Projection of Points

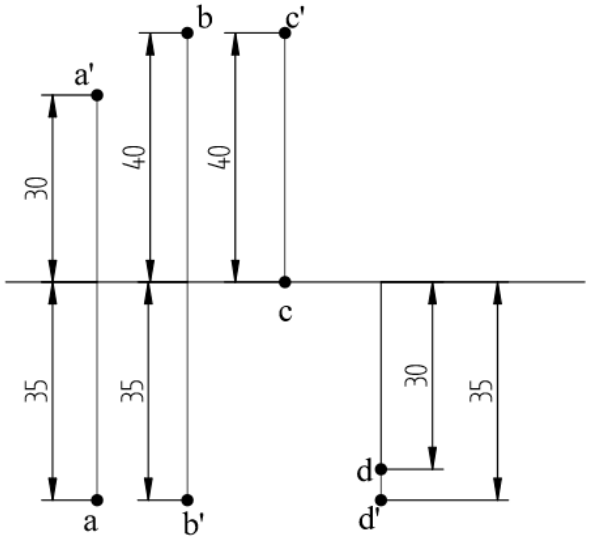
1. Draw the projections of the following points on the same XY line, keeping convenient distance between each projector. Name the quadrants in which they lie.

   A - 30 mm above HP and 35 mm in front of VP.

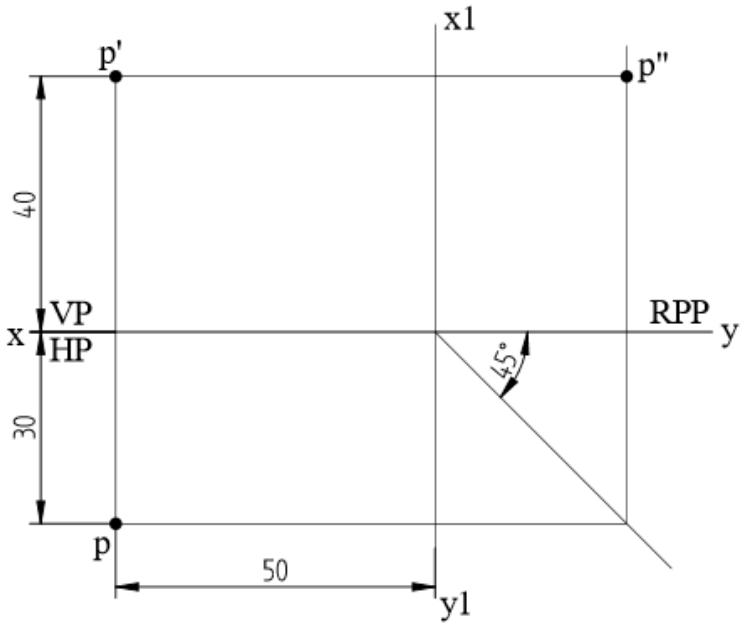
   B - 35 mm below HP and 40 mm behind VP.

   C - 40 mm above HP and on VP.

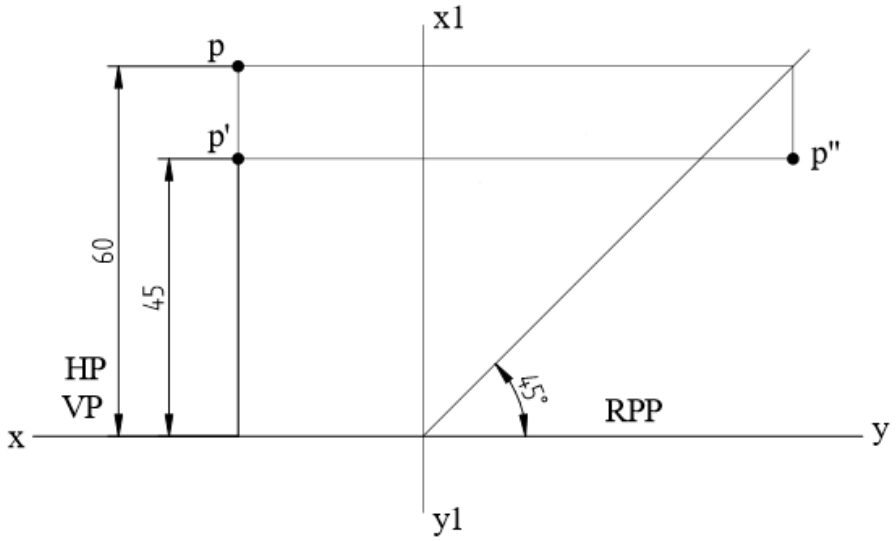
   D -35mm below HP and 30mm in front of VP.



