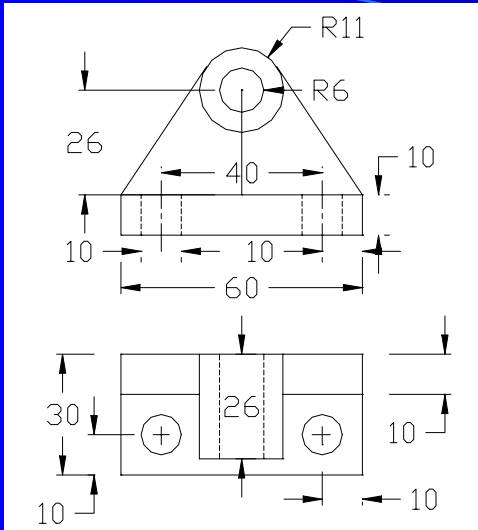
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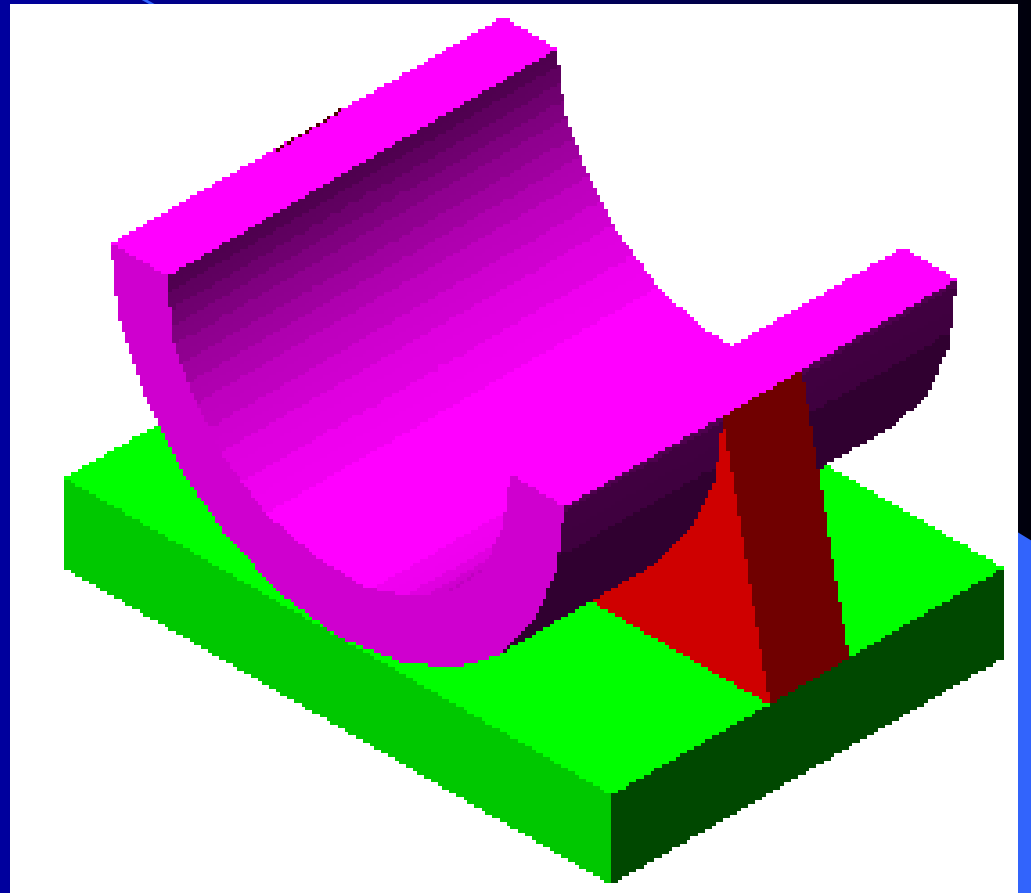
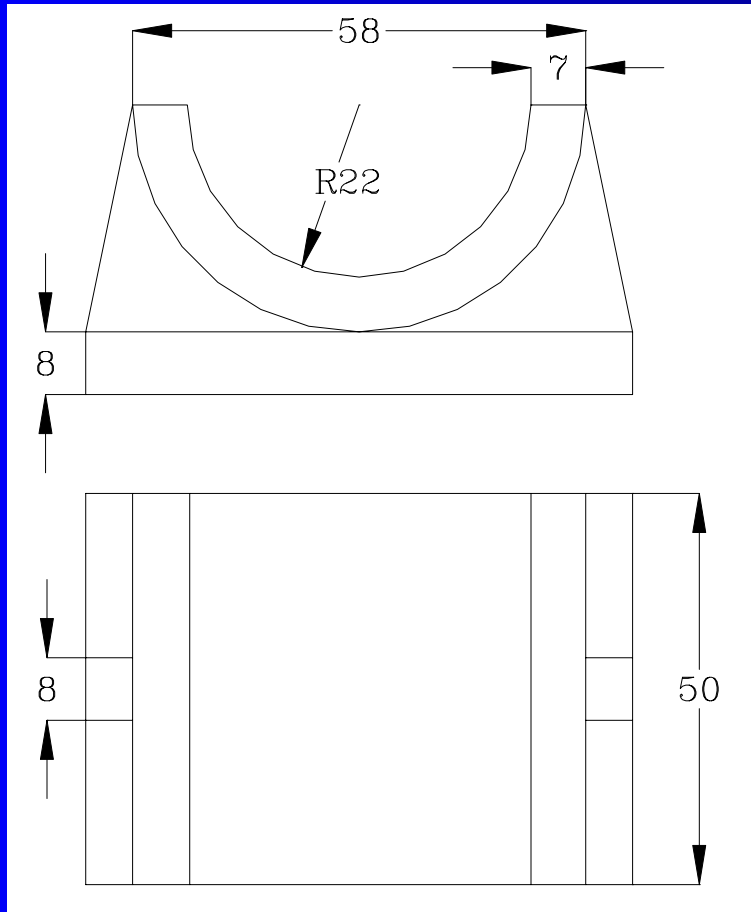


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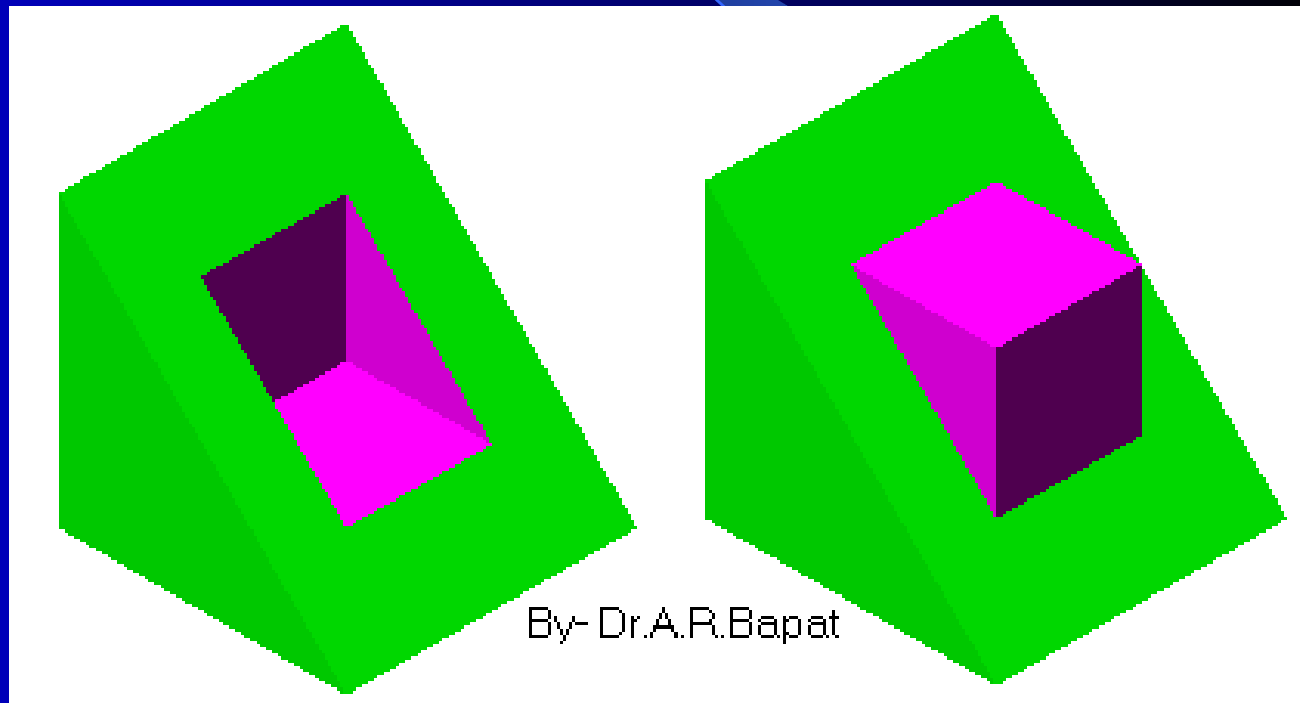
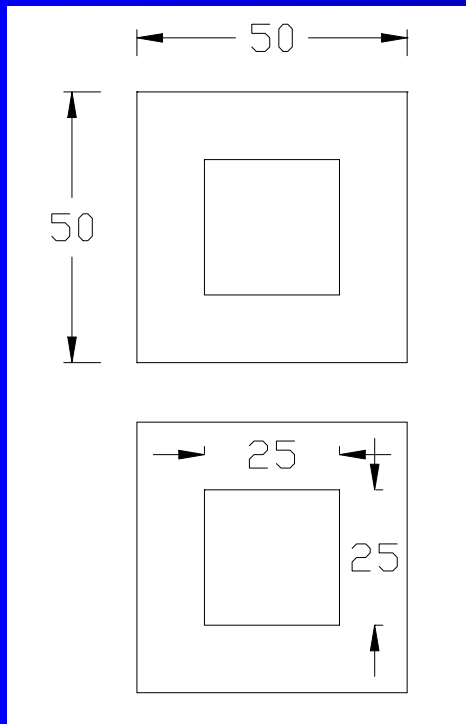




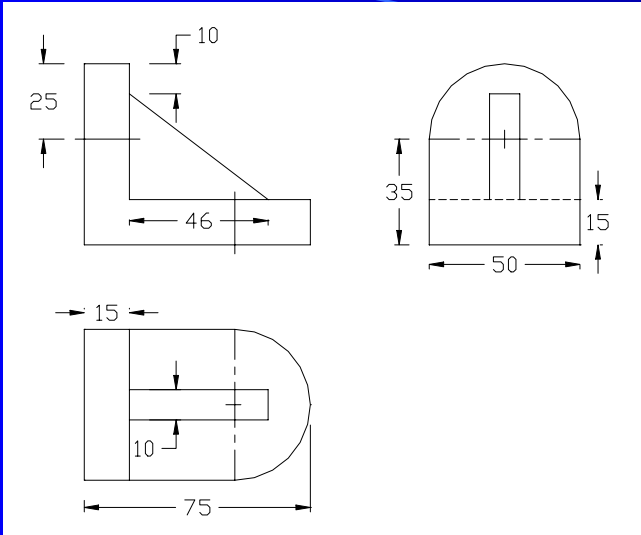
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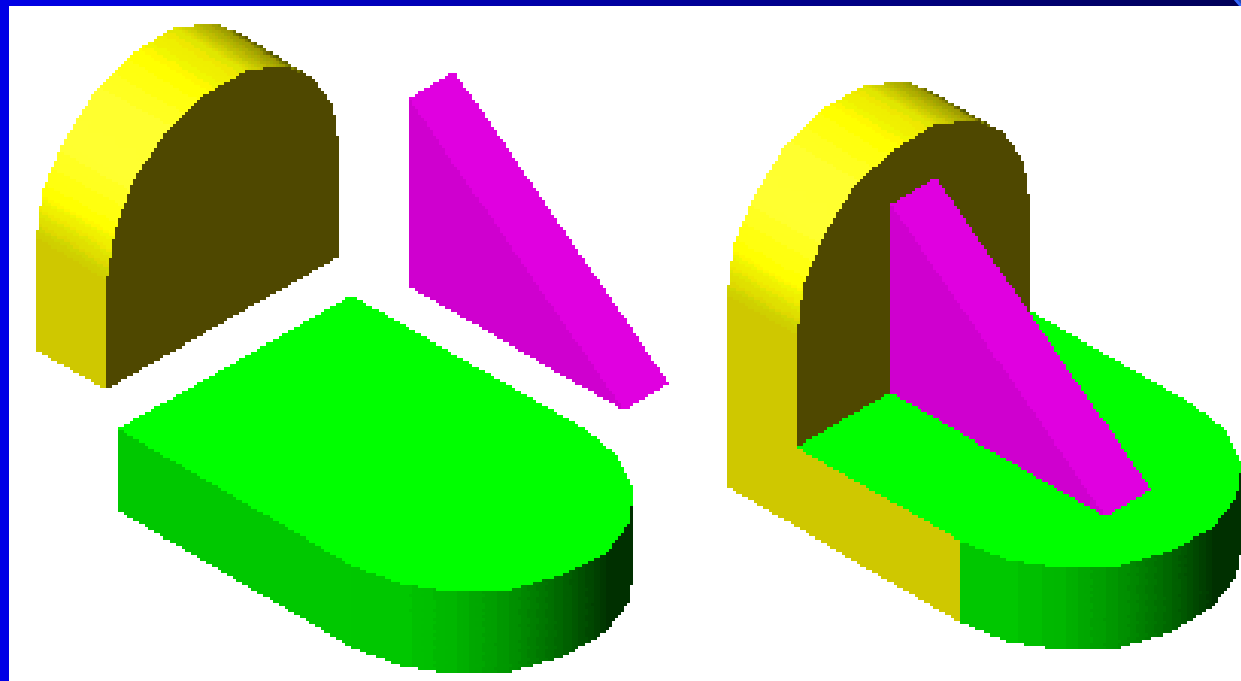
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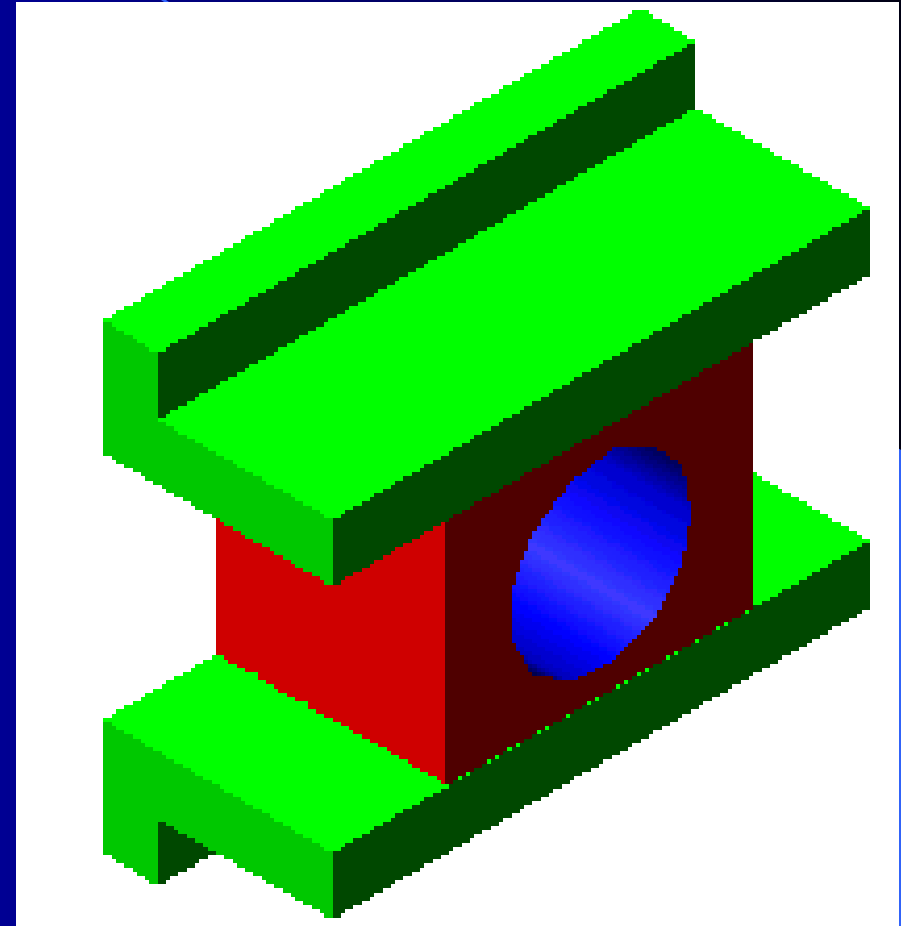
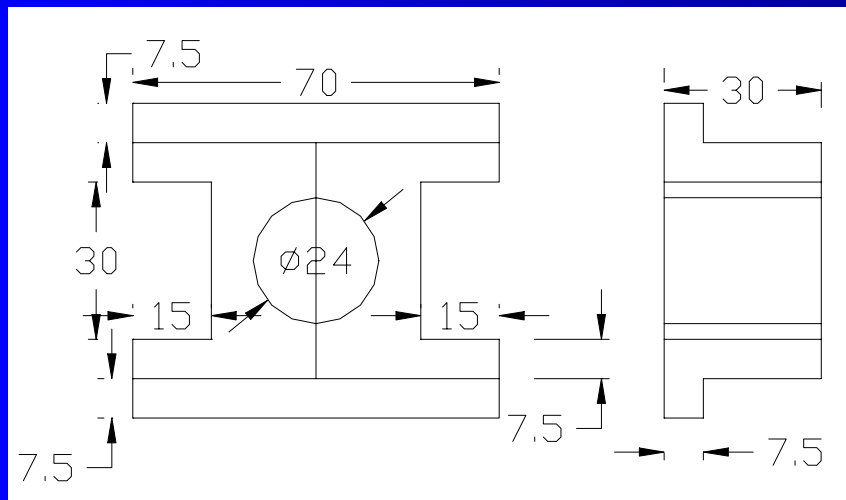
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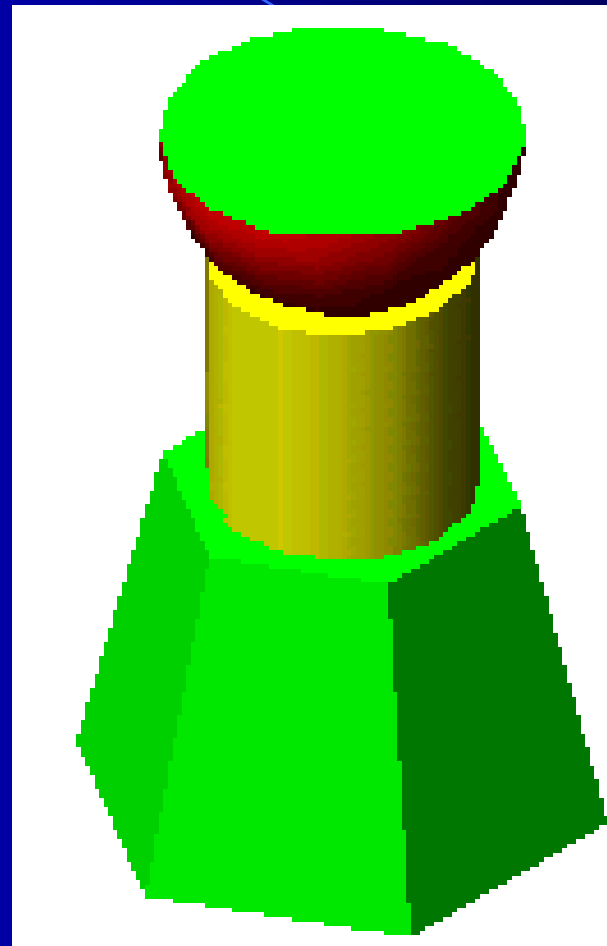
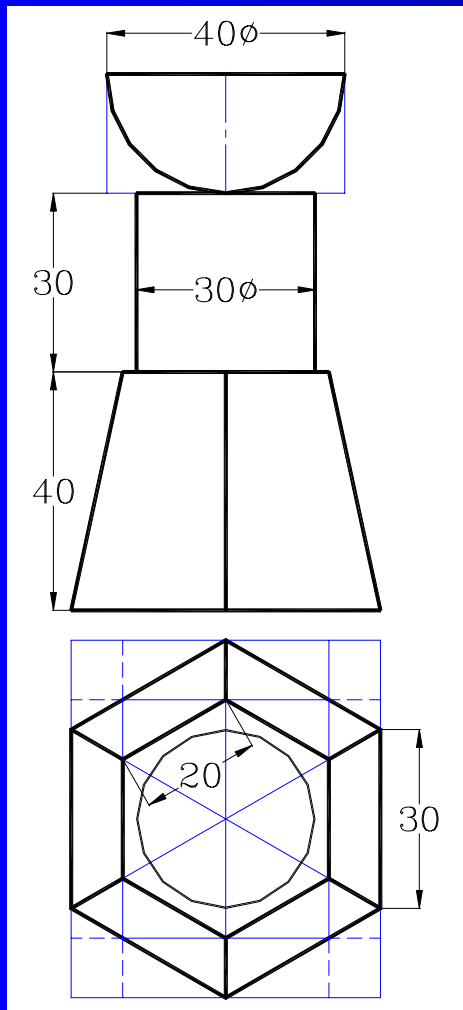
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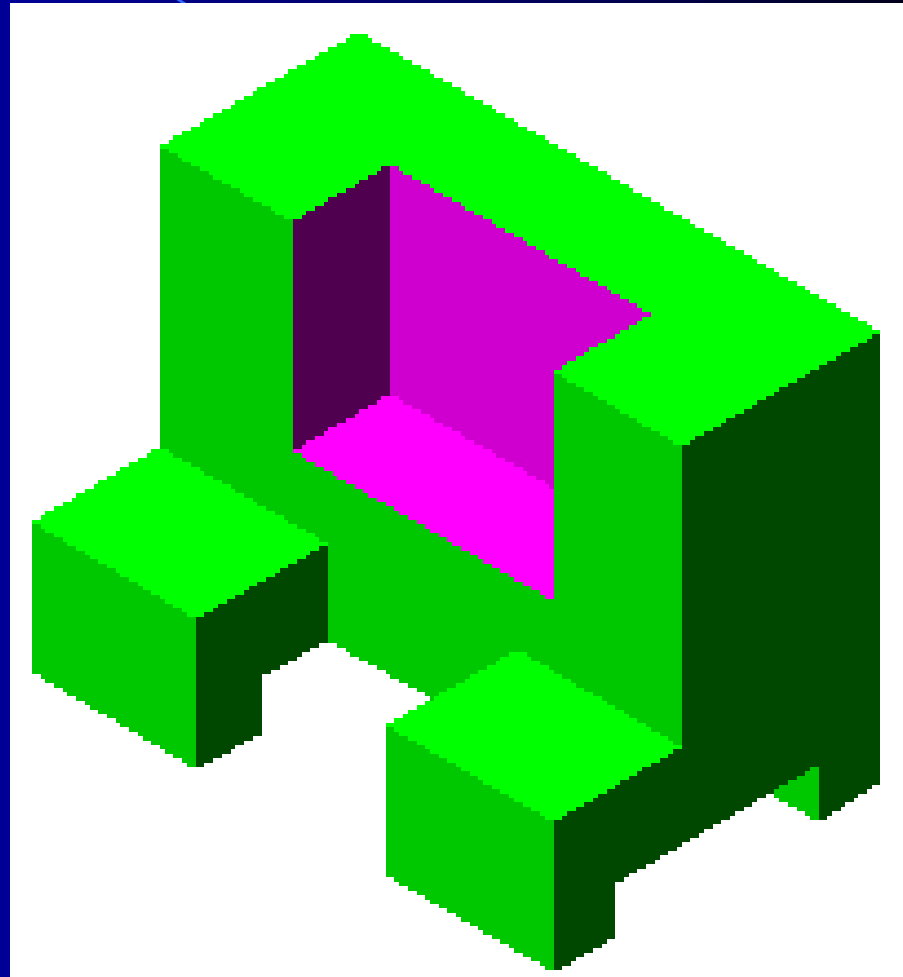
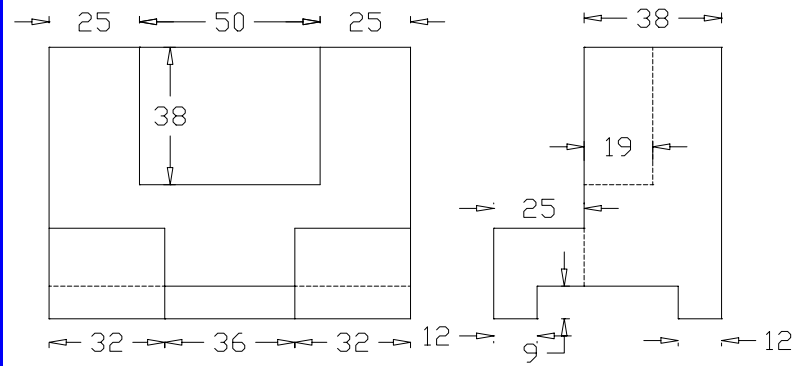
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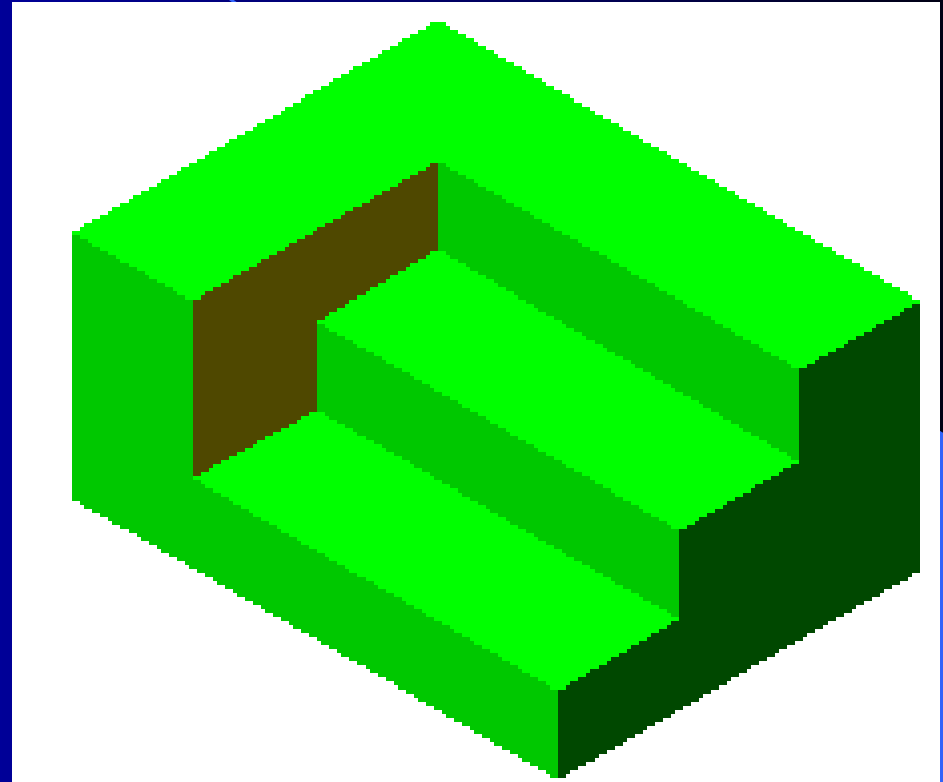
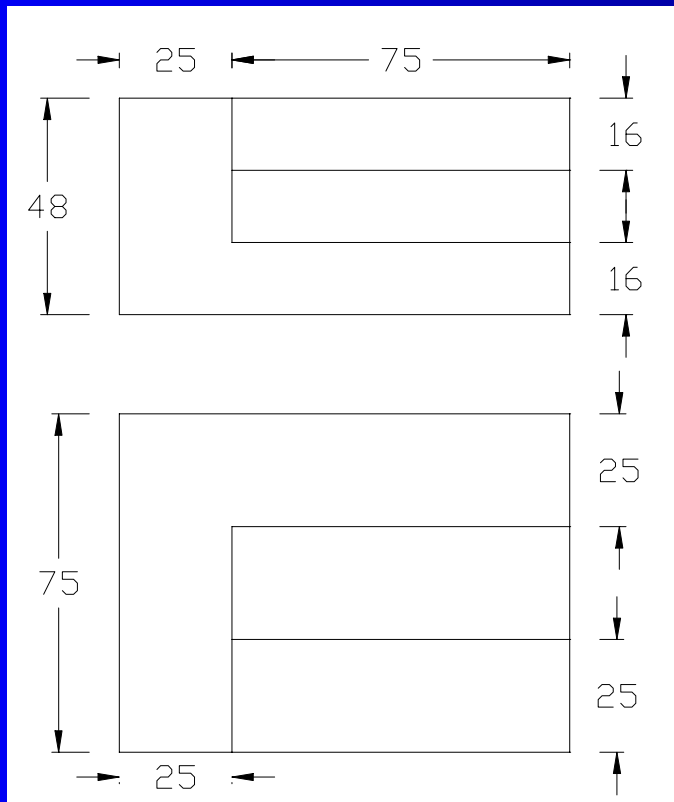
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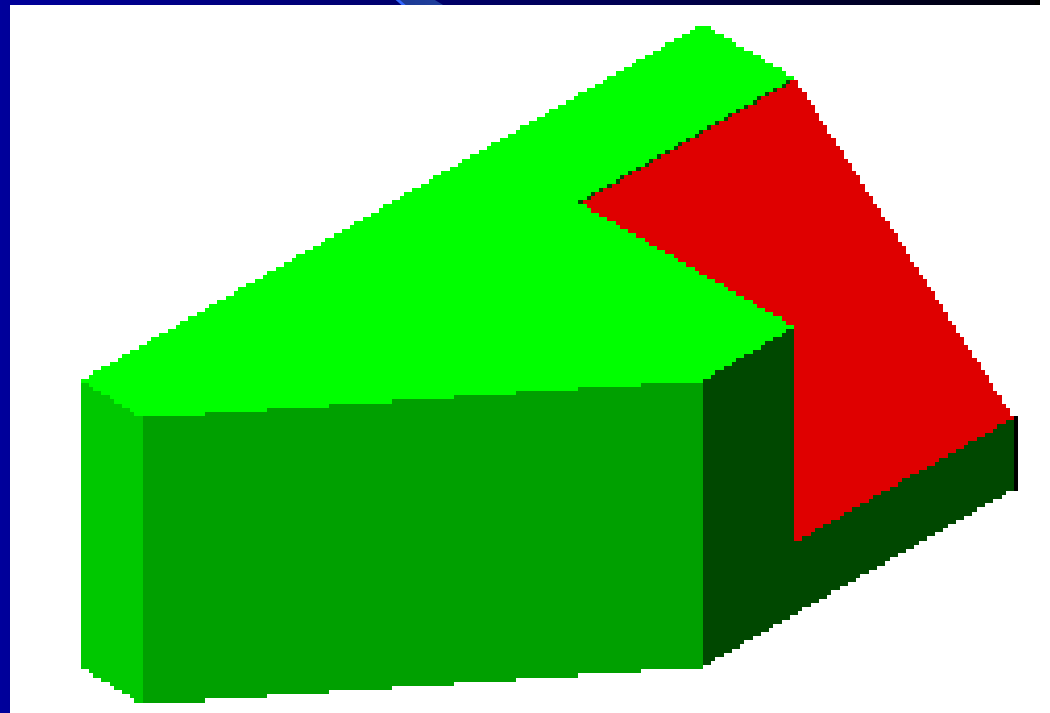
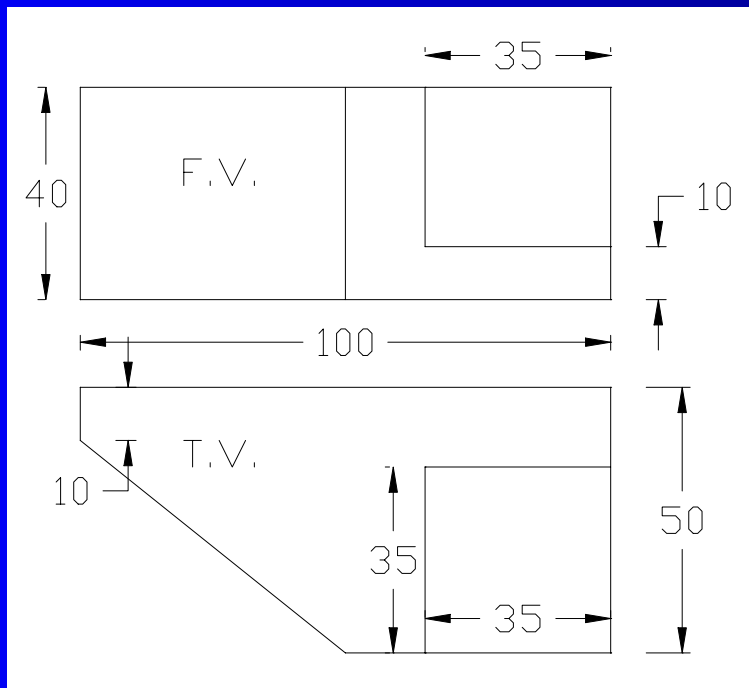
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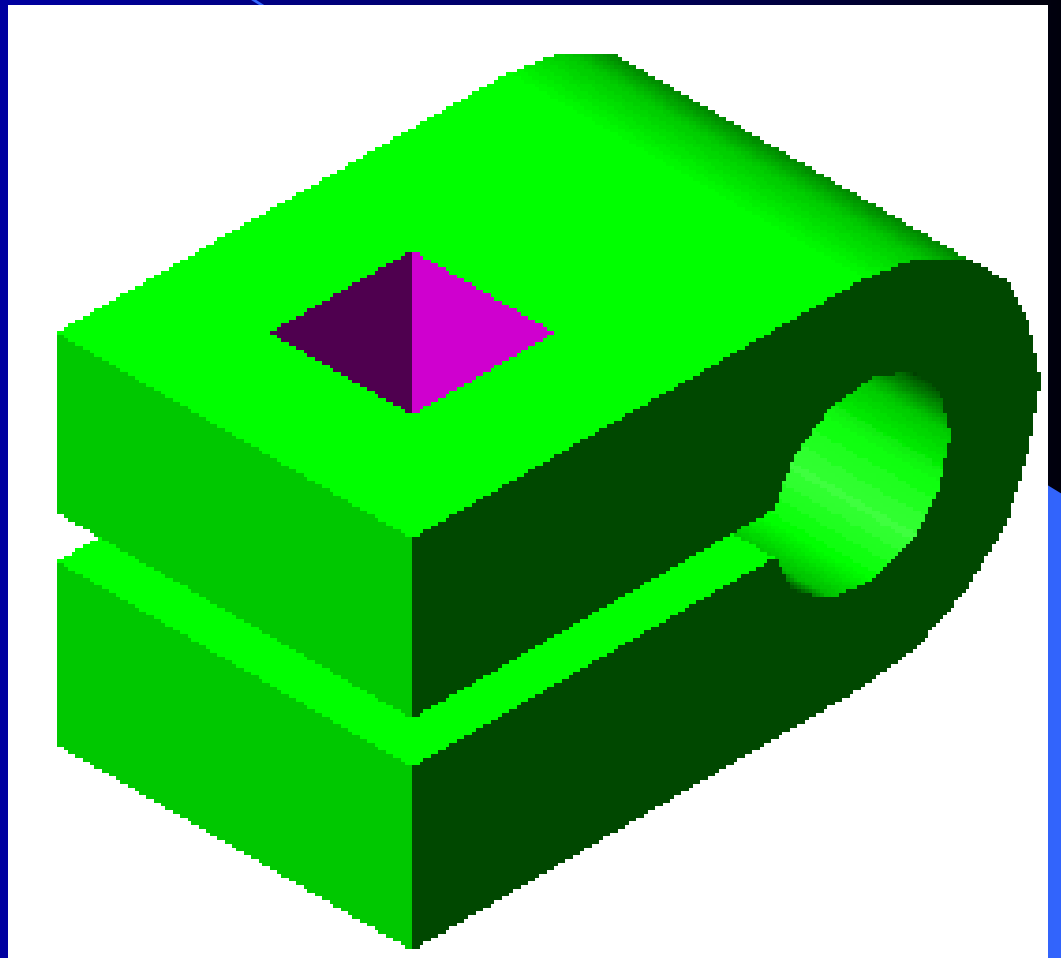
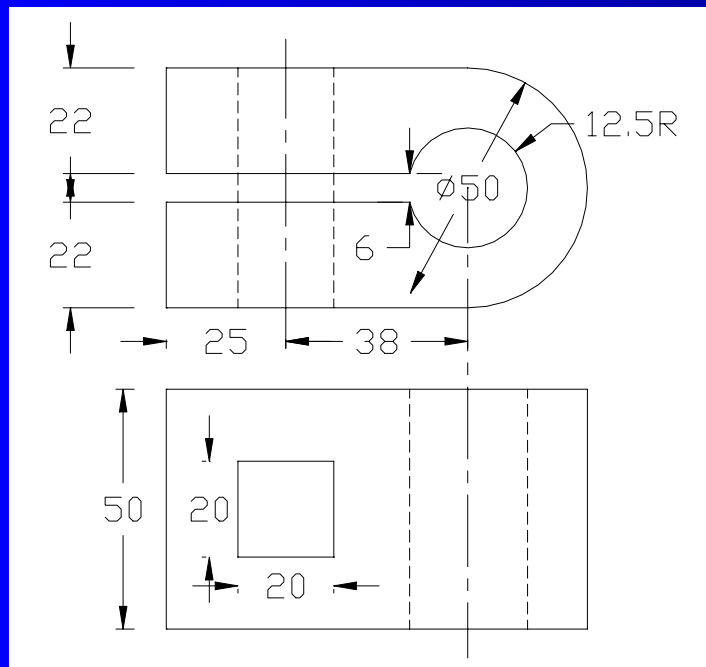


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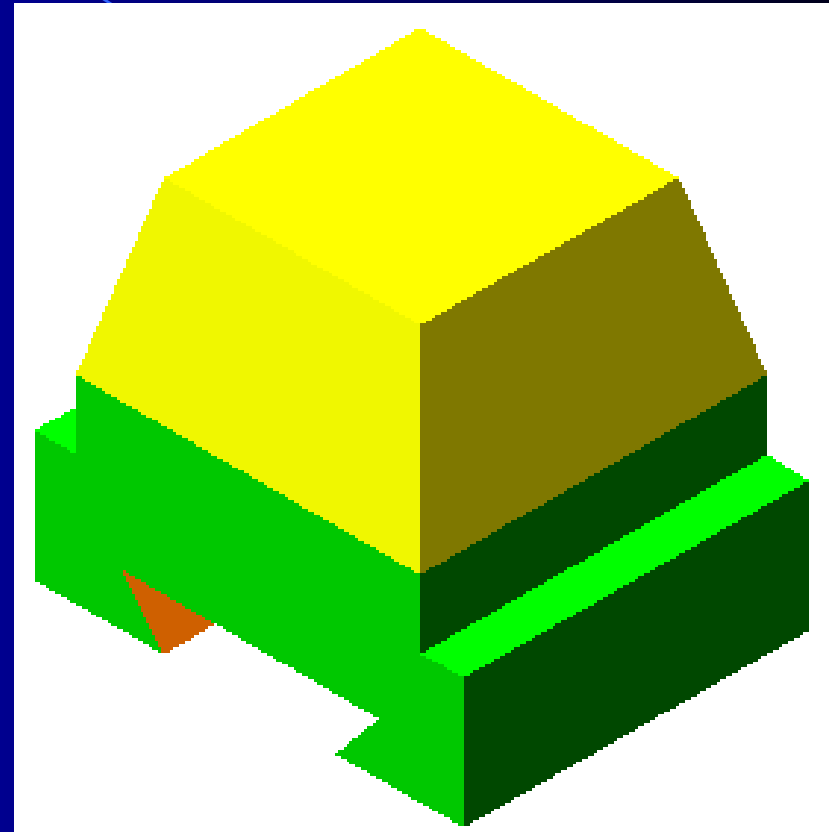
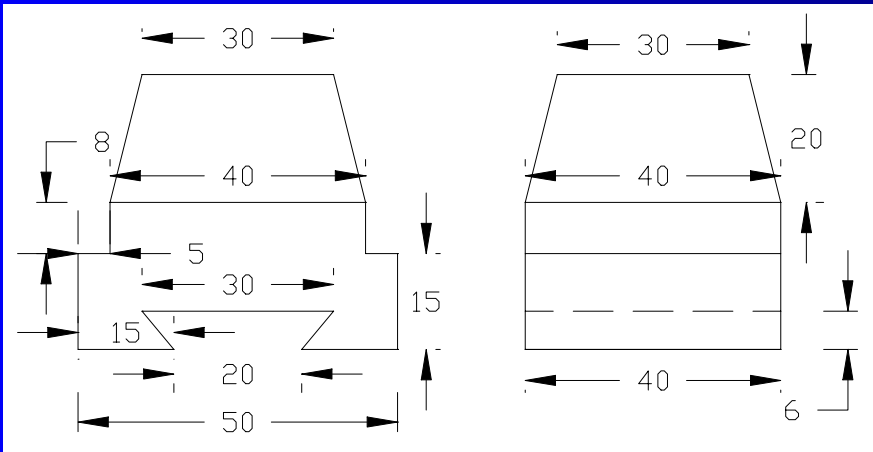




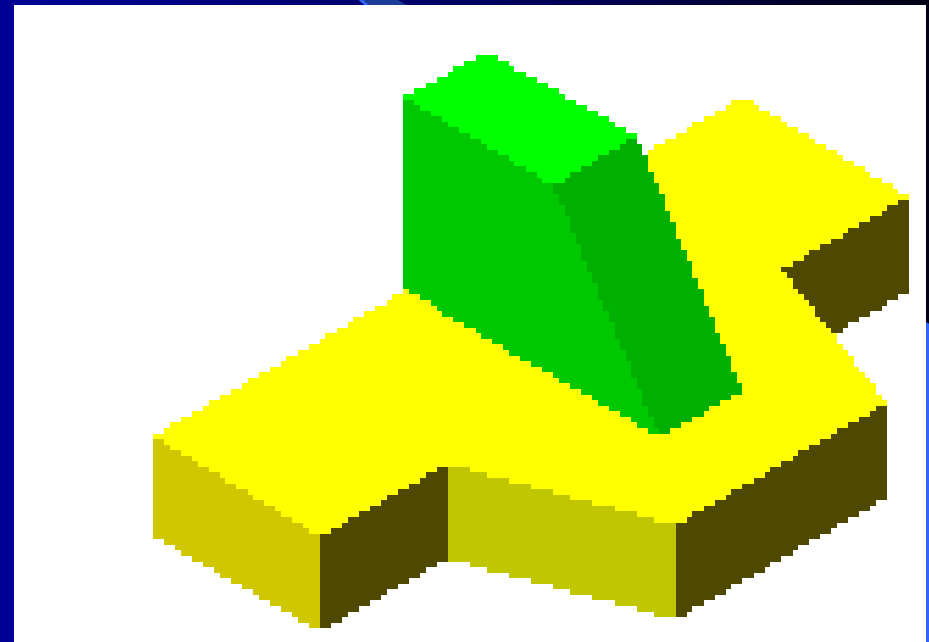
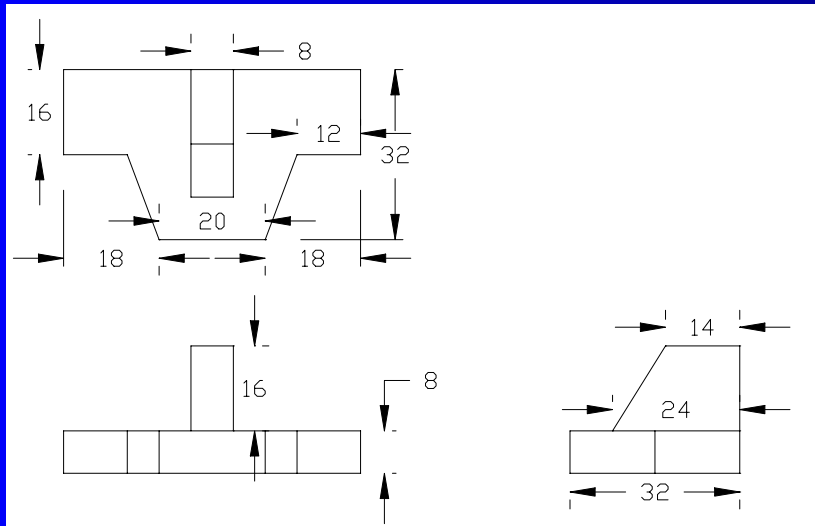
# Model - 26



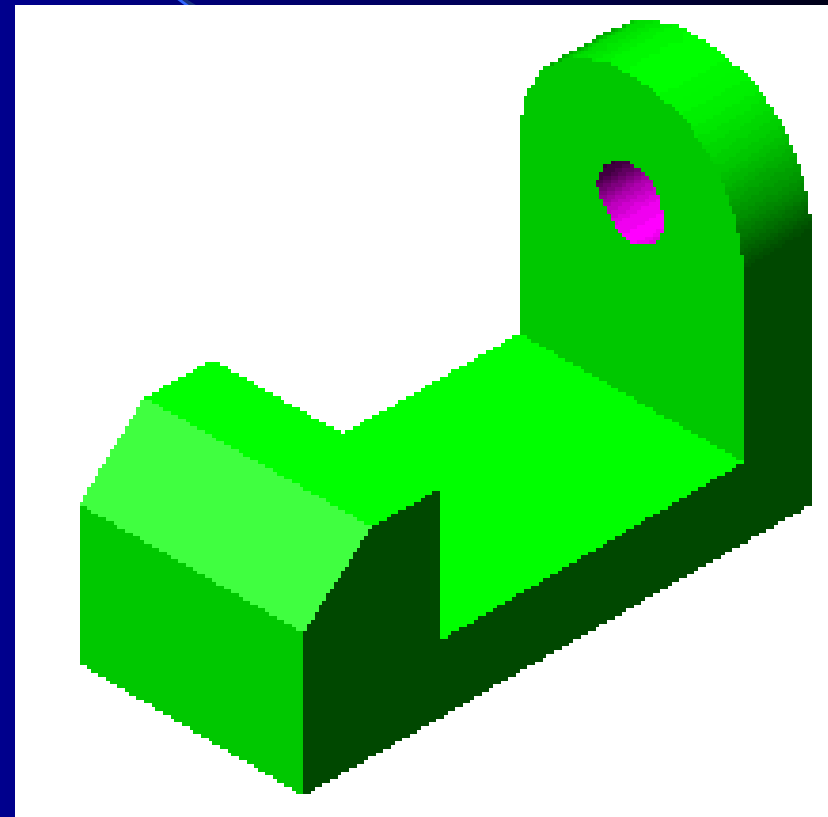
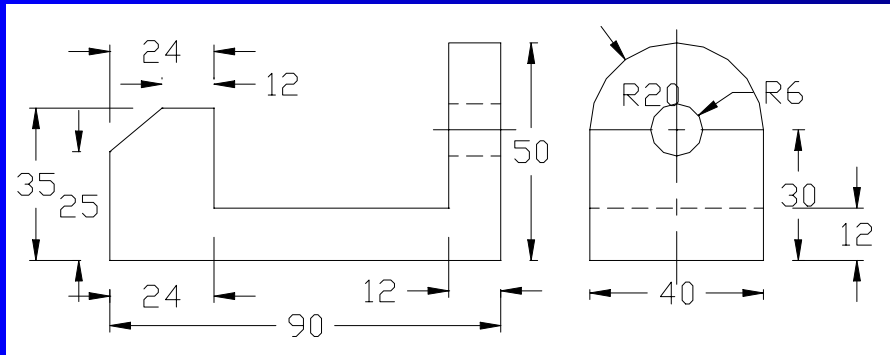
# Model - 27



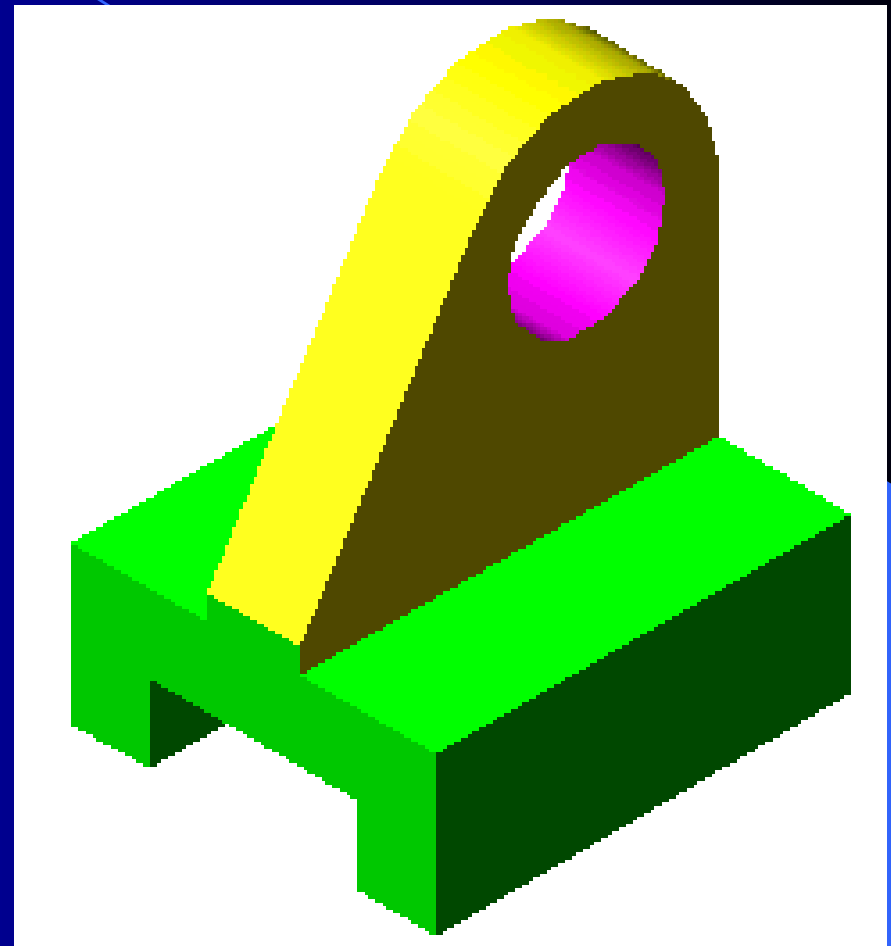
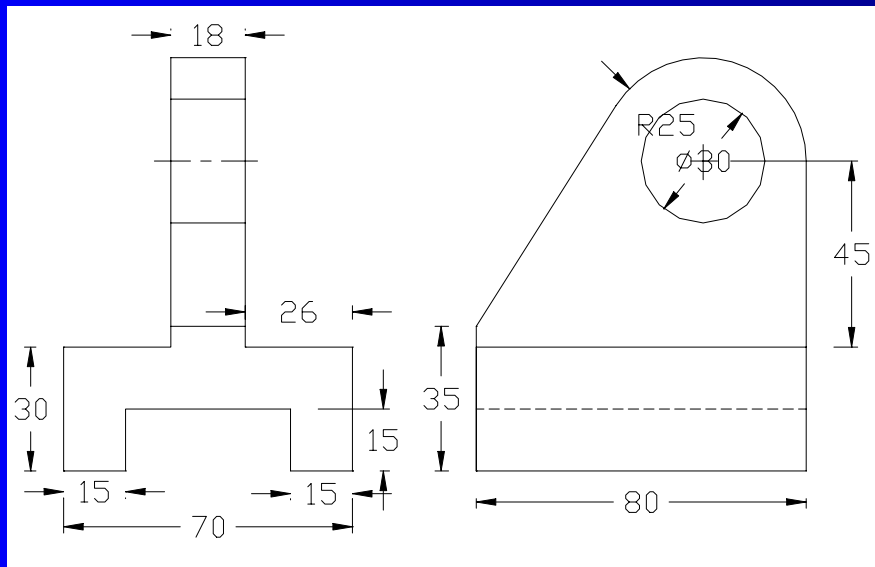
# Model - 28



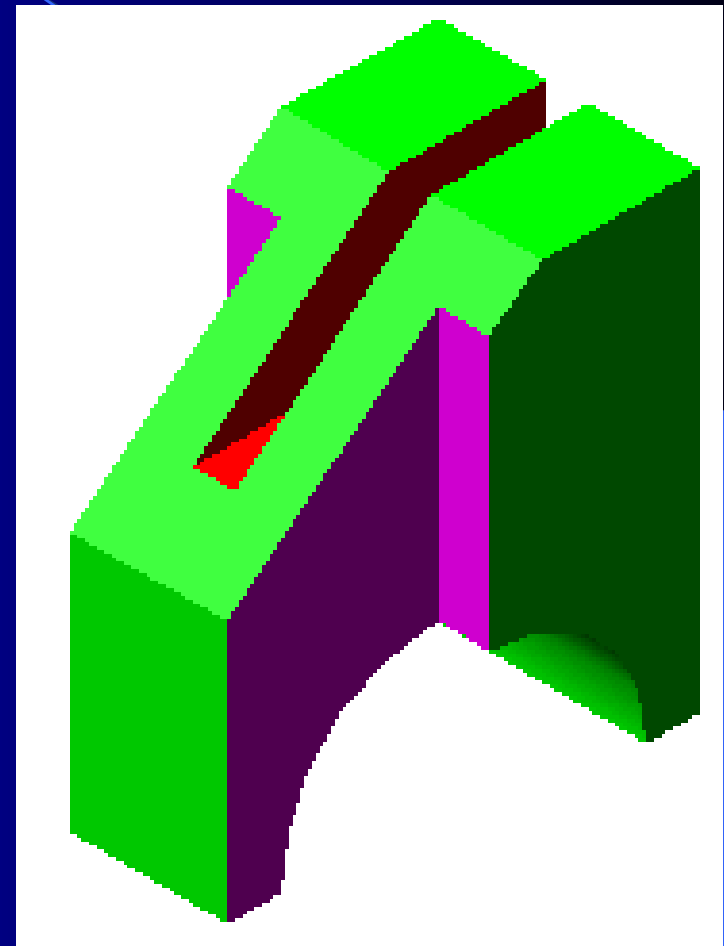
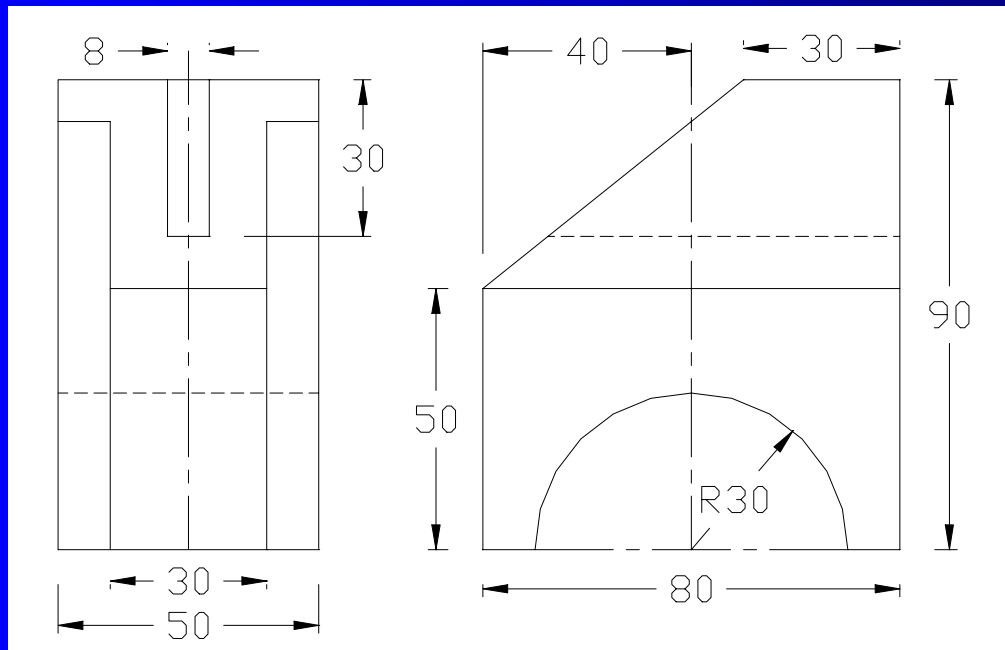
# Model - 29



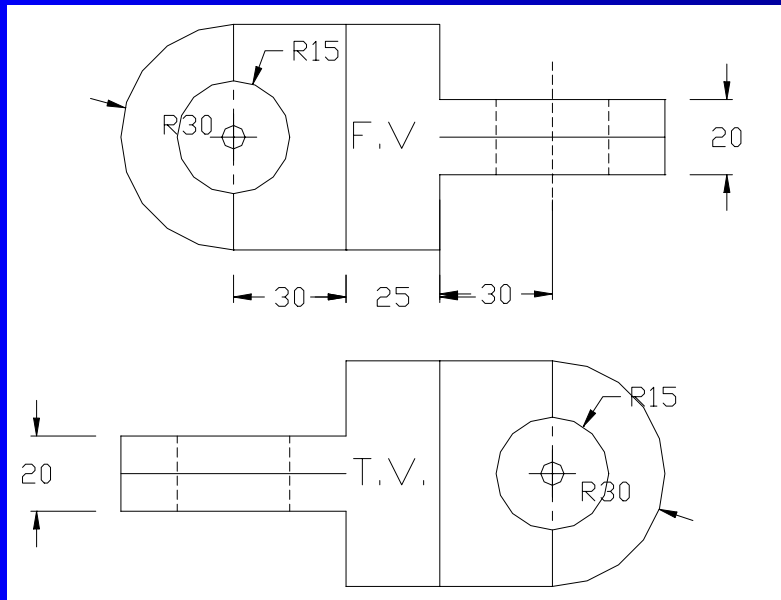
# Model - 30



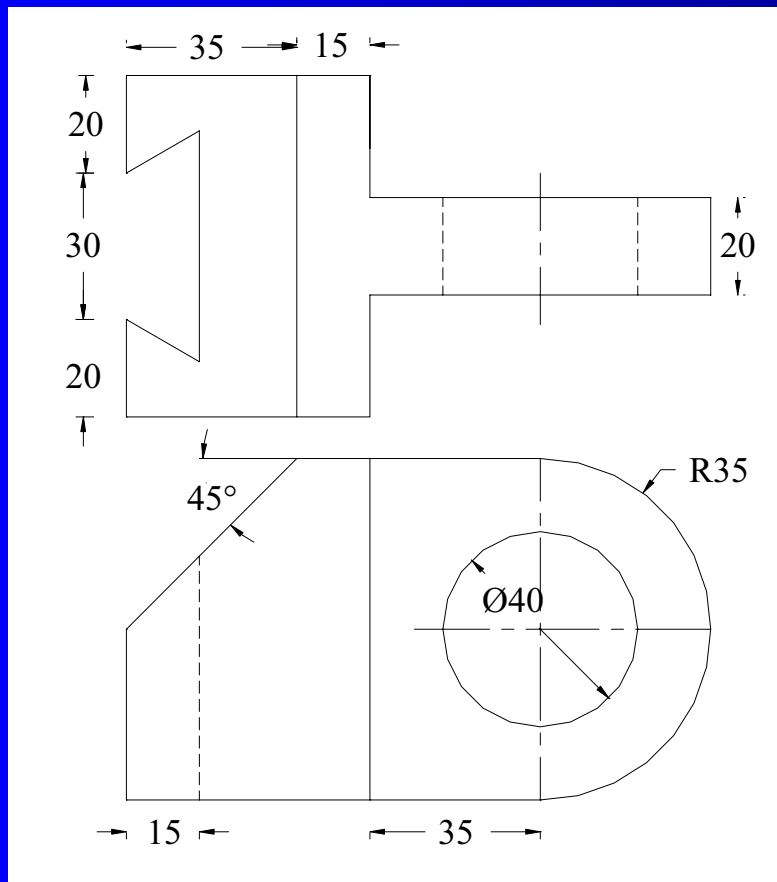
# Model - 31



# Model - 32

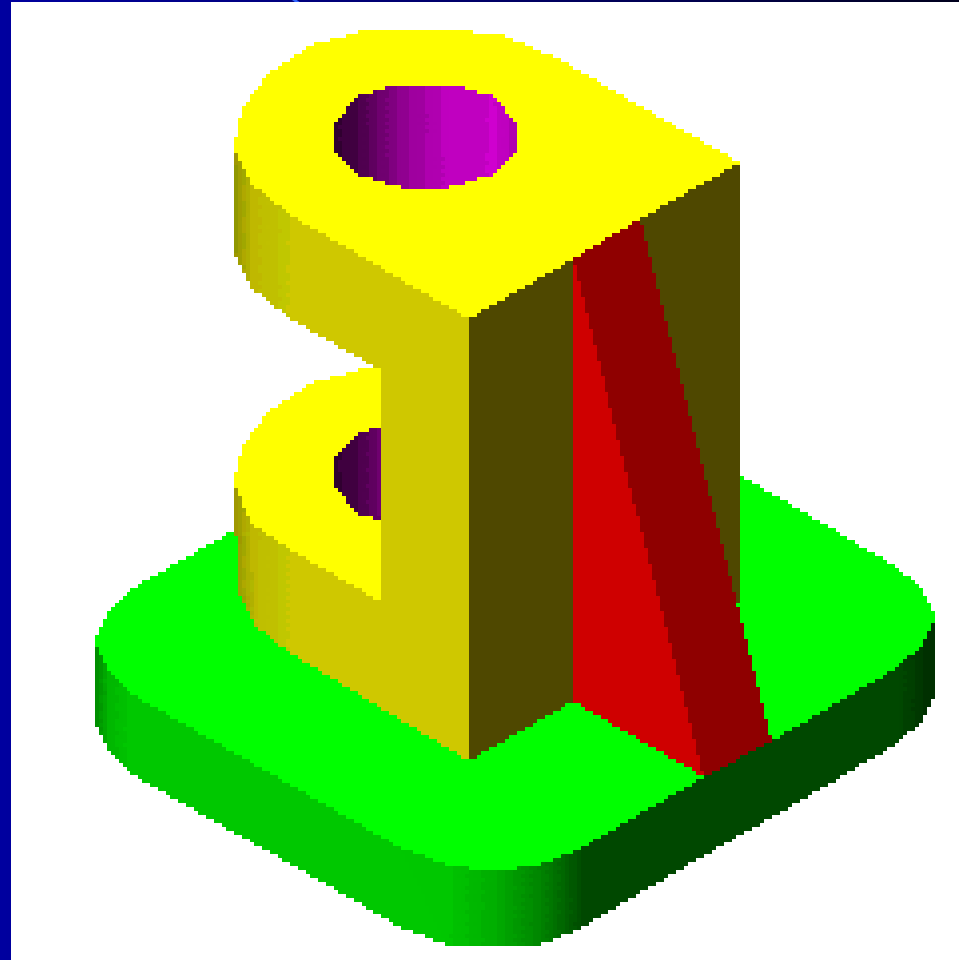
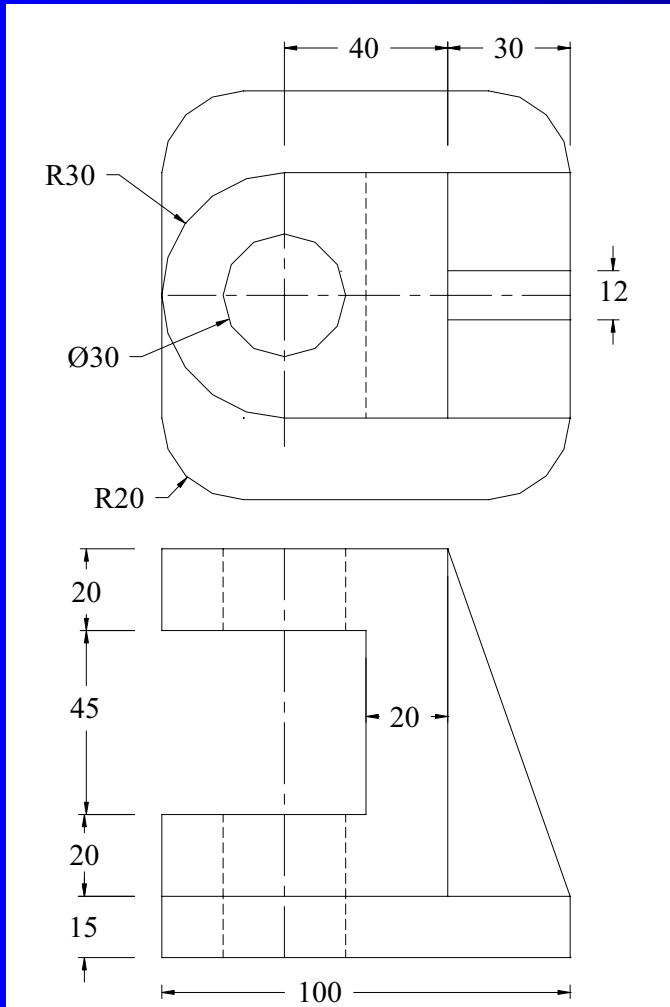


# Model - 33

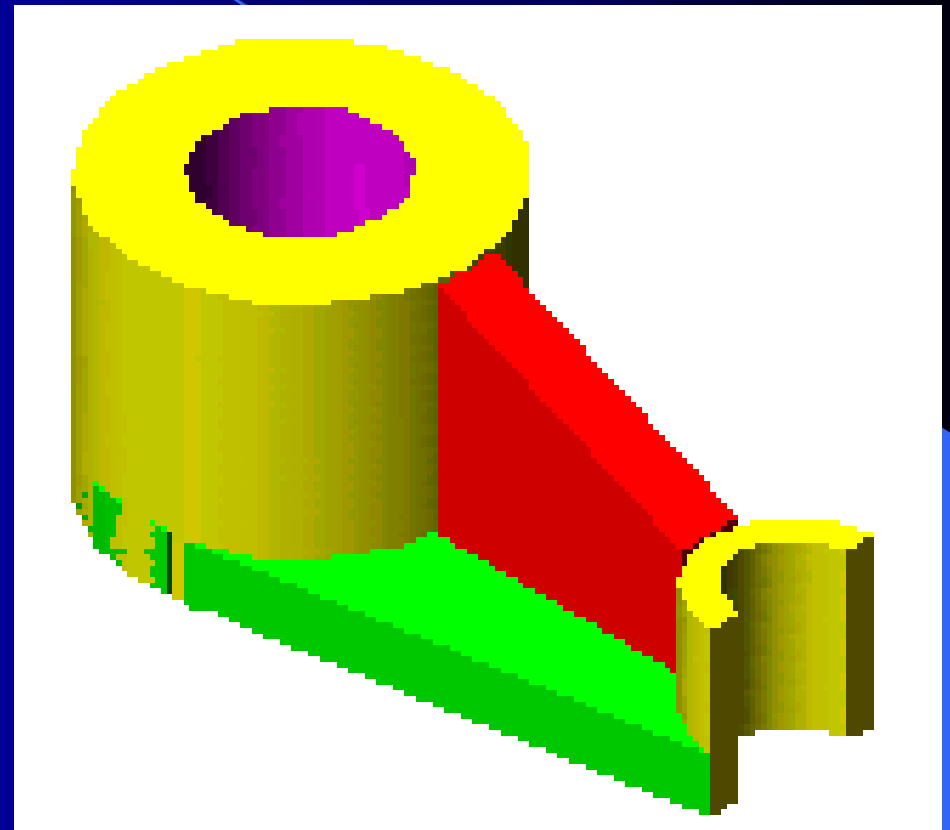
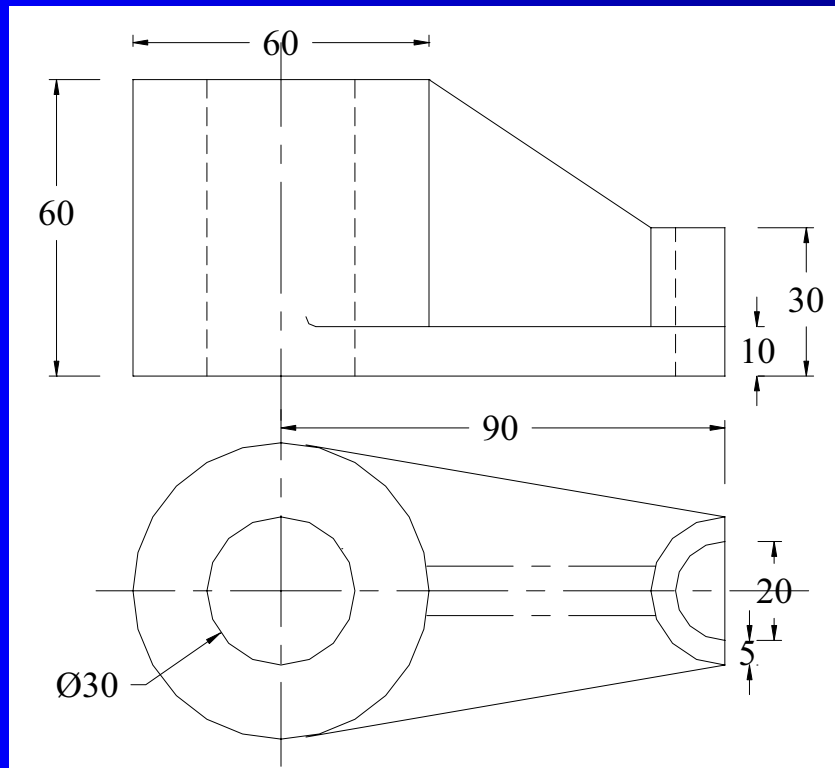




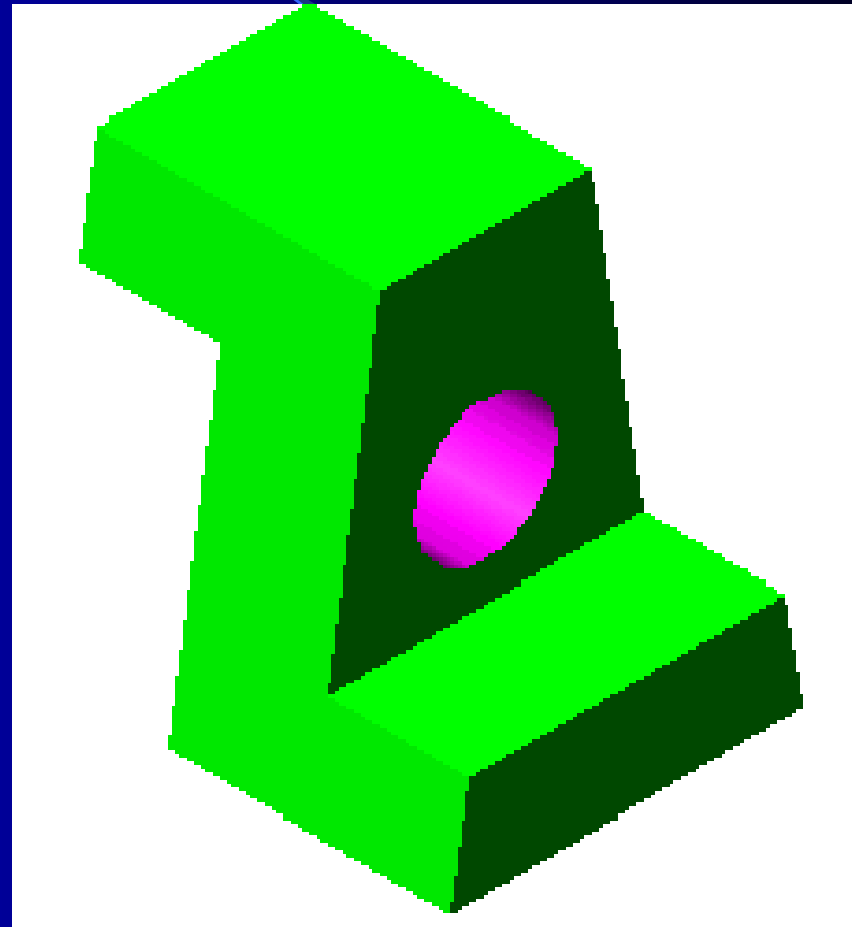
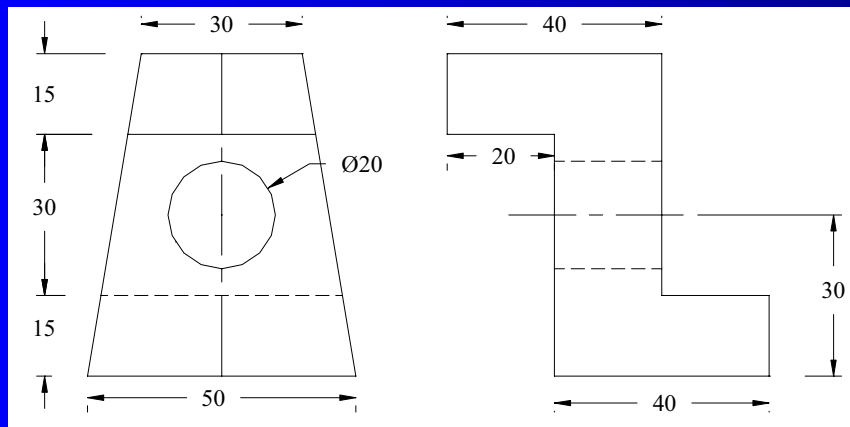
# Model - 34



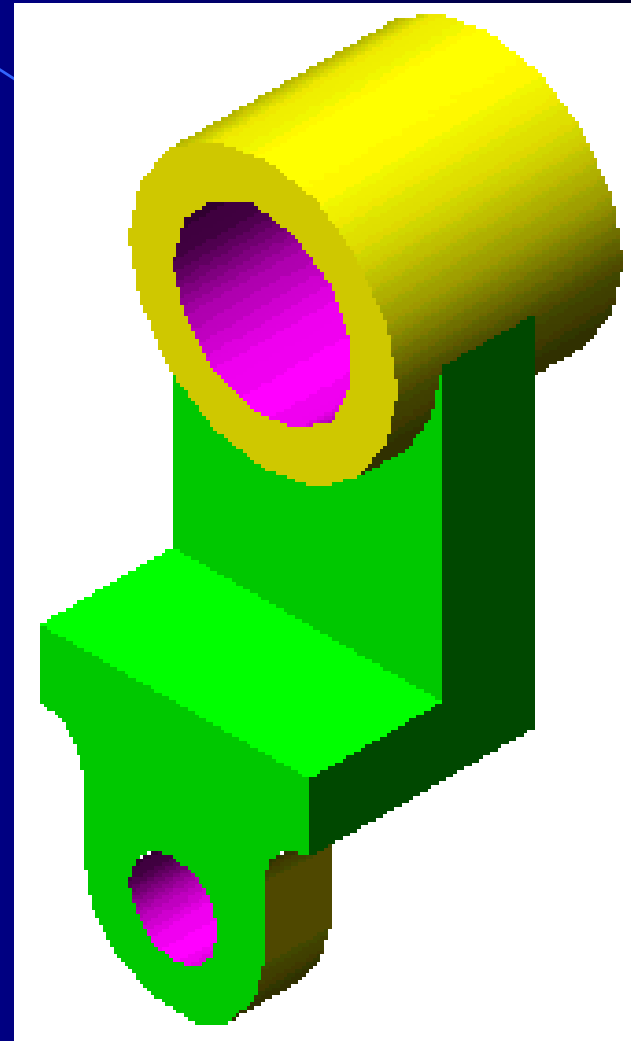
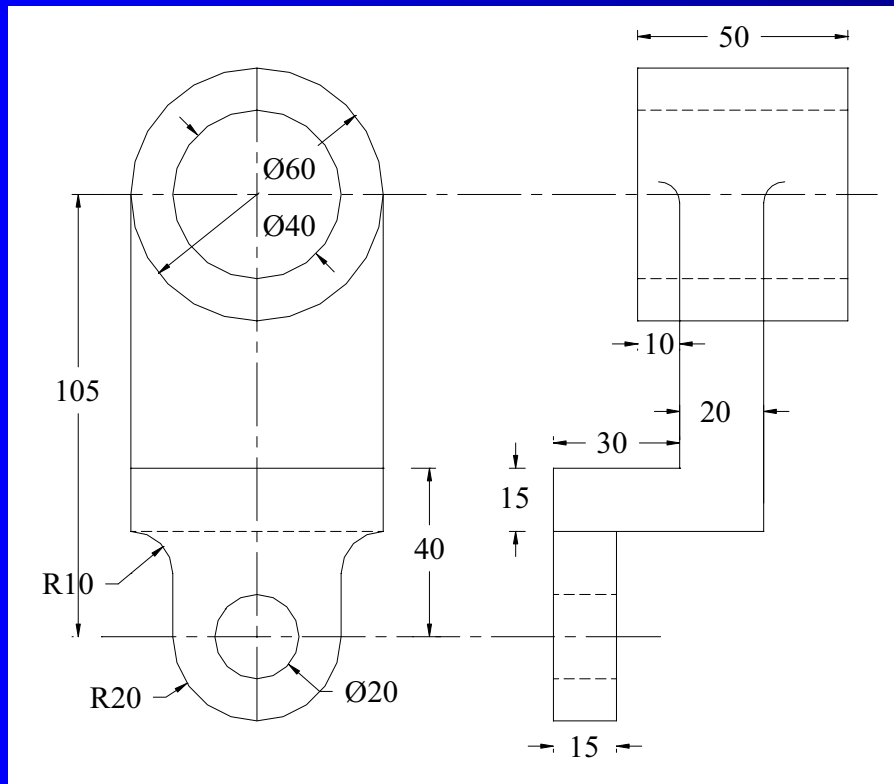
# Model - 35



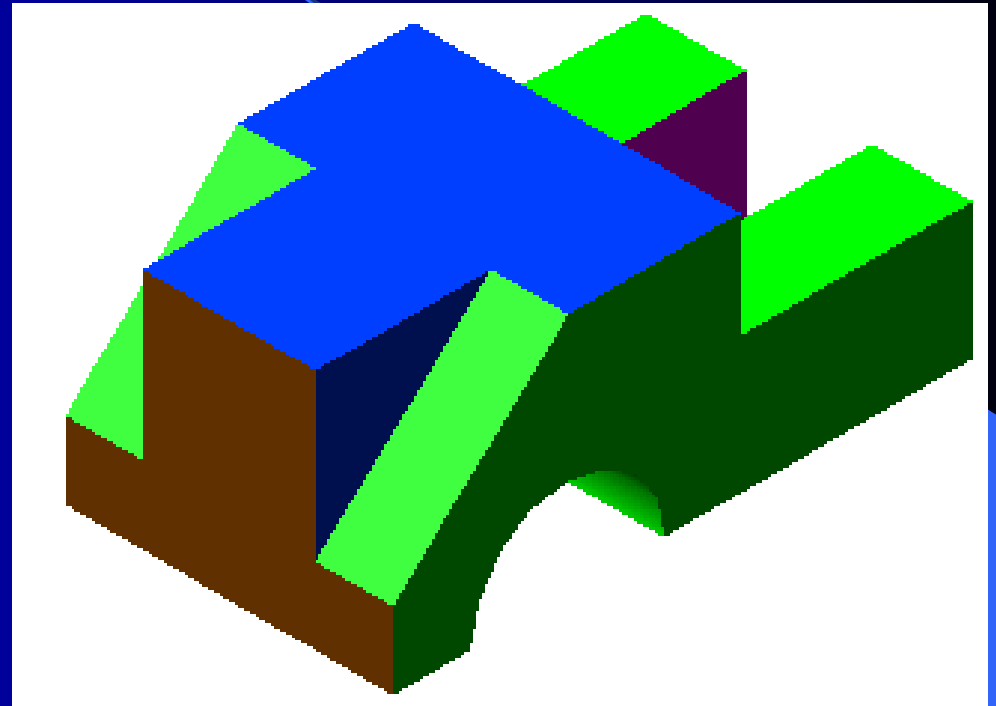
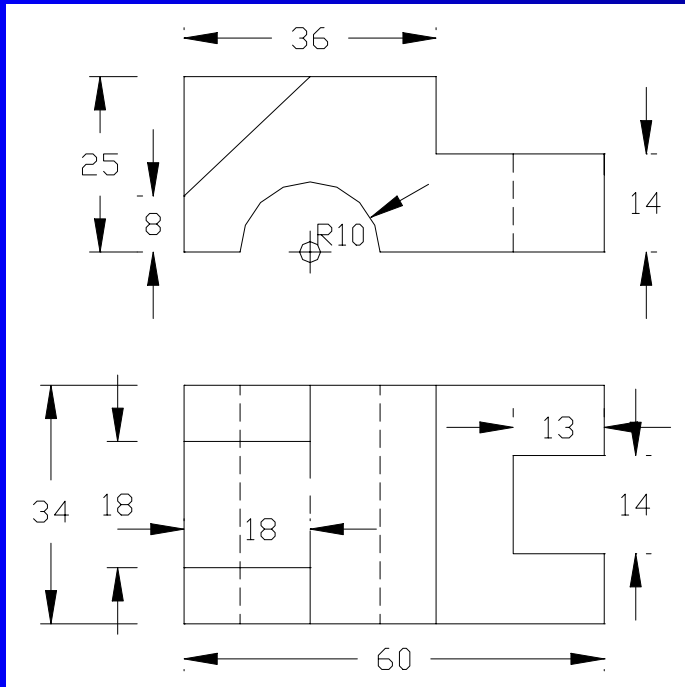
# Model - 36



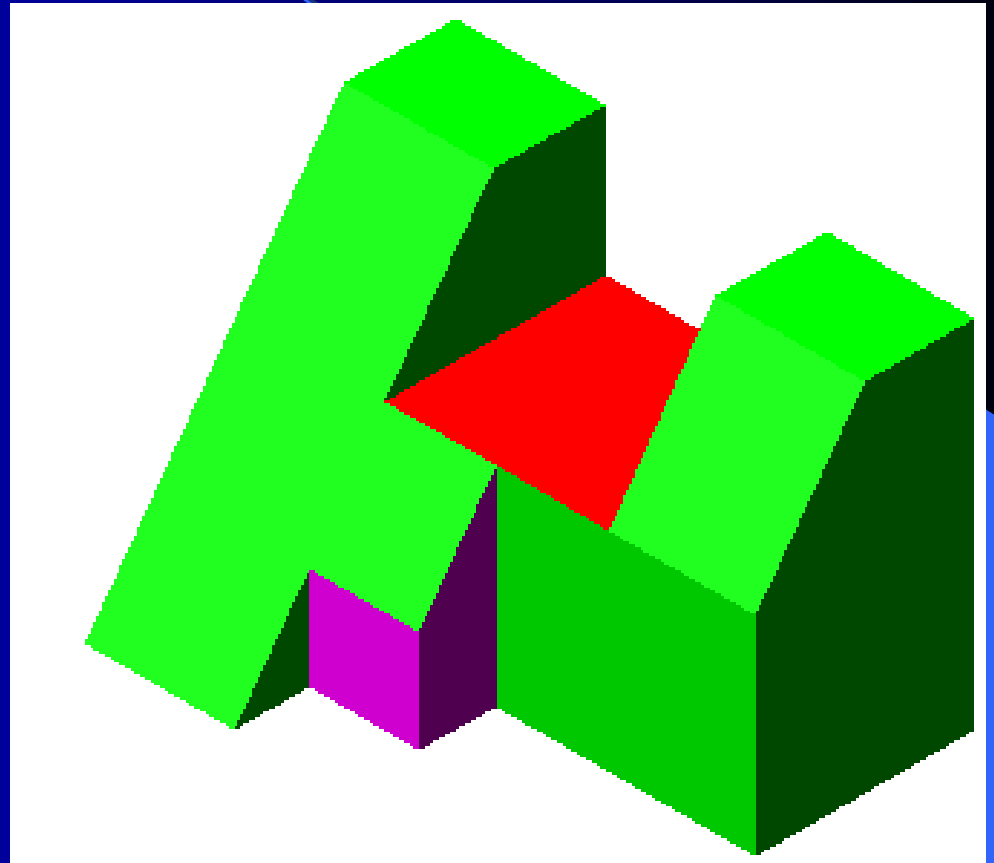
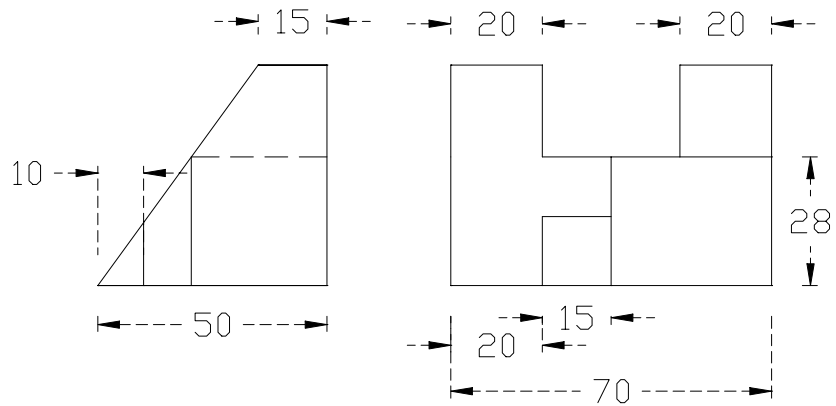
# Model - 37



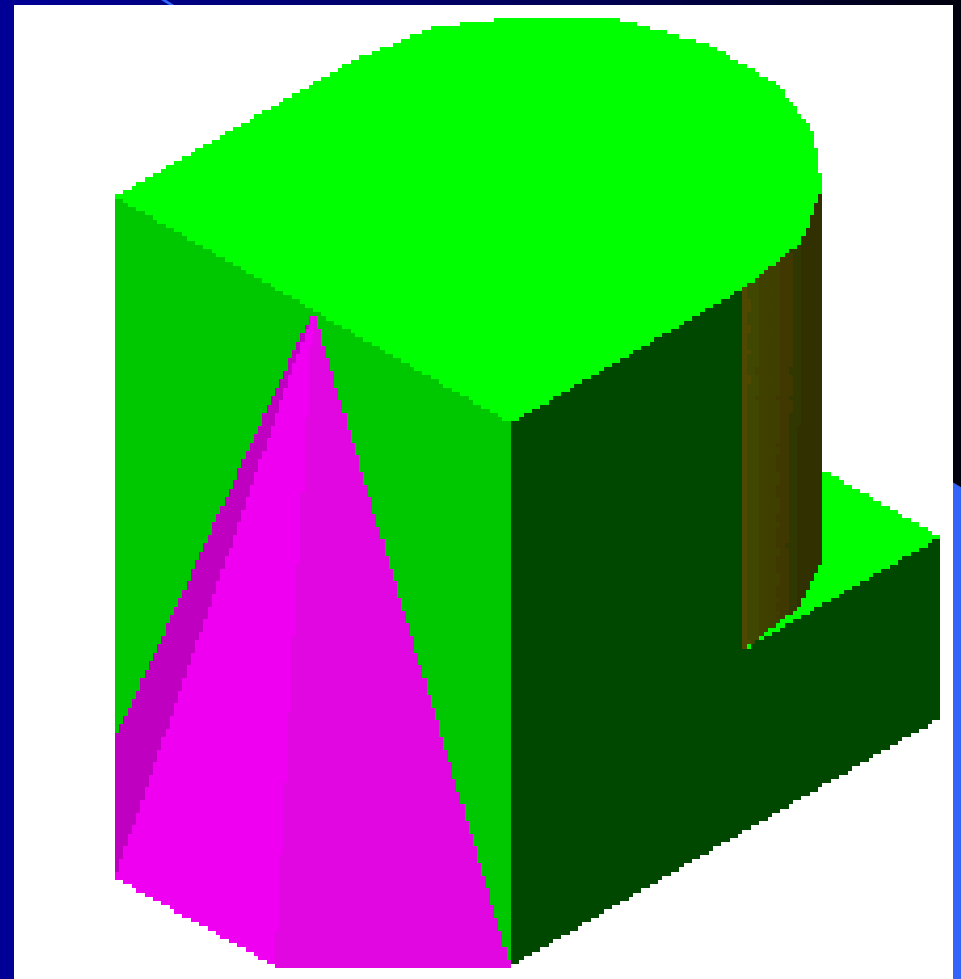
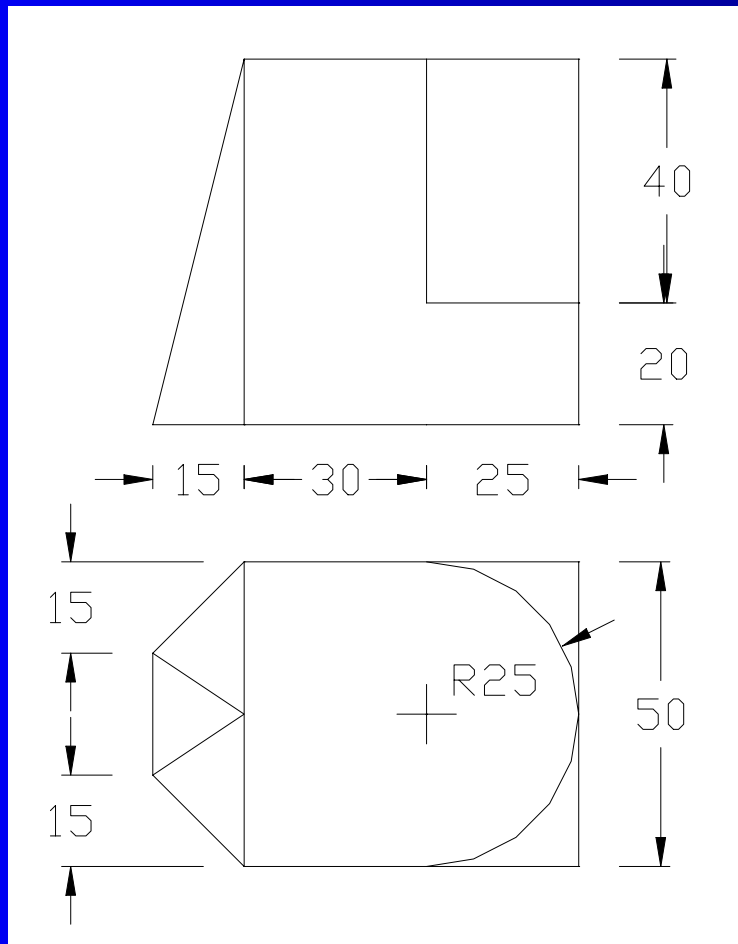
# Model - 38



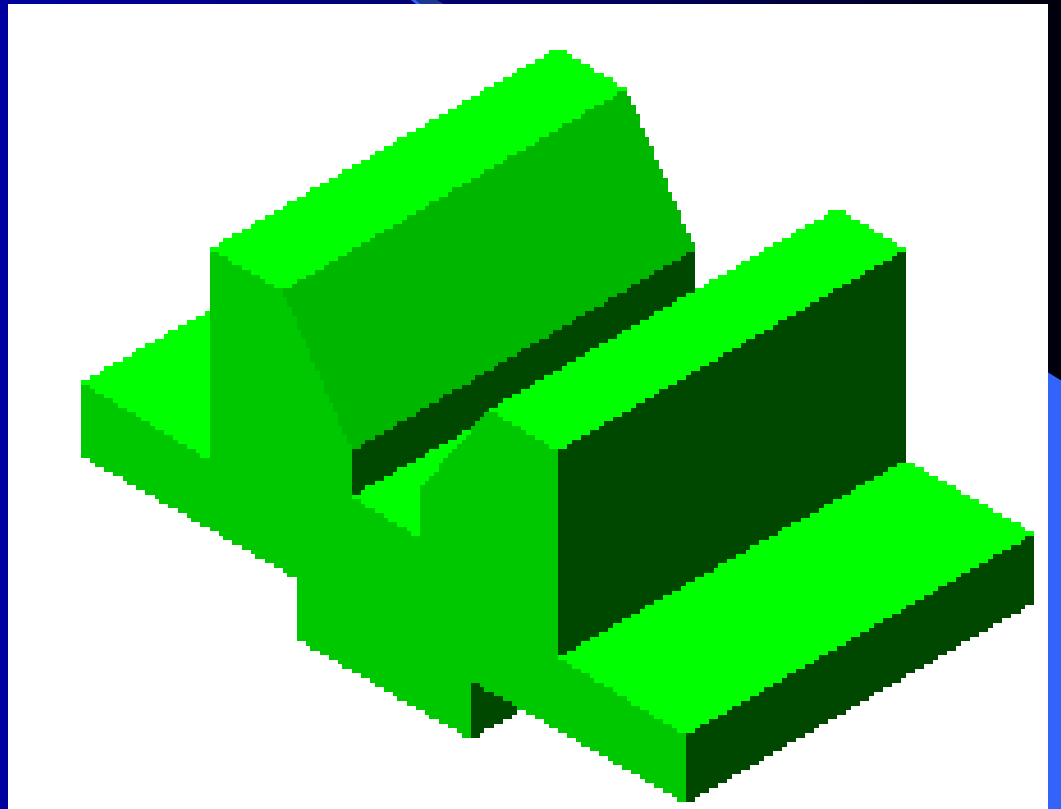
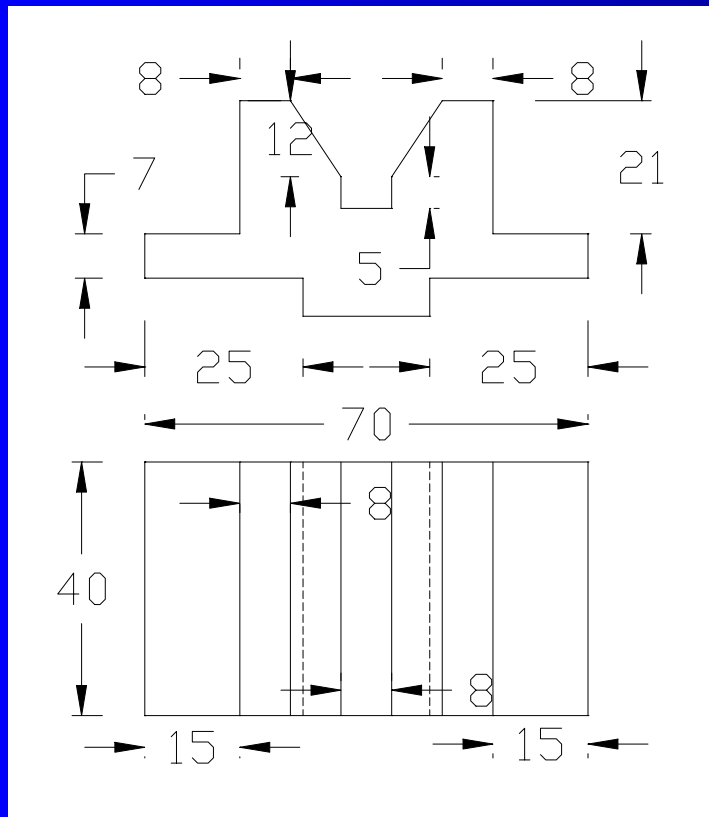
# Model - 39



# Model - 40

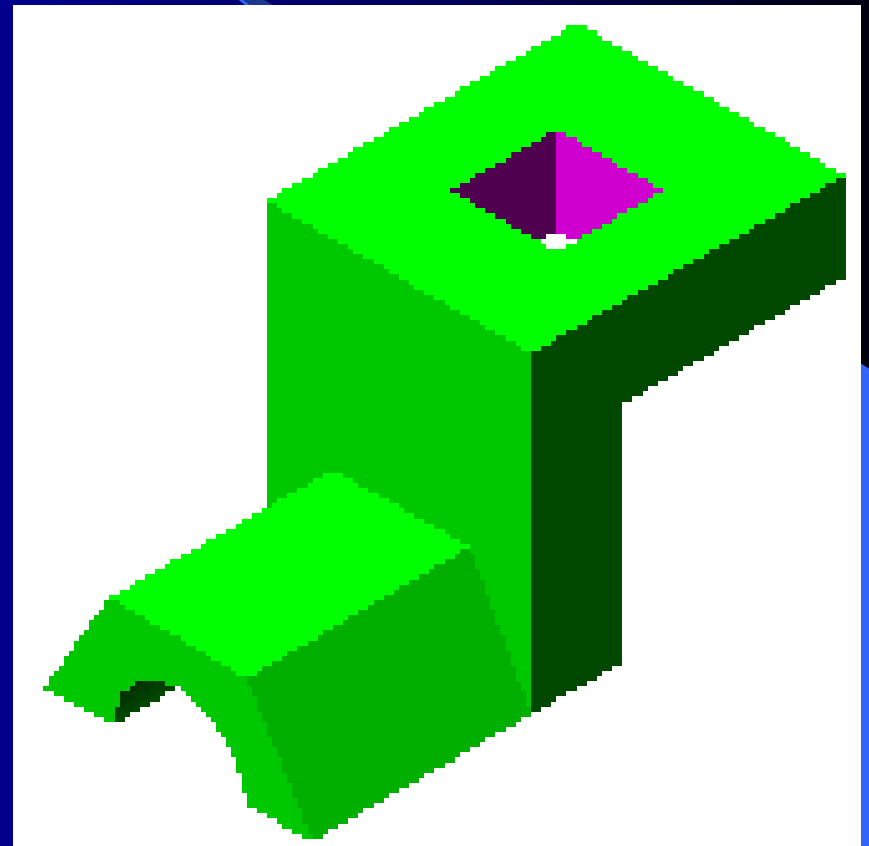
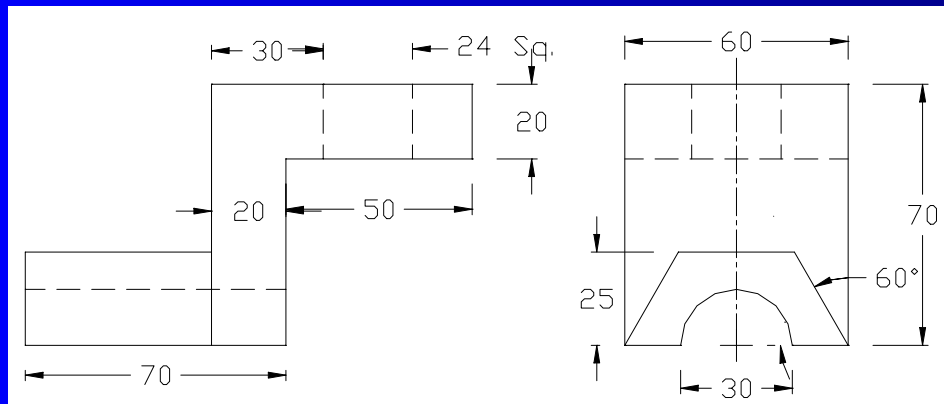


# Model - 41

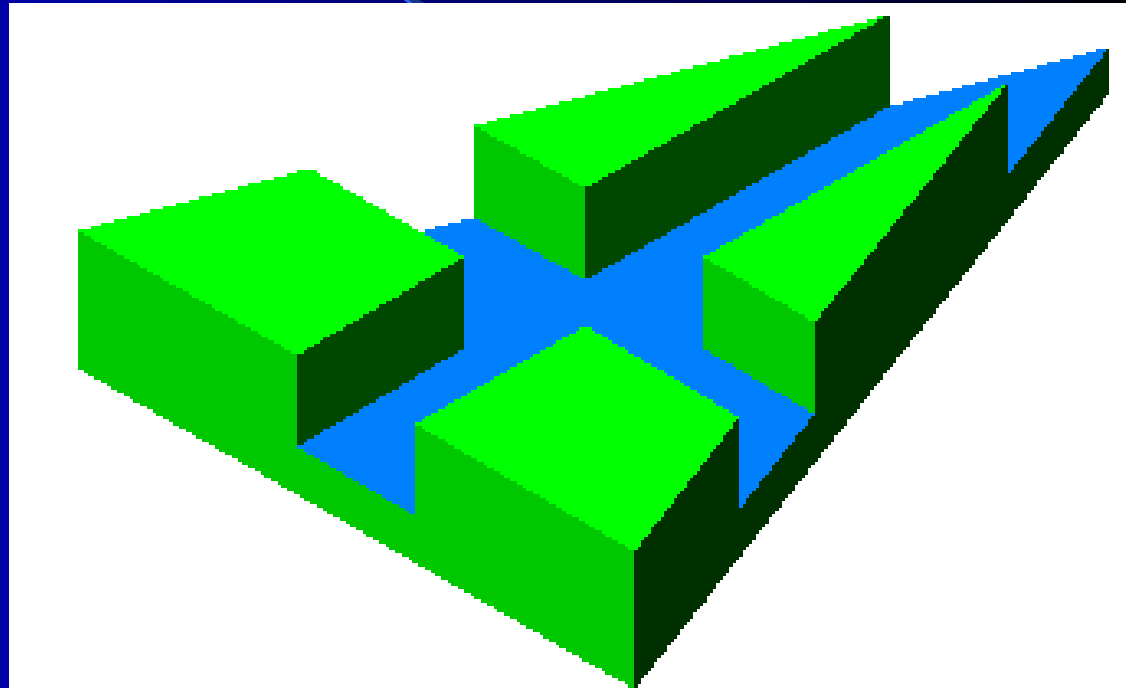
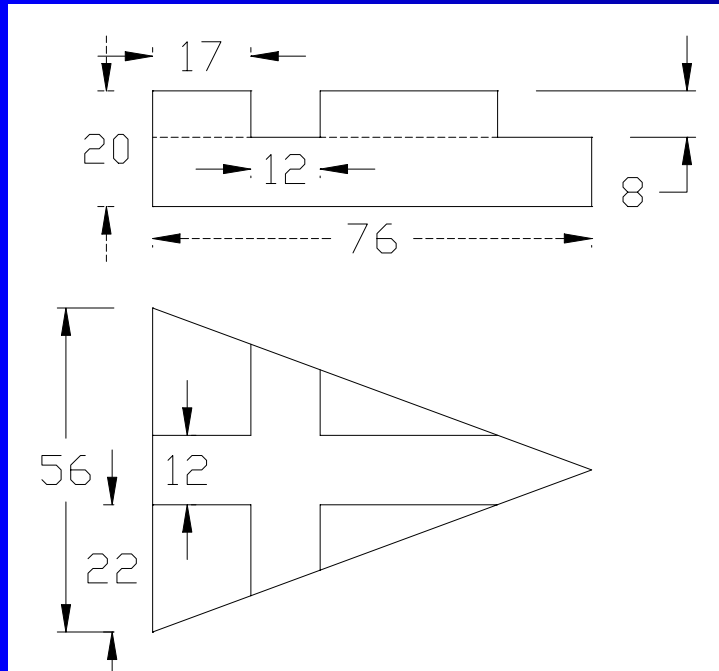