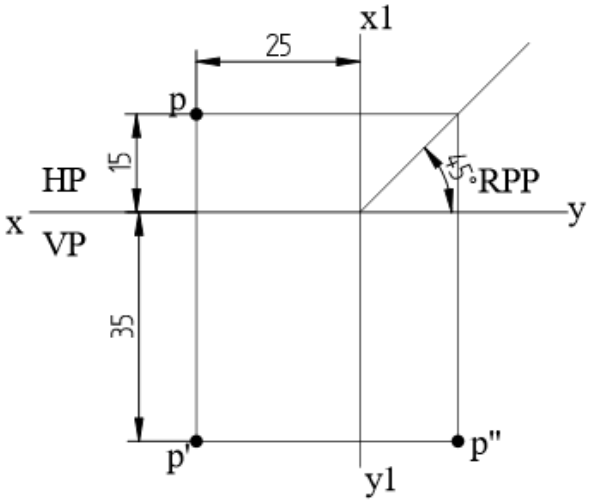
2. A point P is 30 mm in front of VP, 40 mm above HP and 50 mm from RPP. Draw its projections.



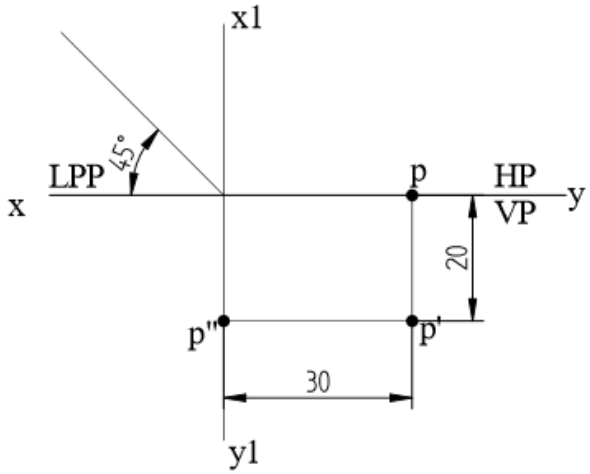
3. A point P is 45 mm above HP, 60 mm behind VP and 30 mm from RPP. Draw the three principal view of the point. Also state the quadrant in which it lies.



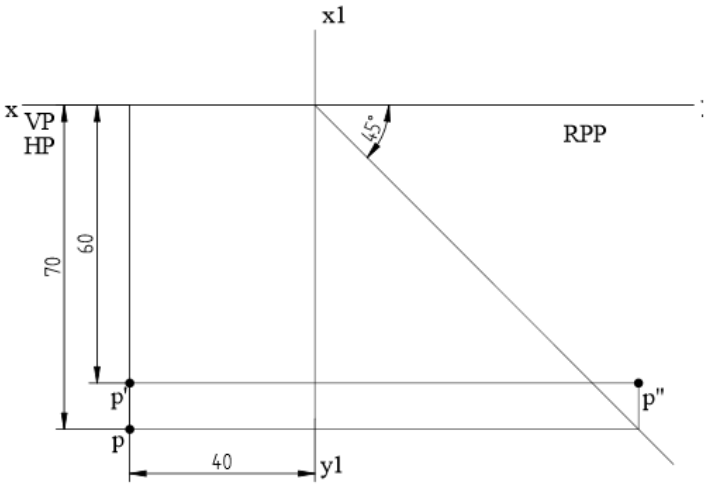
4. A point is 35 mm below HP, 15 mm behind VP and 25 mm behind / in front / from RPP. Draw its projections and name the side view.