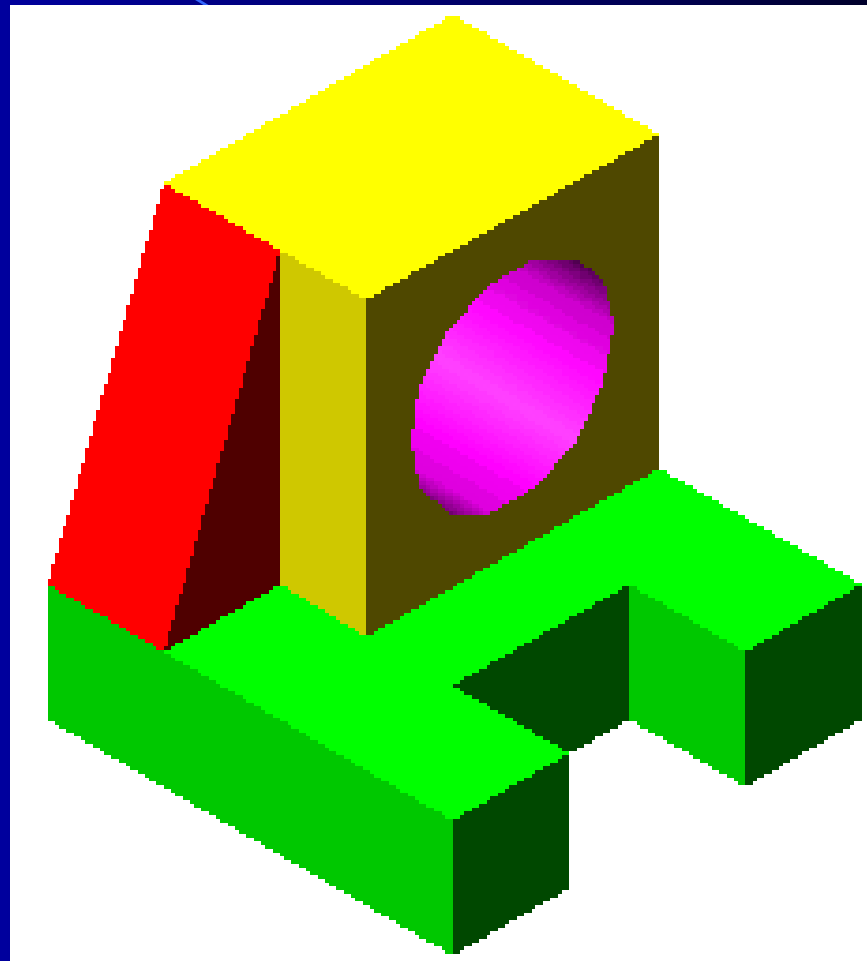
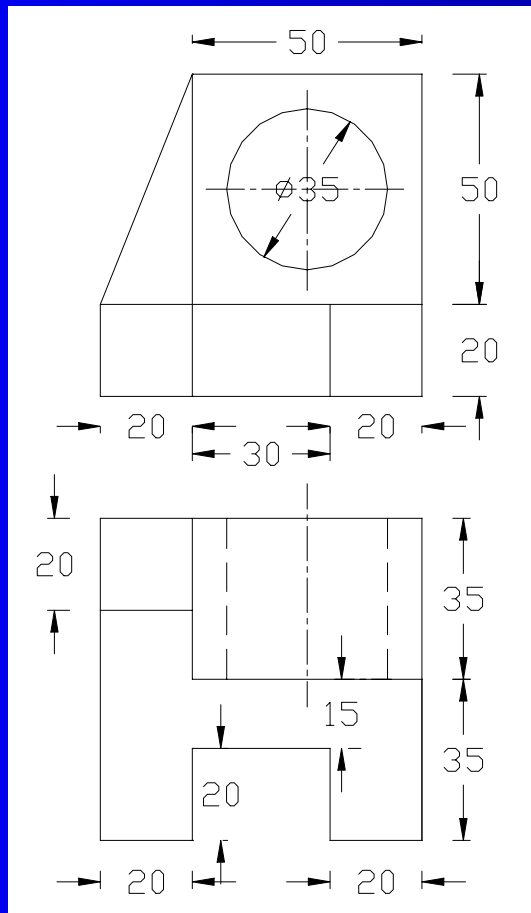
# Model - 42



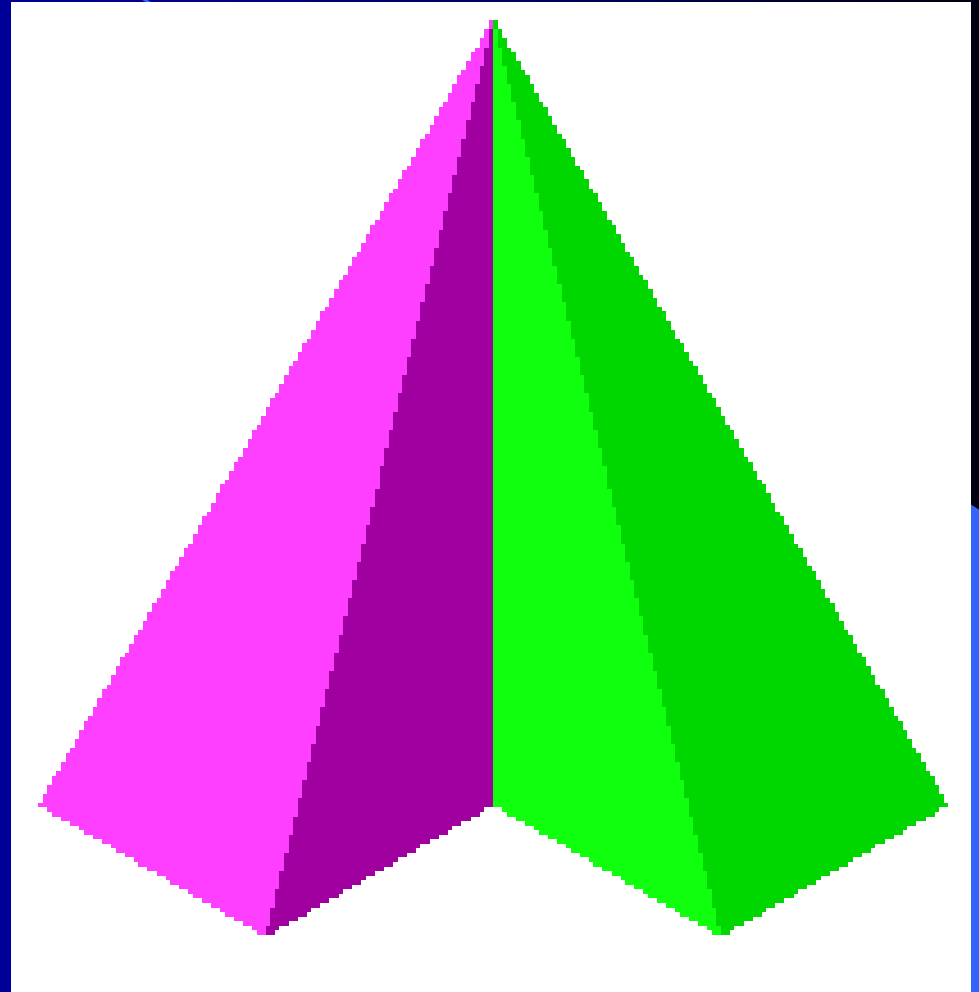
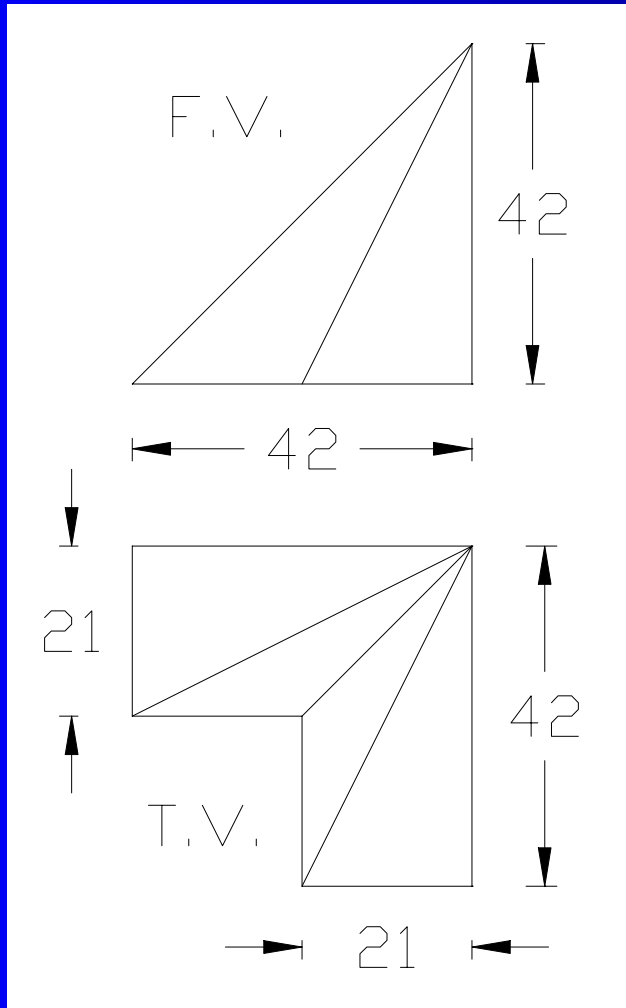
# Model - 43



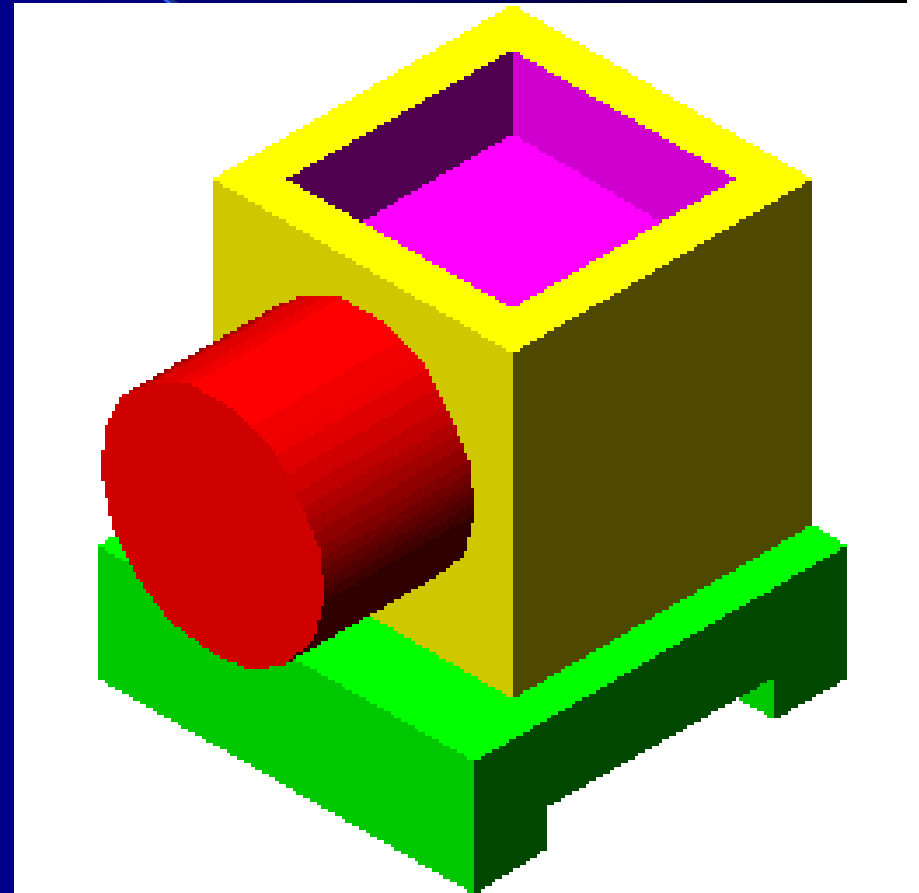
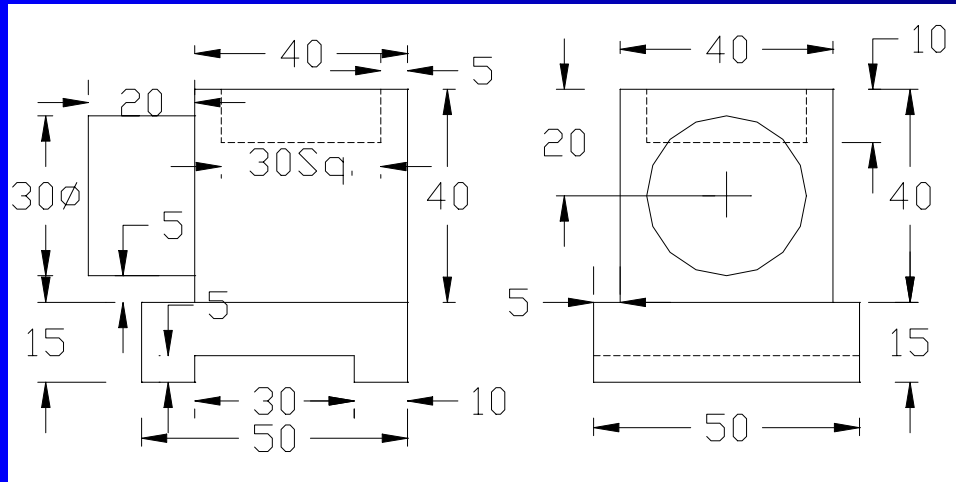
# Model - 44



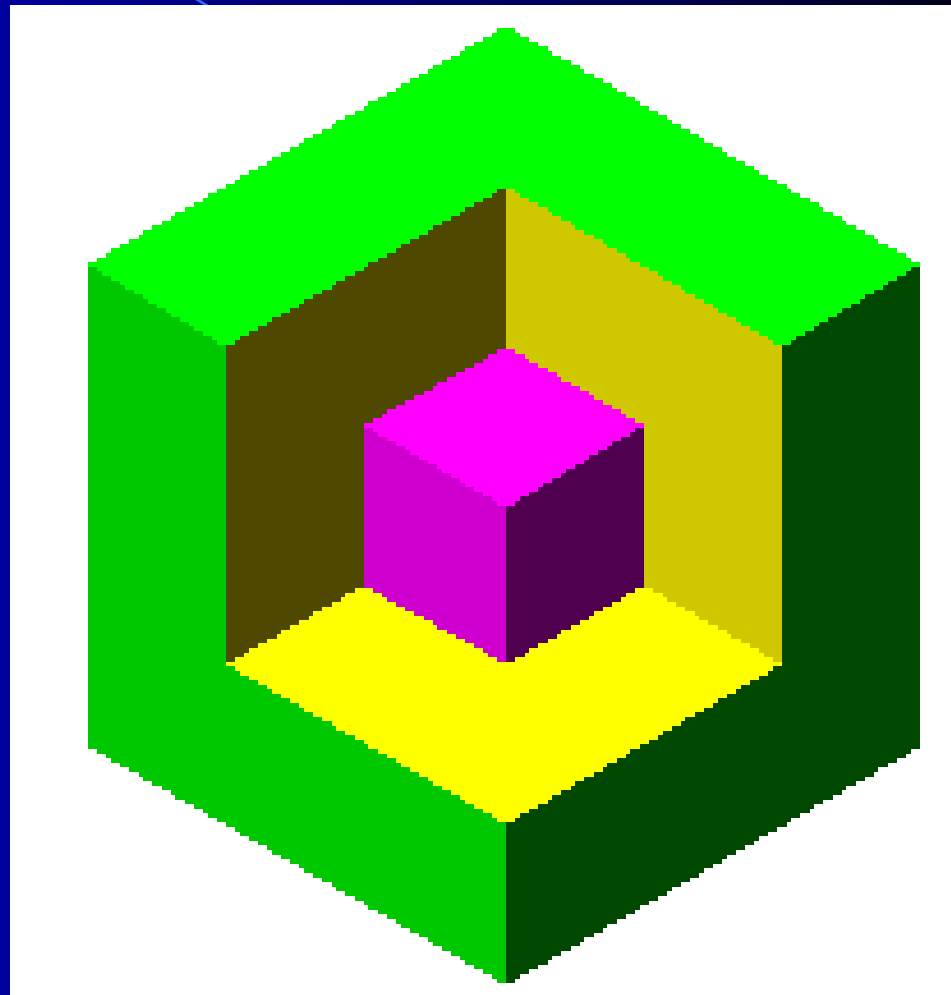
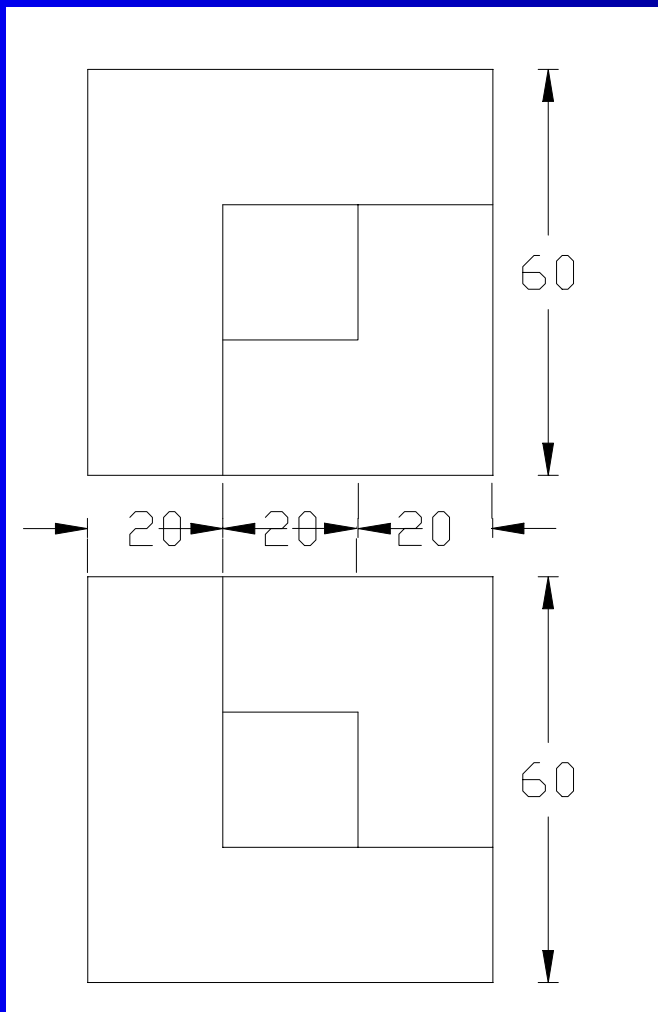
# Model - 45



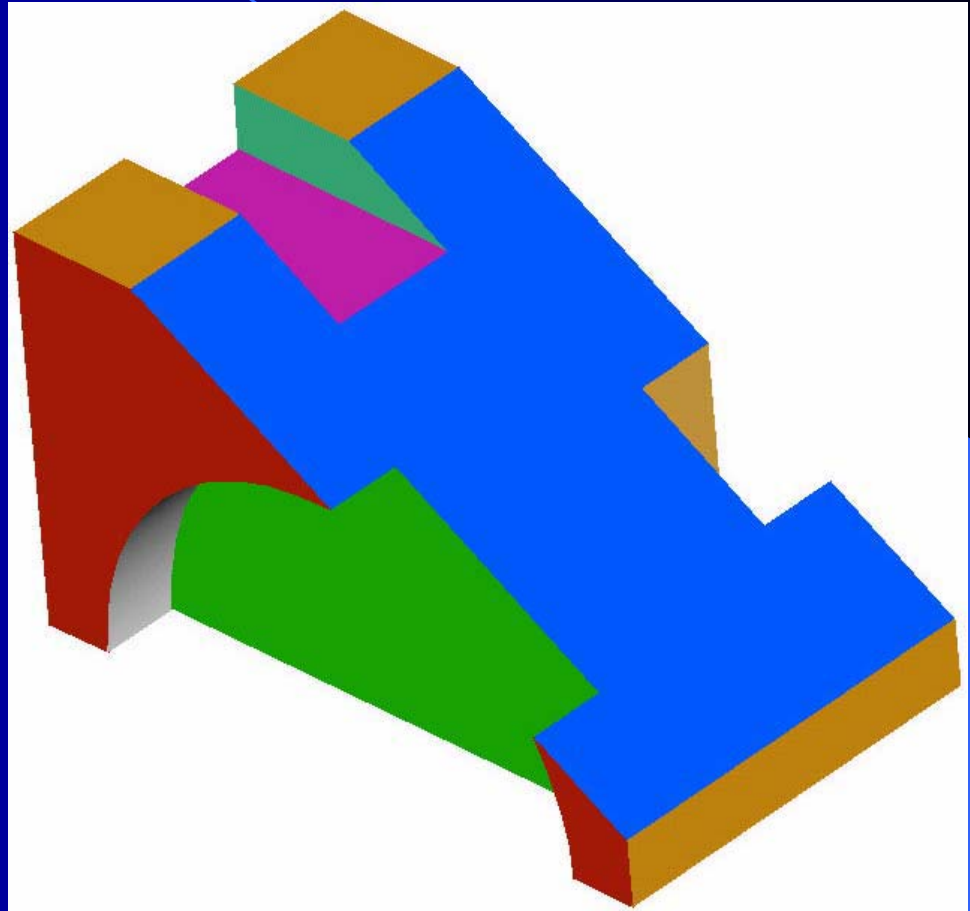
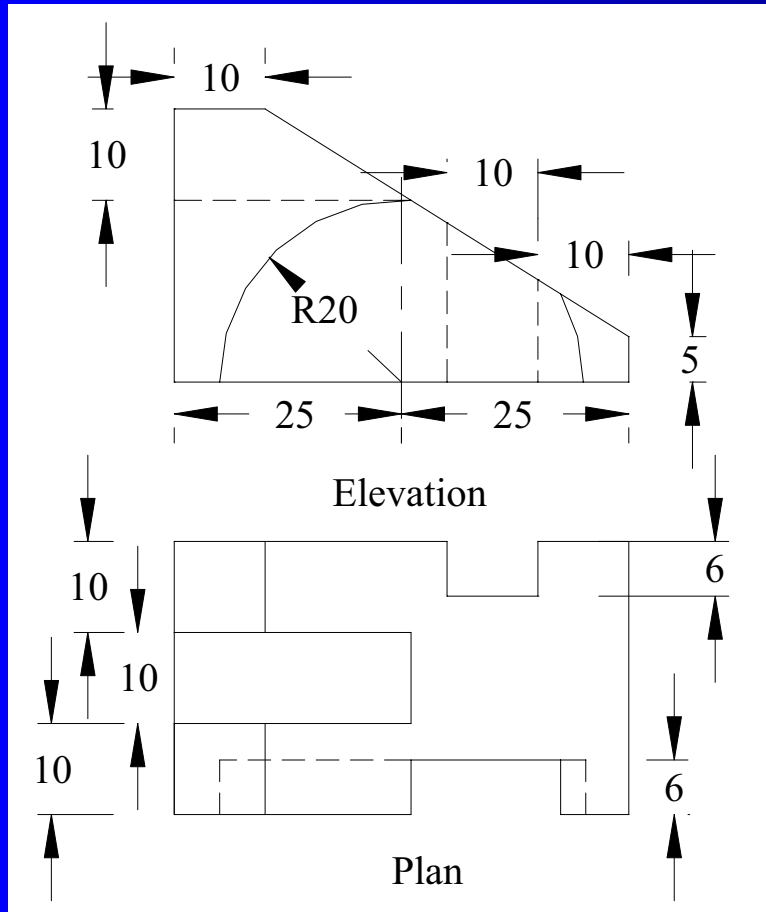
# Model - 46



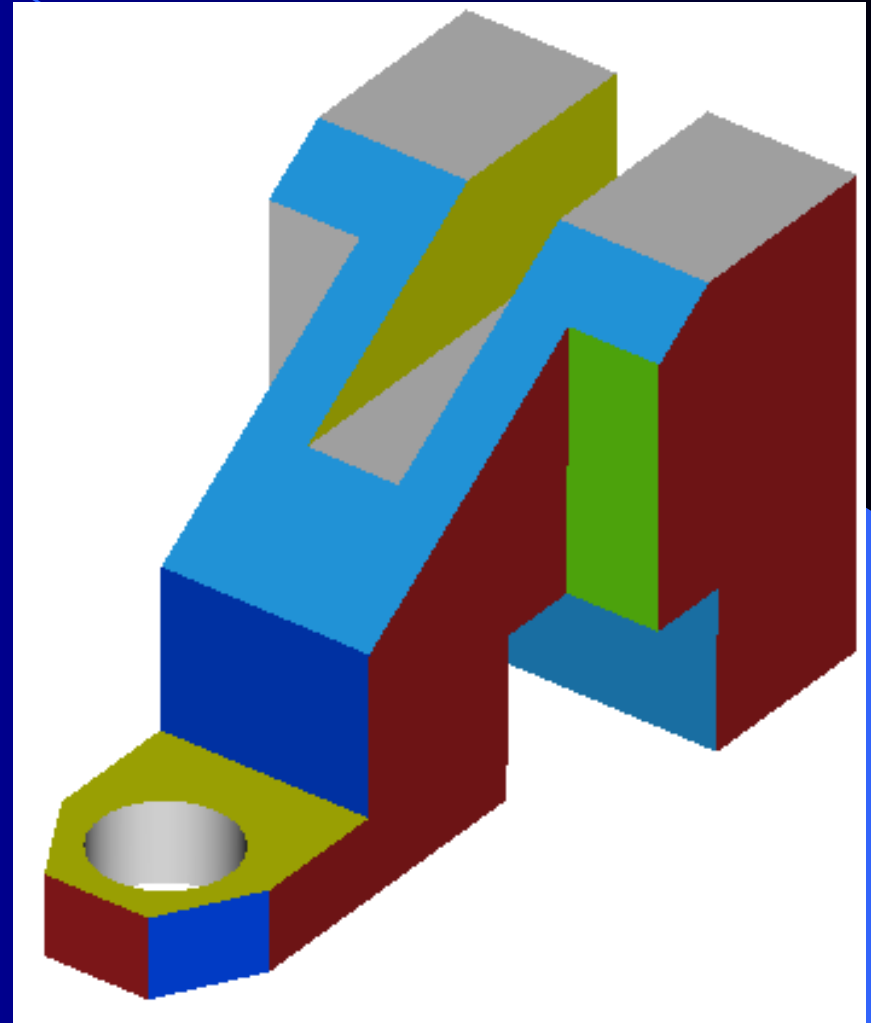
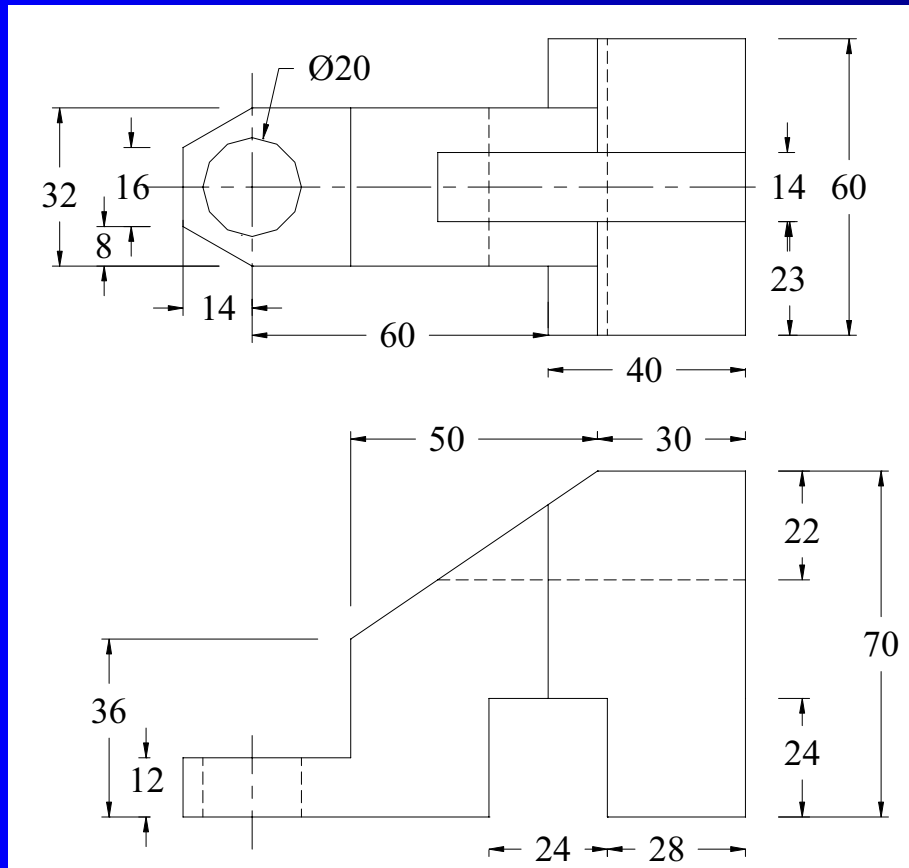
# Model - 47



# Model - 48

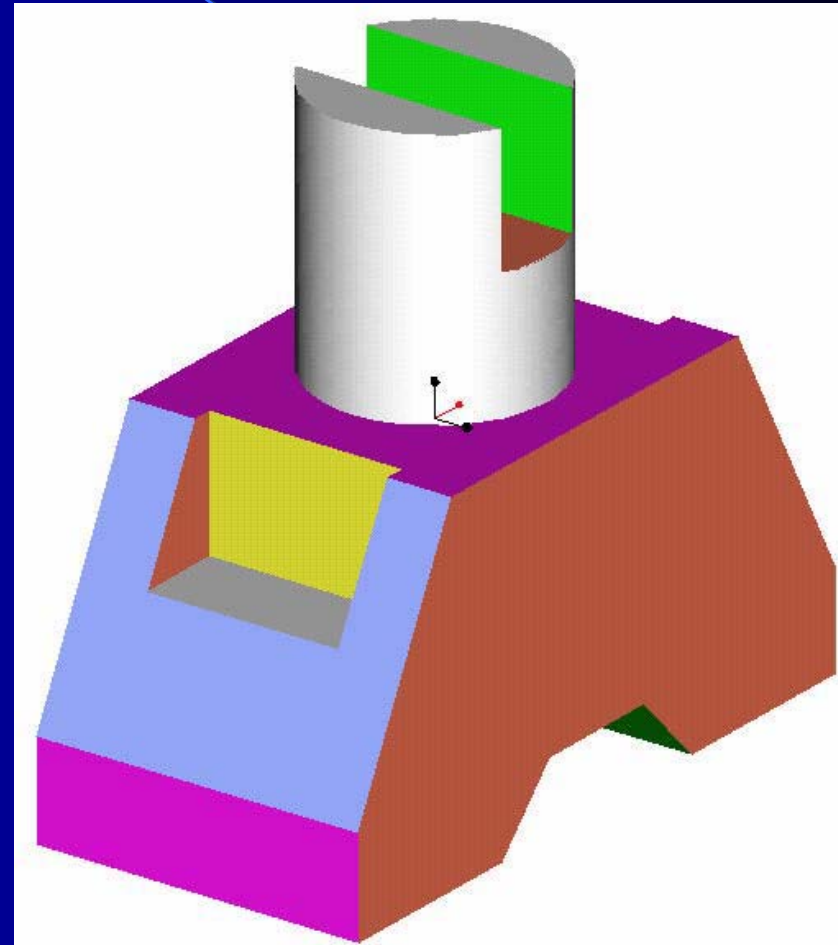
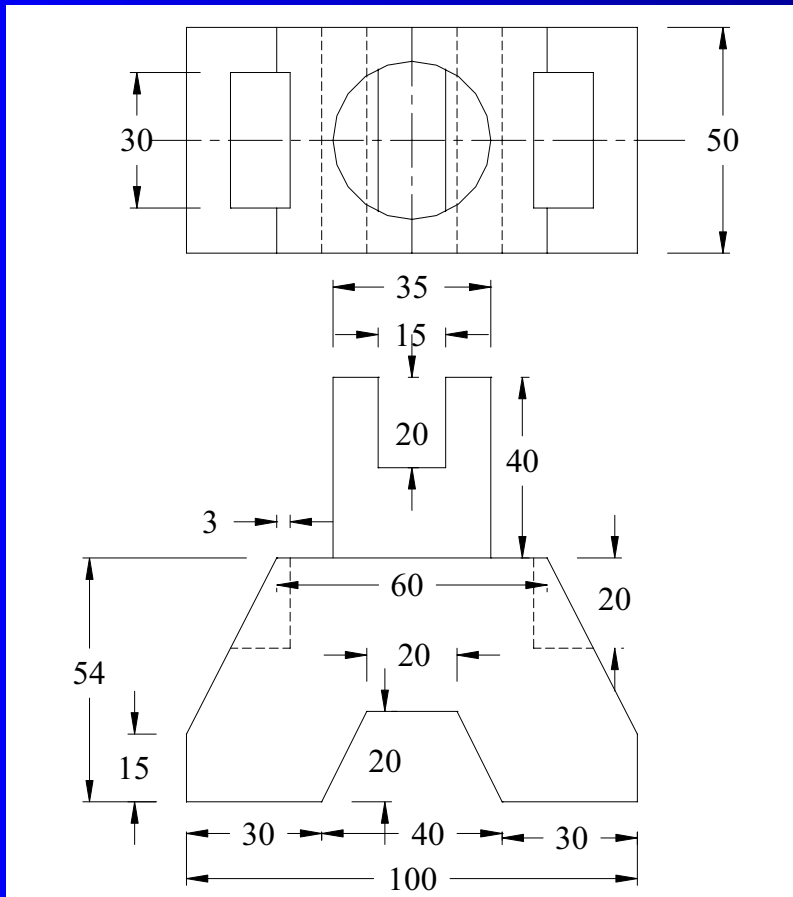


# Model - 49

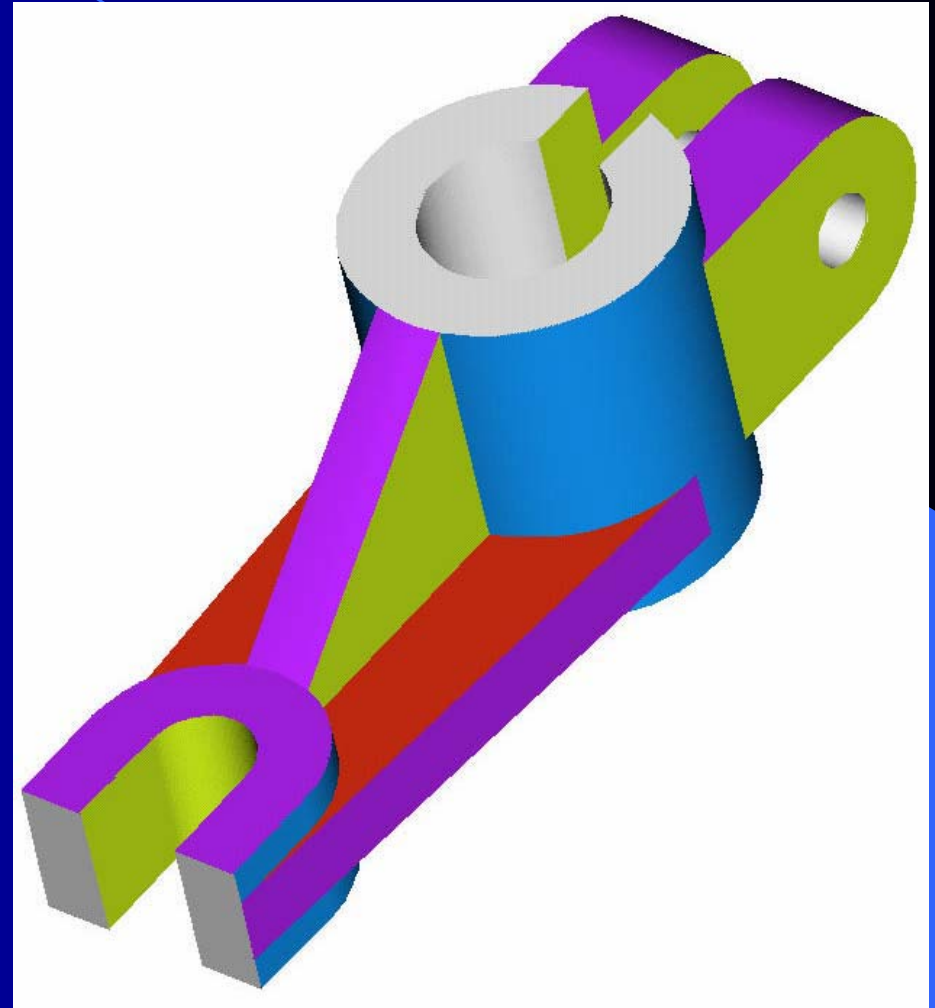
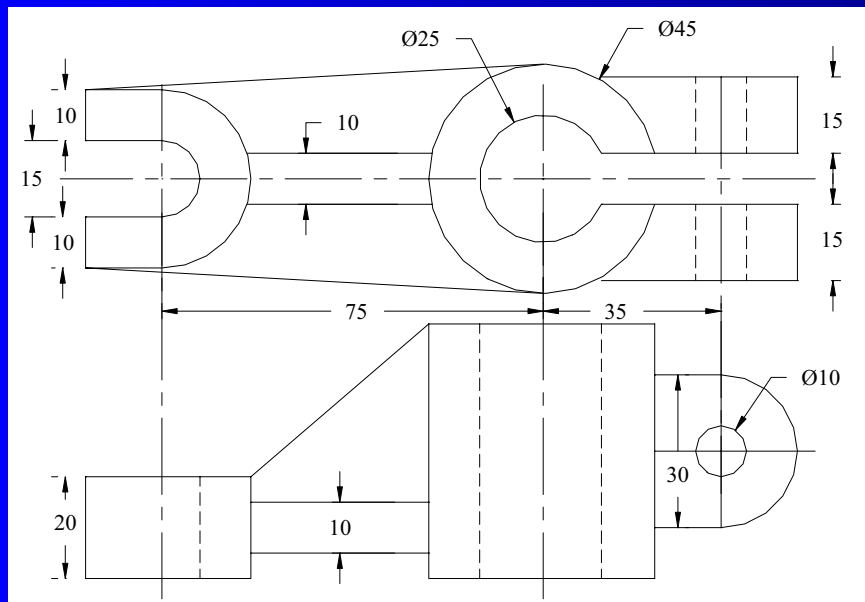




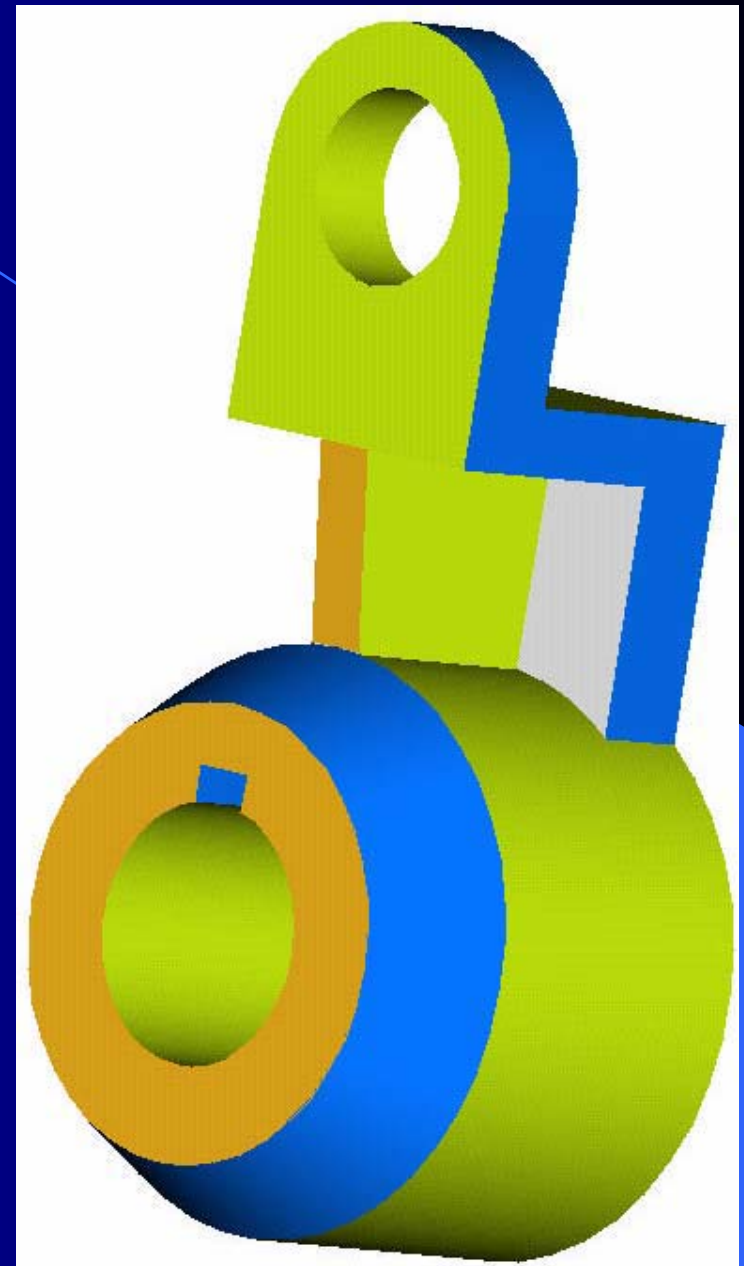
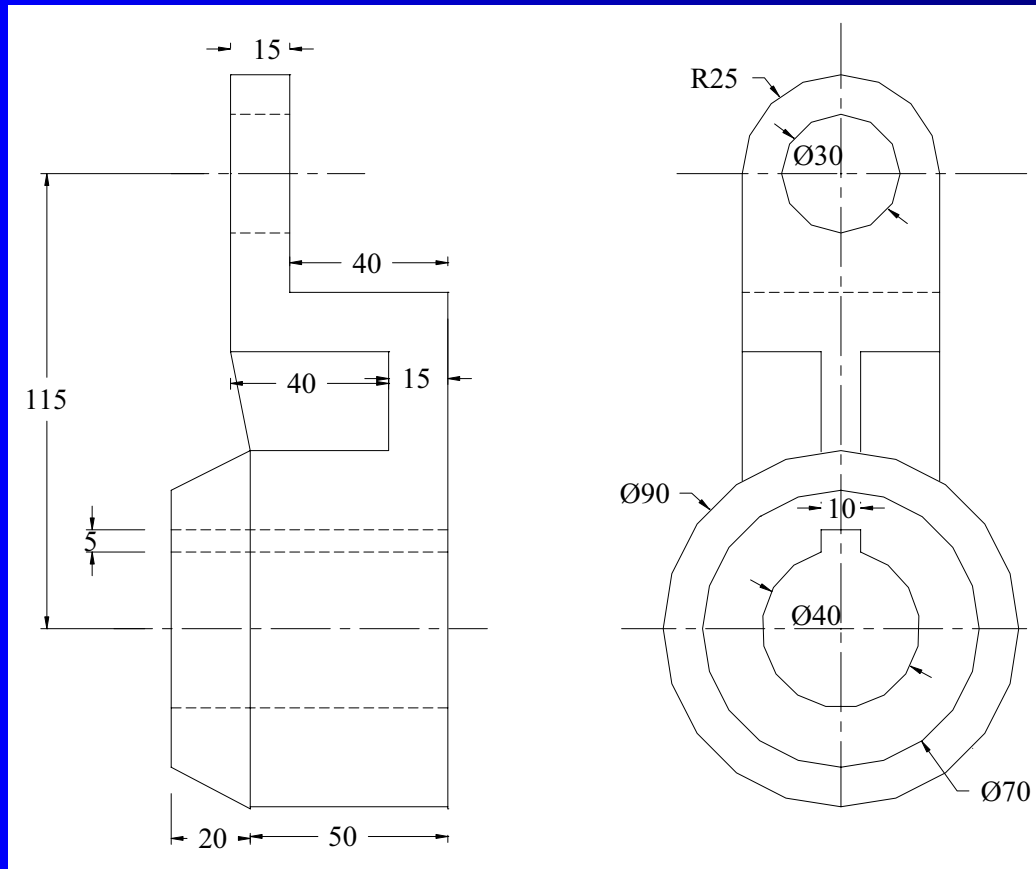
# Model - 50



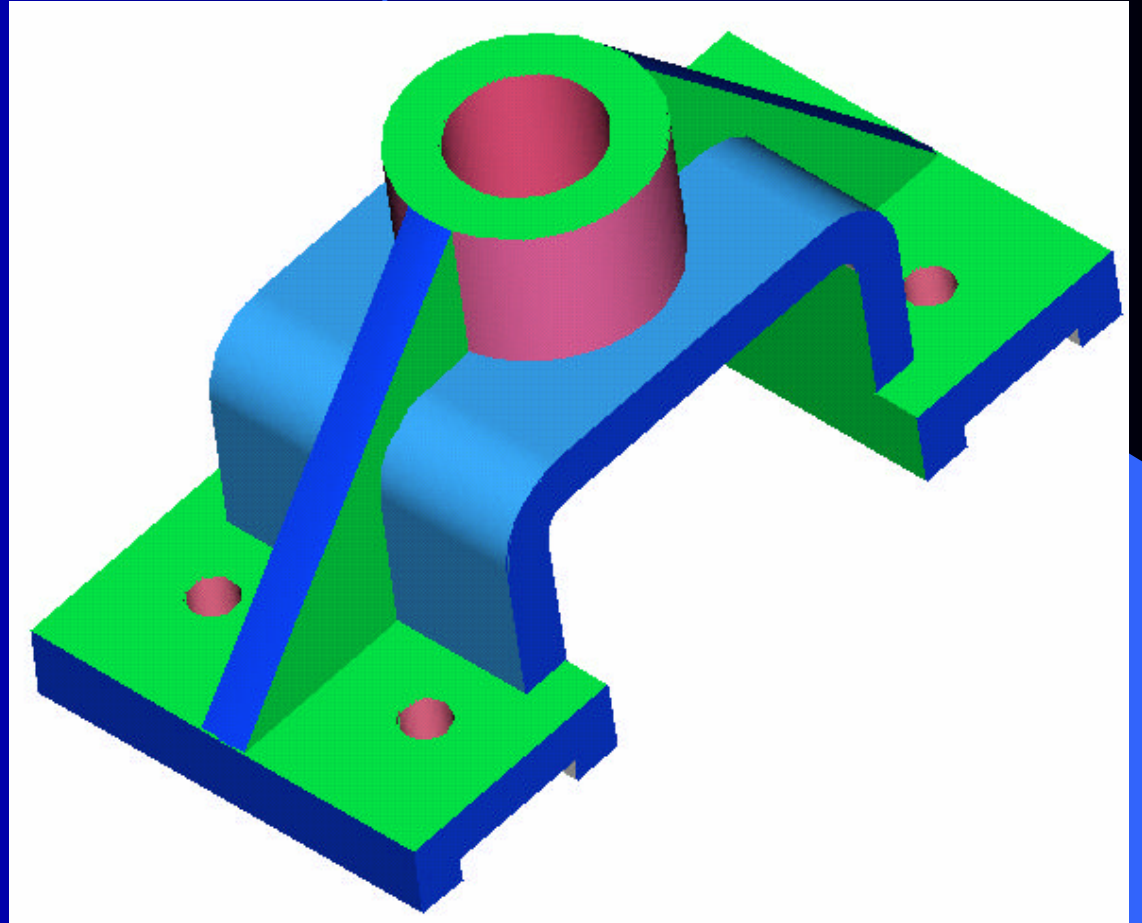
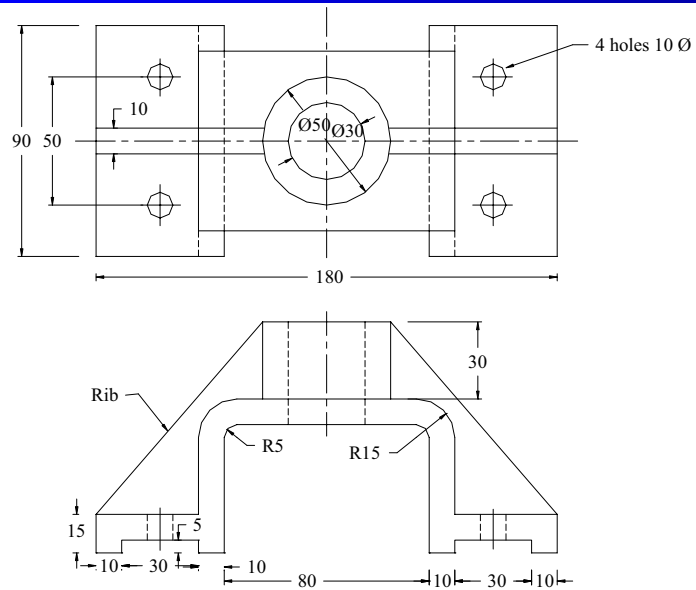
# Model - 51



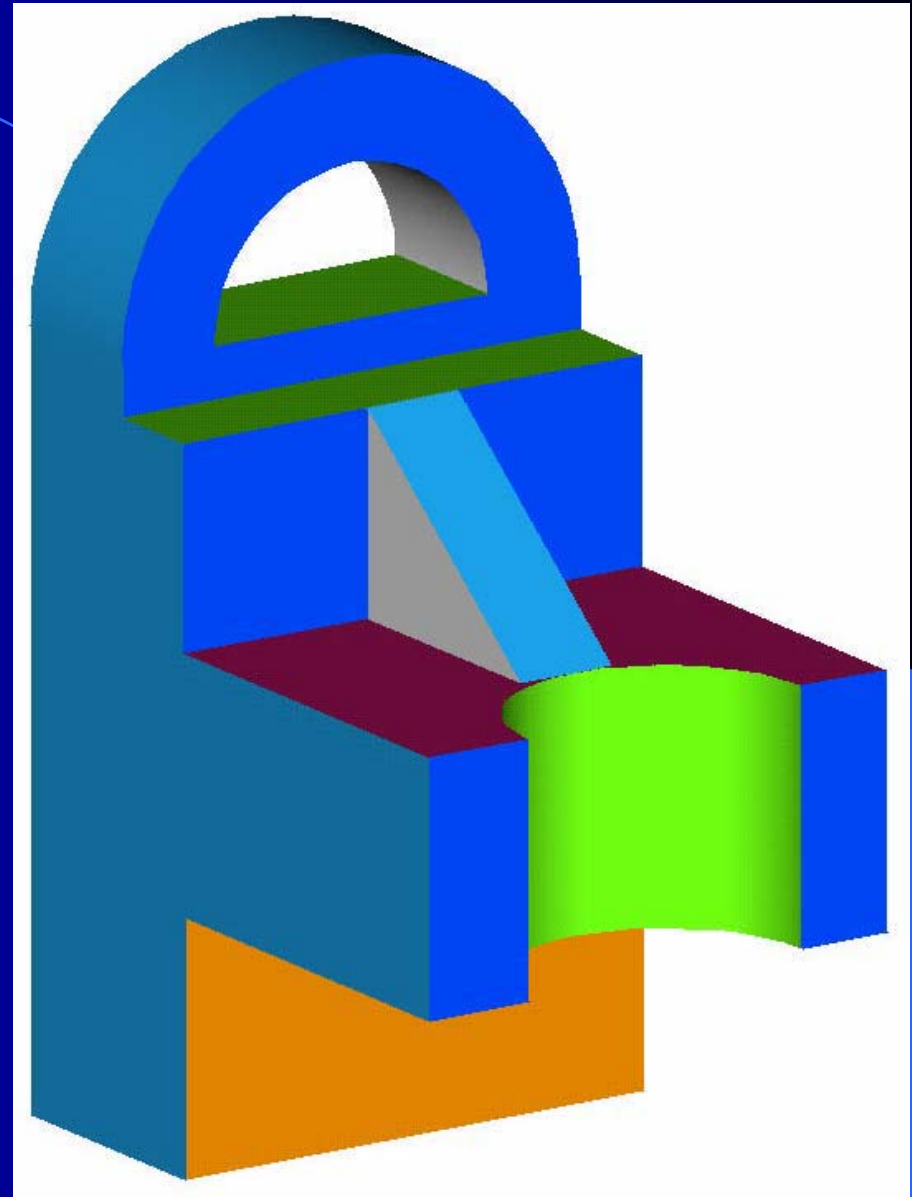
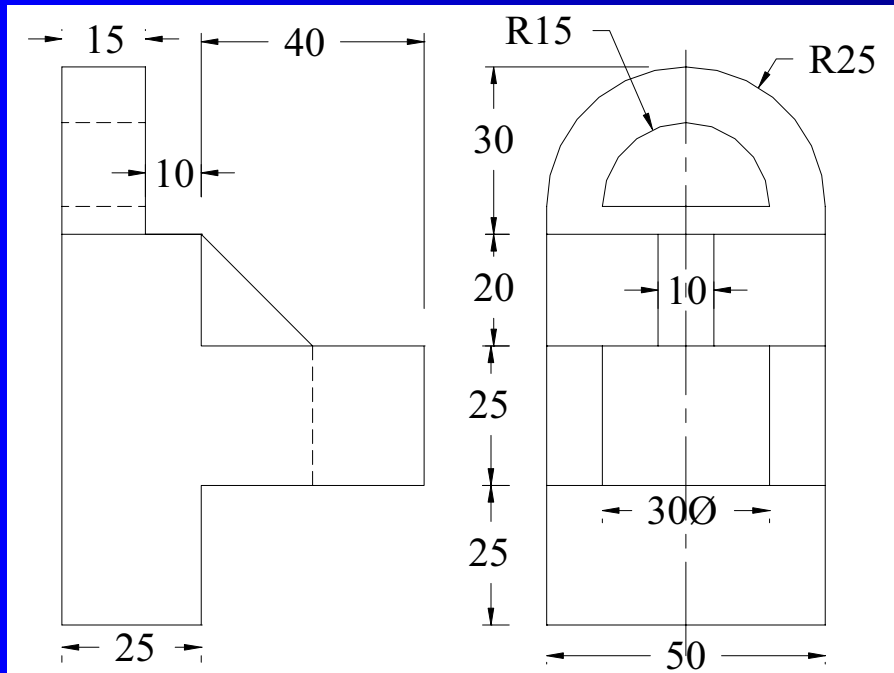
# Model - 52



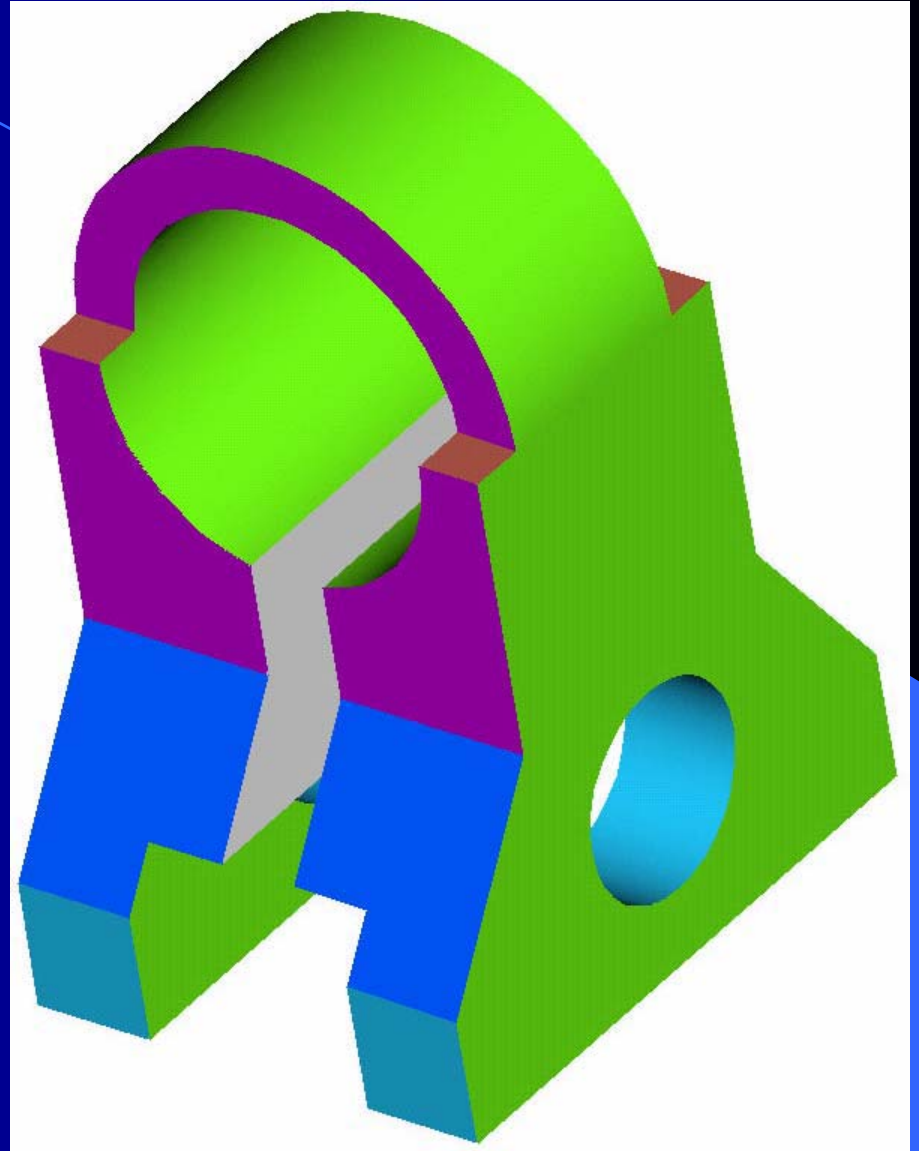
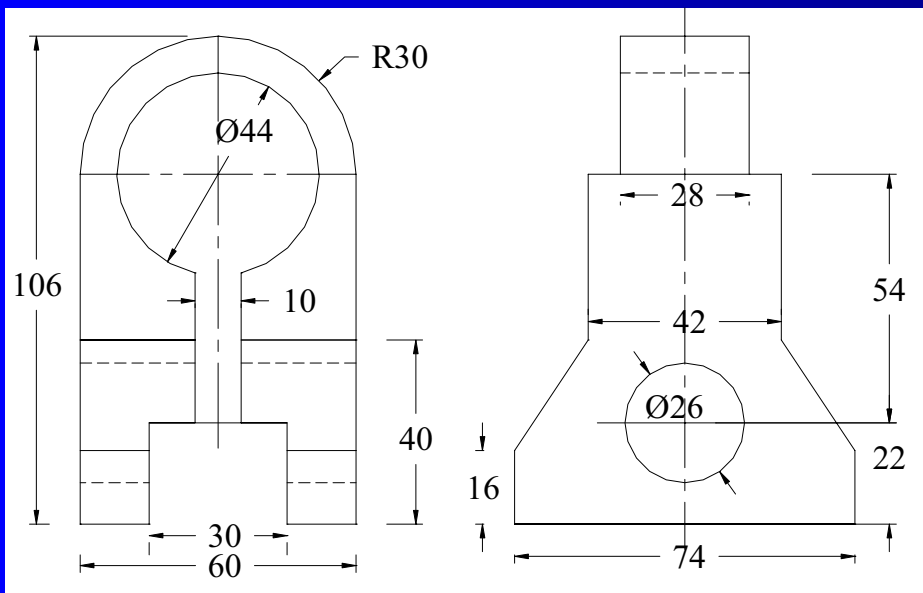
# Model - 53



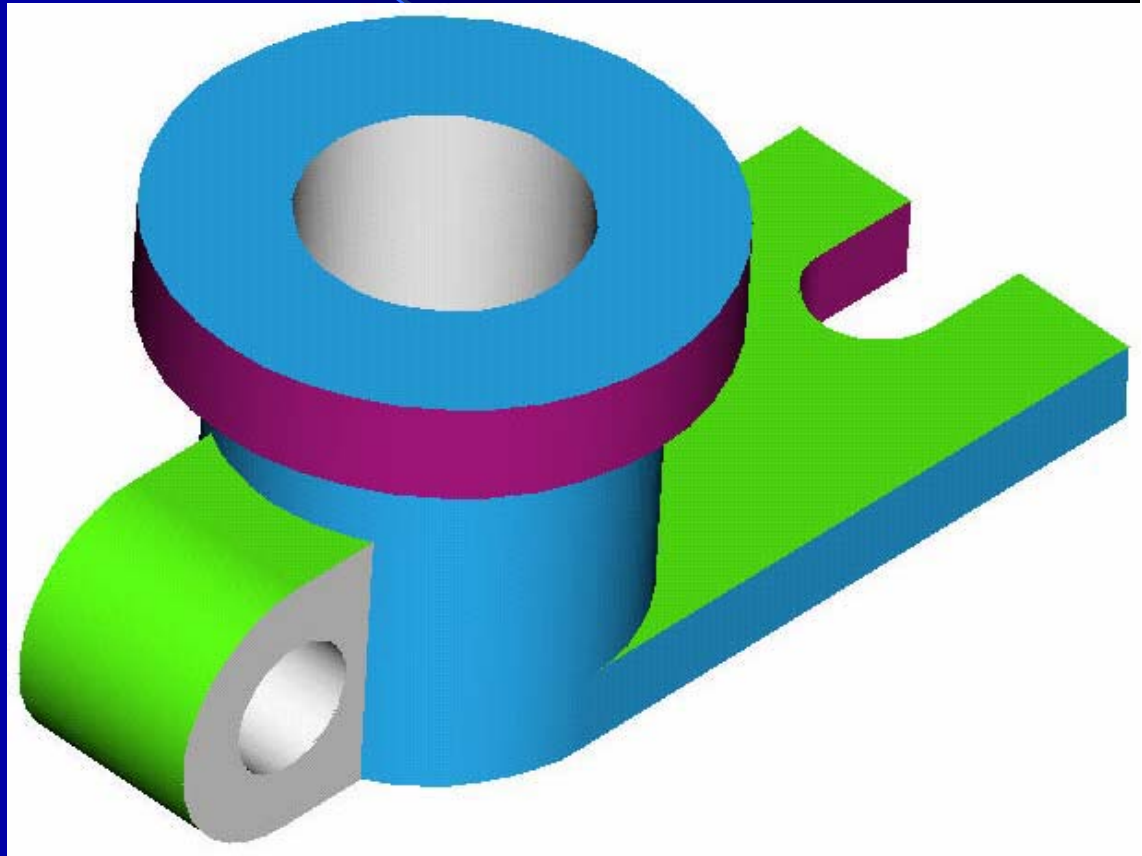
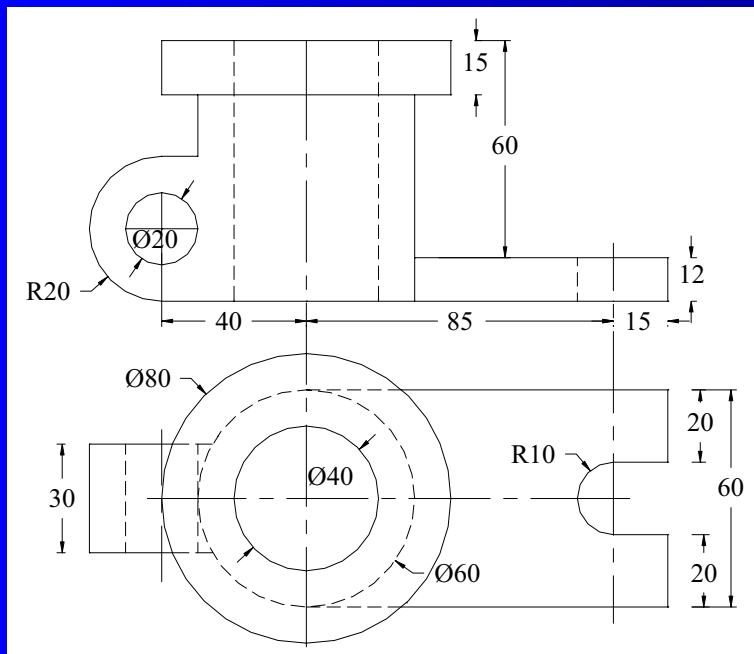
# Model - 54



# Model - 55

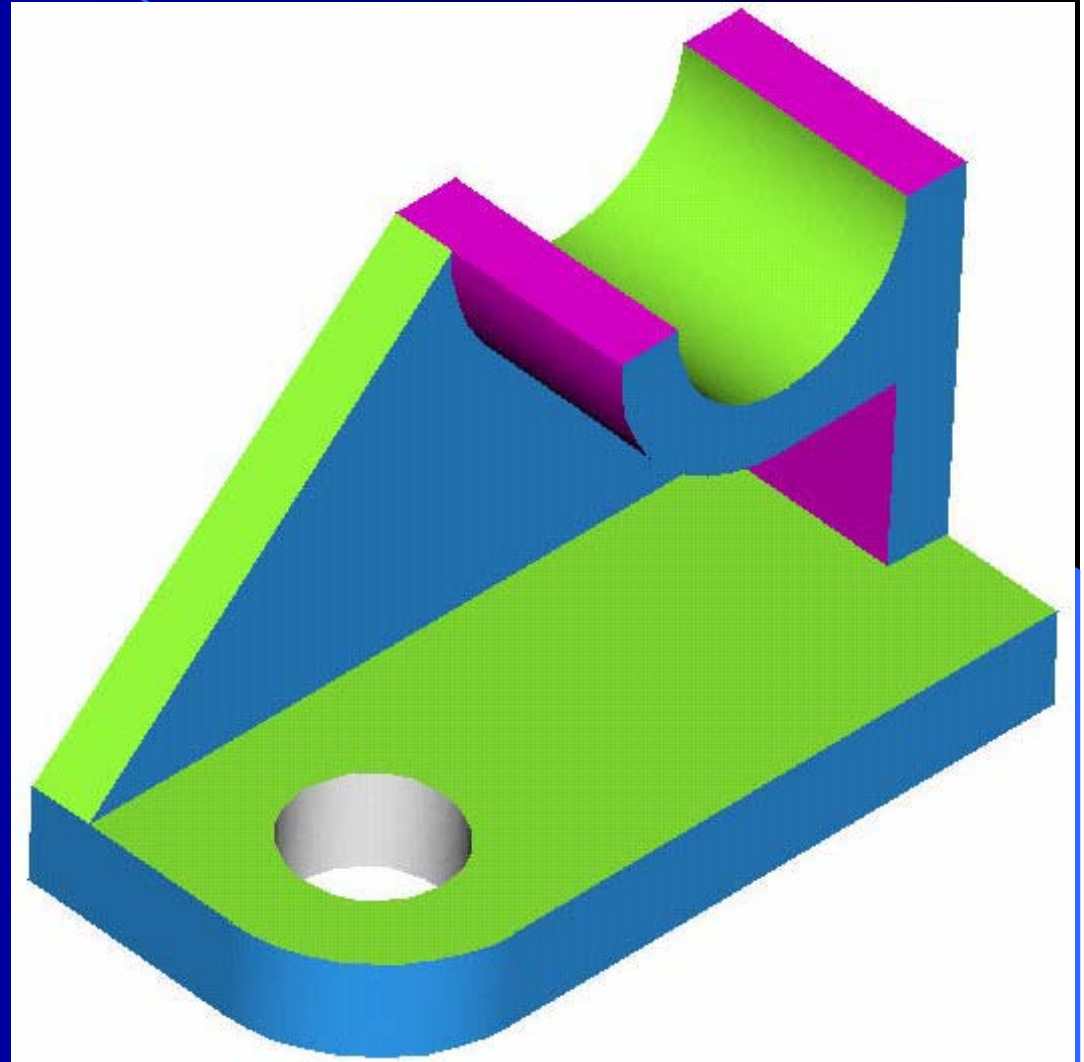
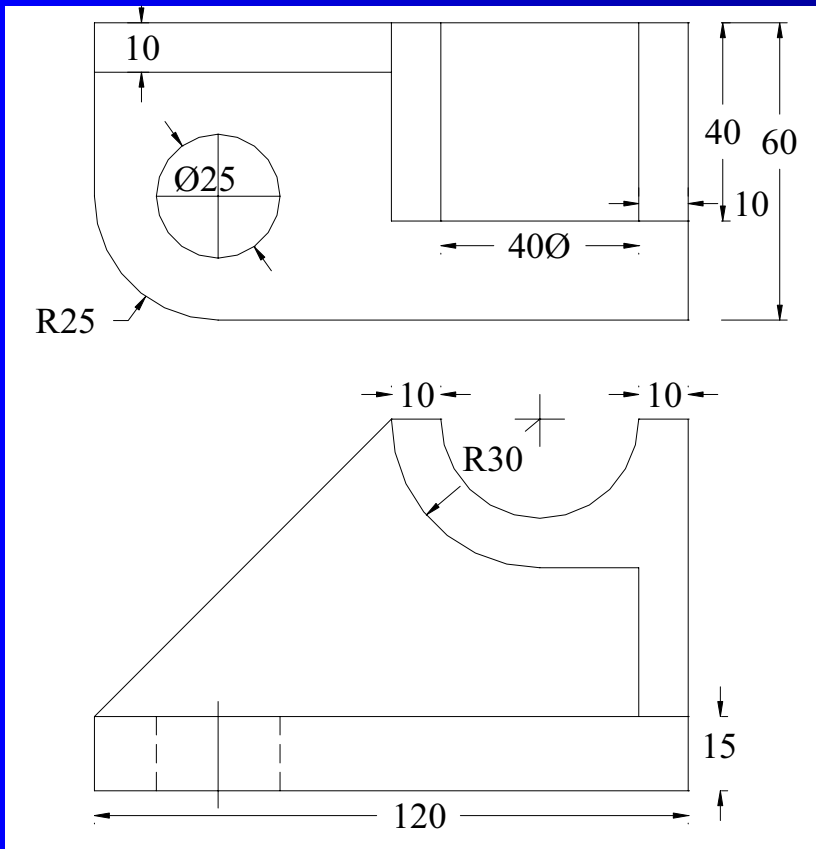


# Model - 56



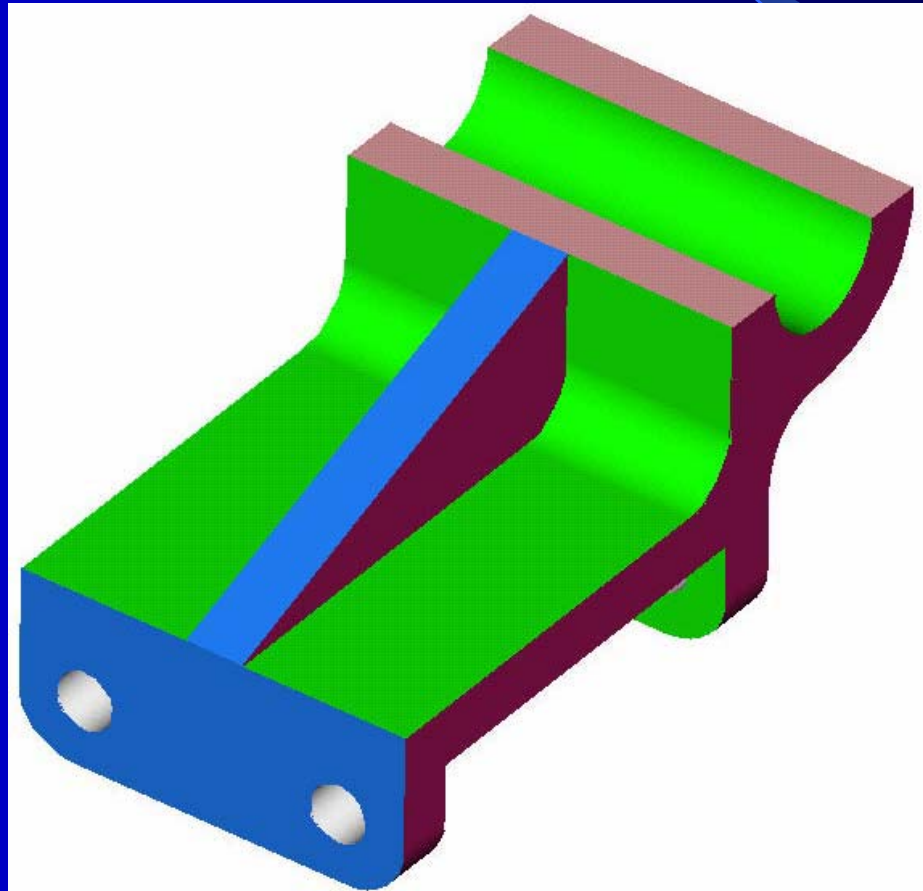
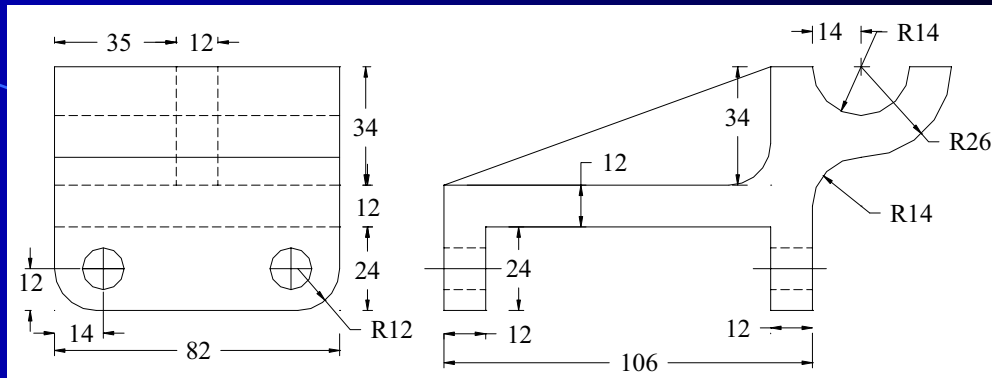


# Model - 57

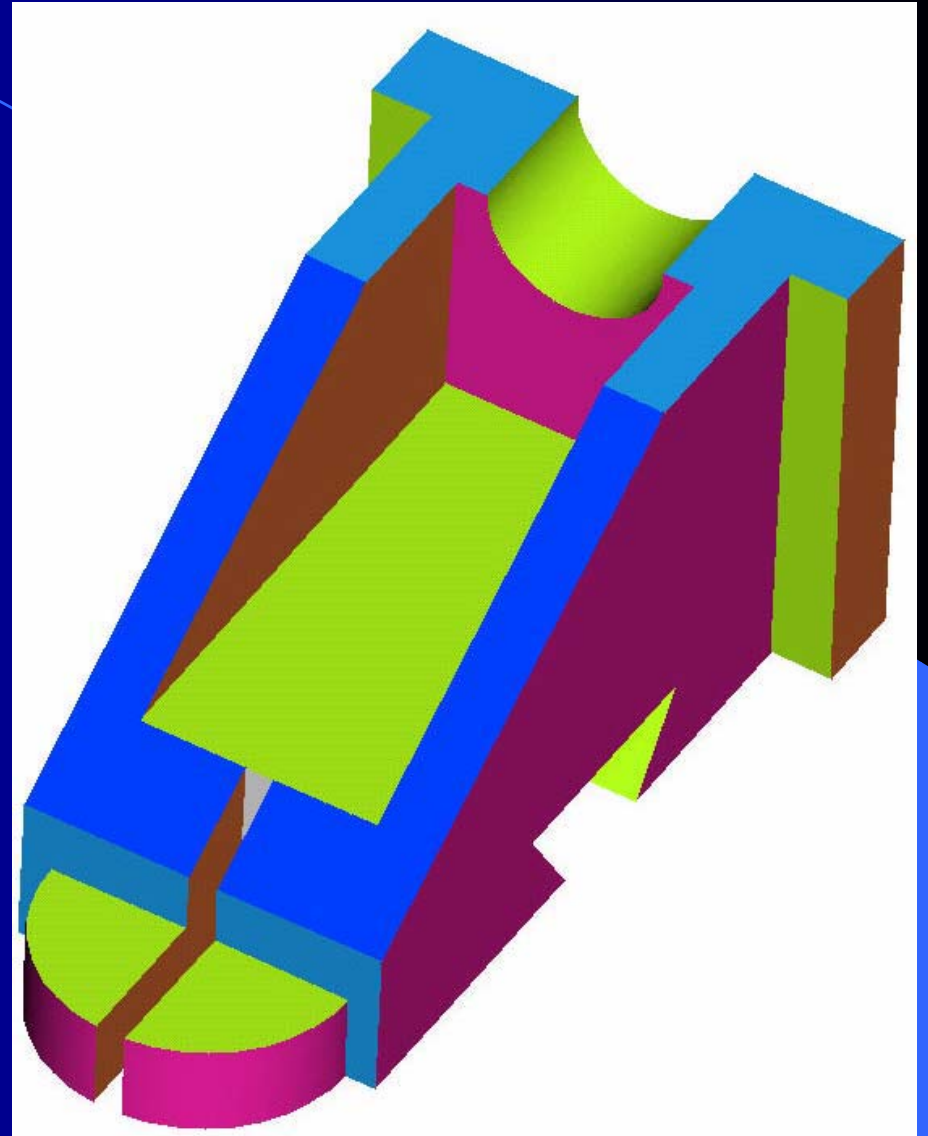
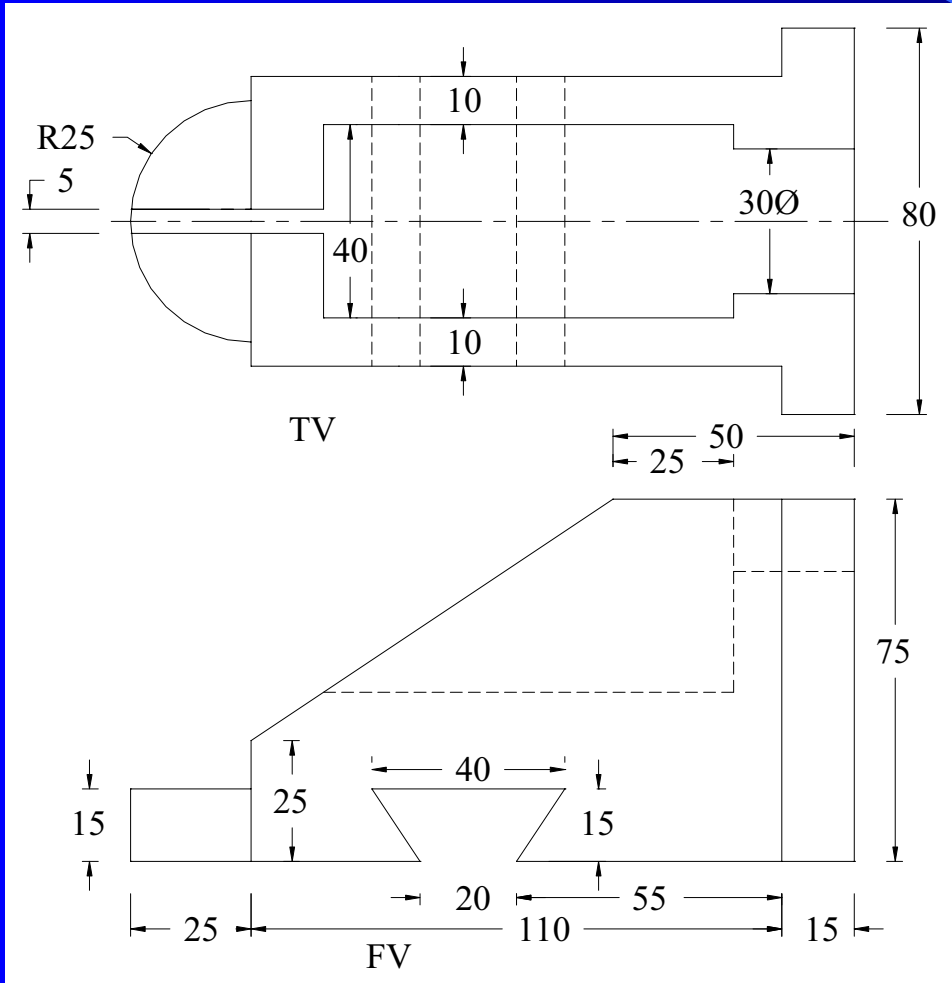




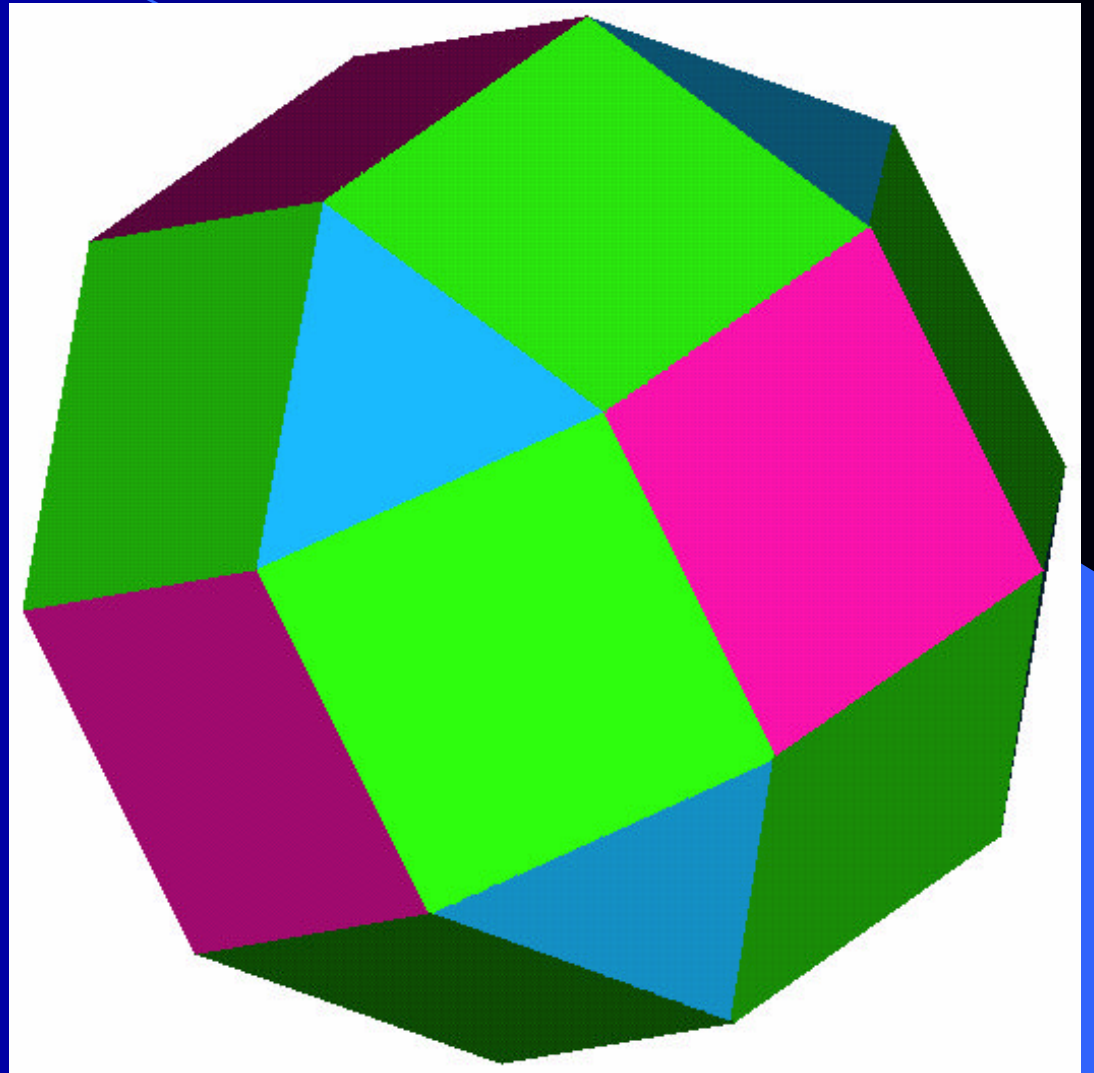
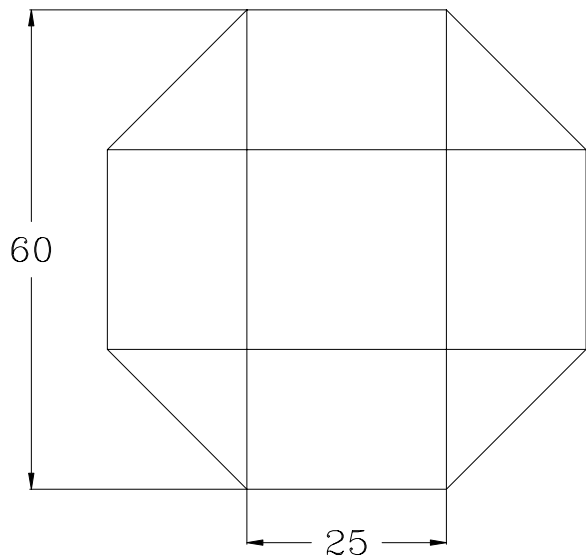
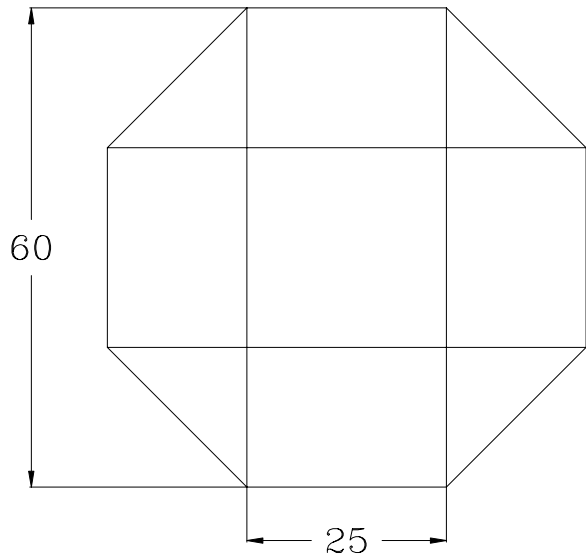
# Model - 58



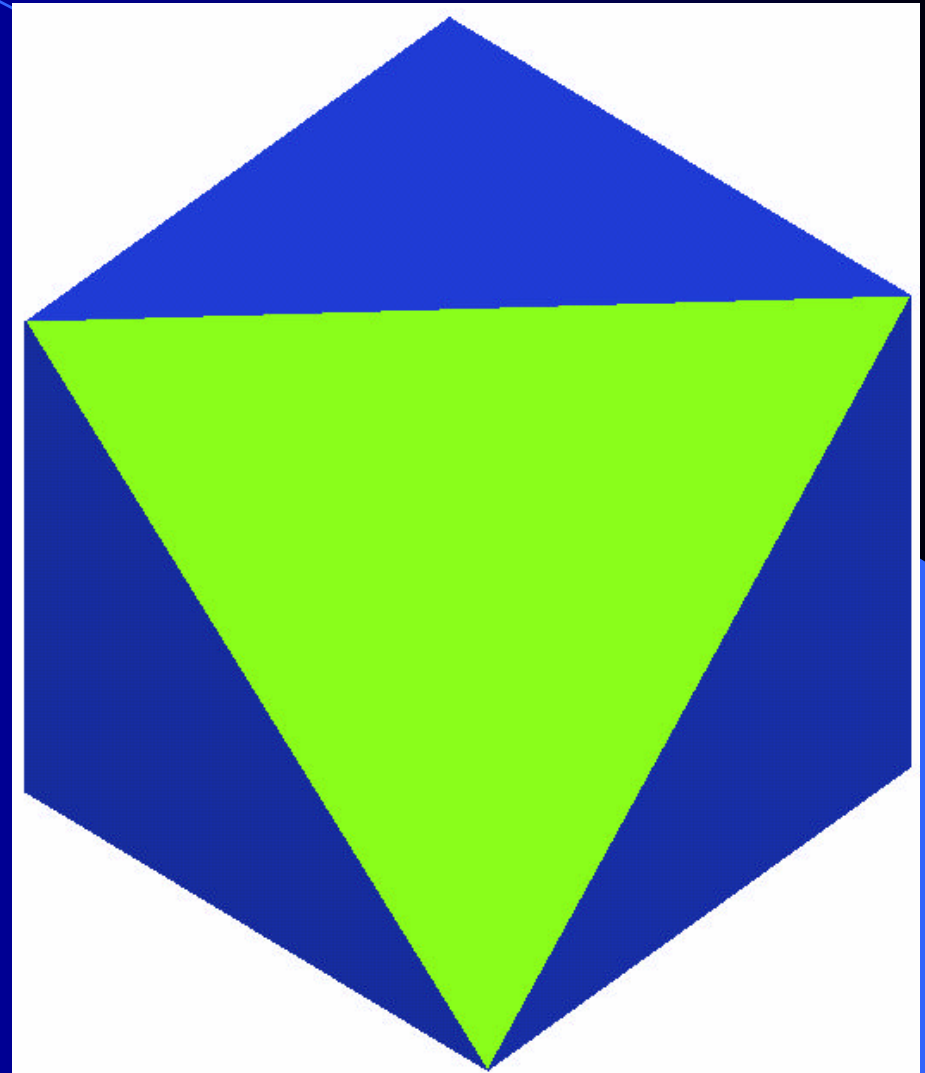
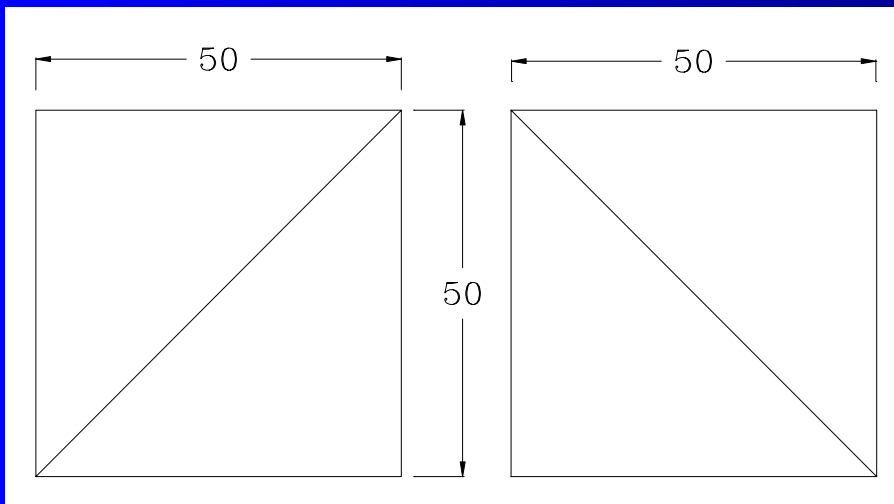
# Model - 59

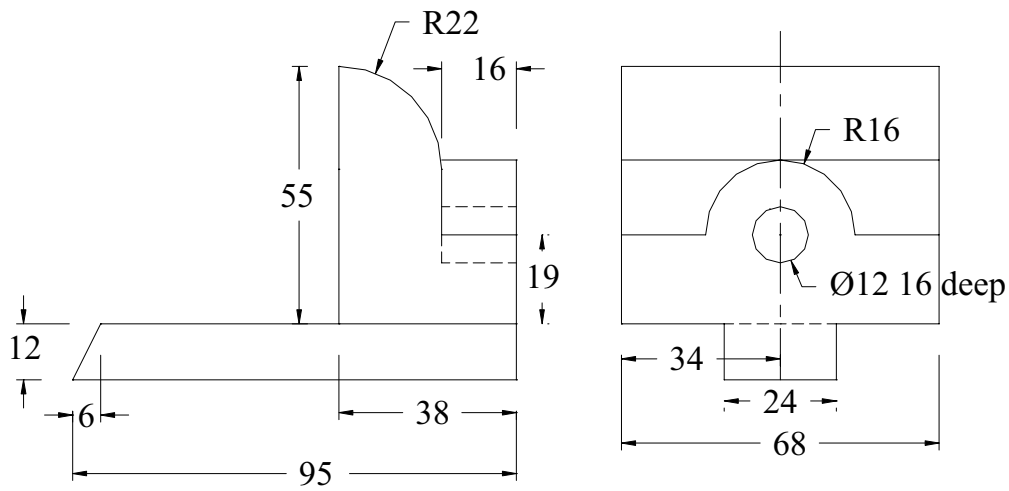


# Model - 60

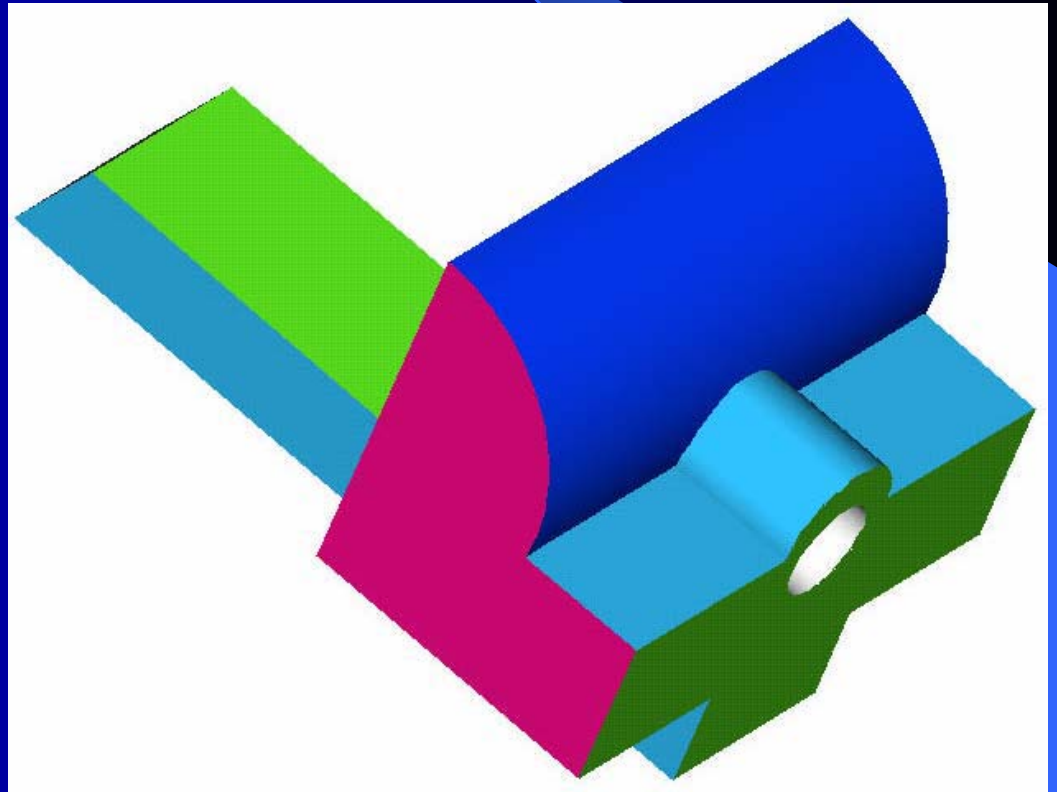


# Model - 61

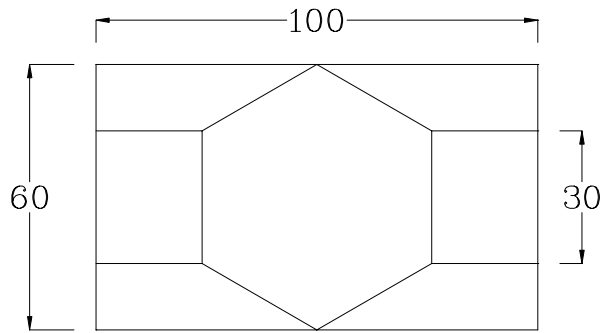




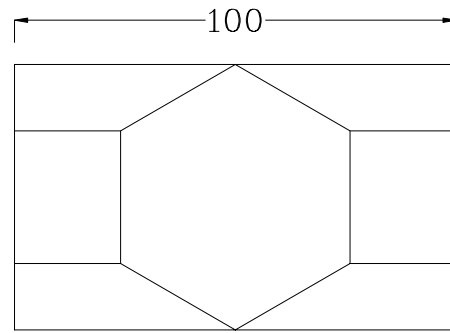
# Model - 62



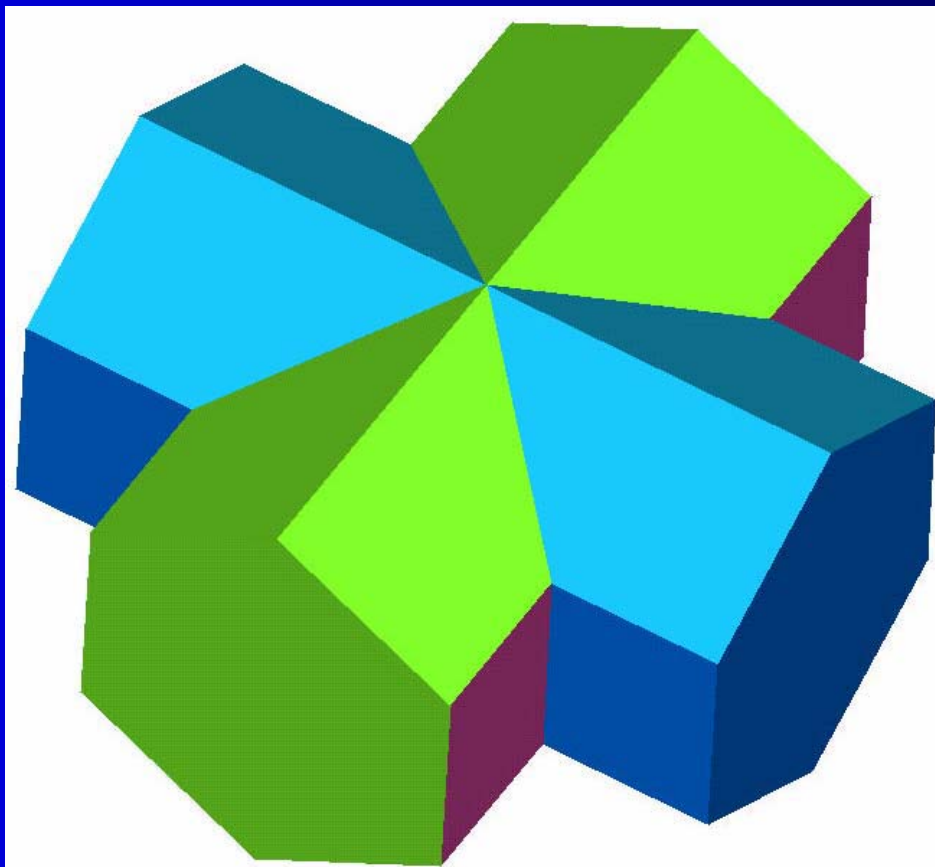
# Model - 63



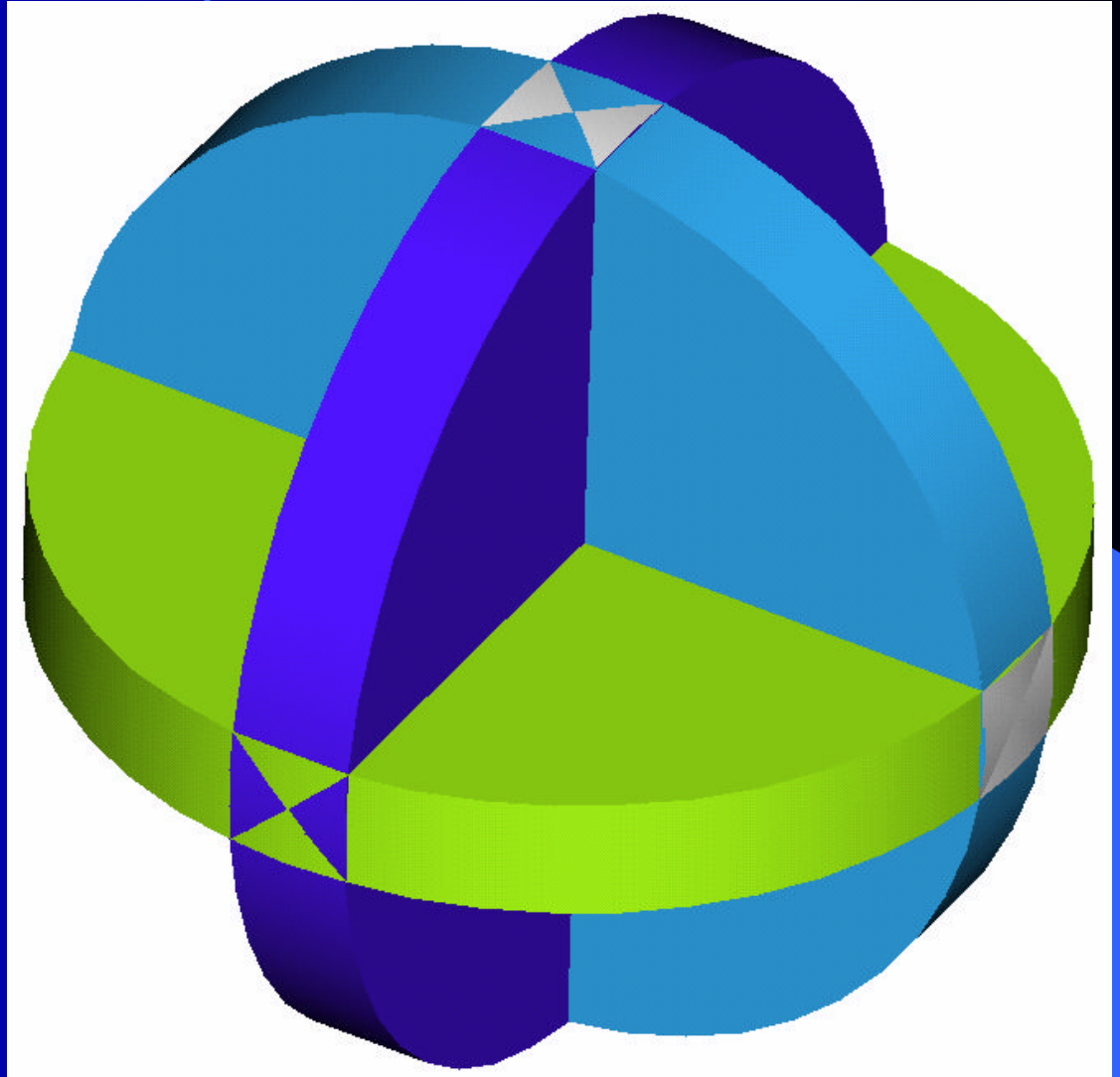
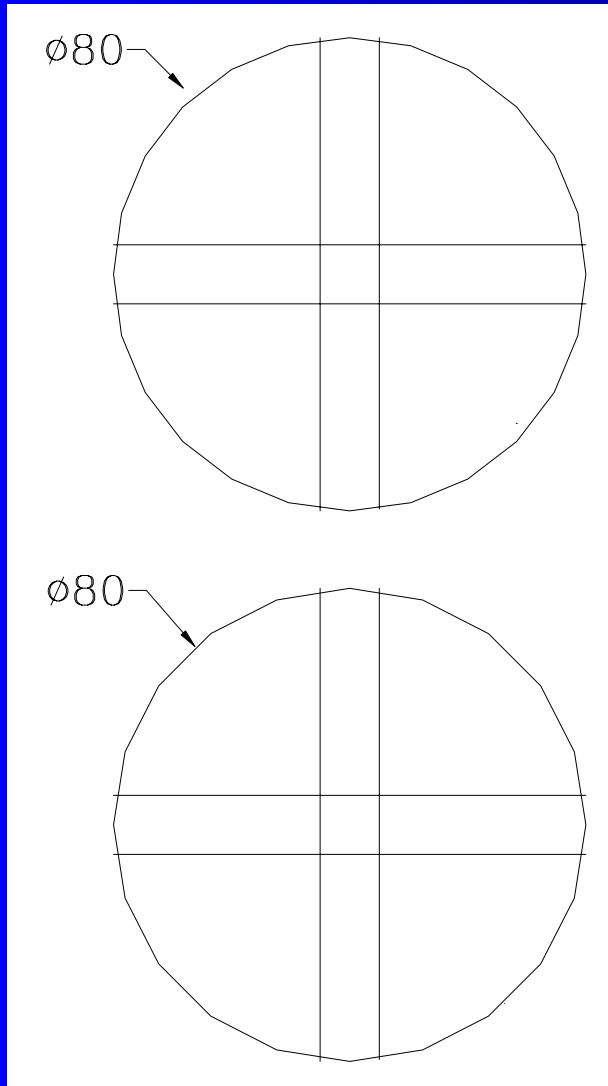
F.V.



Side V.