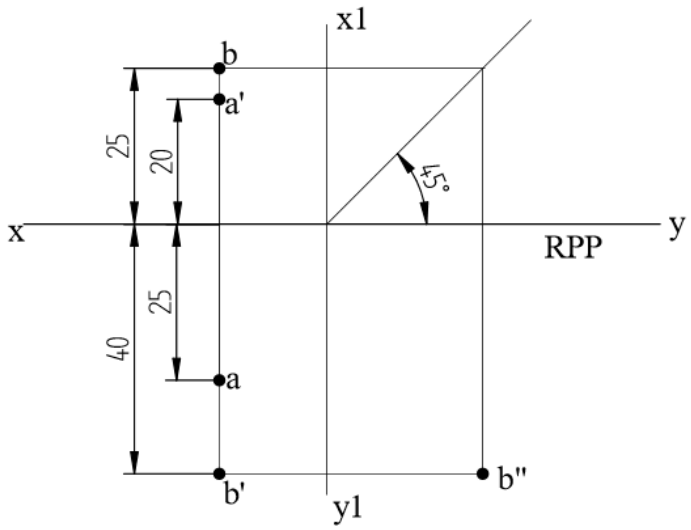
5. A point is lying on VP, 20 mm below HP and 30 mm behind / in front / from LPP. Draw its projections and name the side view.



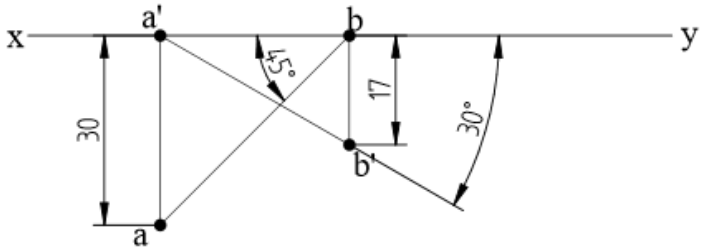
6. Draw all the three views of a point P lying 60mm below HP, 70 mm in front of VP and 40mm from RPP. Also state the quadrant in which it lies.



7. A point A is 20 mm above HP and 25 mm in front of VP. Another point B is 25 mm behind VP and 40 mm below HP. Draw their projections when the distance between their projectors parallel to XY line is zero mm. Add the right side view only to point B.

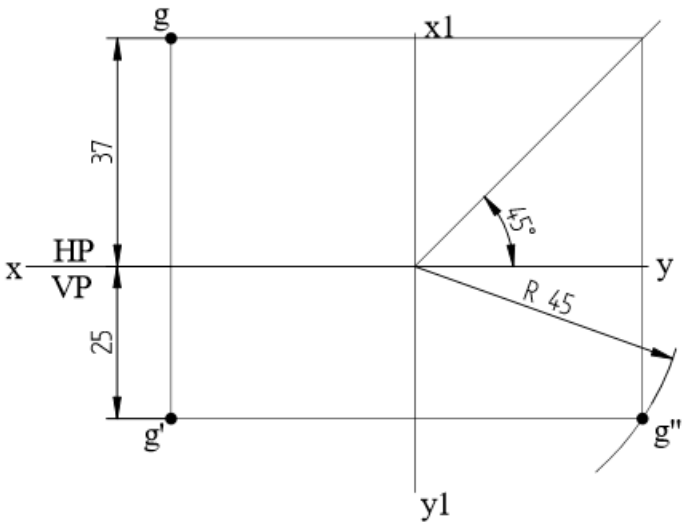


8. A point A is on HP and 30mm in front of VP. Another point B on VP and Below HP. The line joining there front views makes an angle of 30^0 to xy line while the line joining there top views makes an angle of 45^o with xy line. Find the distance of B from HP.



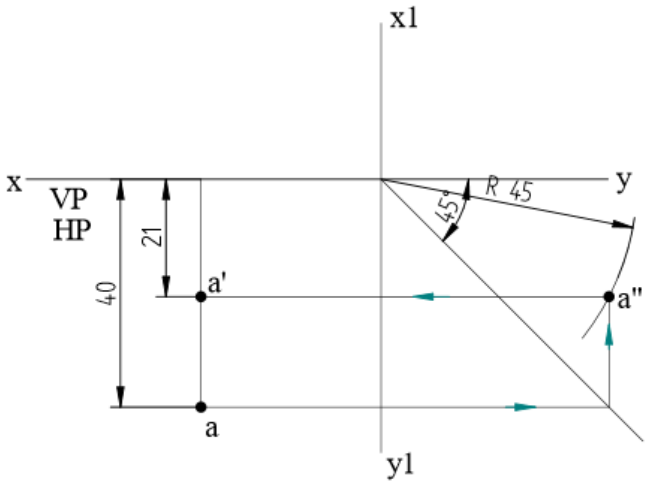
Ans: The point B is 17 mm below HP

9. A point G is 25 mm below HP and is situated in the third quadrant. Its shortest distance from the intersection of XY and X_1Y_1 is 45 mm. Draw its projection and find its distance from VP.