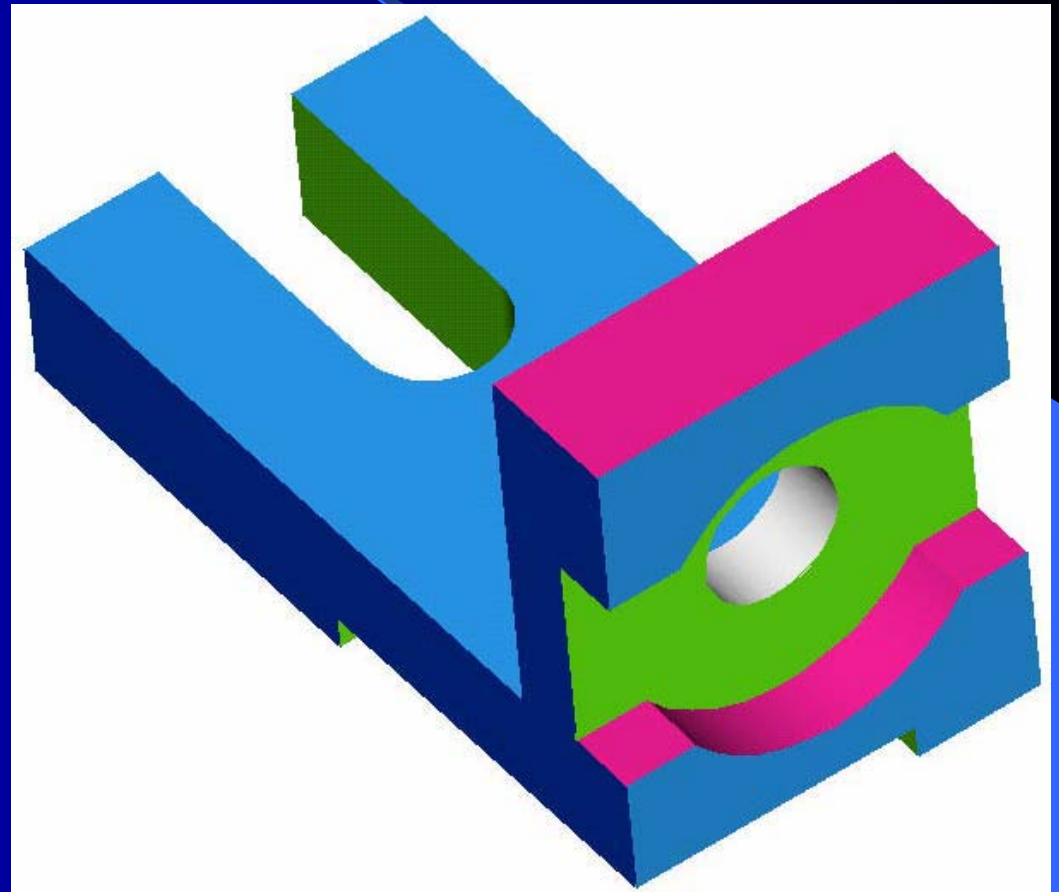
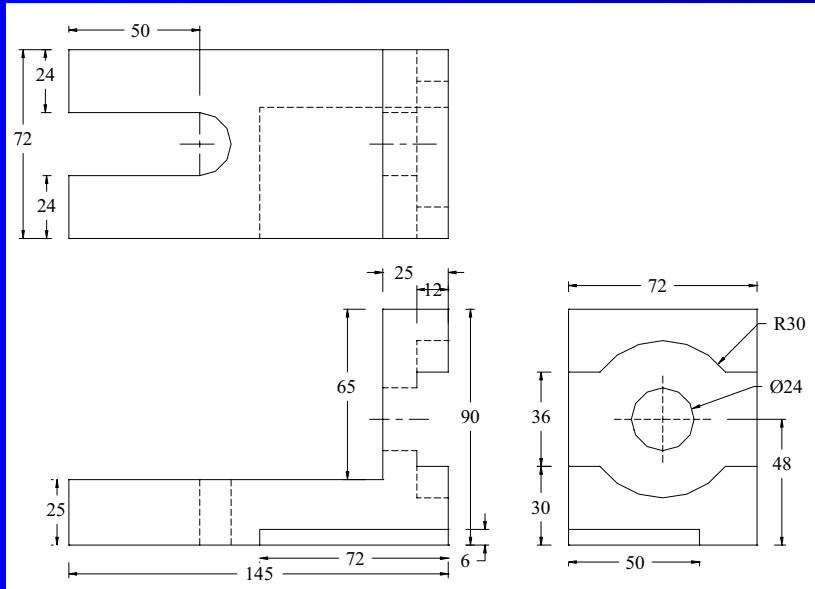


# Model - 64



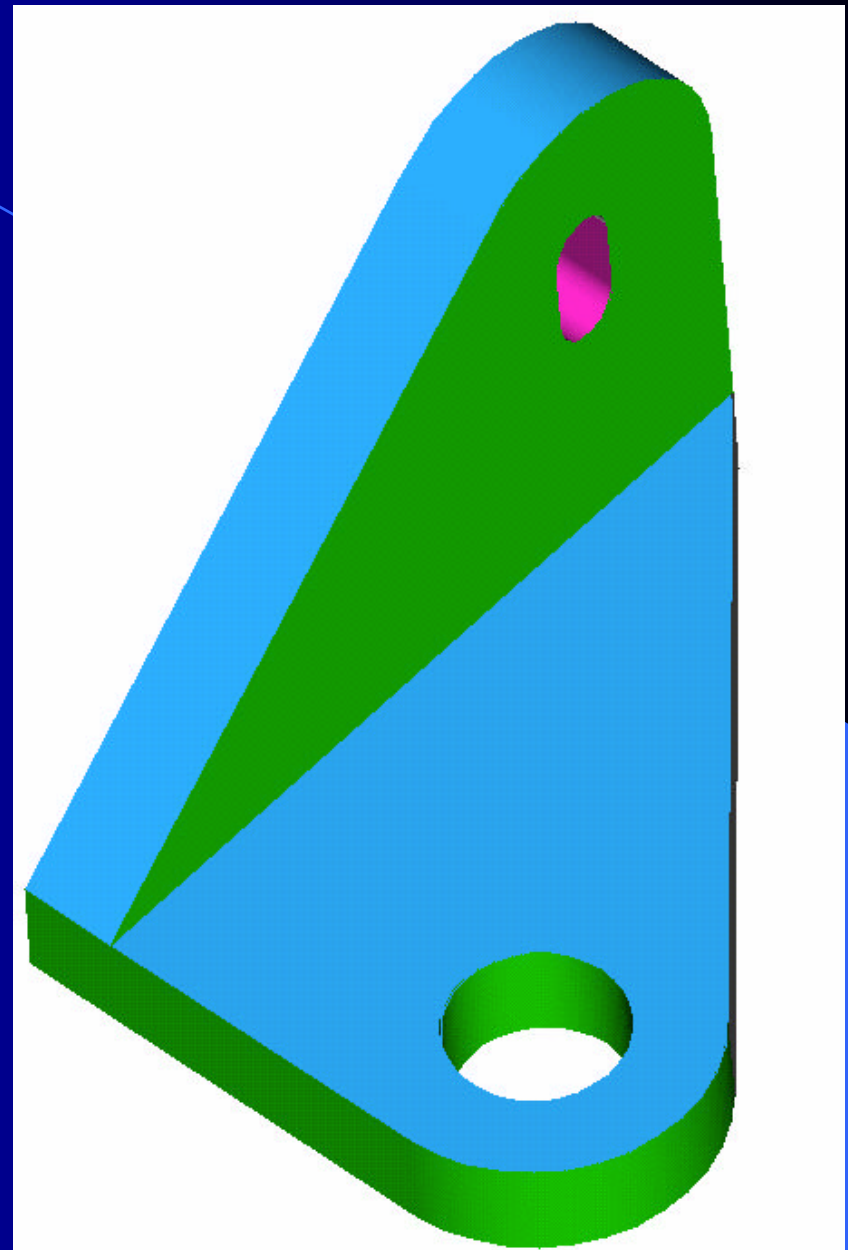
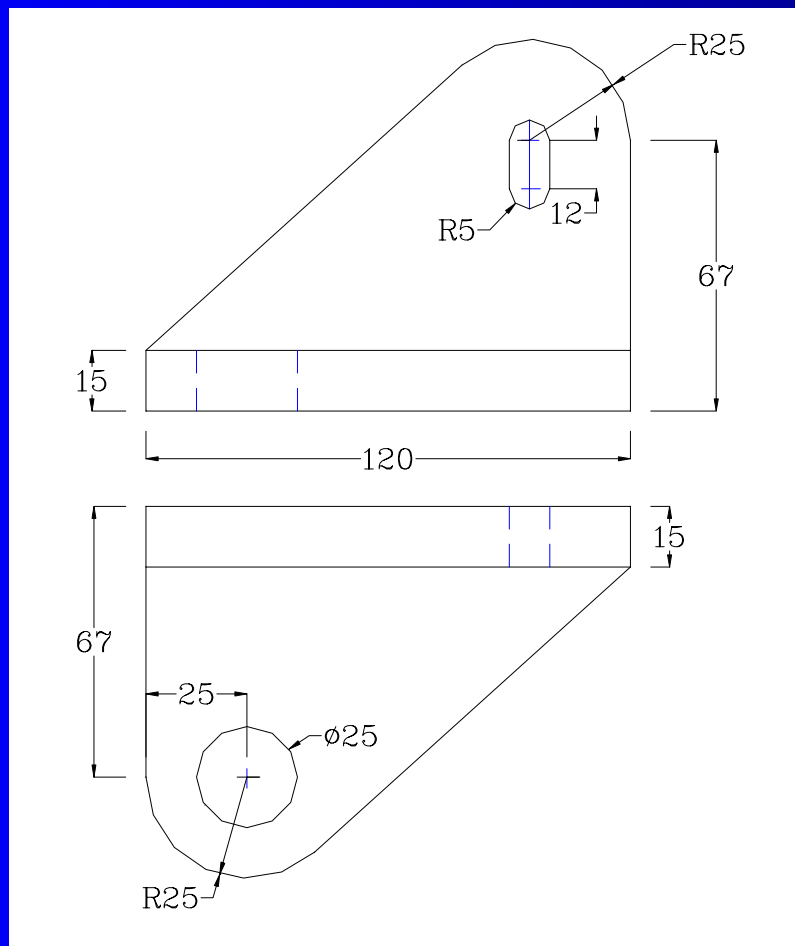


# Model - 65

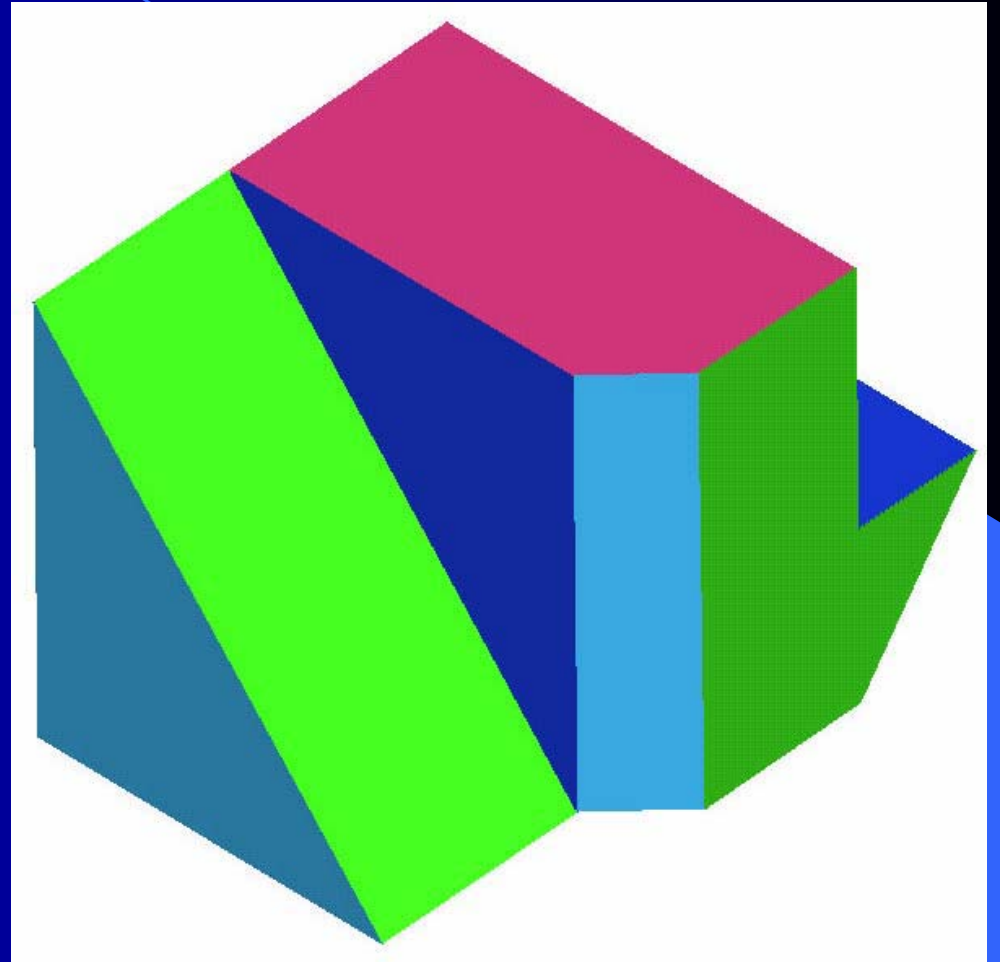
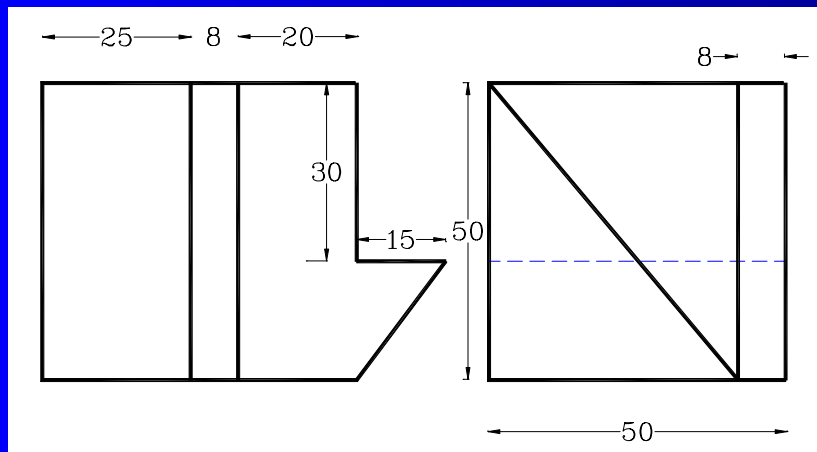




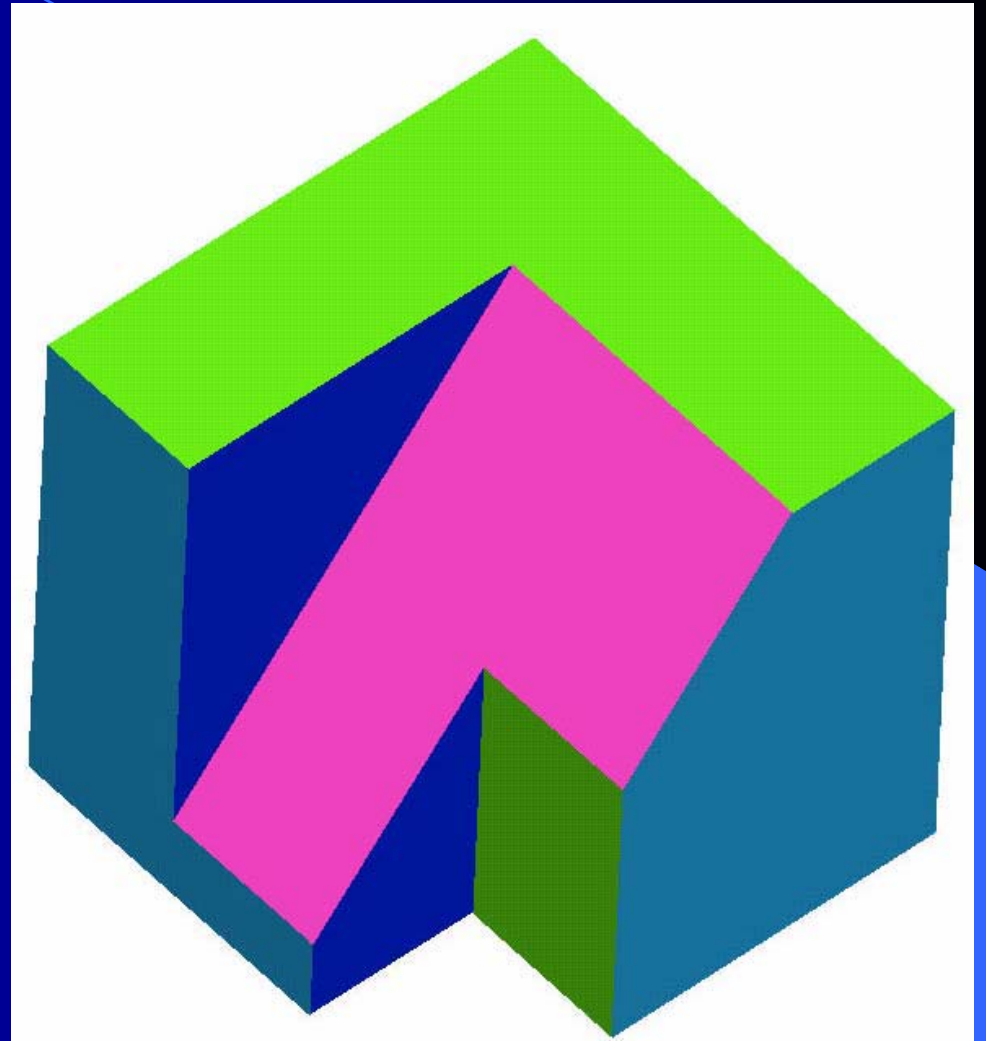
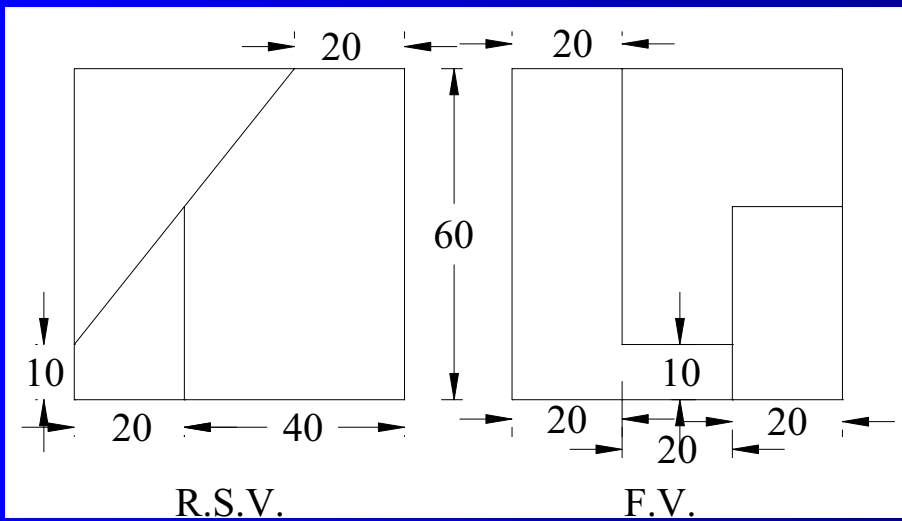
# Model - 66



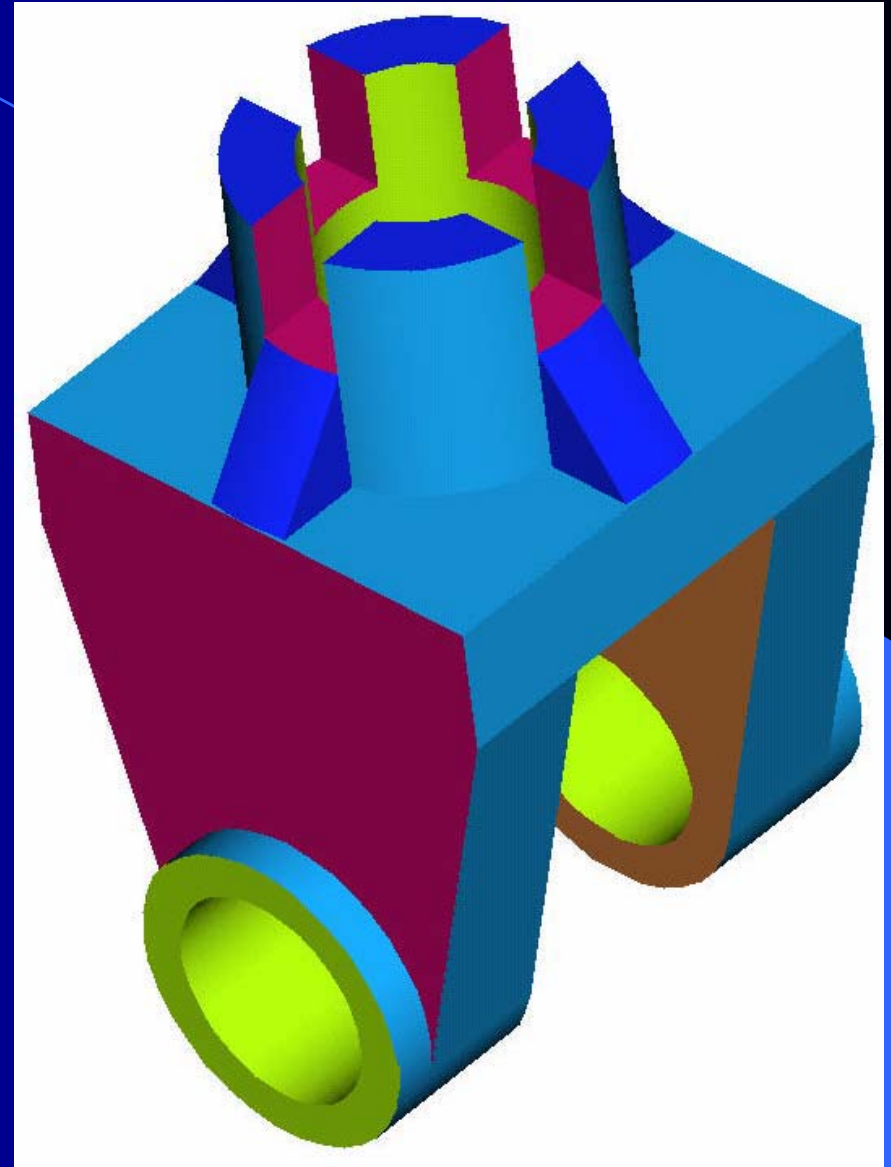
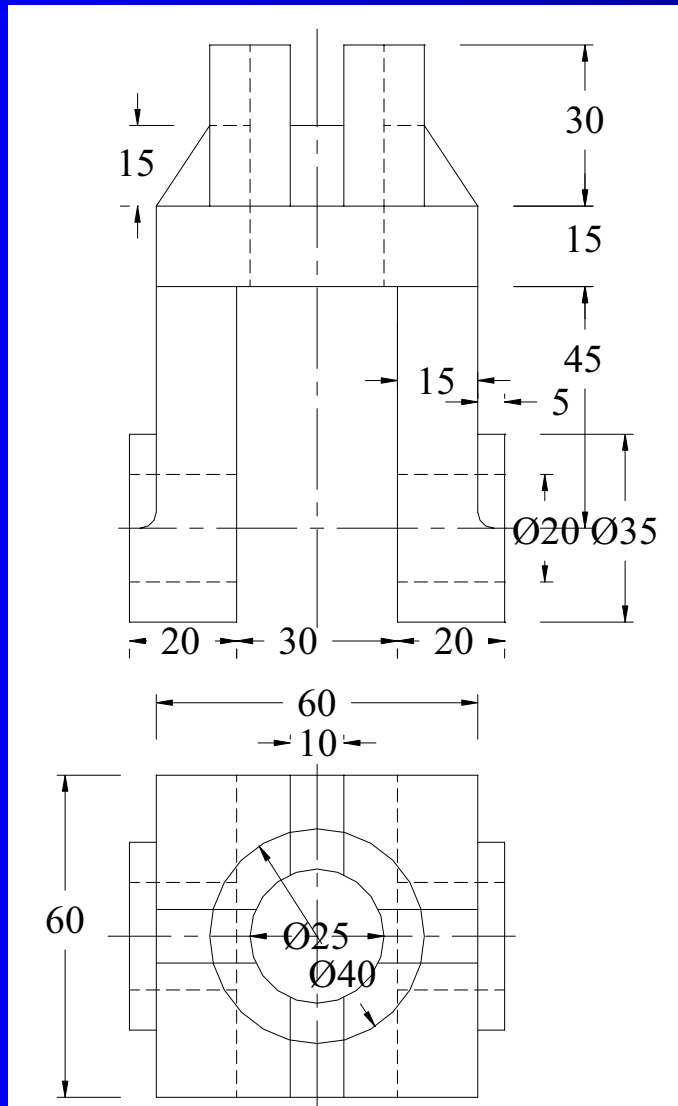
# Model - 67



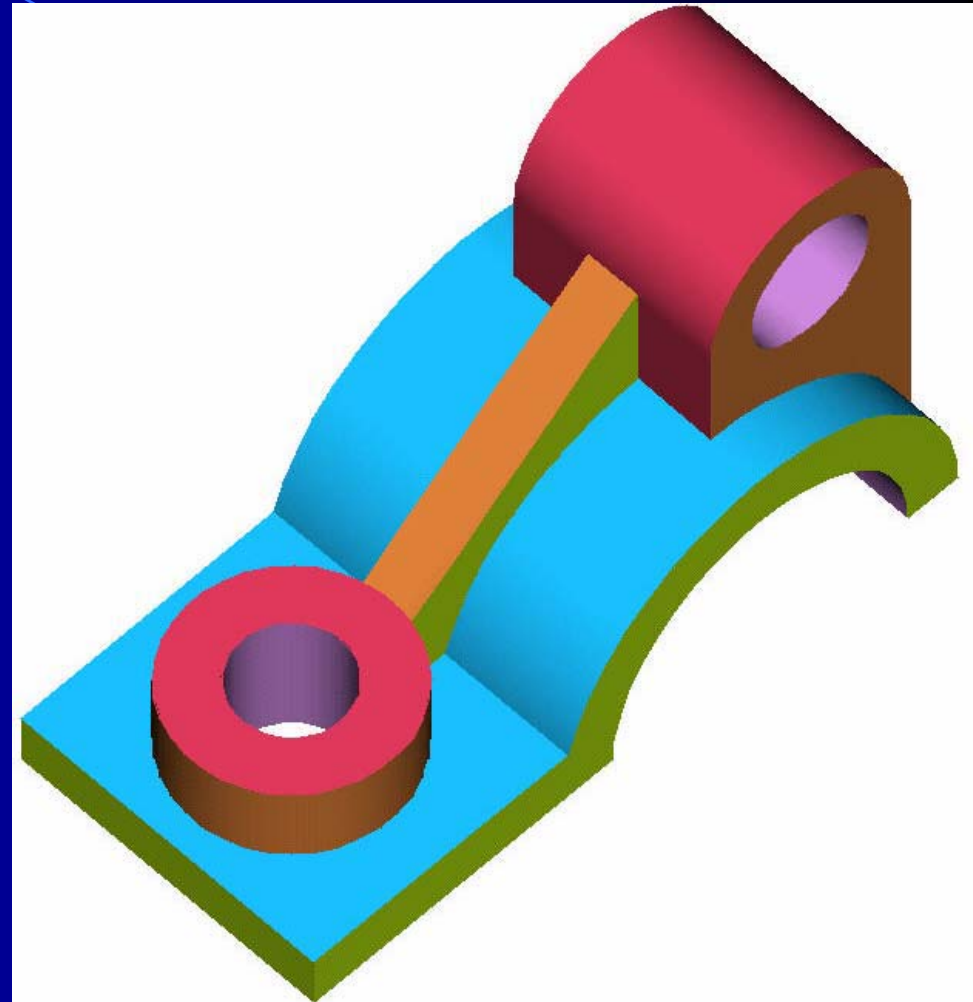
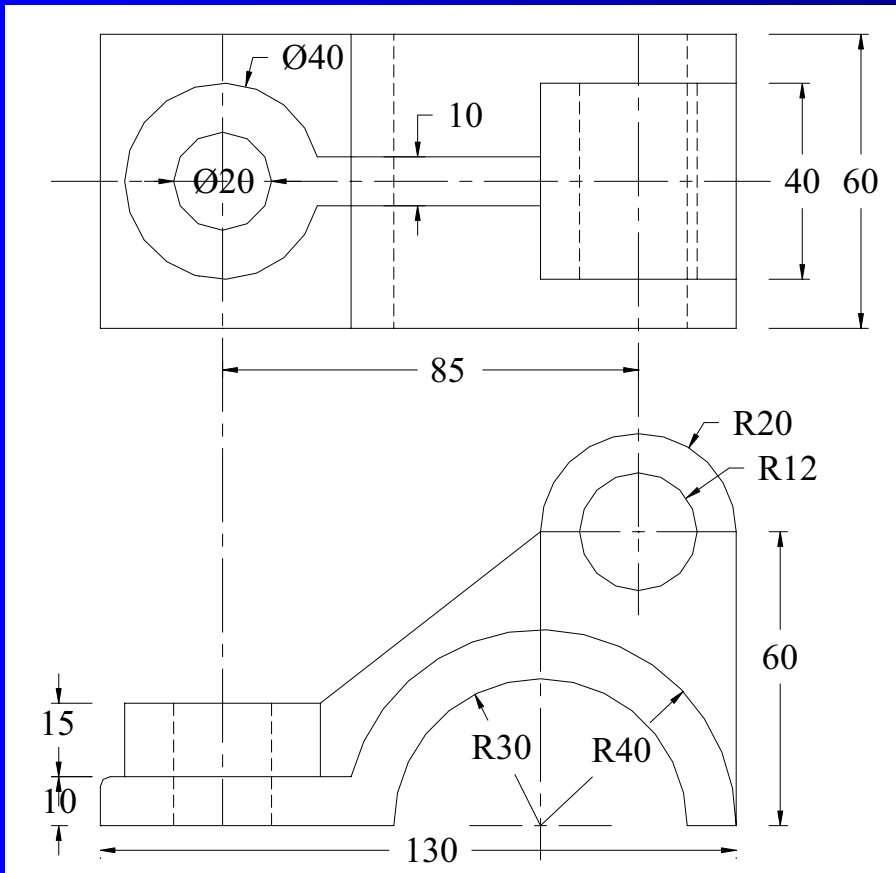
# Model - 68



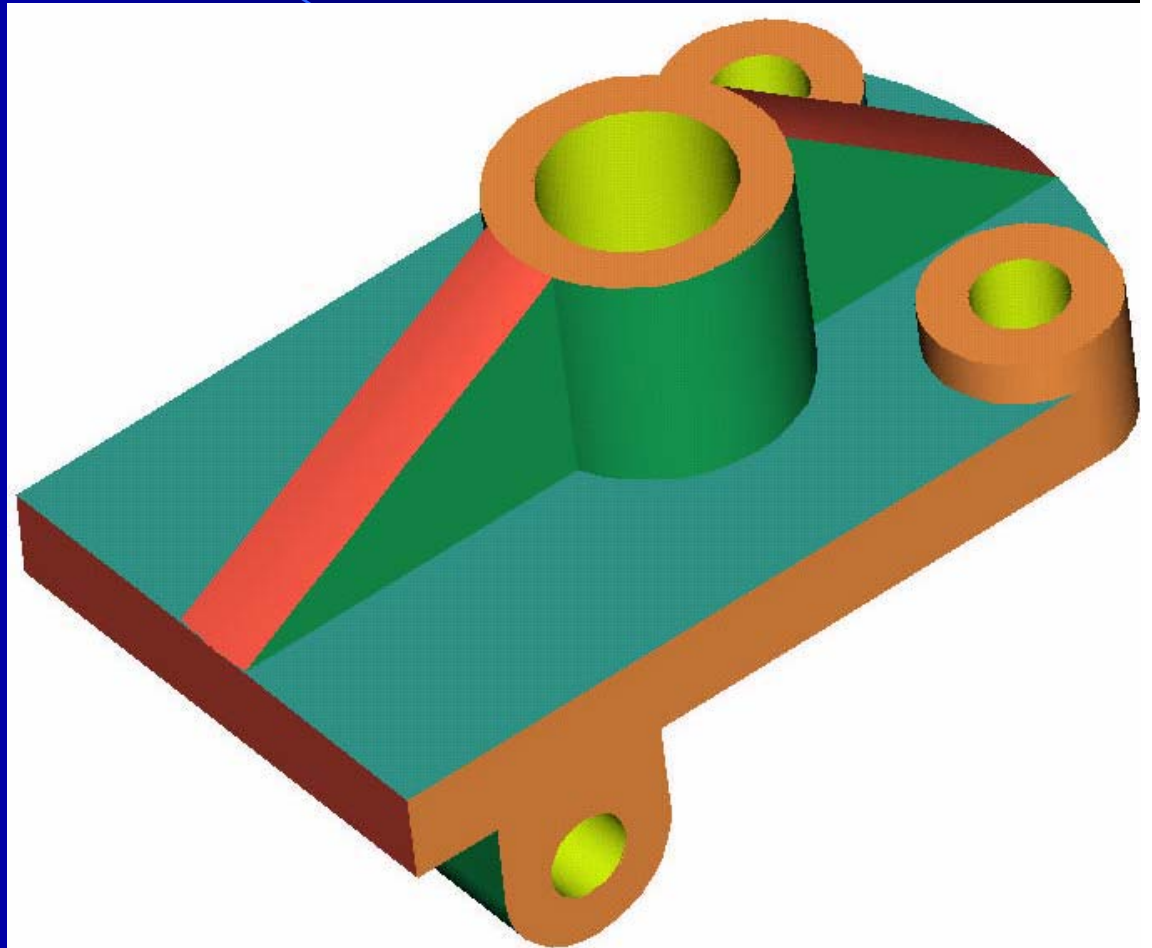
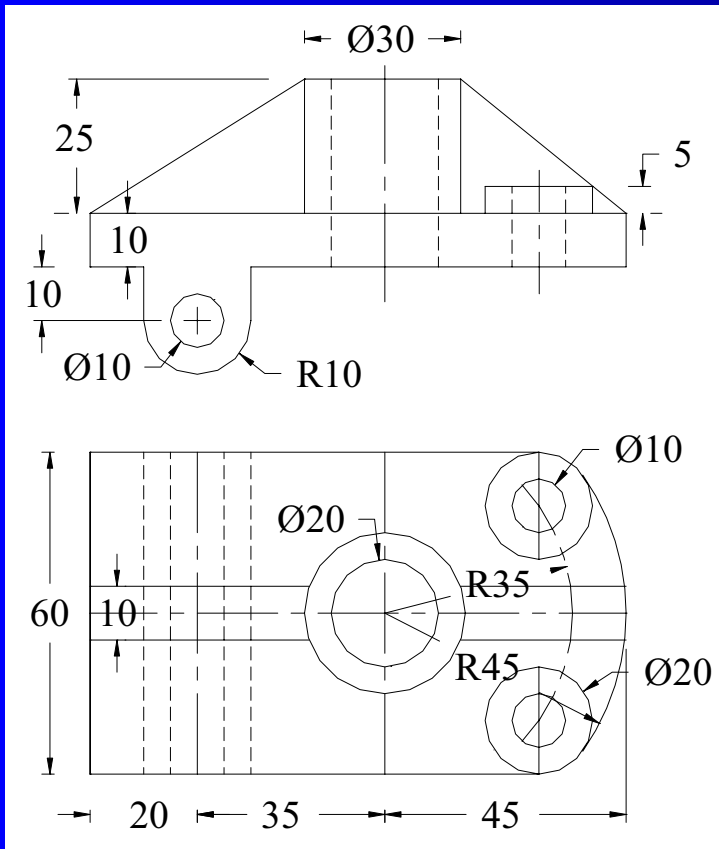
# Model - 69



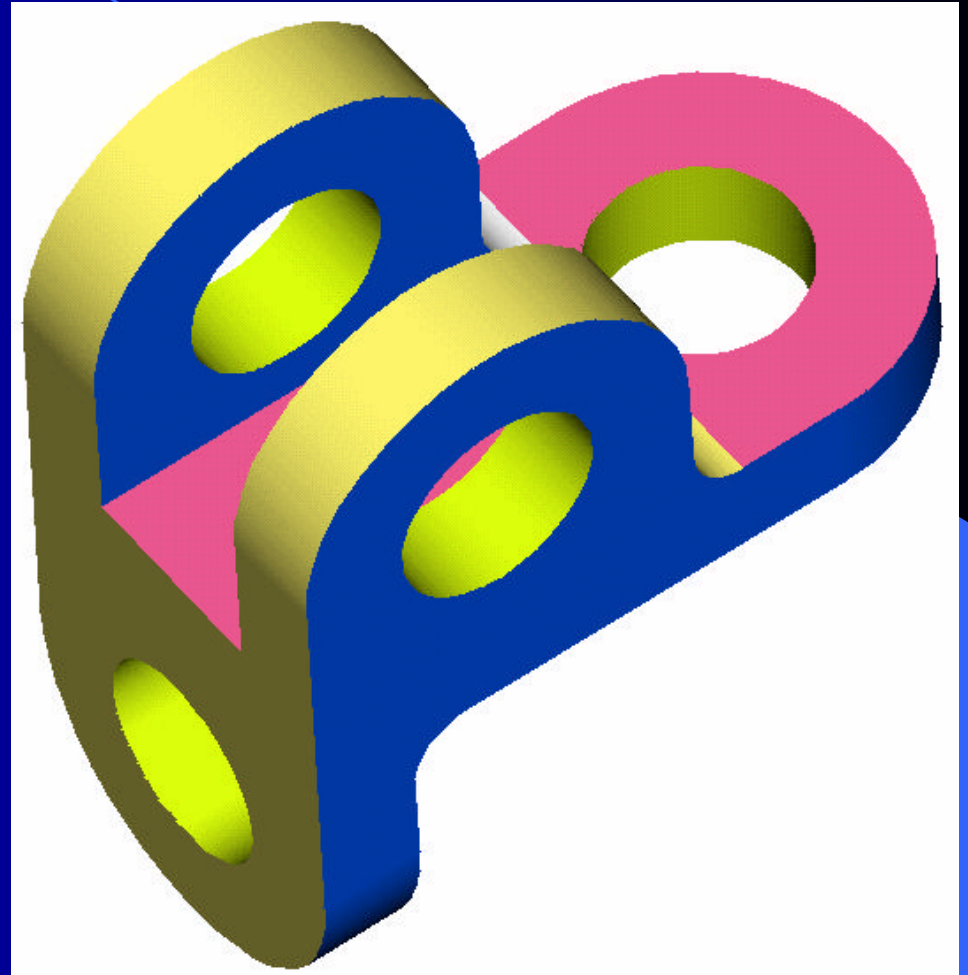
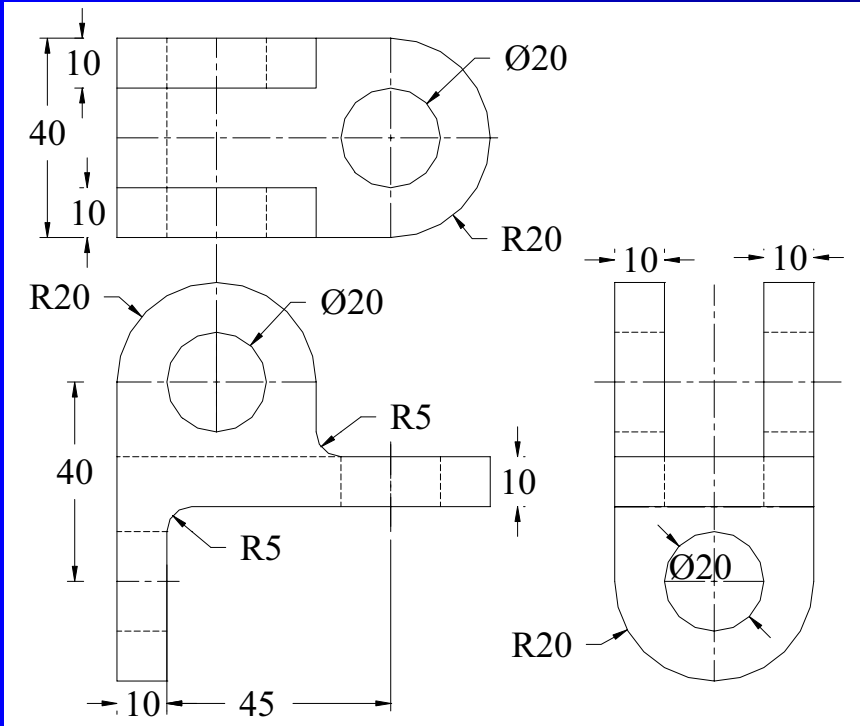
# Model - 70



# Model - 71

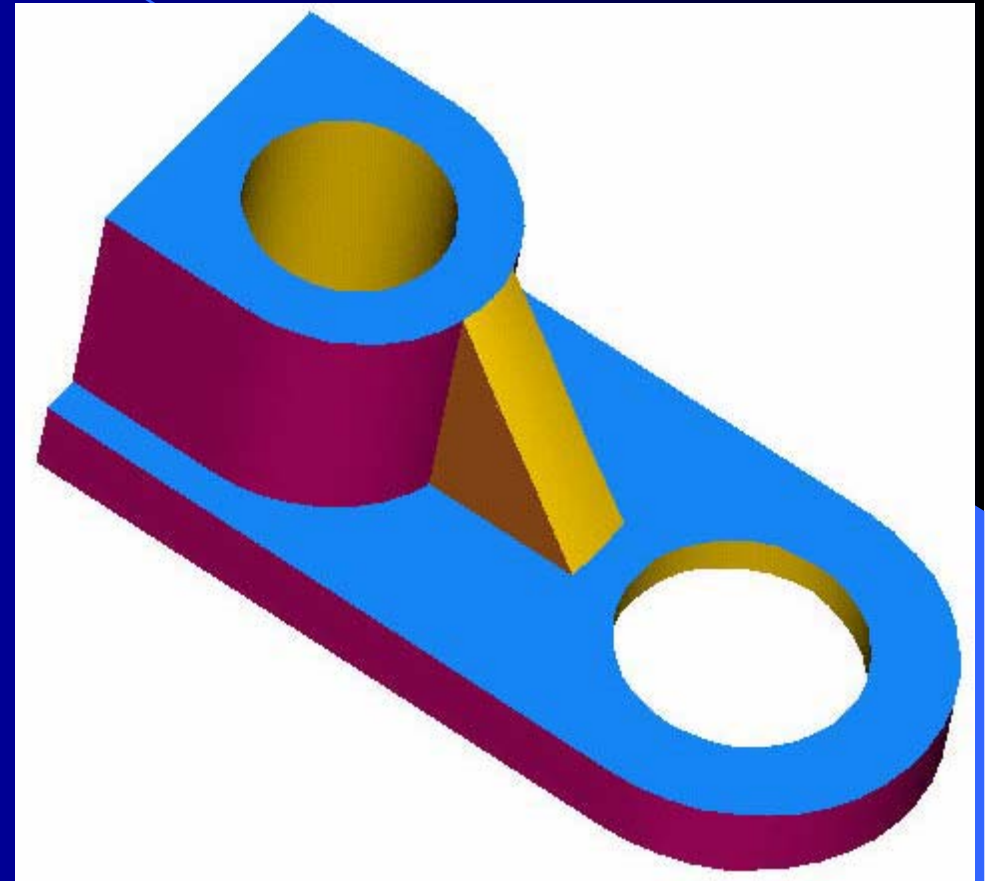
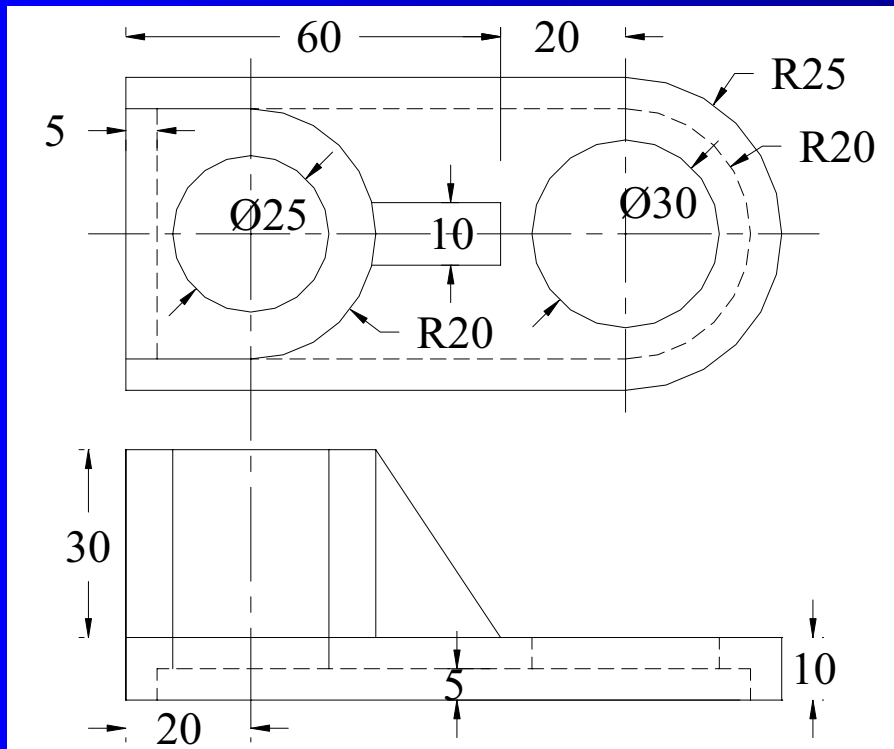


# Model - 72



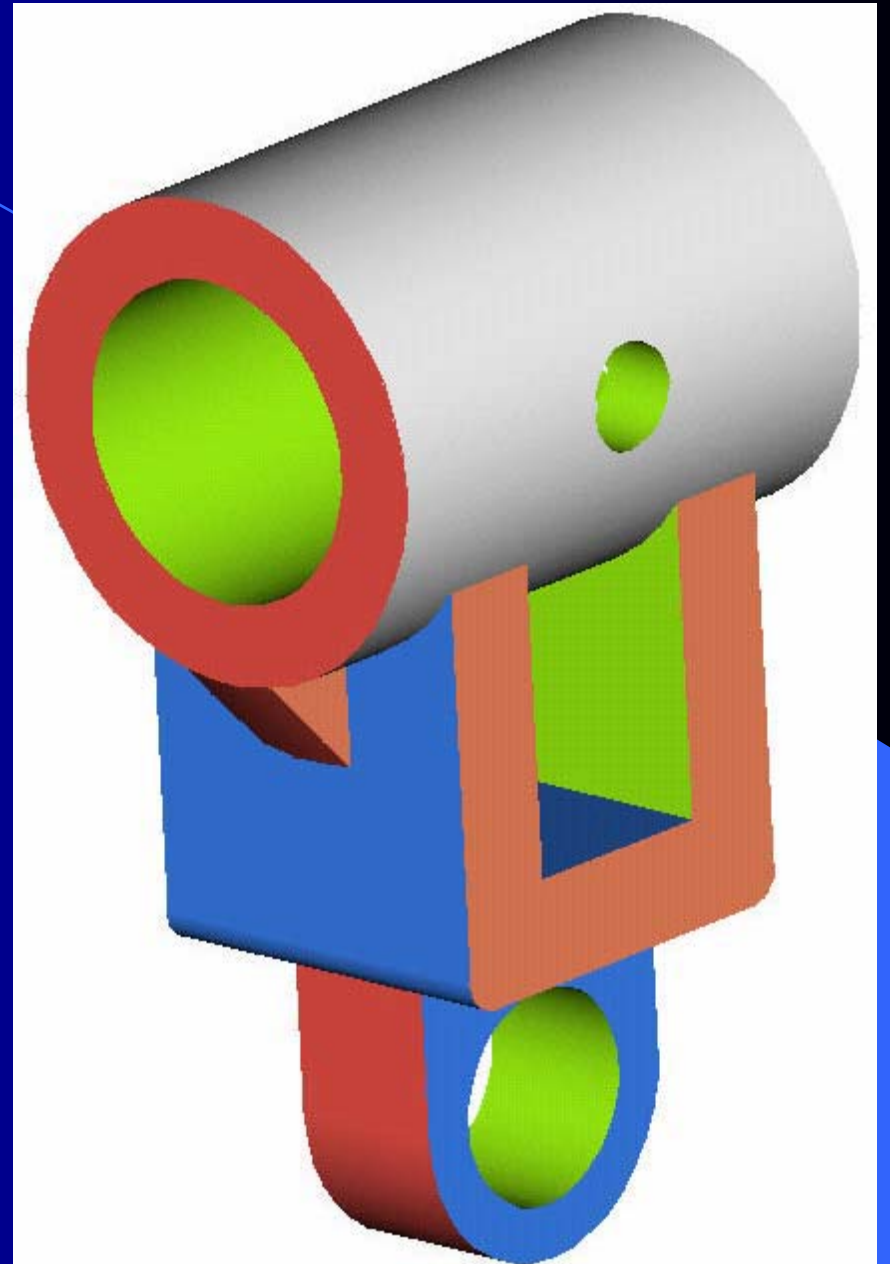
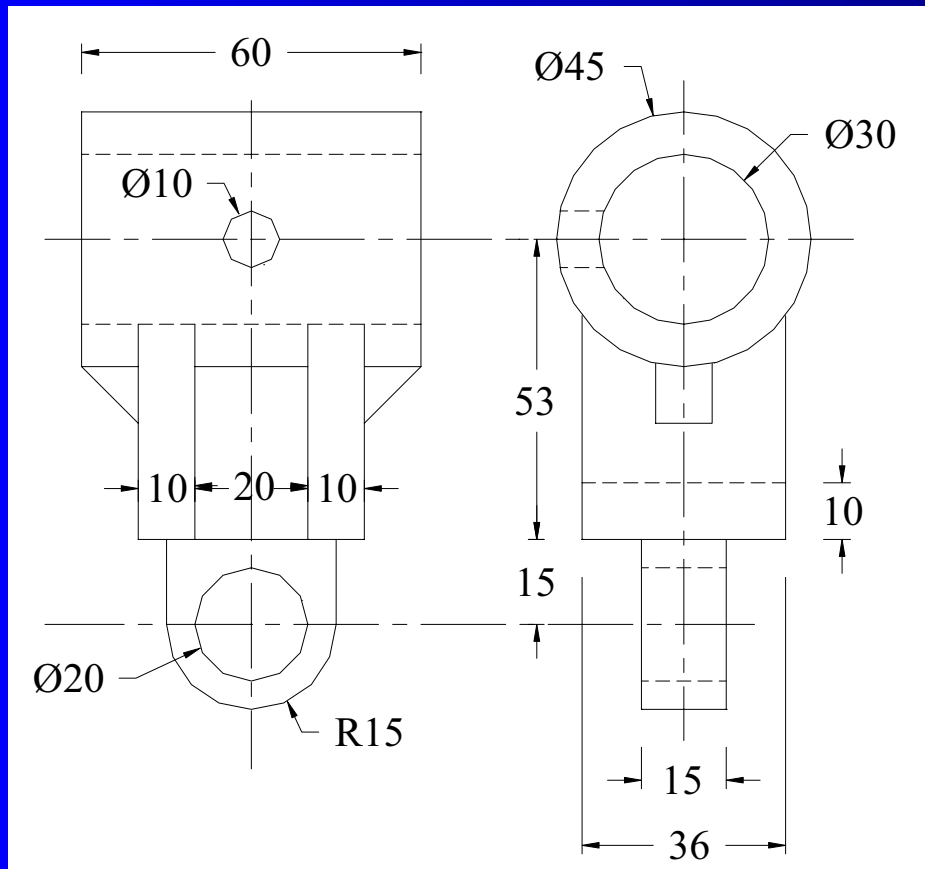


# Model - 73

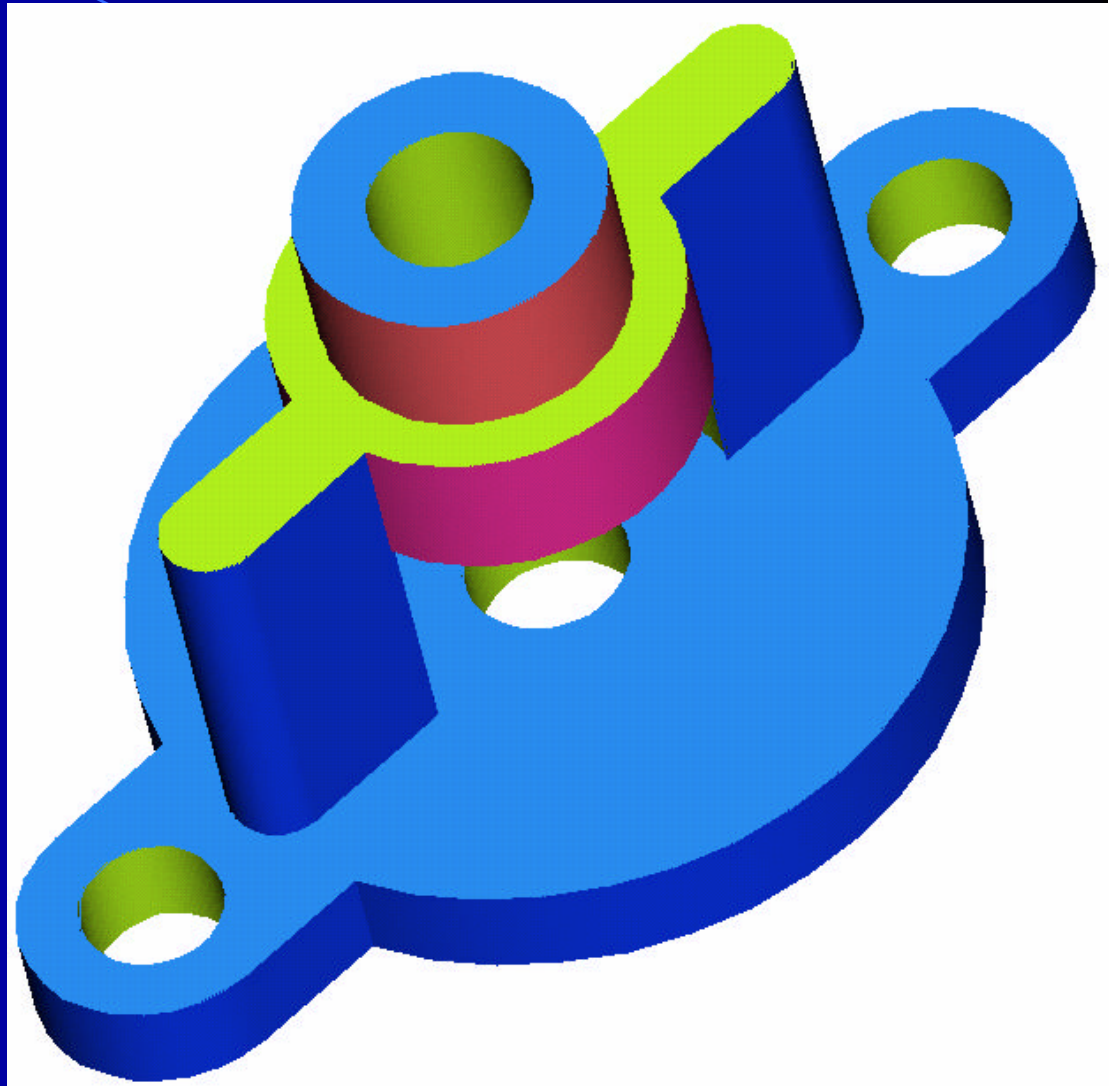
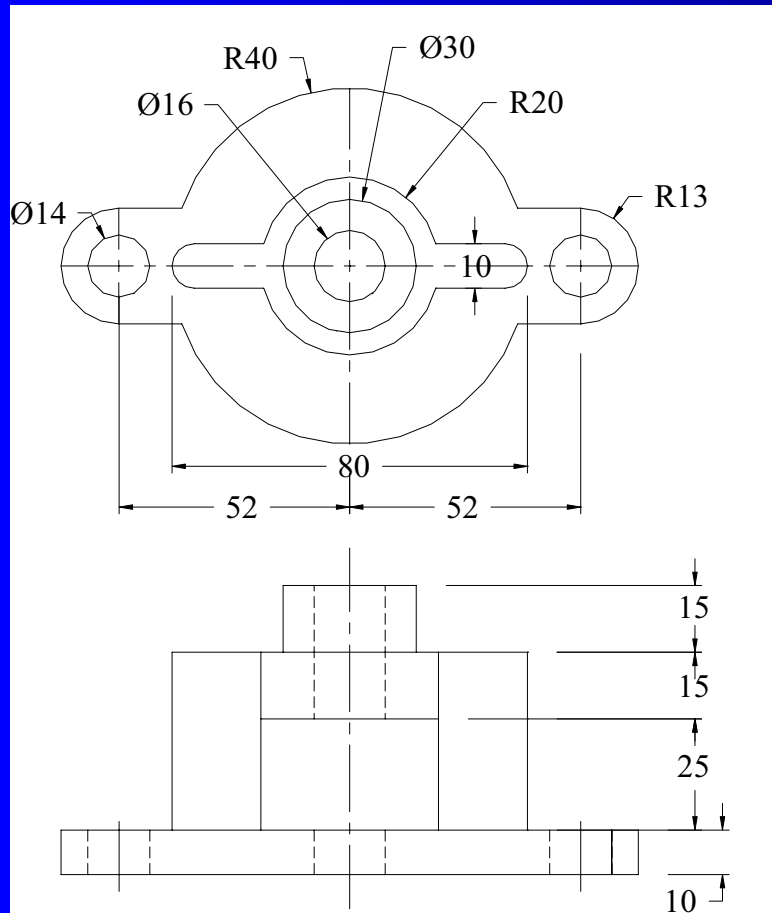




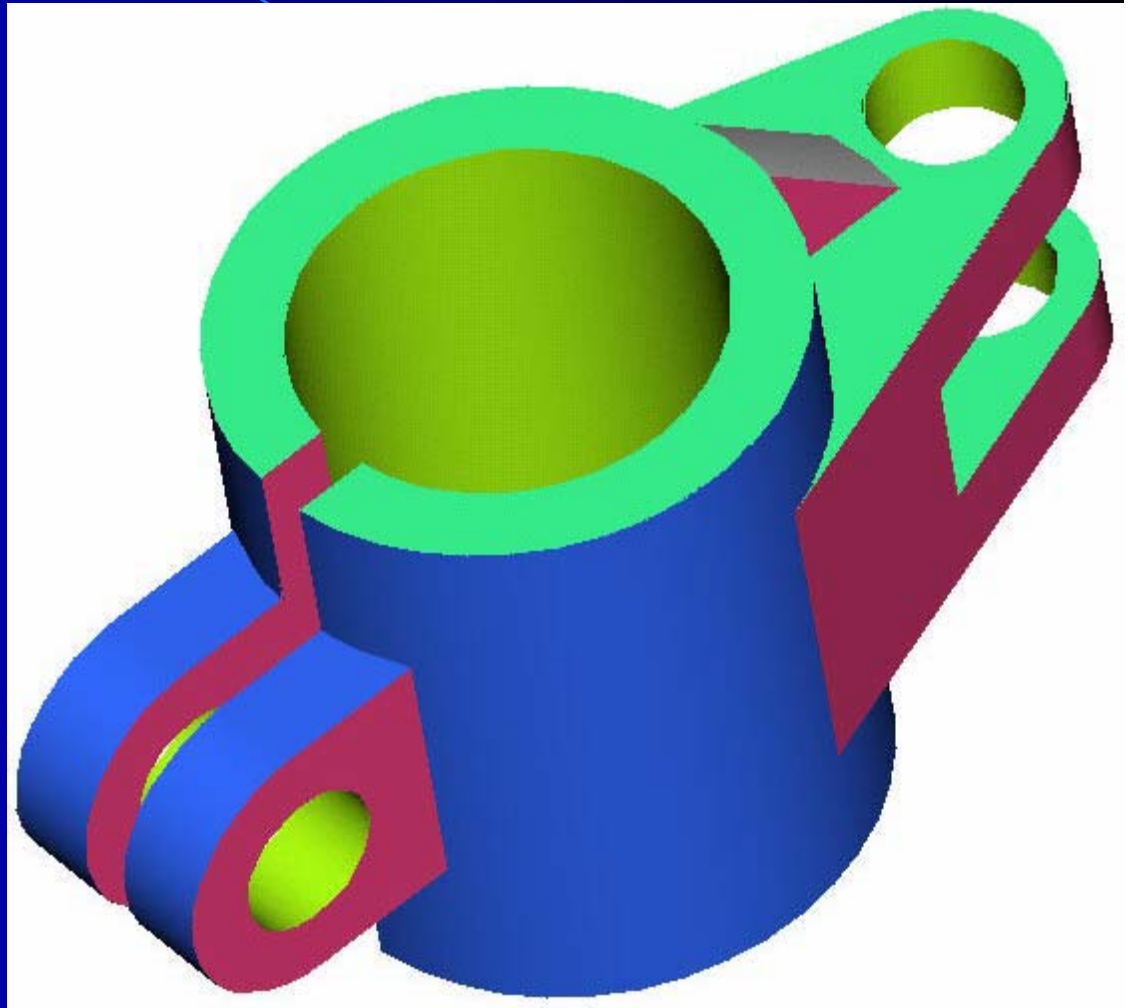
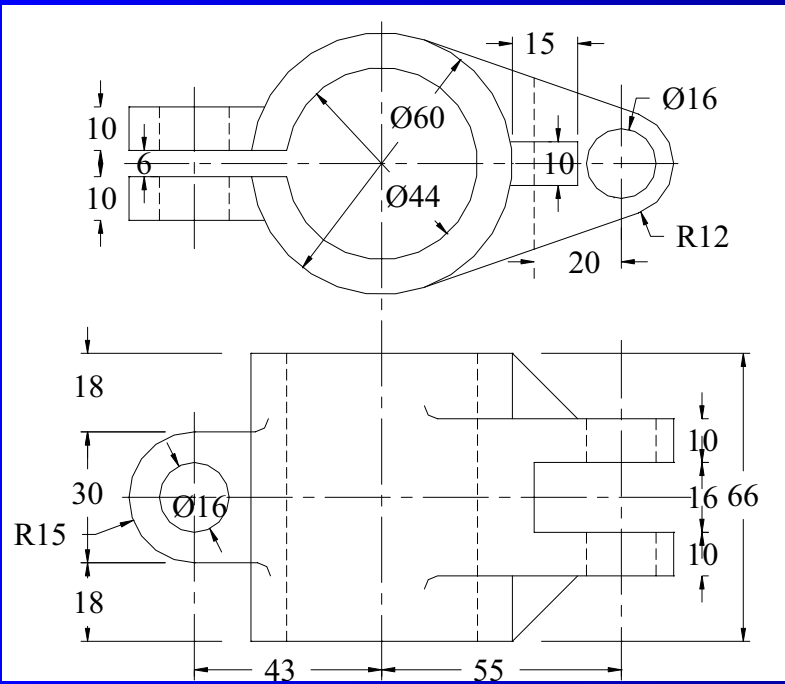
# Model - 74



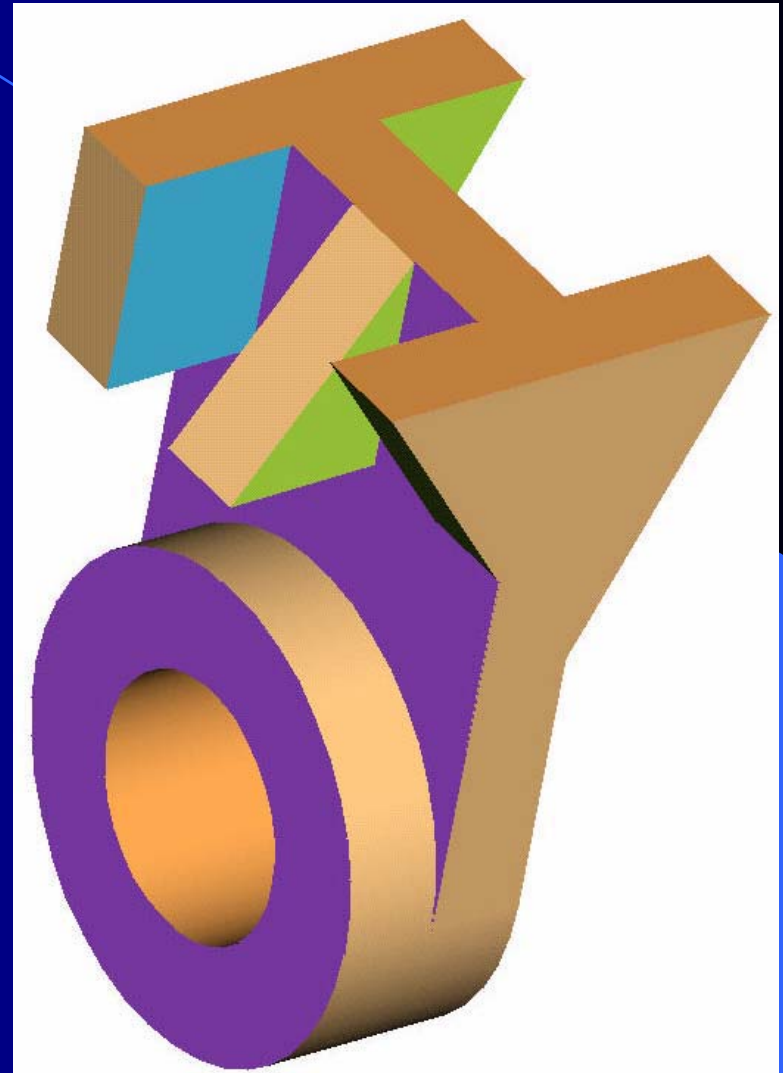
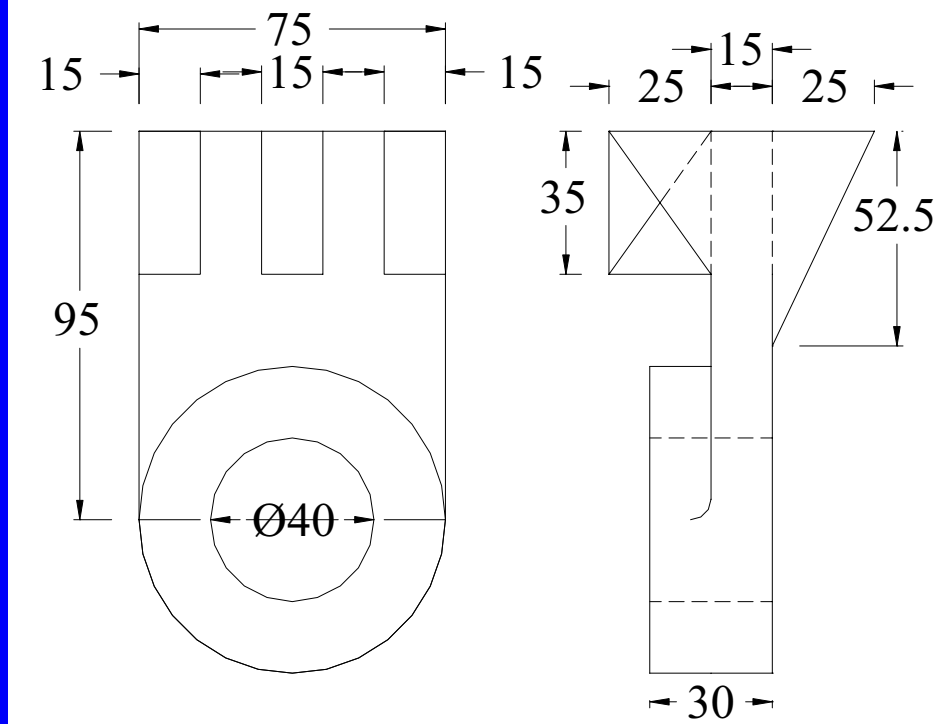
# Model - 75



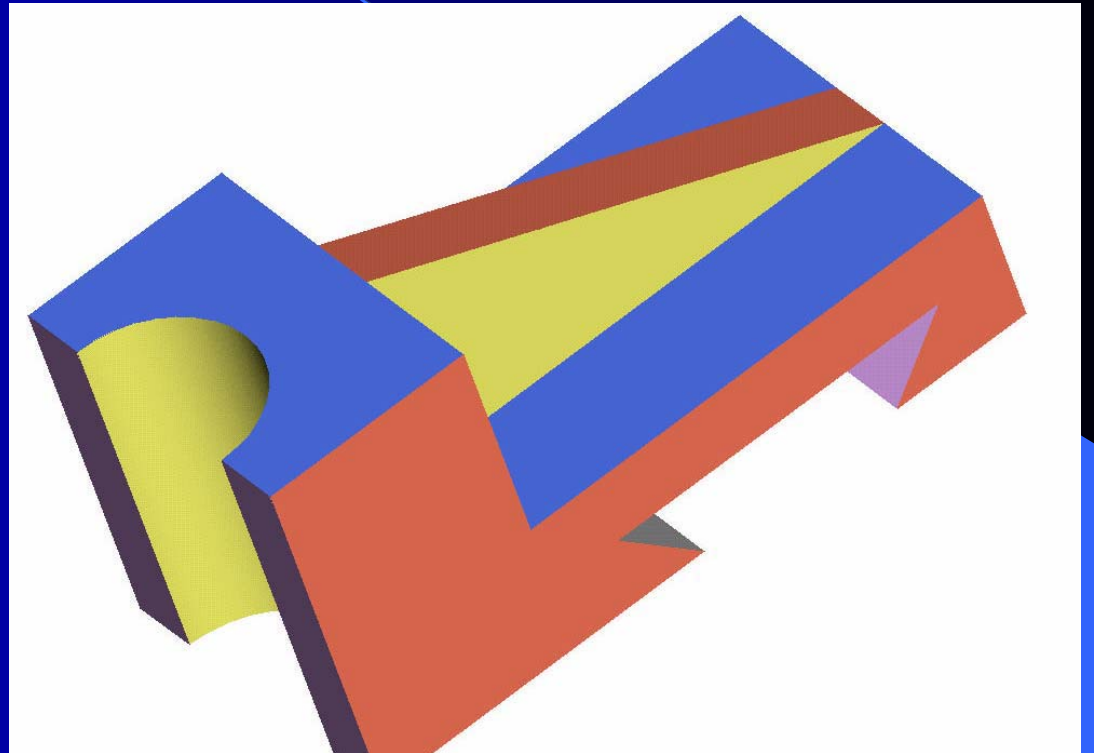
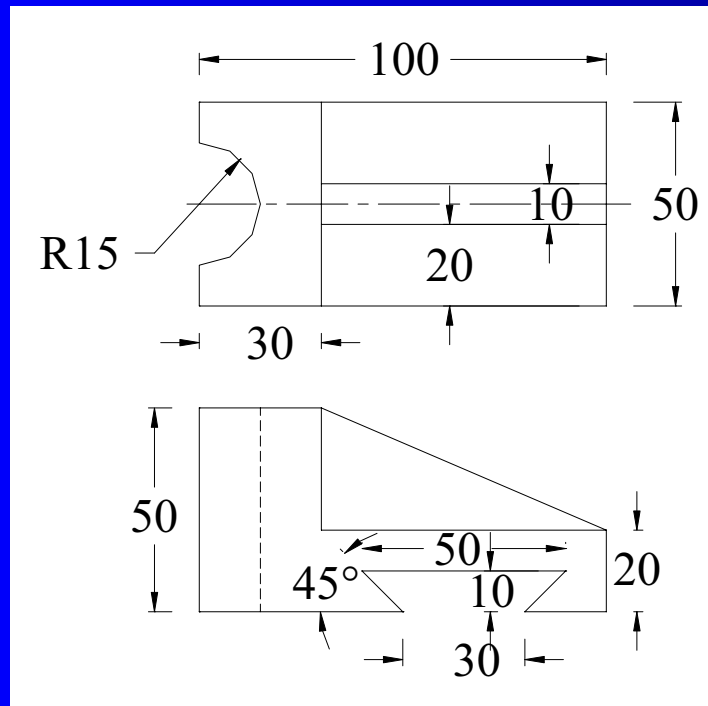
# Model - 76



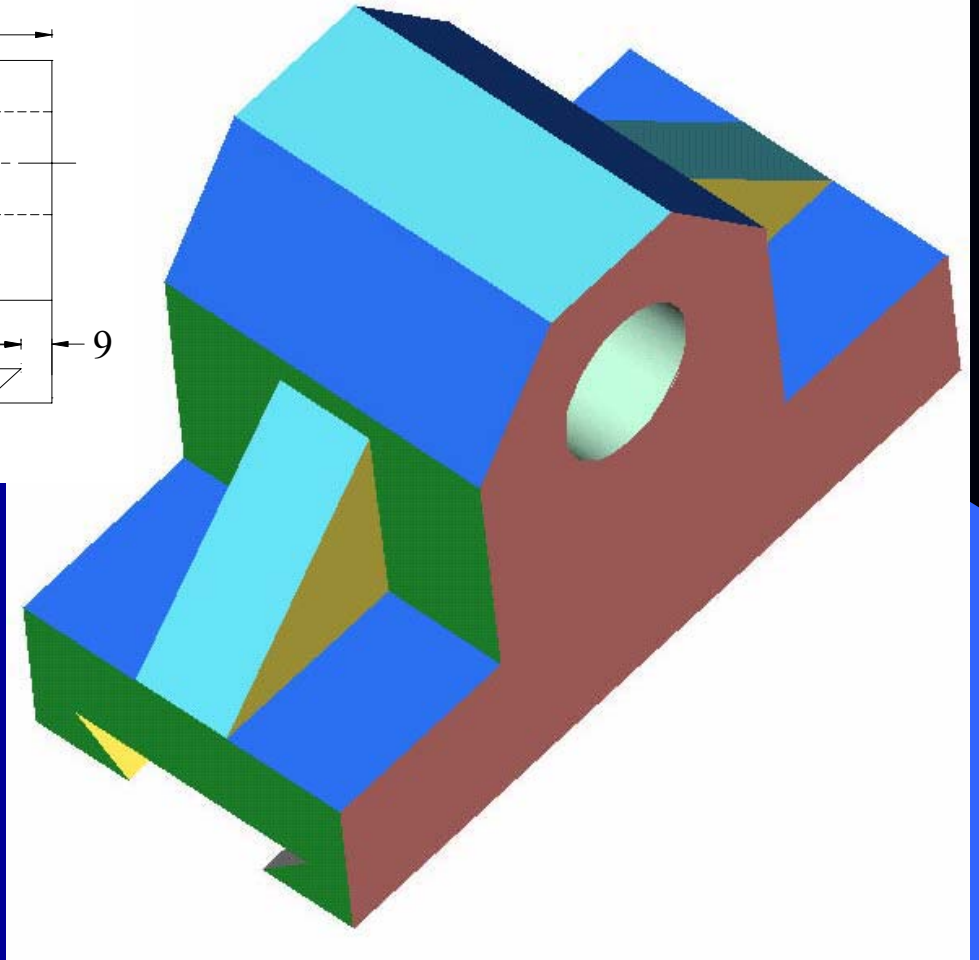
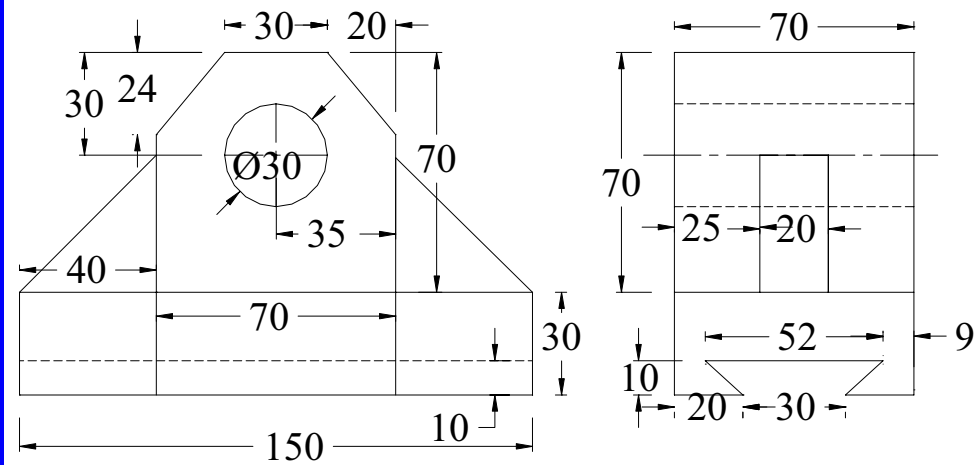
# Model - 77



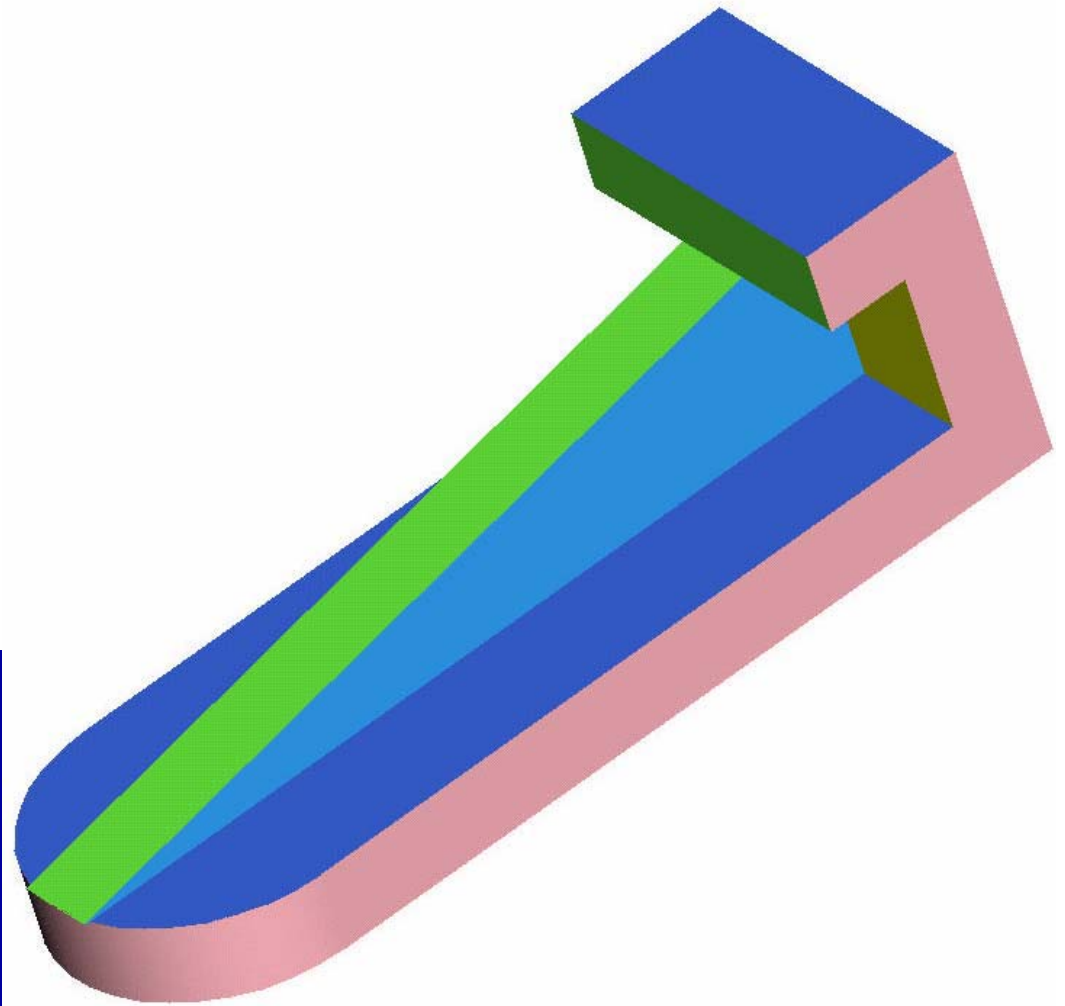
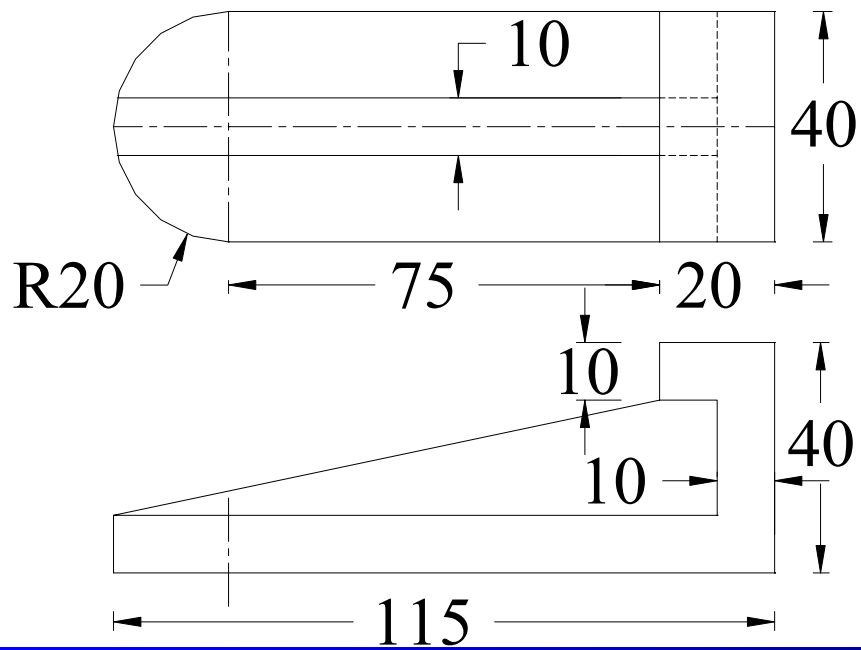
# Model - 78



# Model - 79

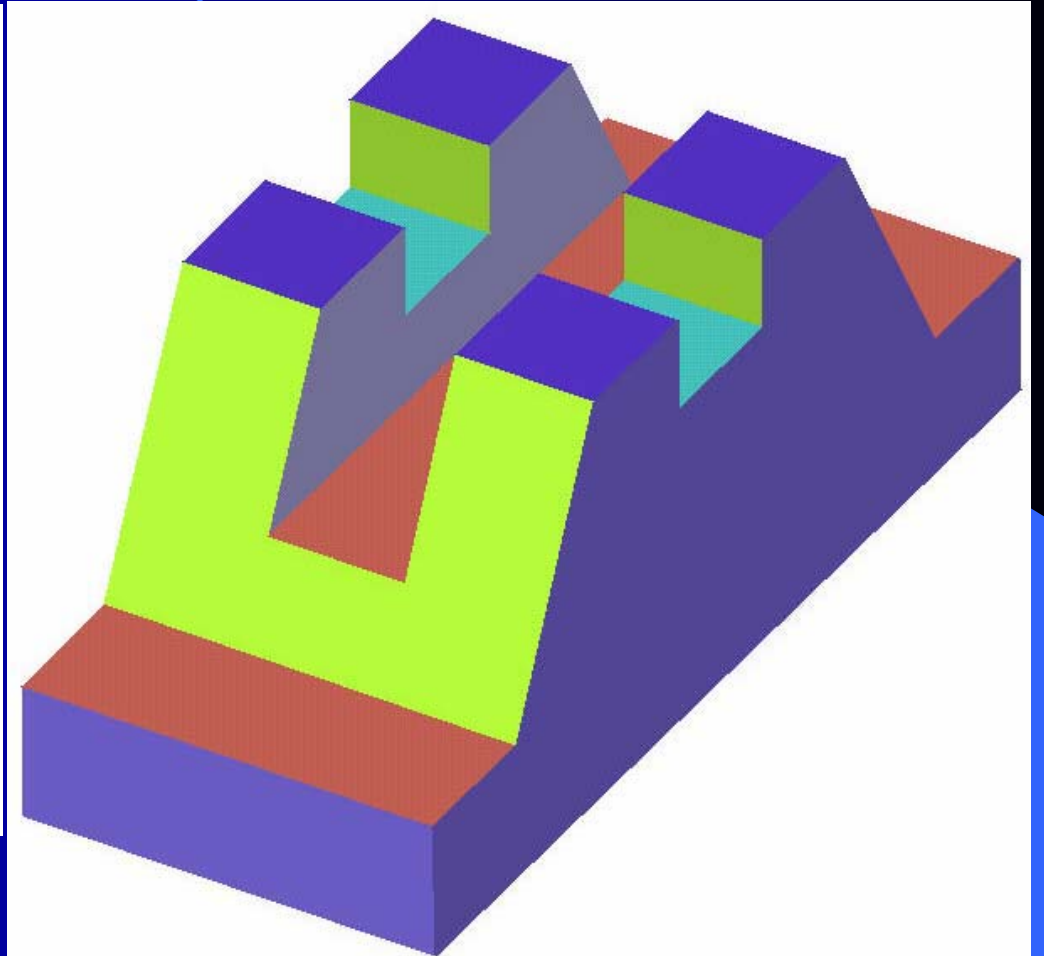
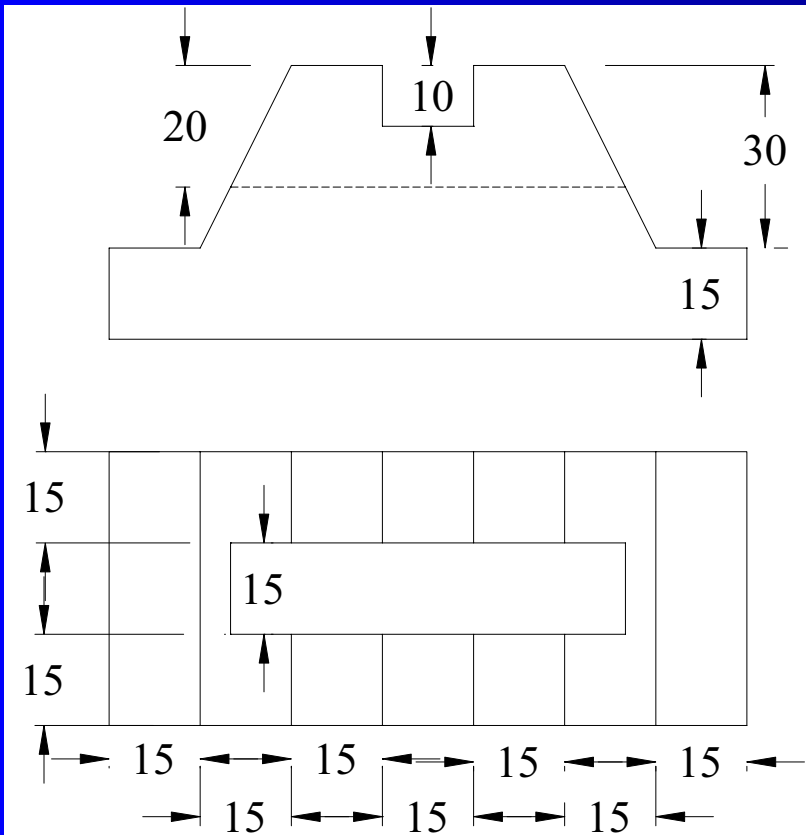


# Model - 80



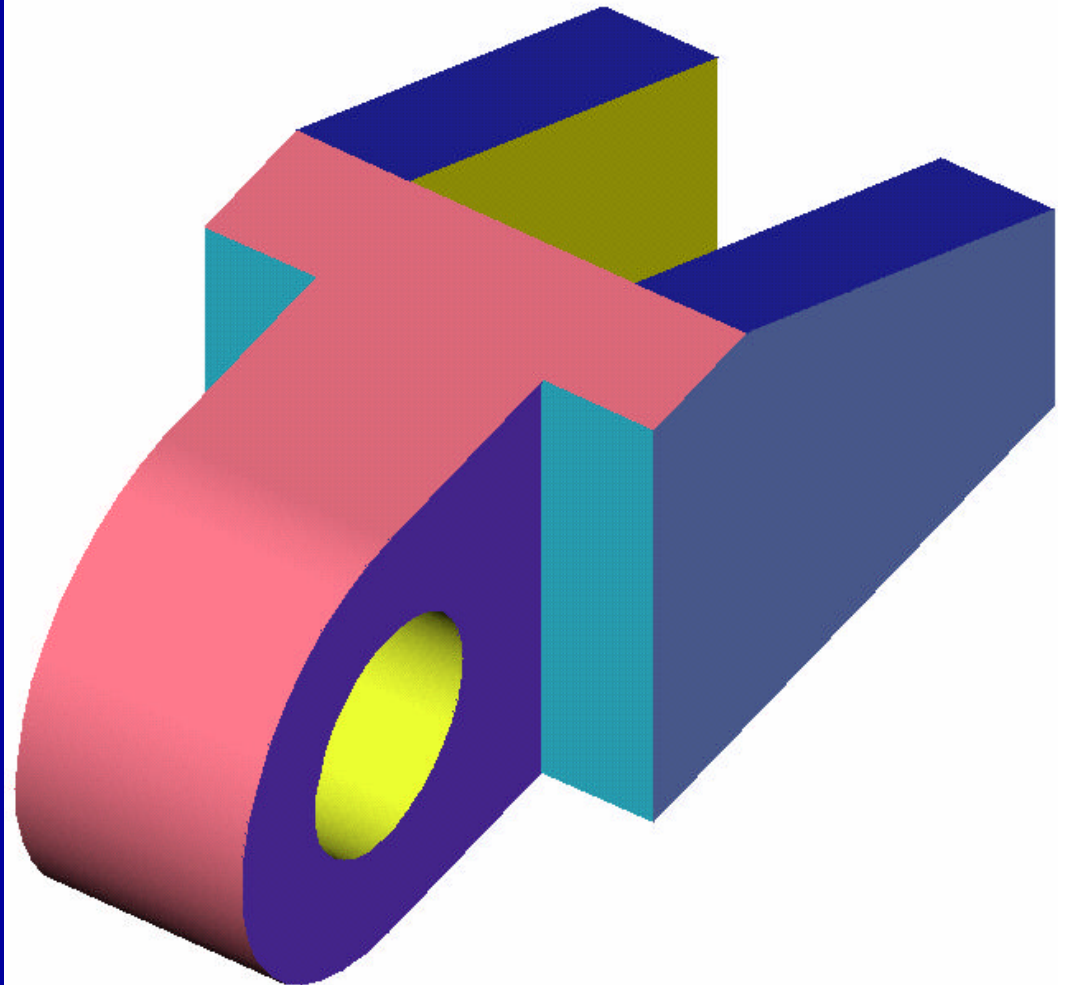
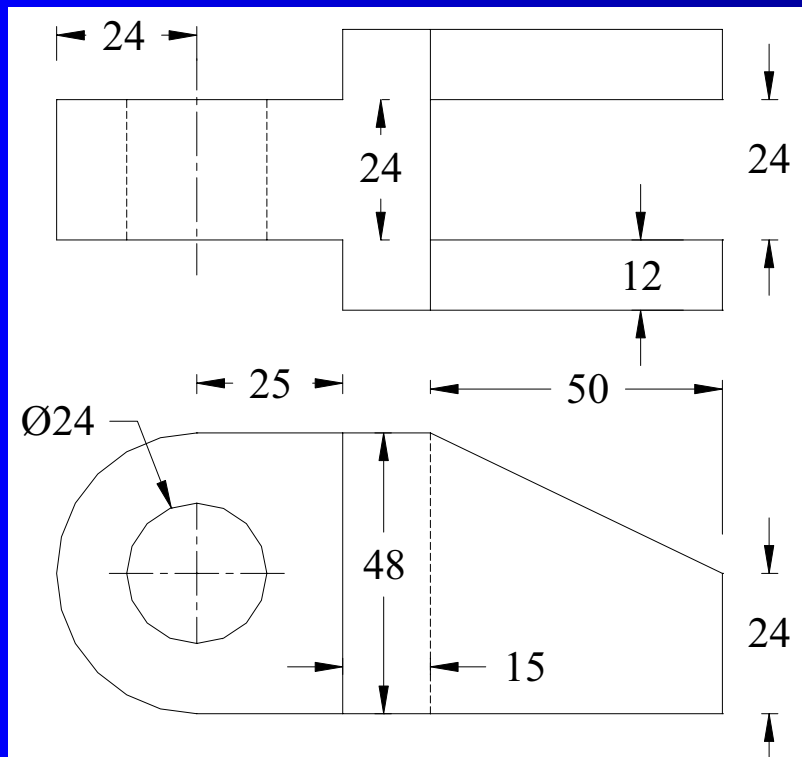


# Model - 81

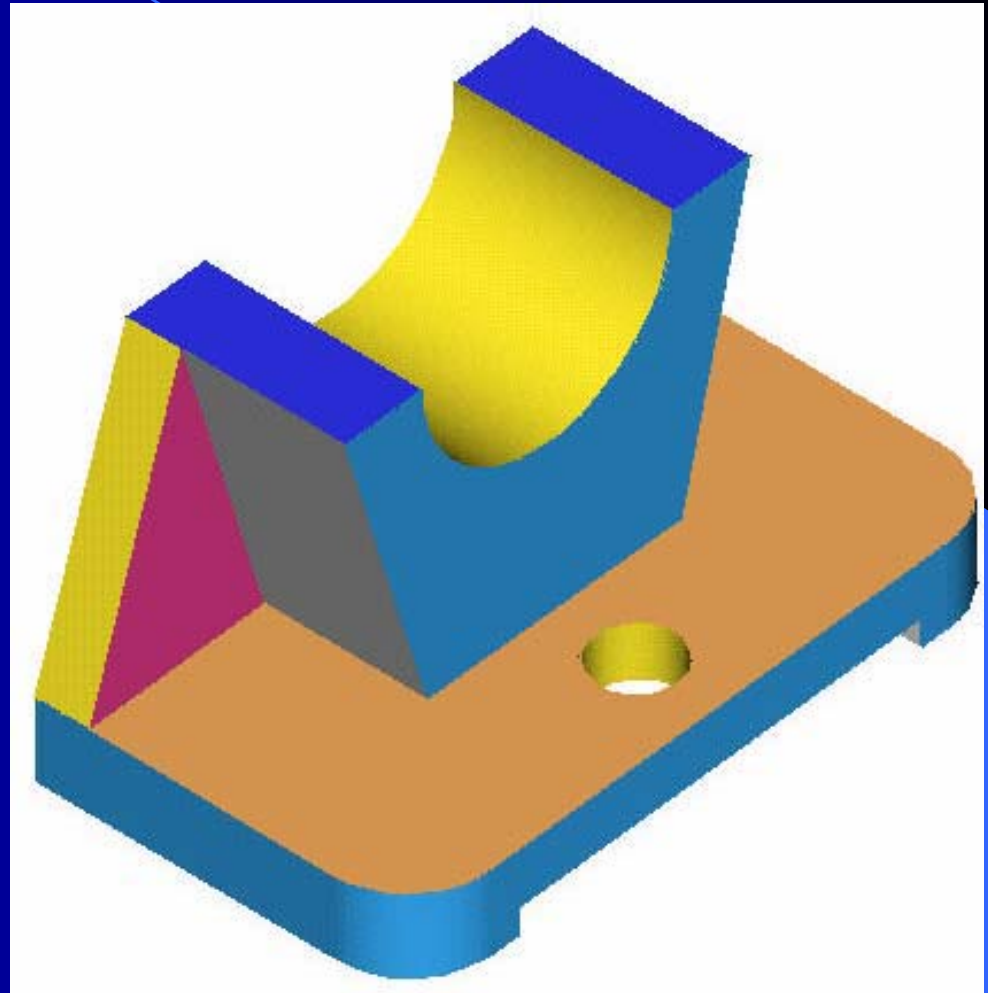
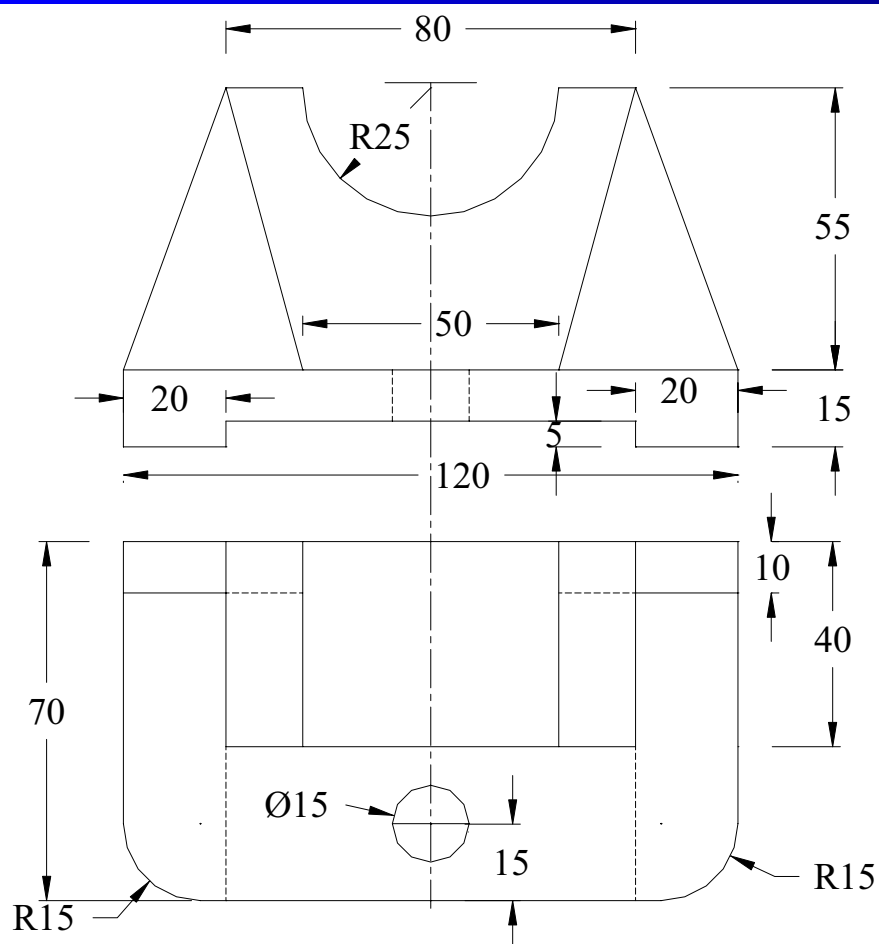




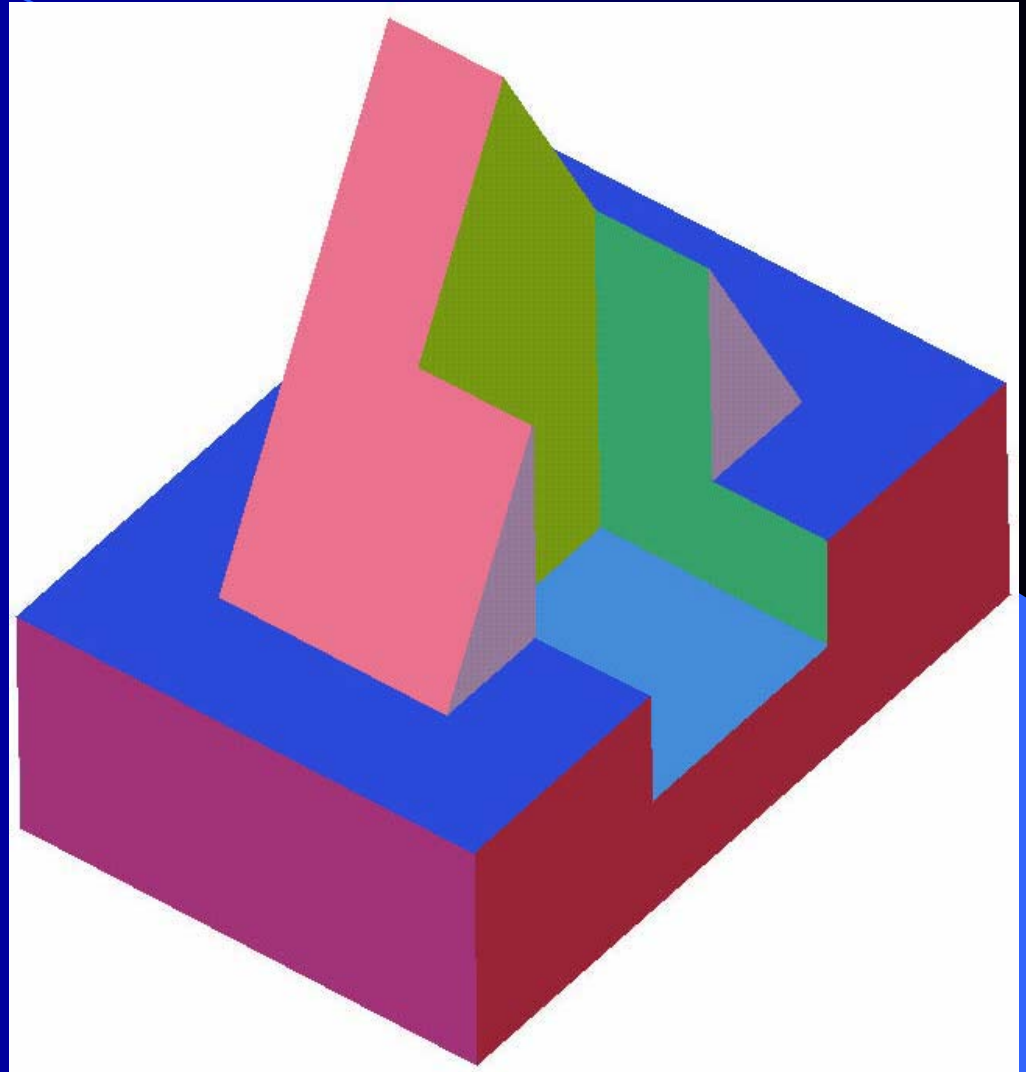
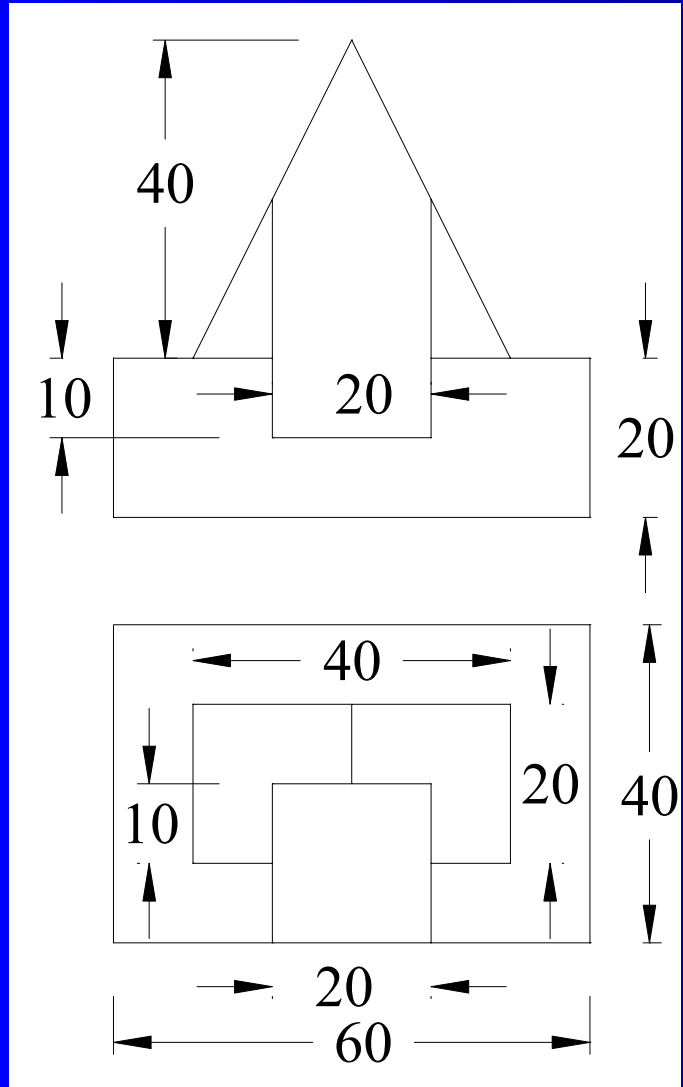
# Model - 82