Ans: The point G is 37 mm behind VP

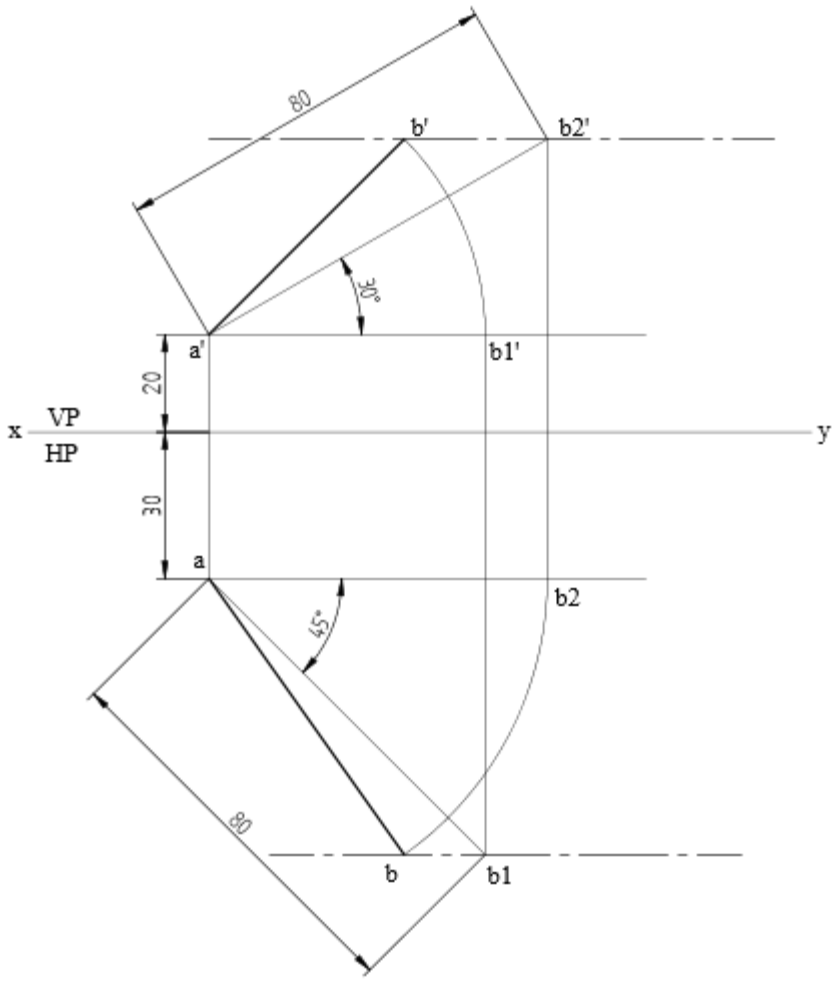
10. A point A is 40 mm in front of VP and is situated in the fourth quadrant. Its shortest distance from the intersection of XY and X_1Y_1, is 45 mm. Draw its projections. Also find distance from HP.