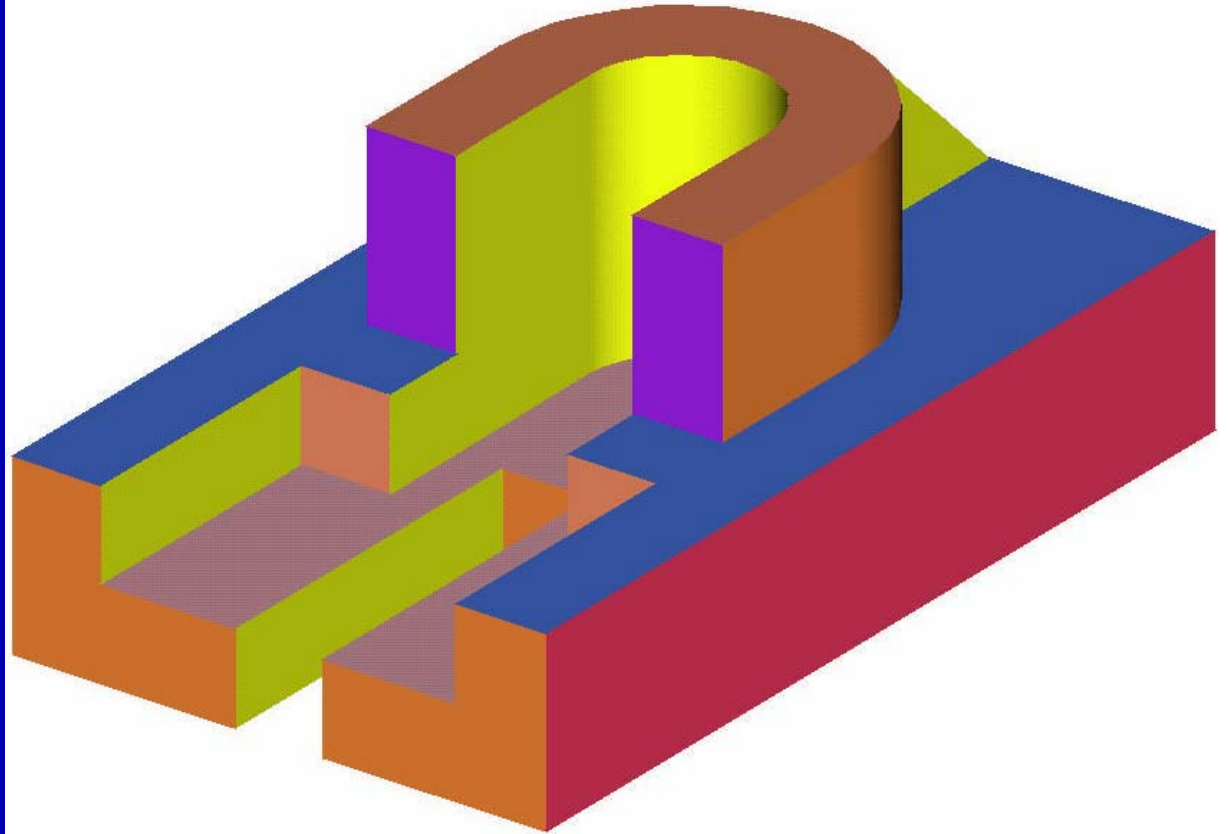
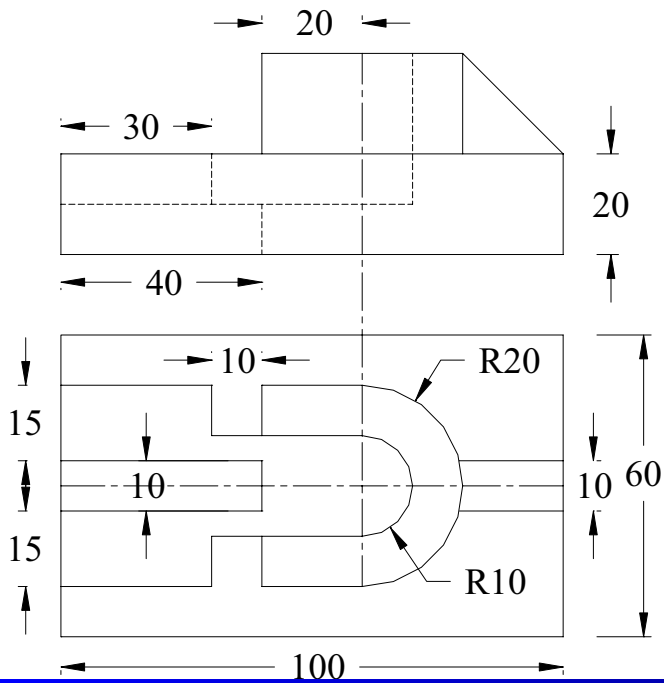
# Model - 83



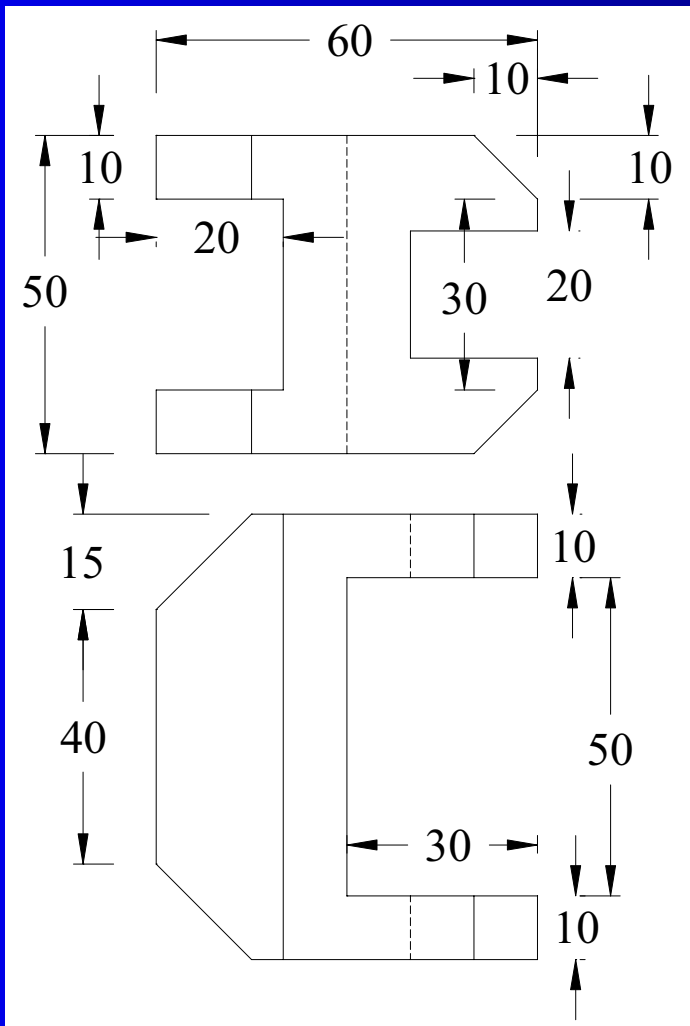
# Model - 84



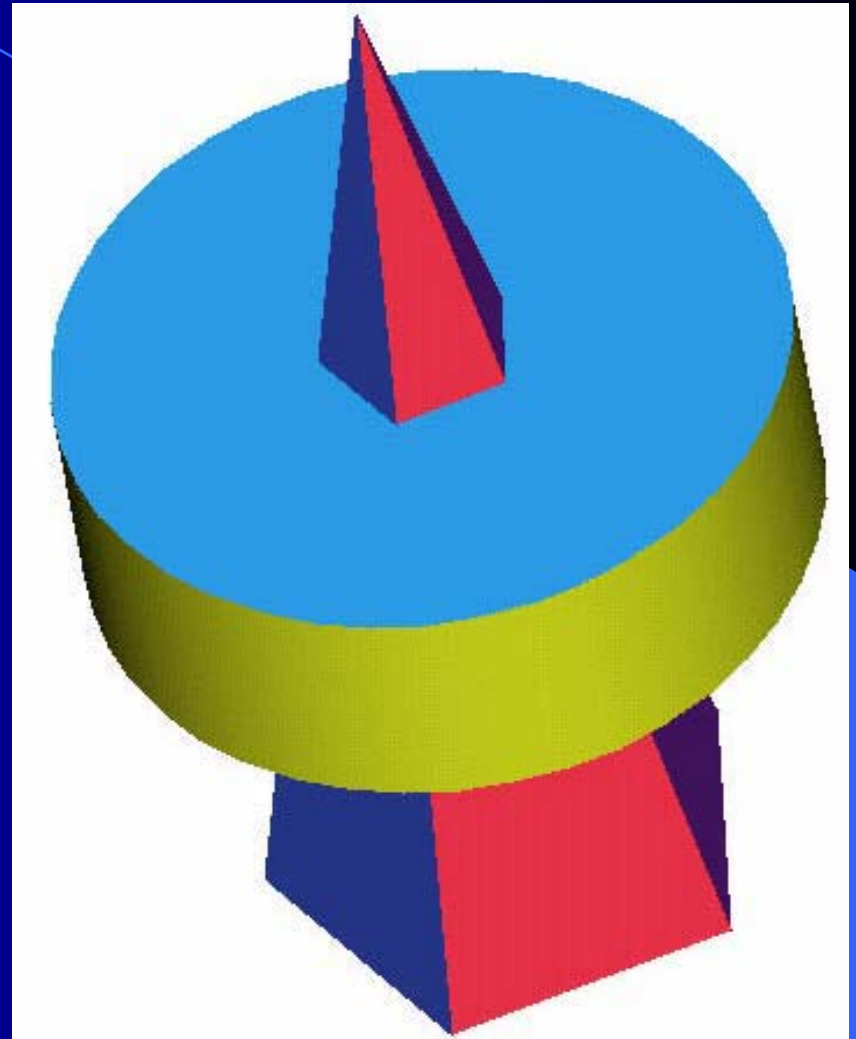
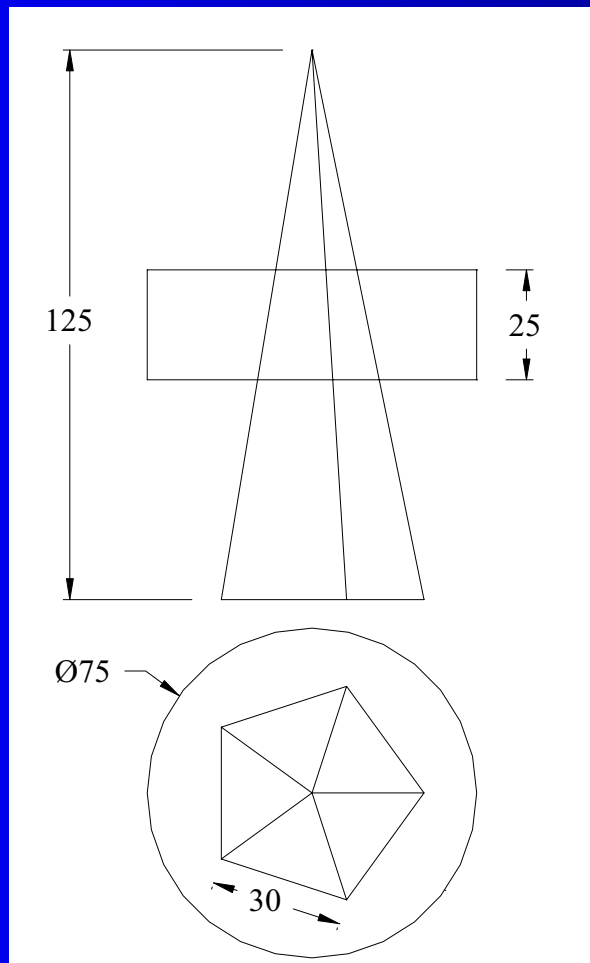
# Model - 85



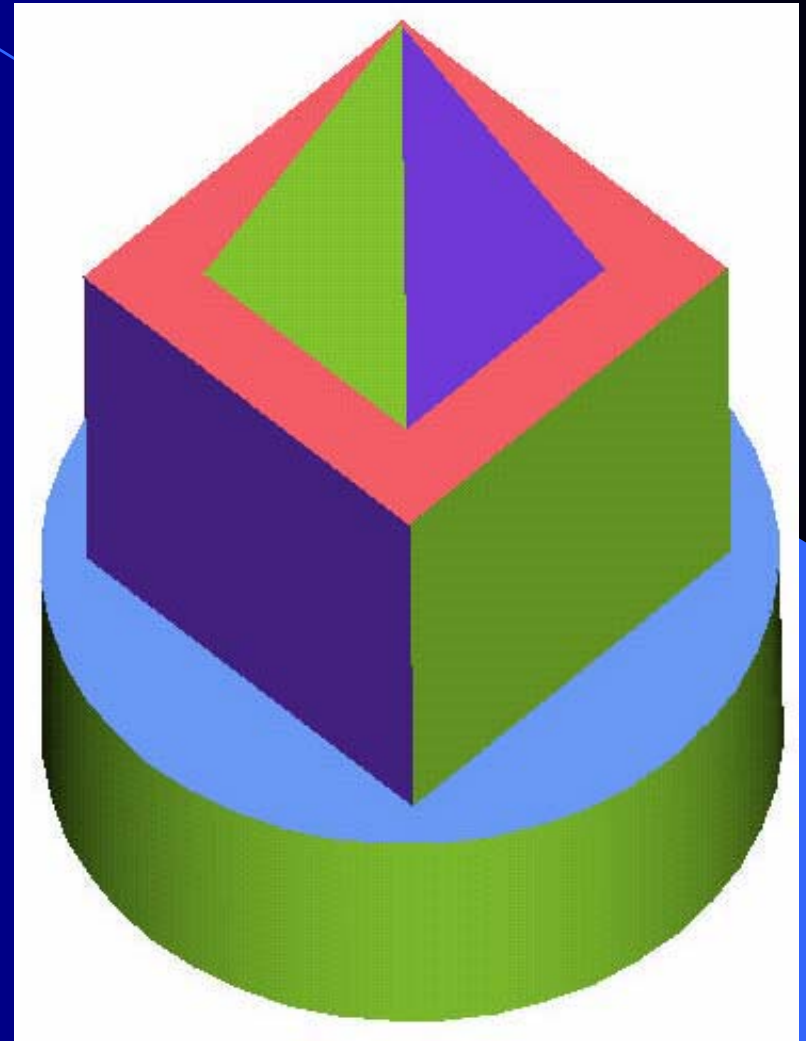
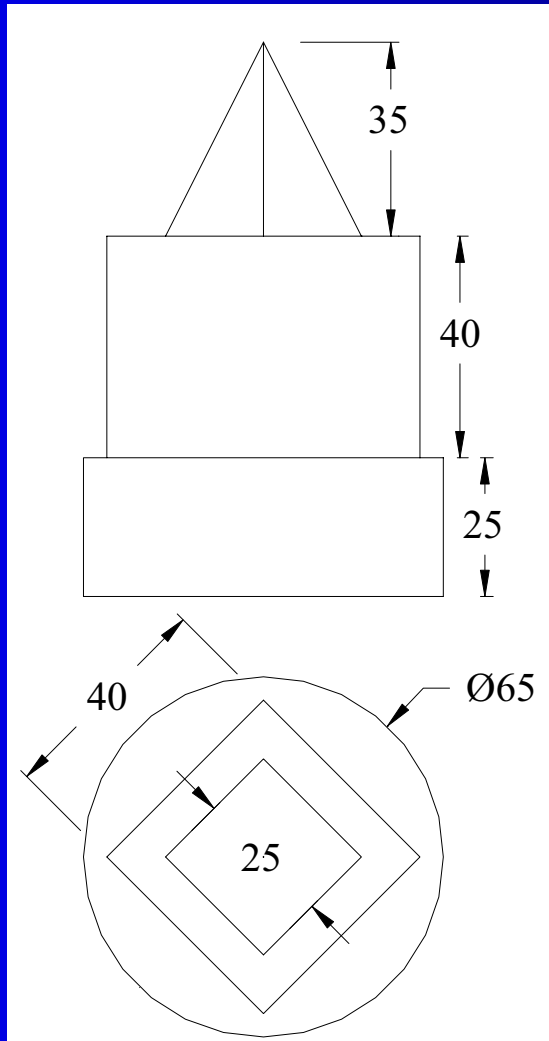
# Model - 86



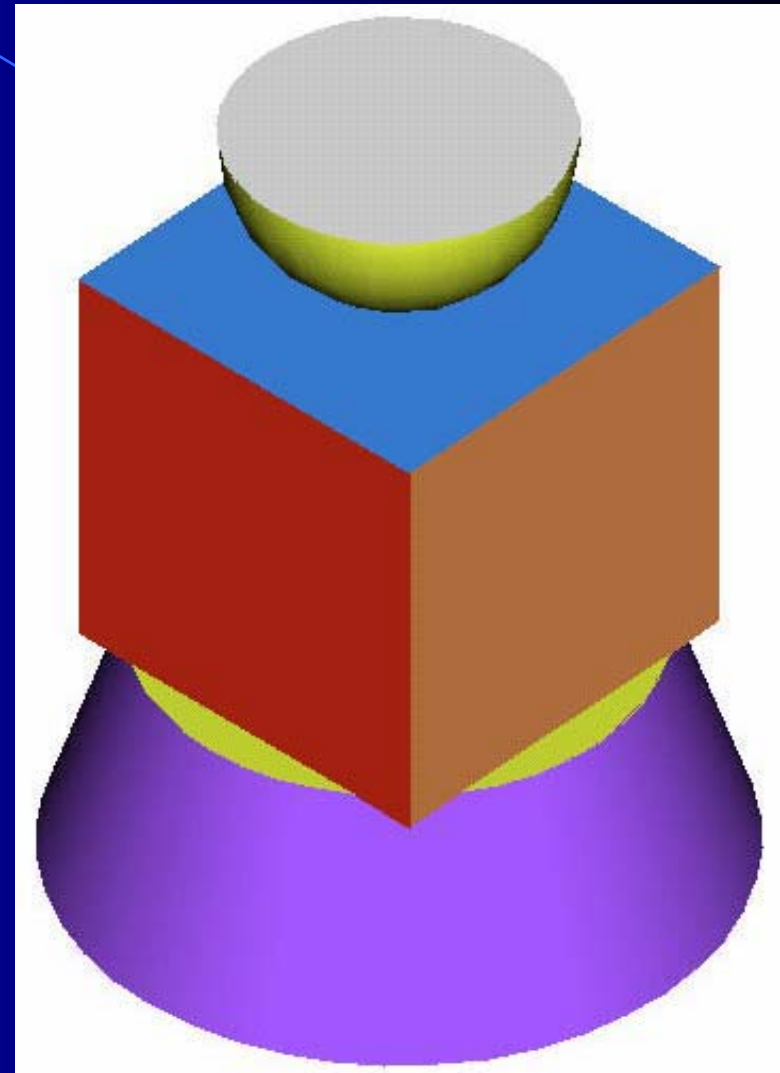
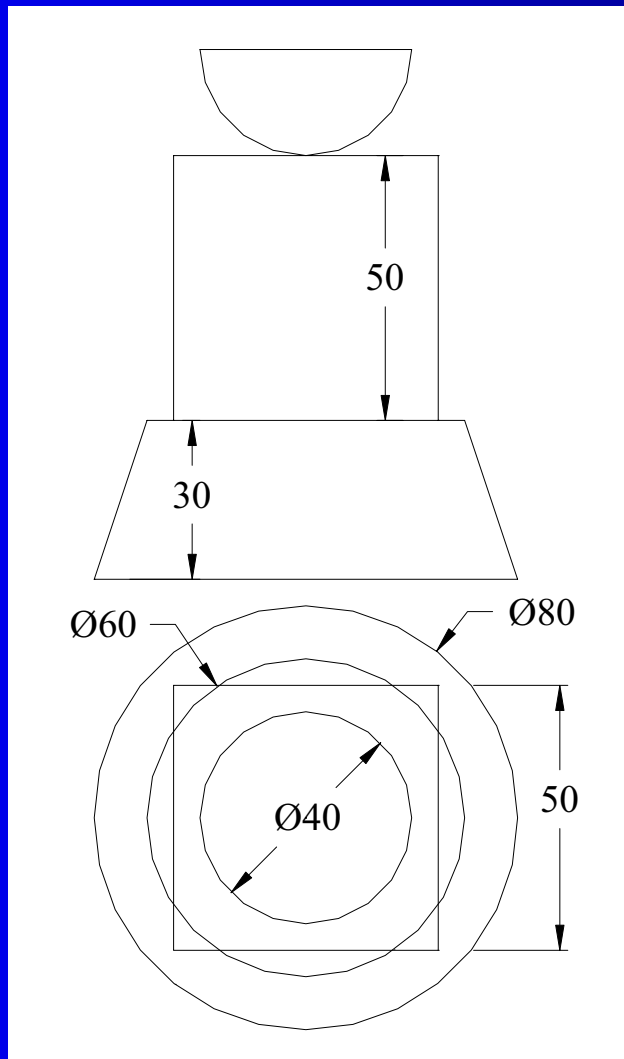
# Model - 87



# Model - 88

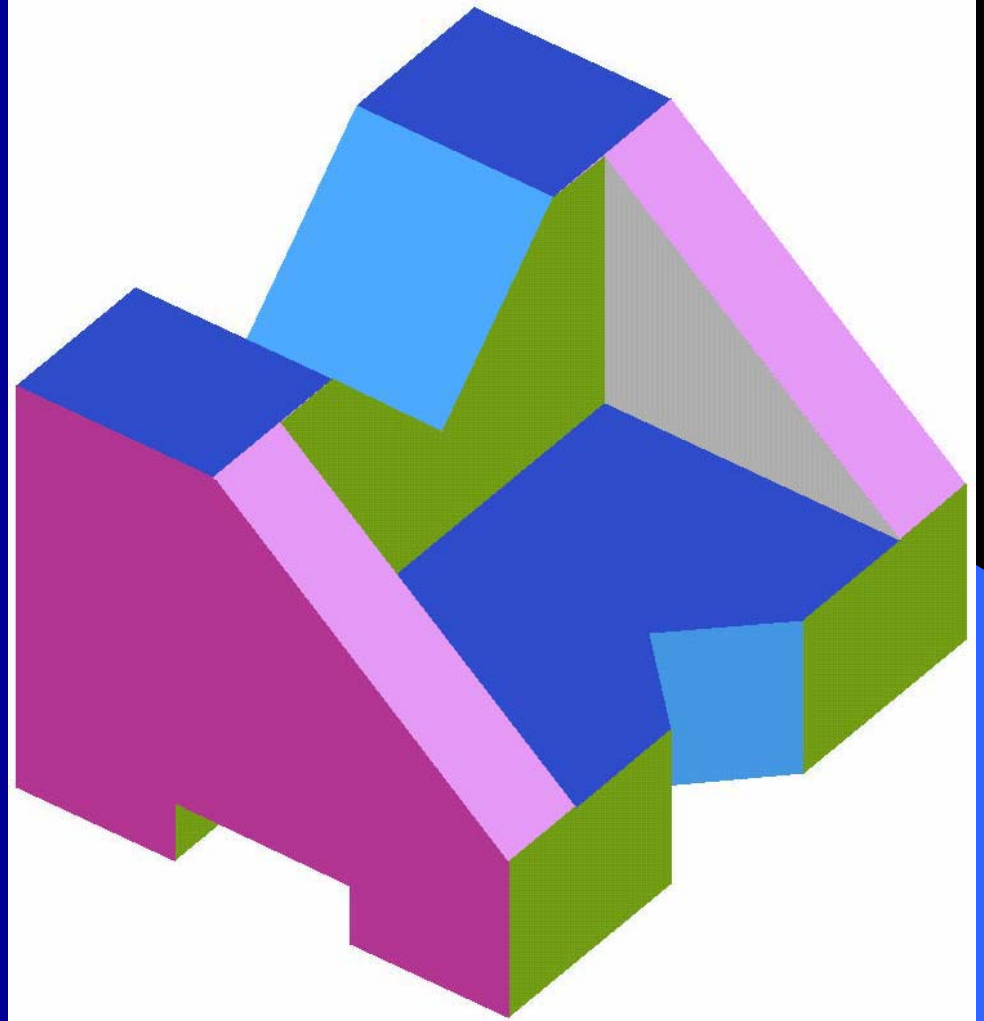
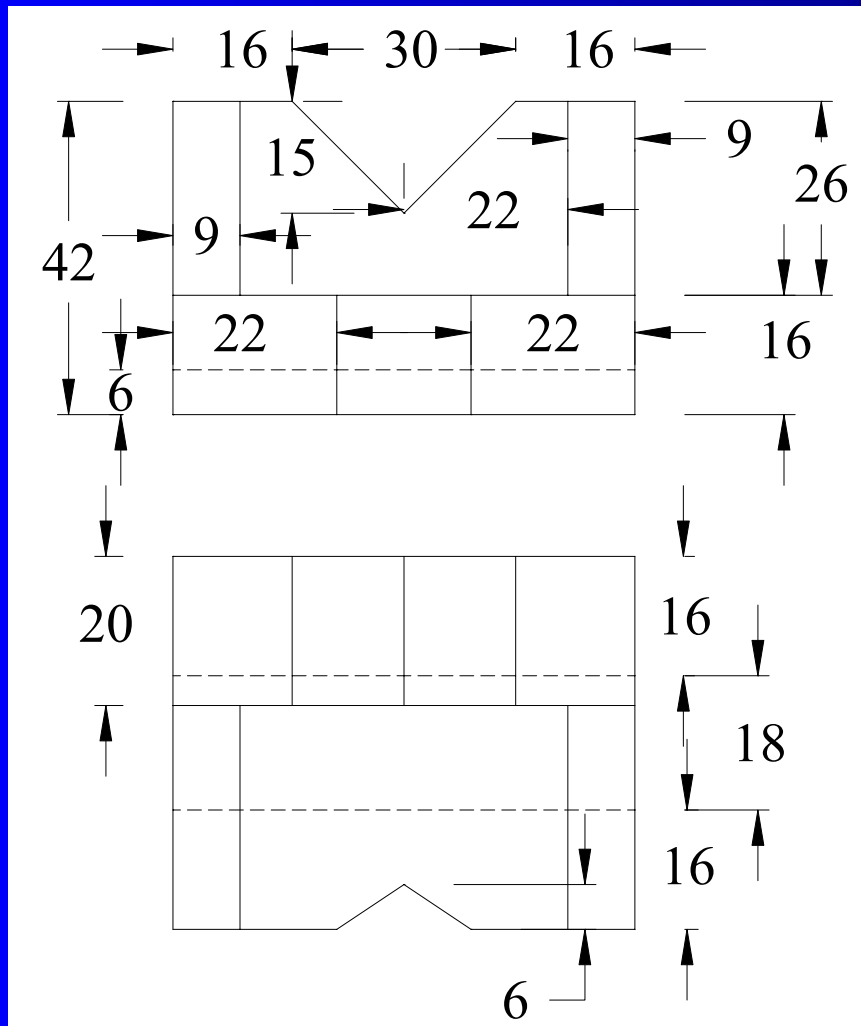


# Model - 89

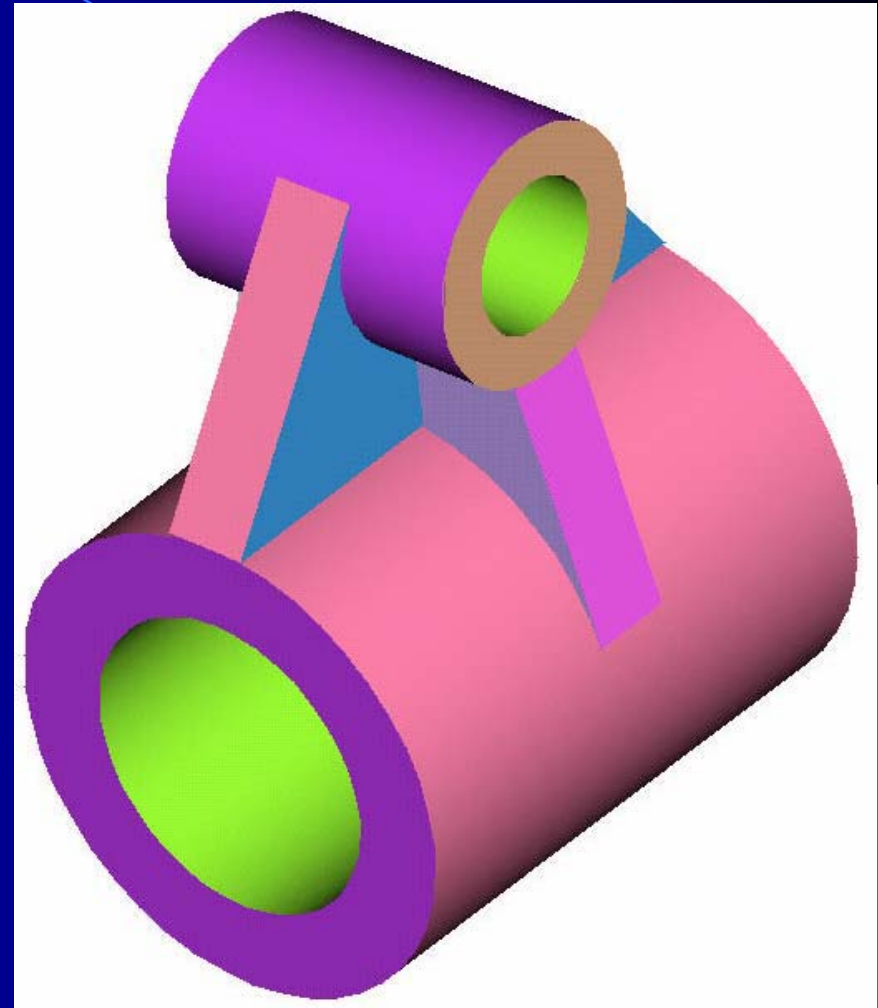
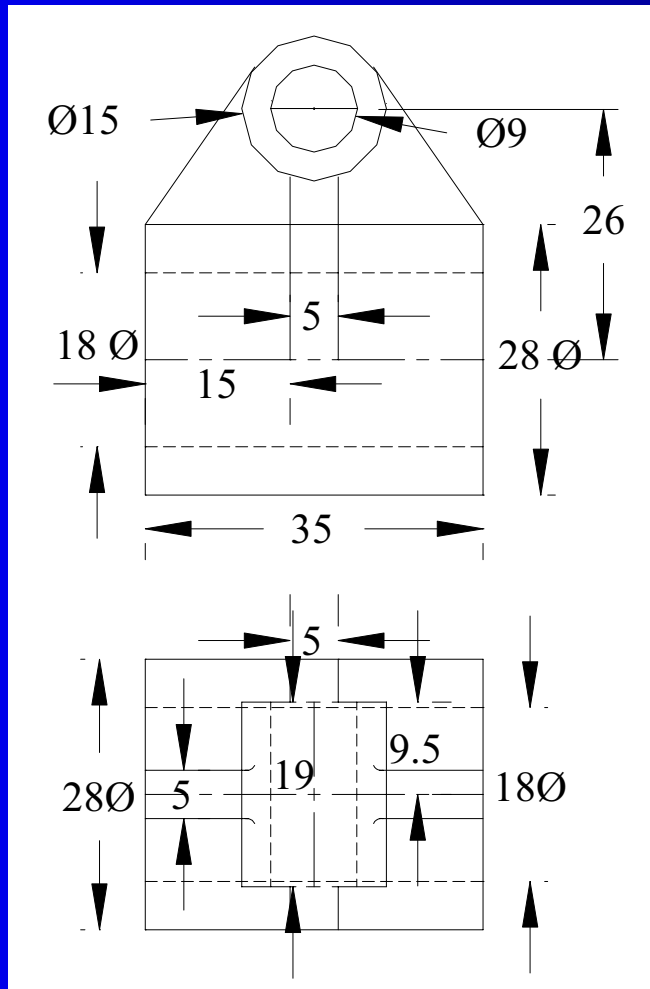




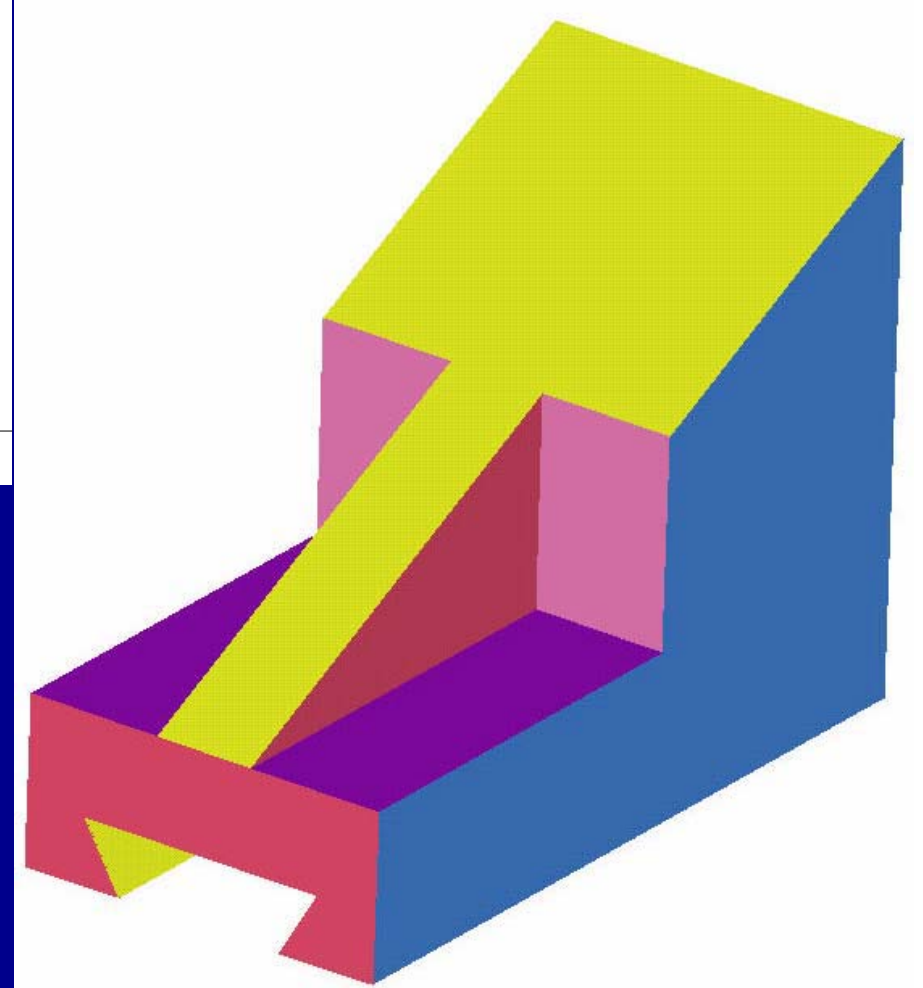
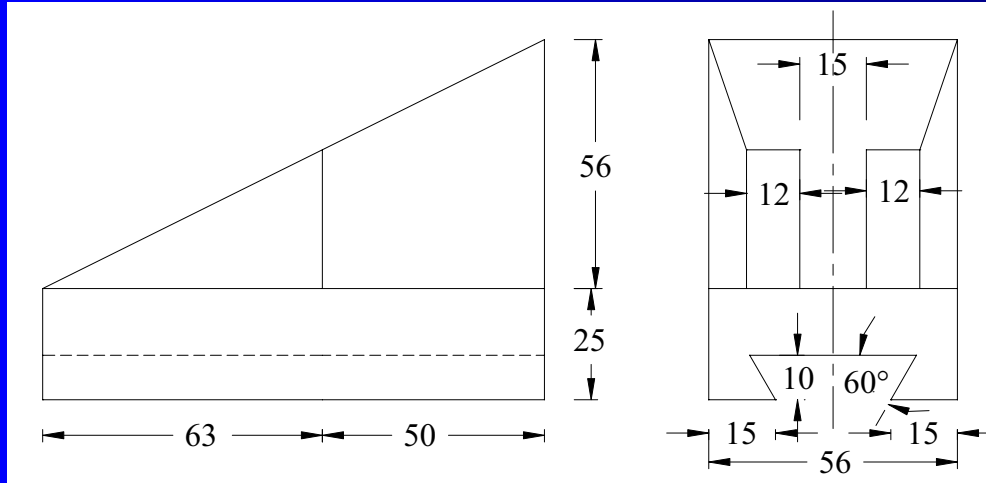
# Model - 90



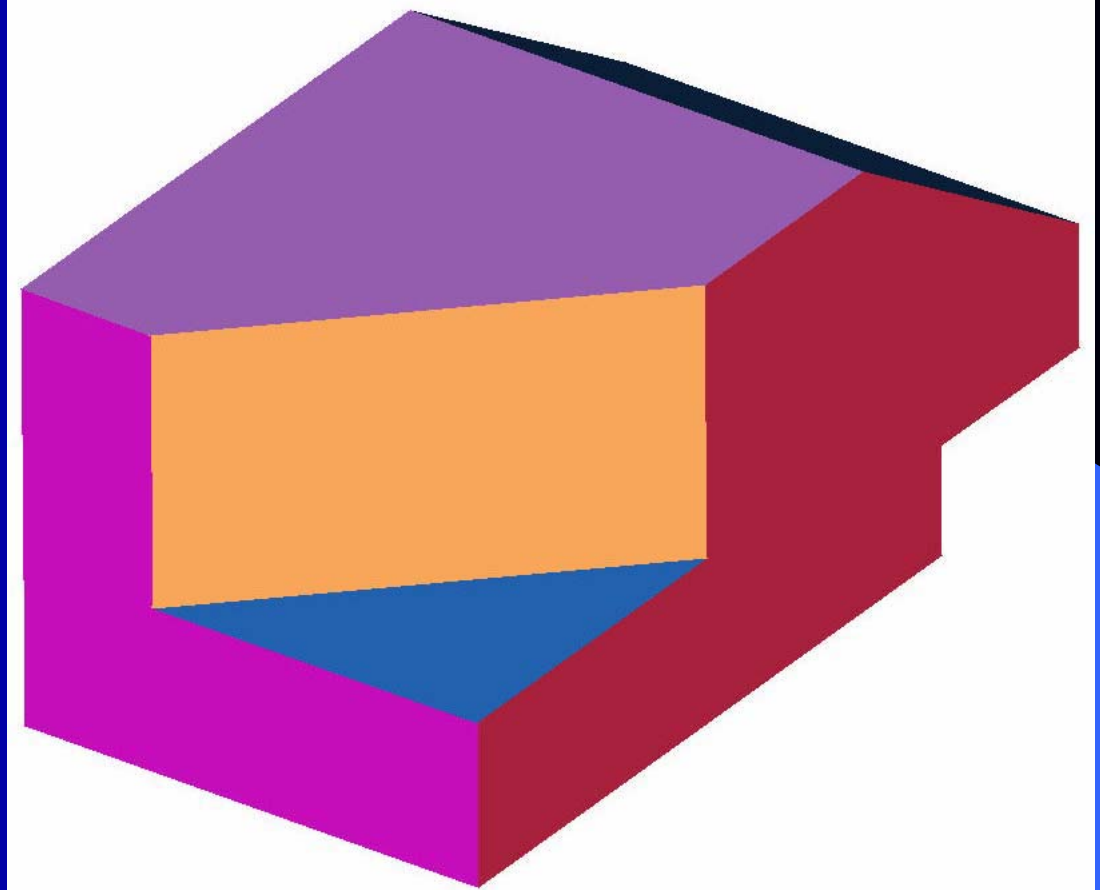
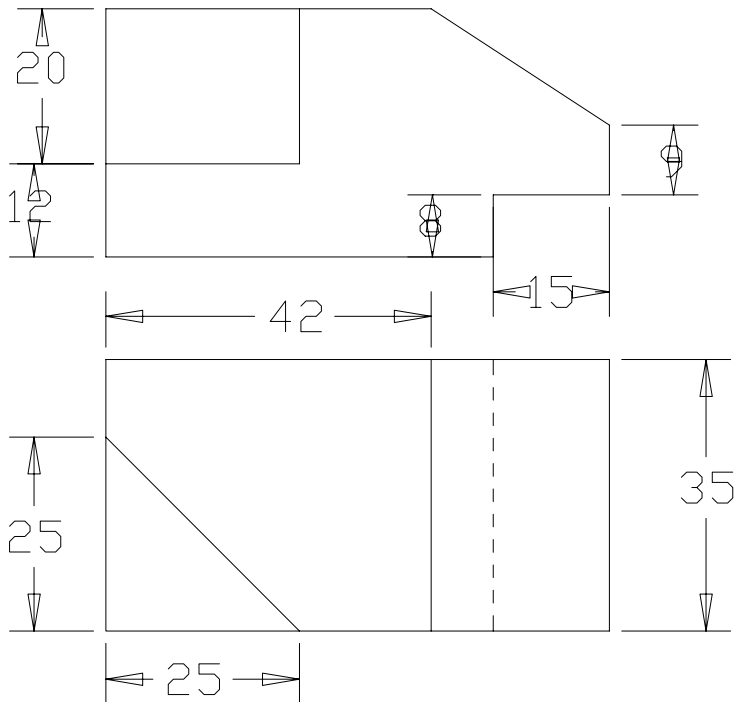
# Model – 91



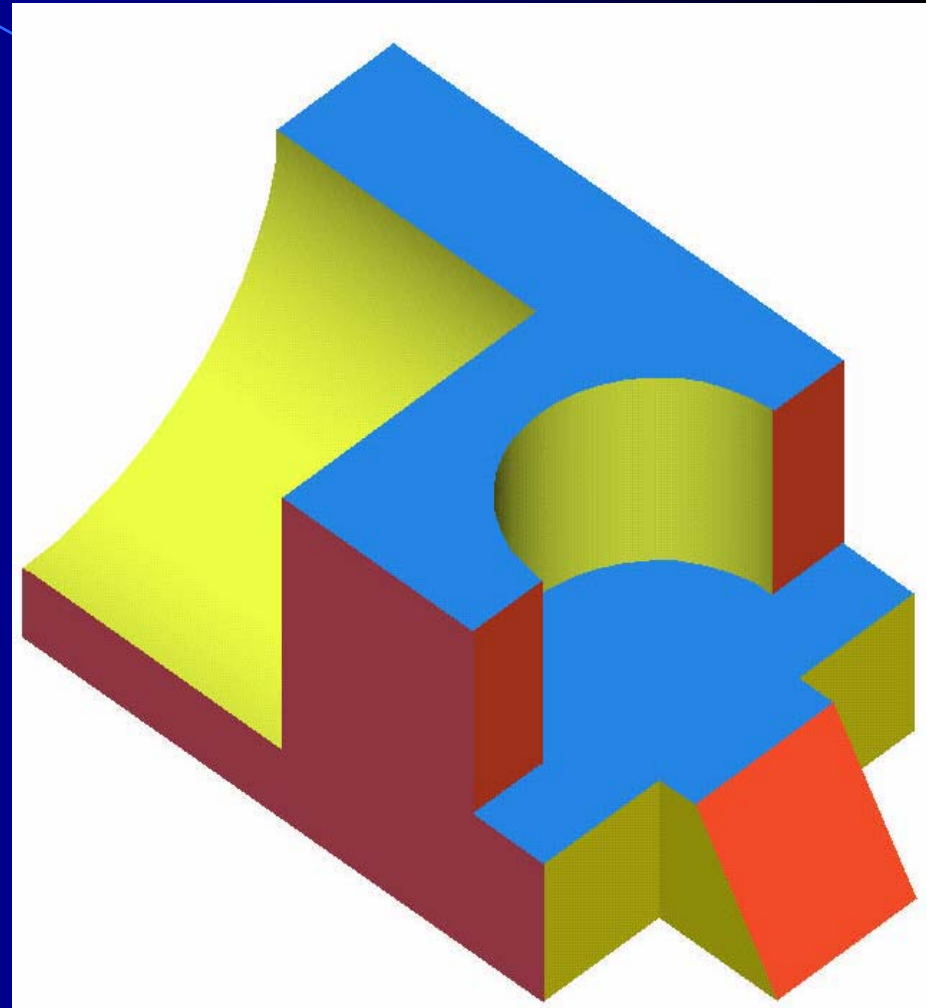
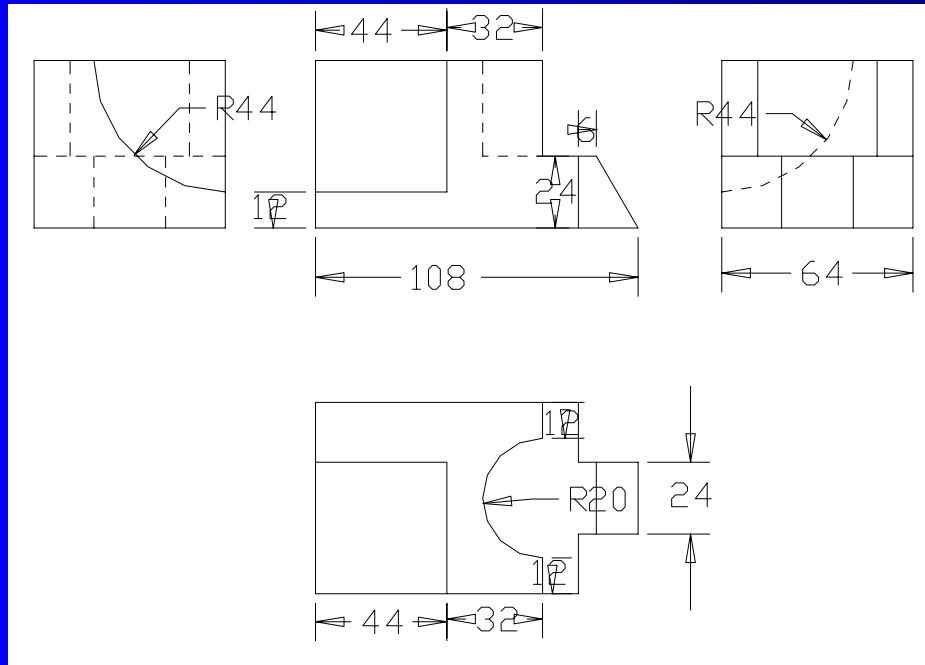
# Model – 92



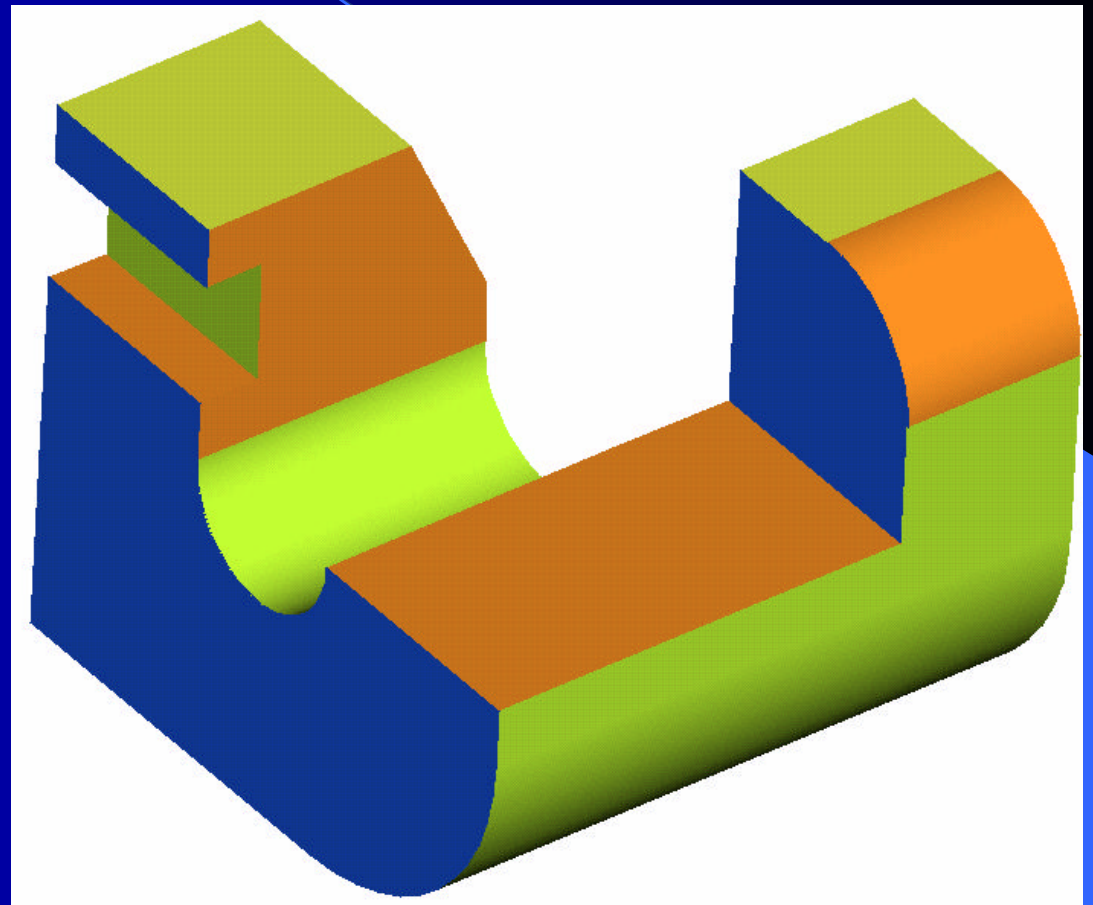
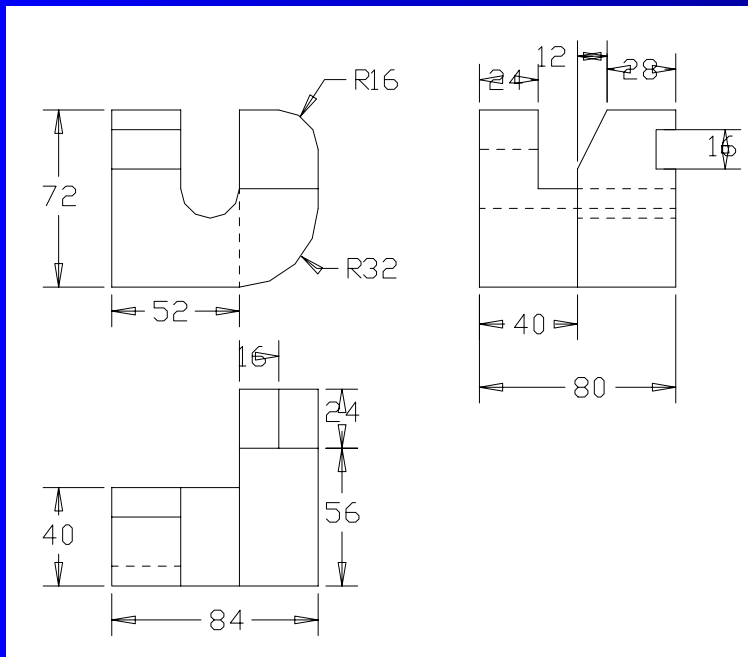
# Model – 93



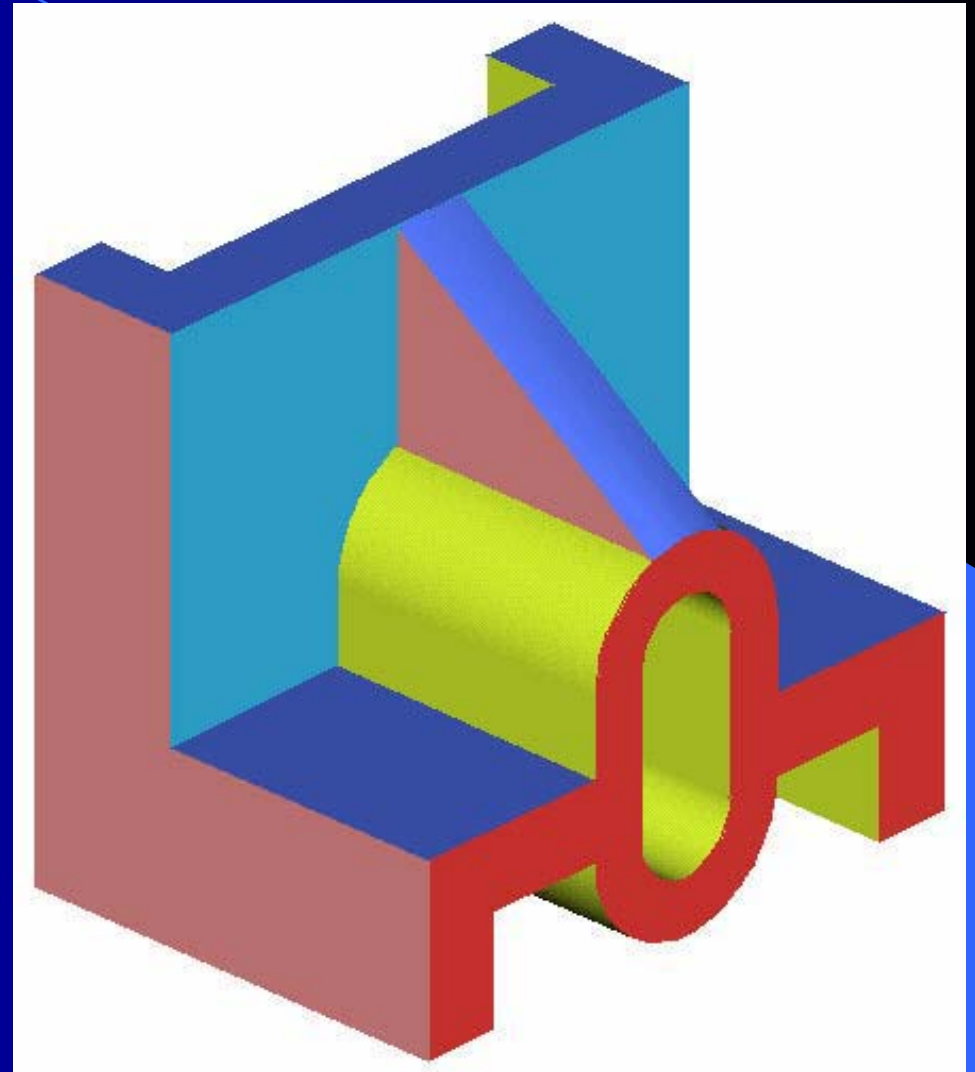
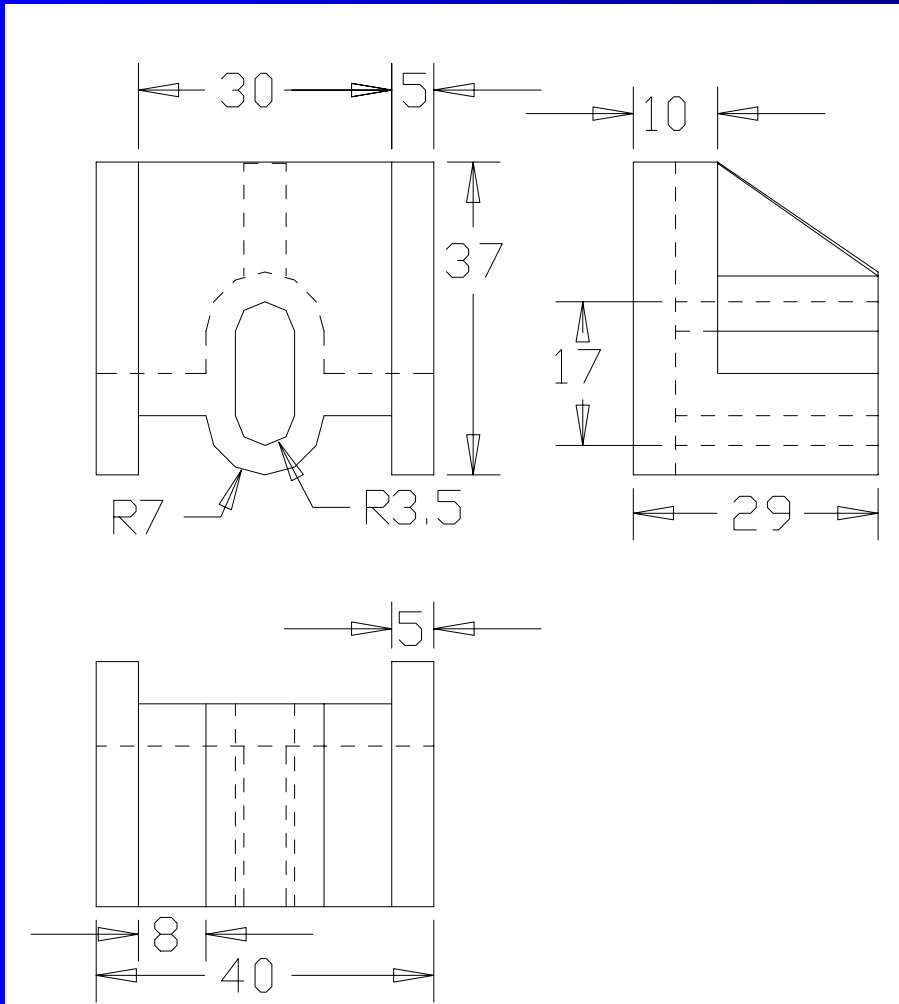
# Model – 94



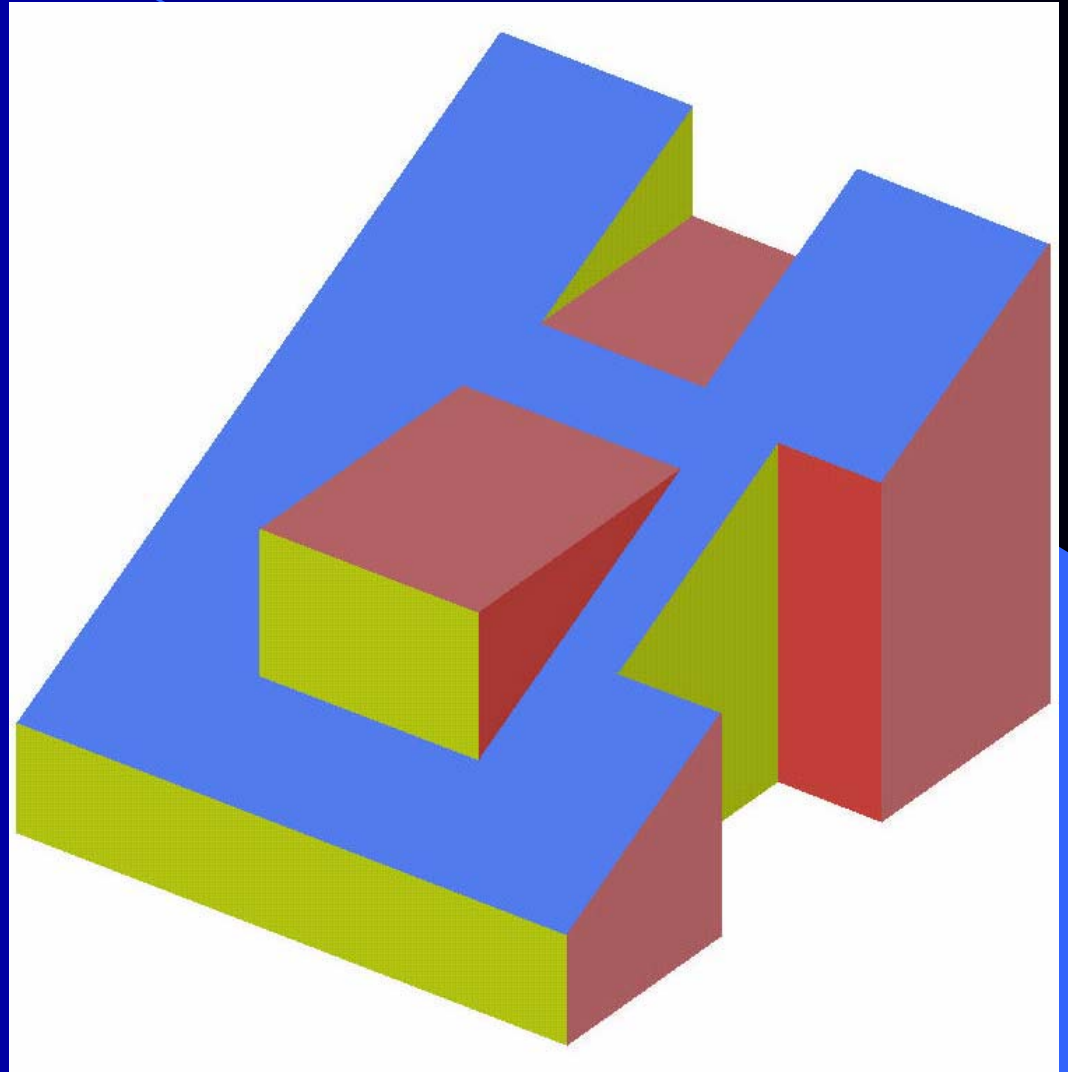
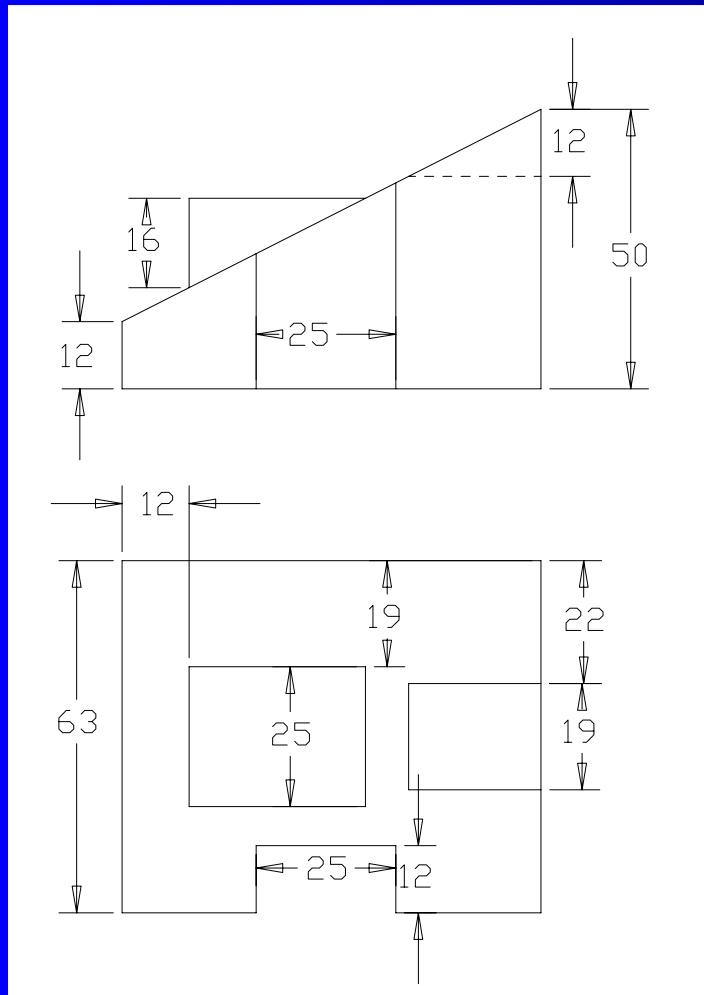
# Model – 95



# Model – 96

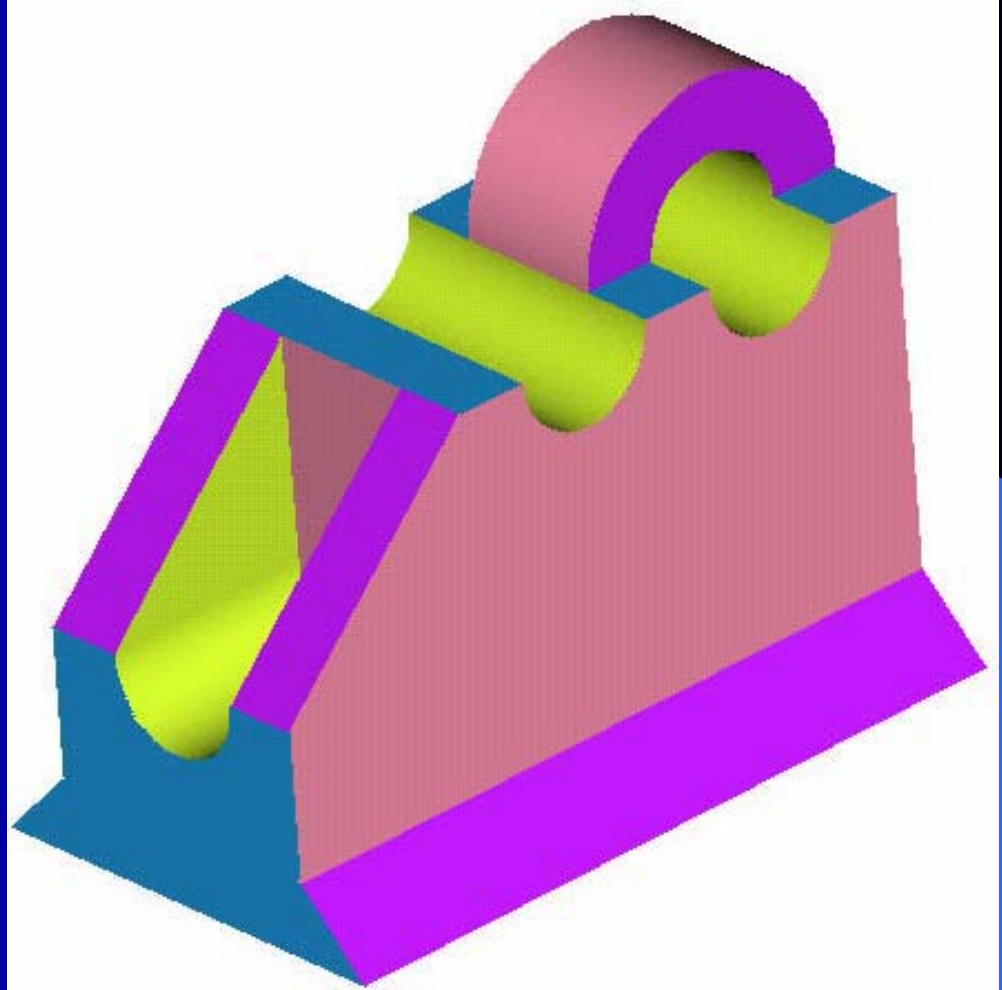
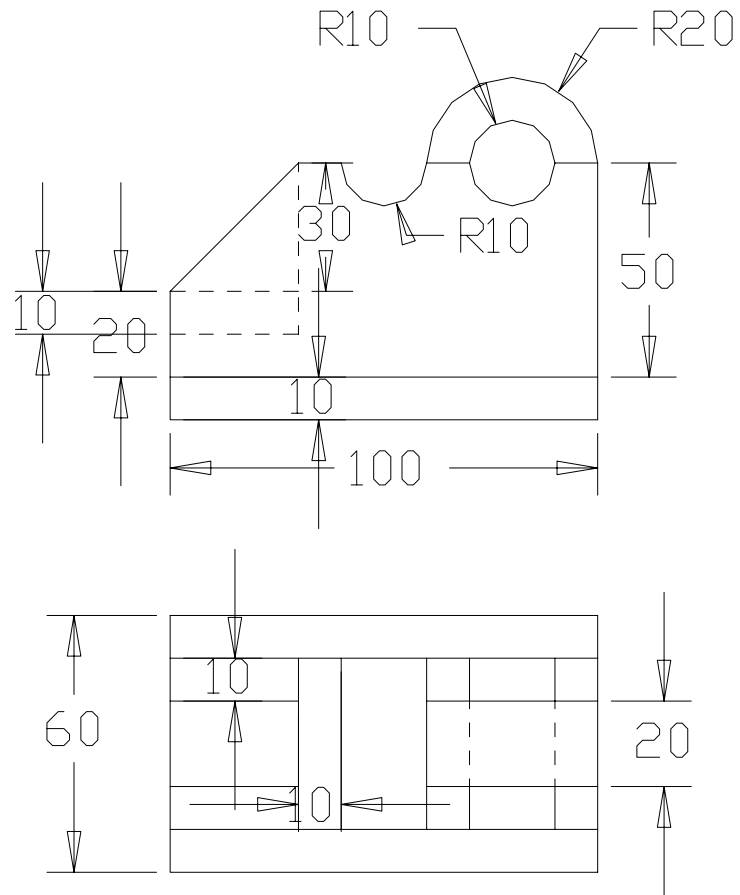


# Model – 97

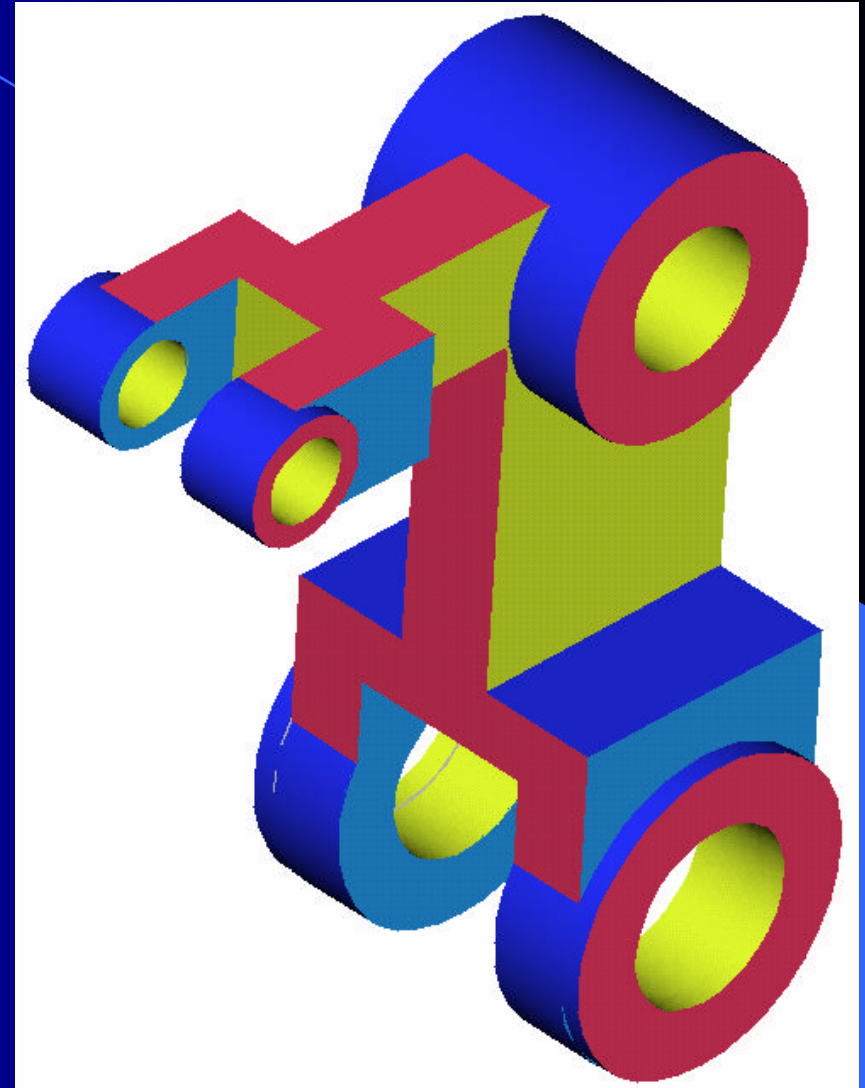




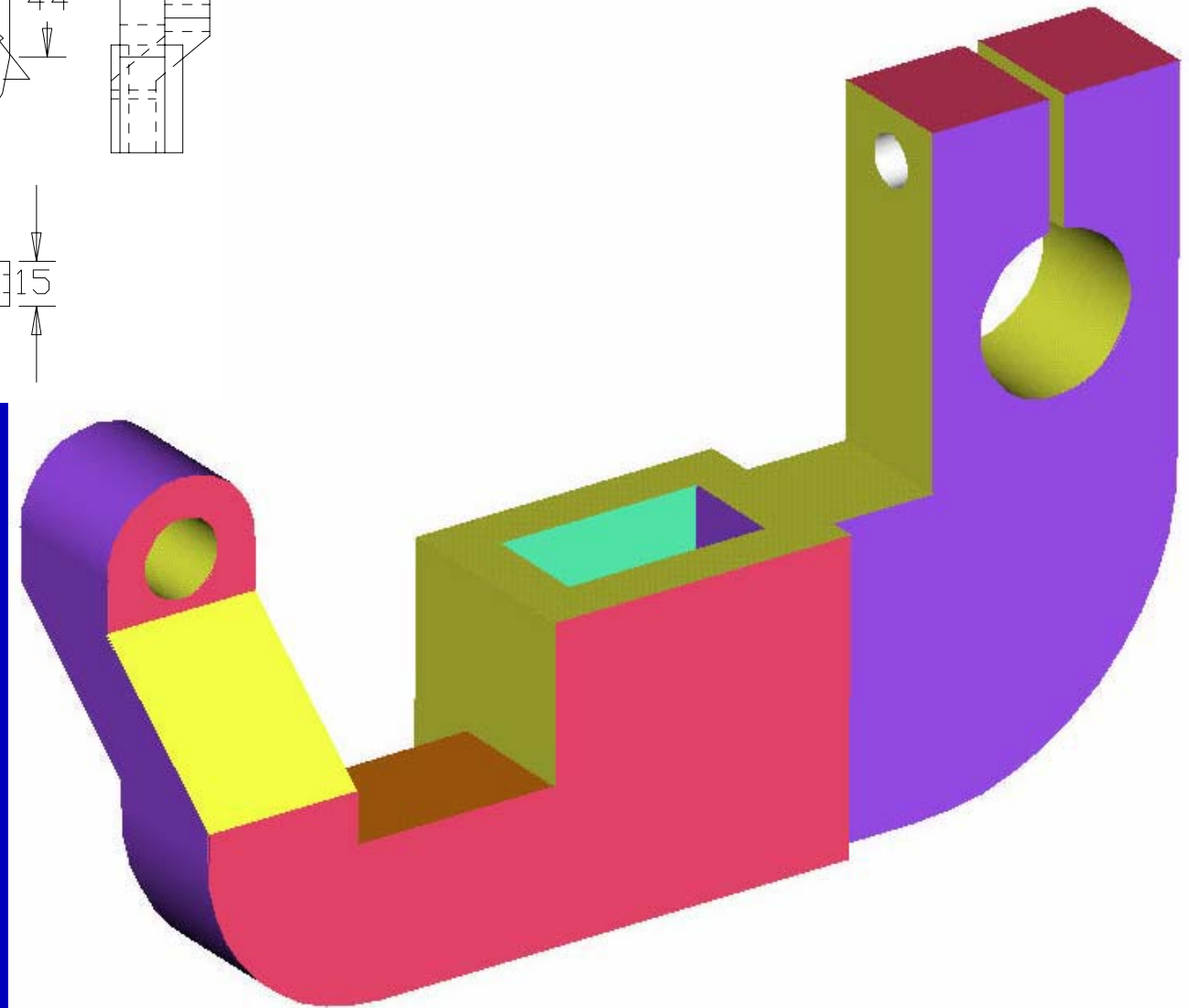
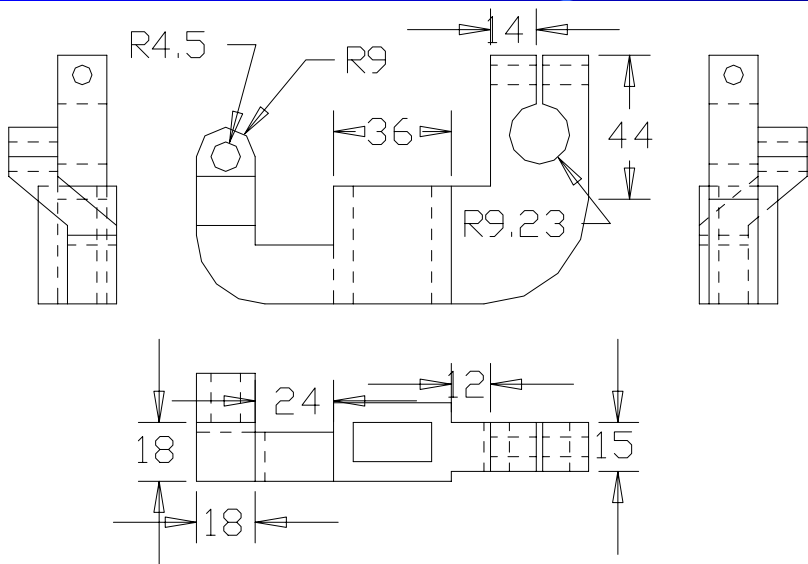
# Model – 98



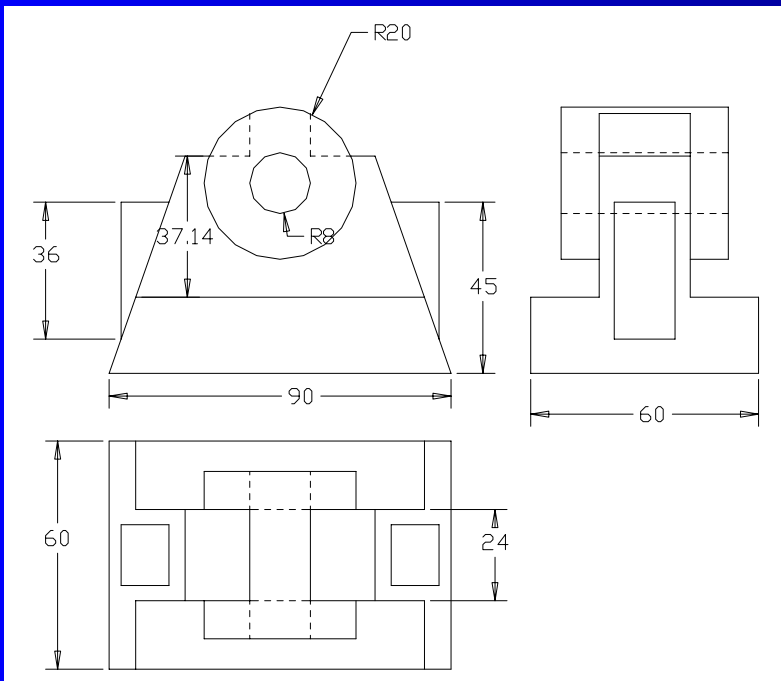
# Model – 99



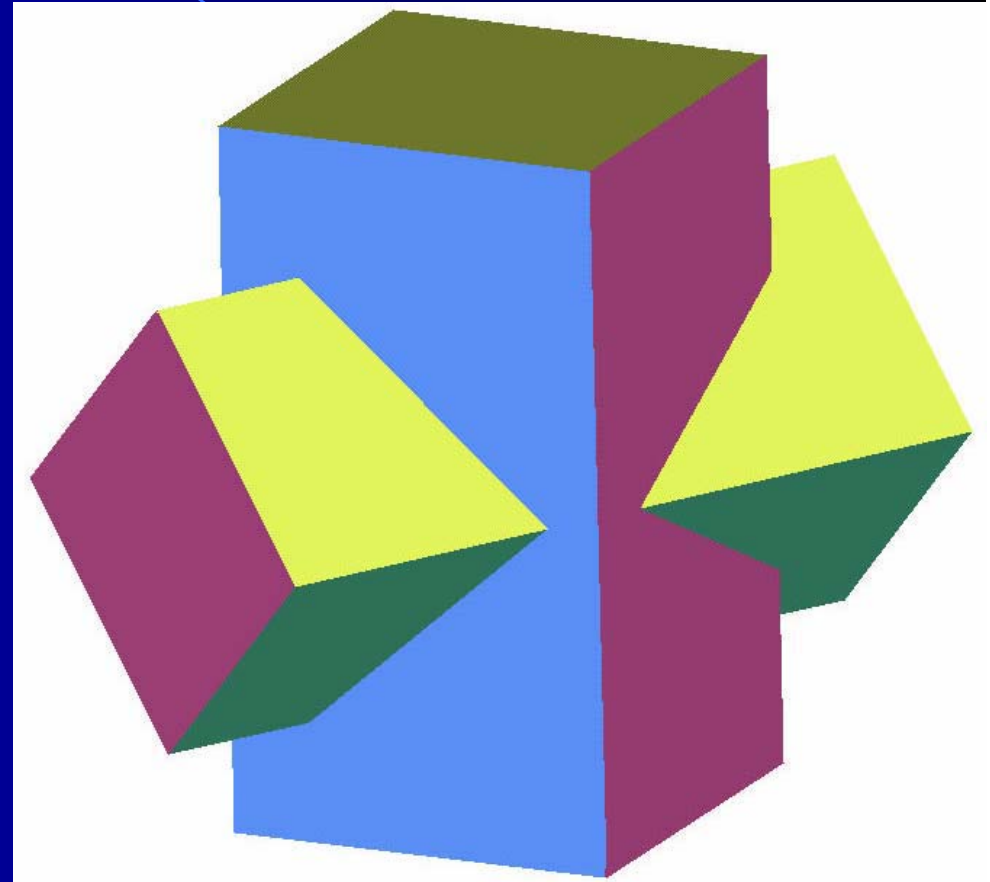
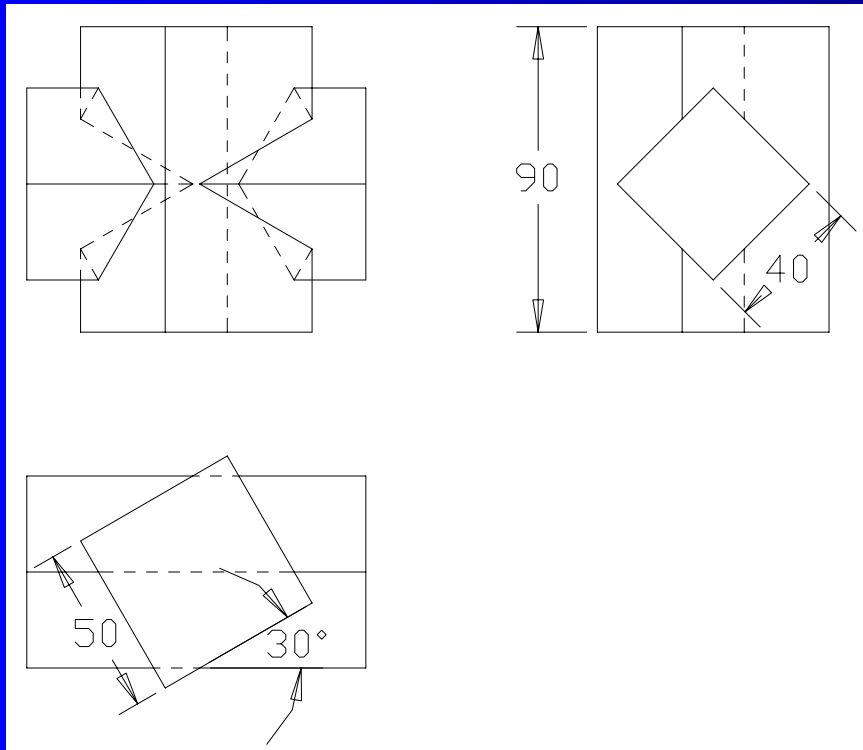
# Model – 100



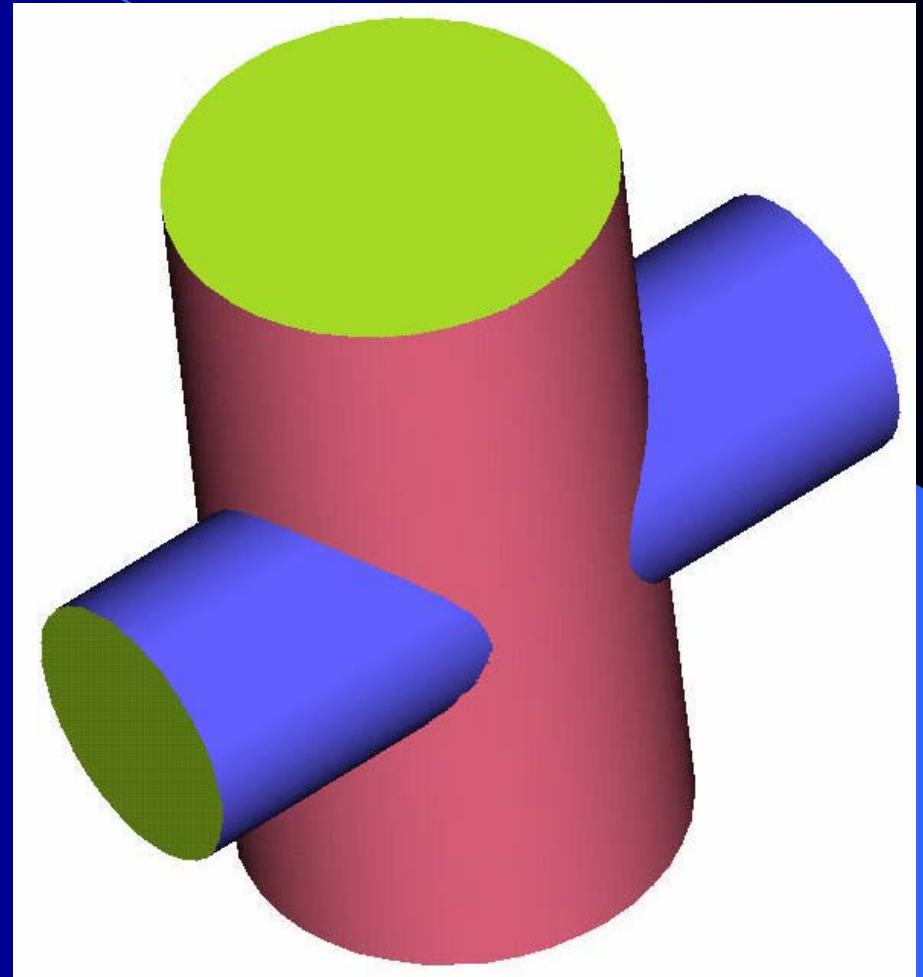
# Model – 101



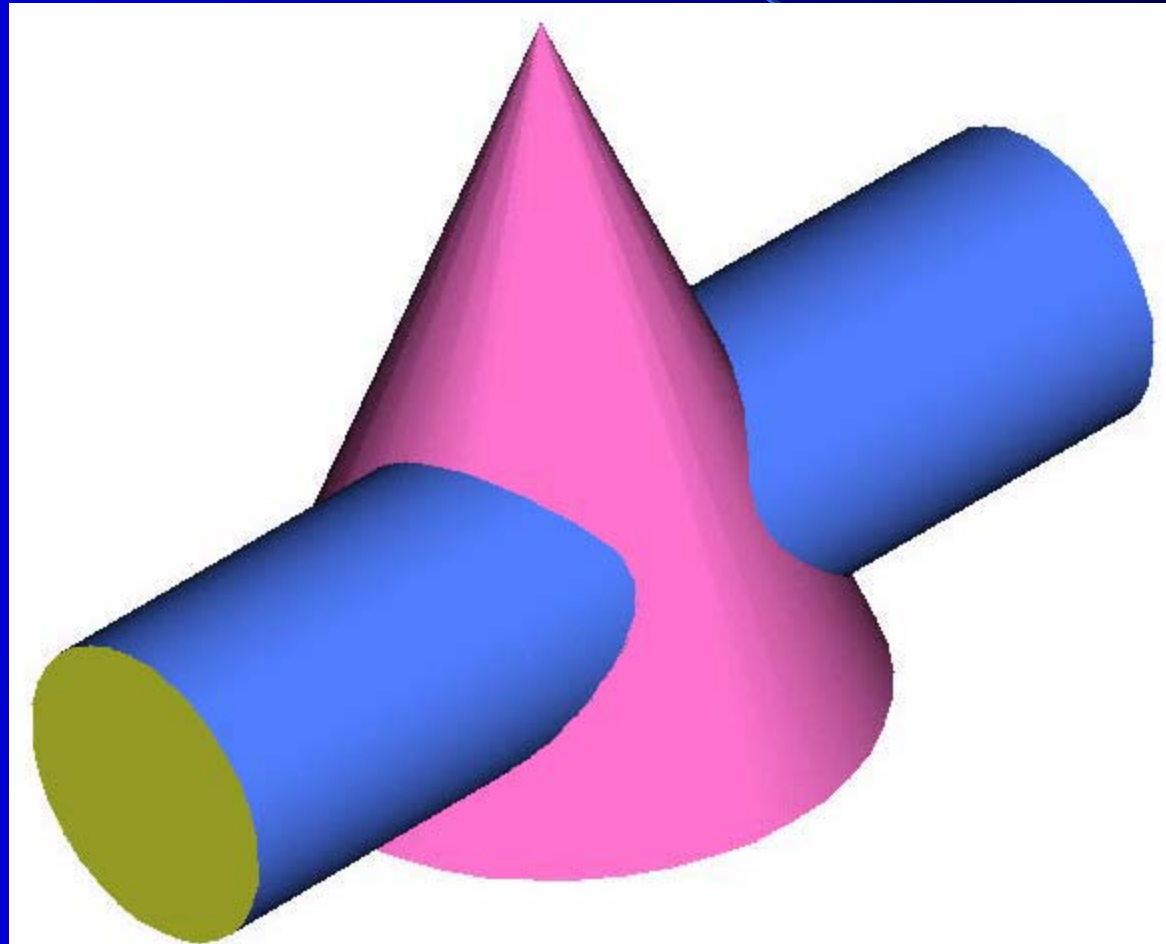
# Model – 102



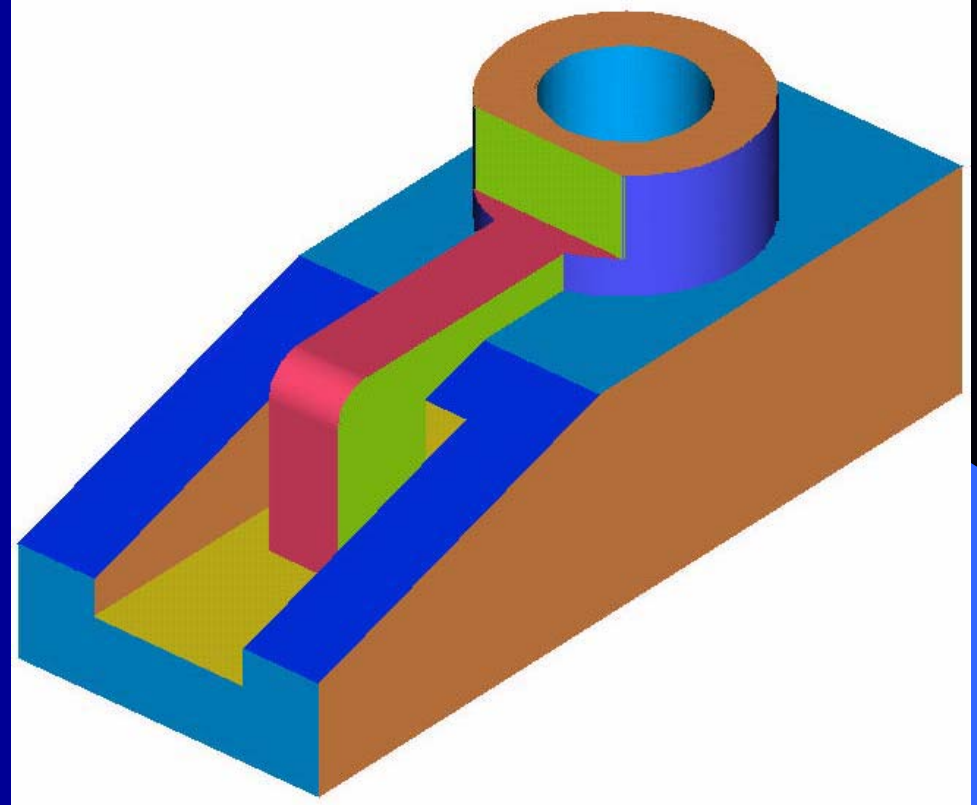
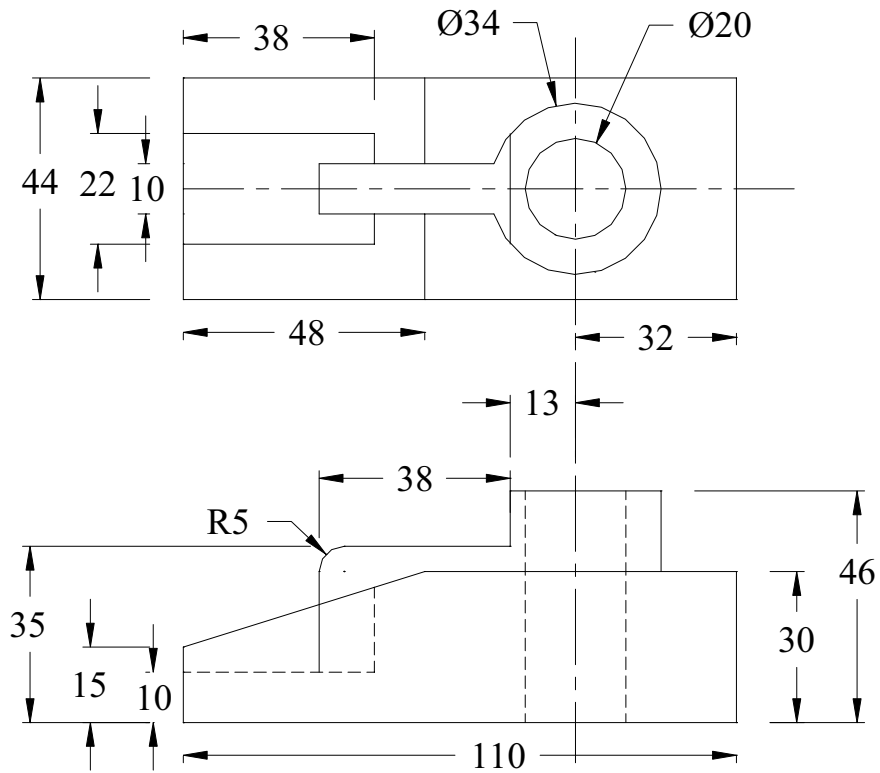
# Model – 103



# Model – 104

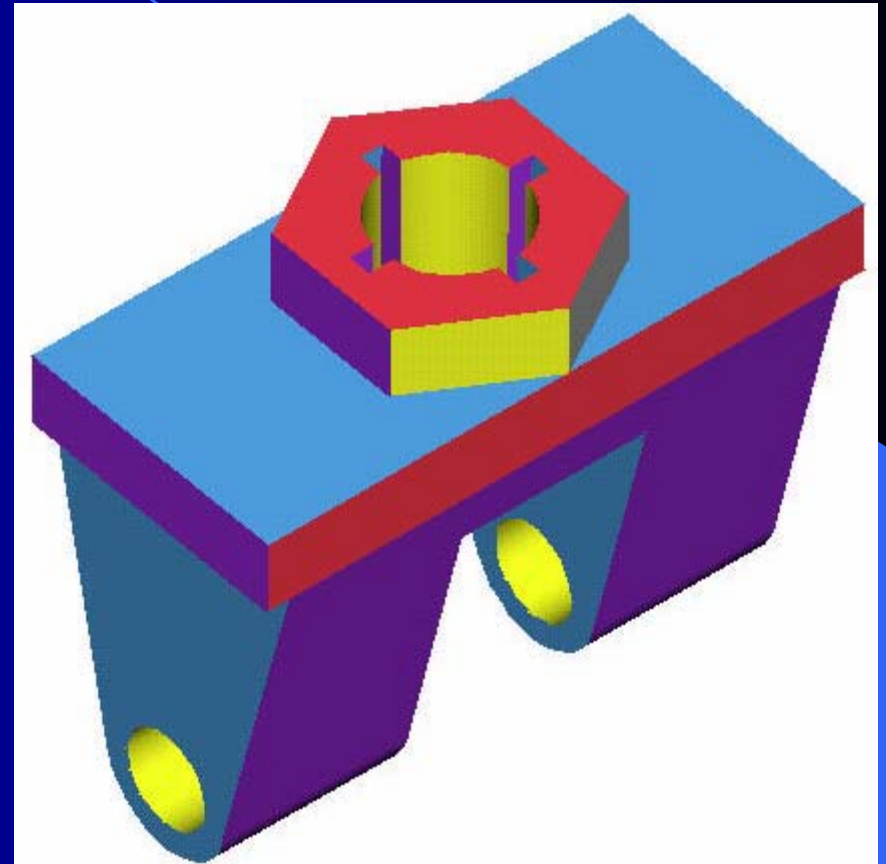
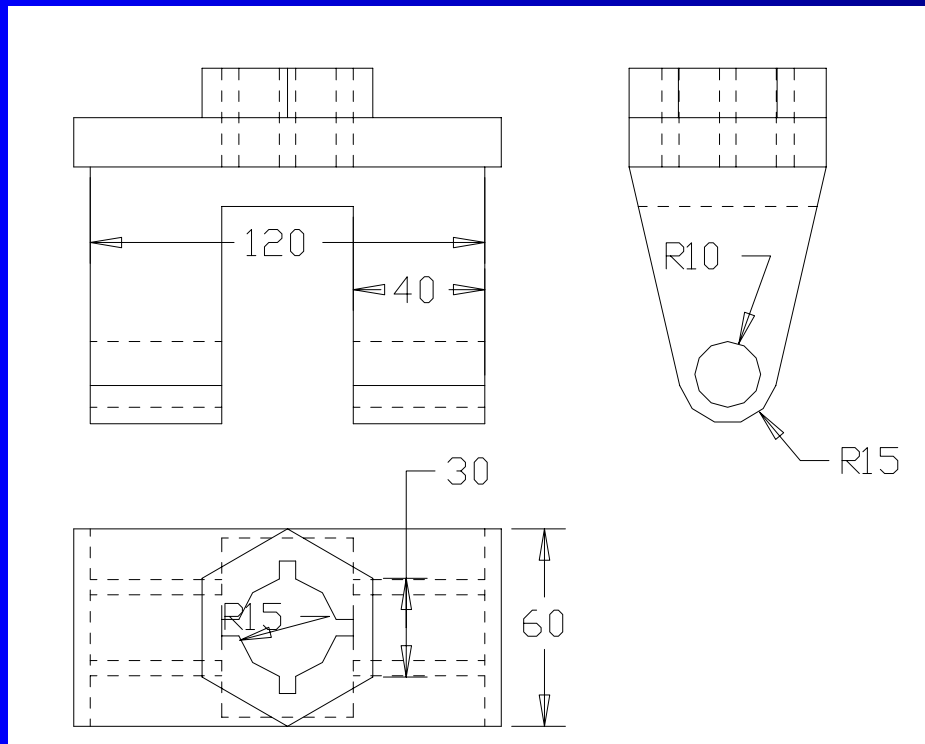


# Model – 105

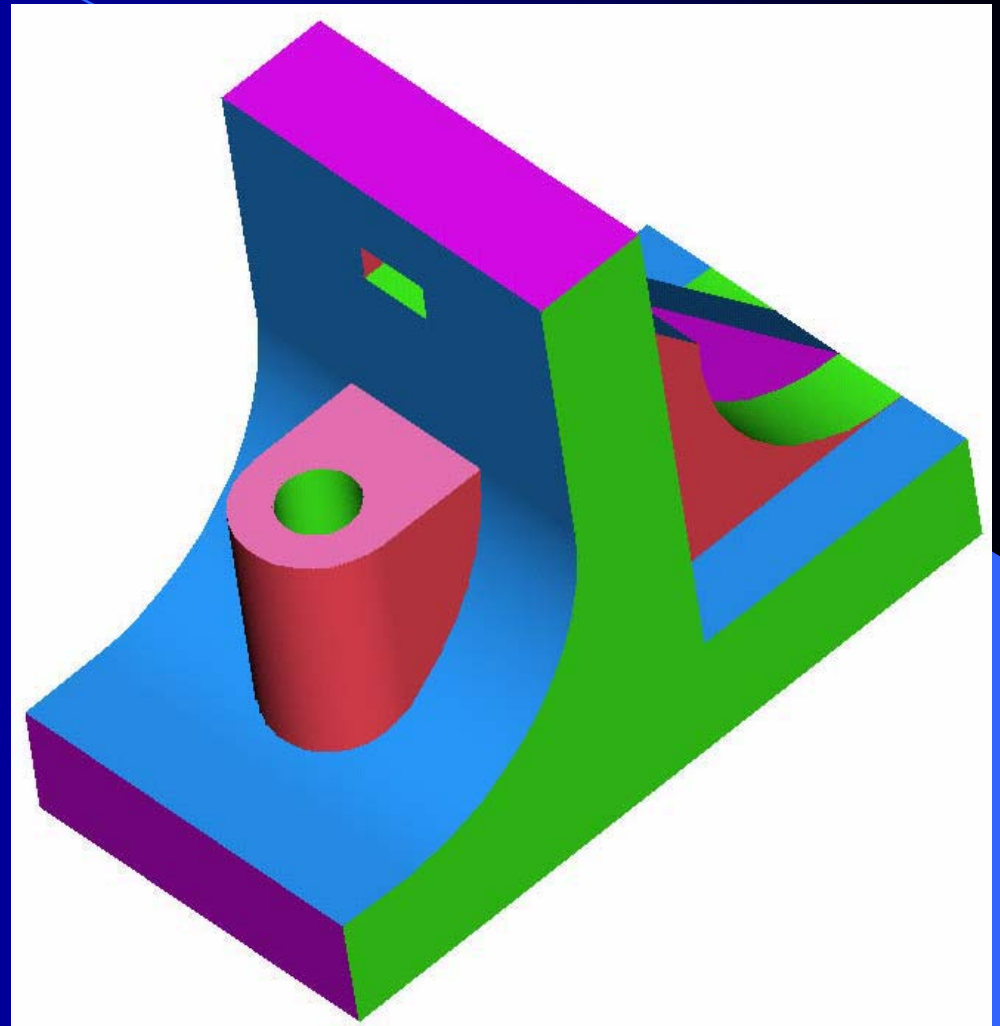
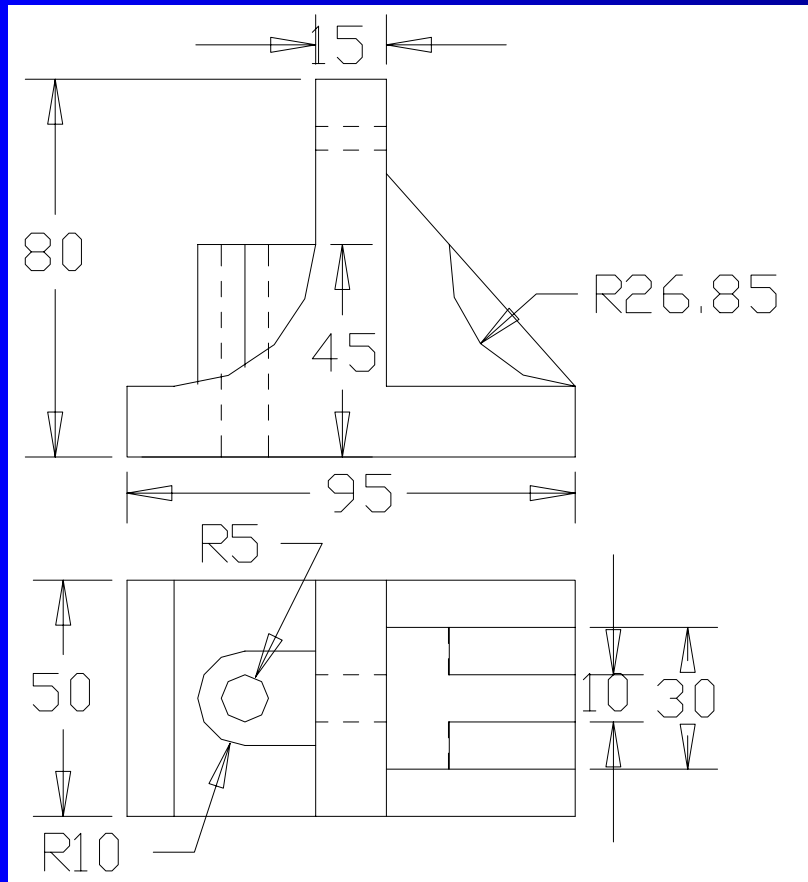




# Model – 106



# Model – 107



# Model – 108