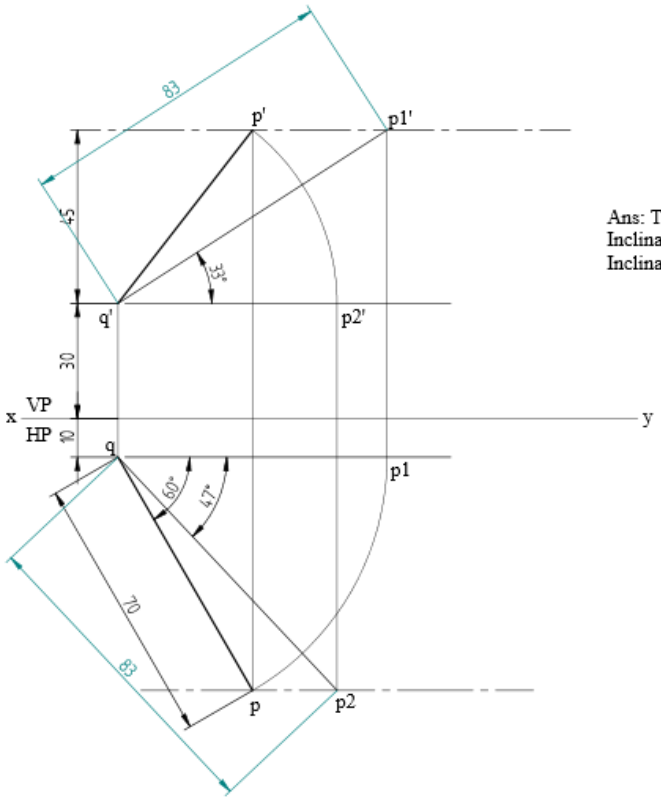
Ans: The point A is 21 mm below HP

Projection of Lines

1. A line AB 80 mm long has its end A 20 mm above HP and 30 mm in front of VP. It is inclined at 30 deg. to HP and 45 deg. to VP. Draw the projections of the line and find apparent lengths and apparent inclinations.

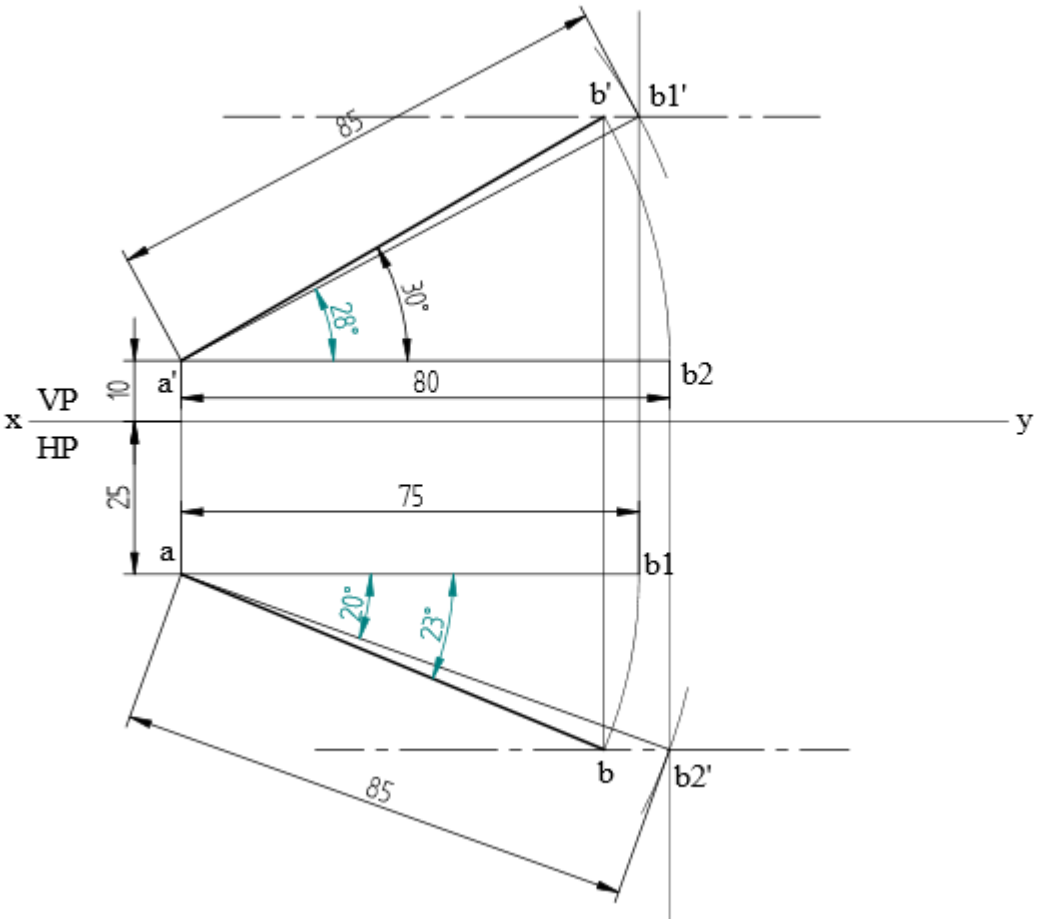

80
b'
b2'
30°
a'
b1'
20
x
VP
HP
y
30
a
b2
45°
80
b
b1

2. The top view PQ of the Straight line is 70 mm and makes an angle of 60 deg. with XY line. The end Q is 10 mm in front of VP and 30 mm above HP. The difference between the distance of P and Q above the HP is 45 mm. Draw the projections. Determine its true length and true inclinations with HP and VP.

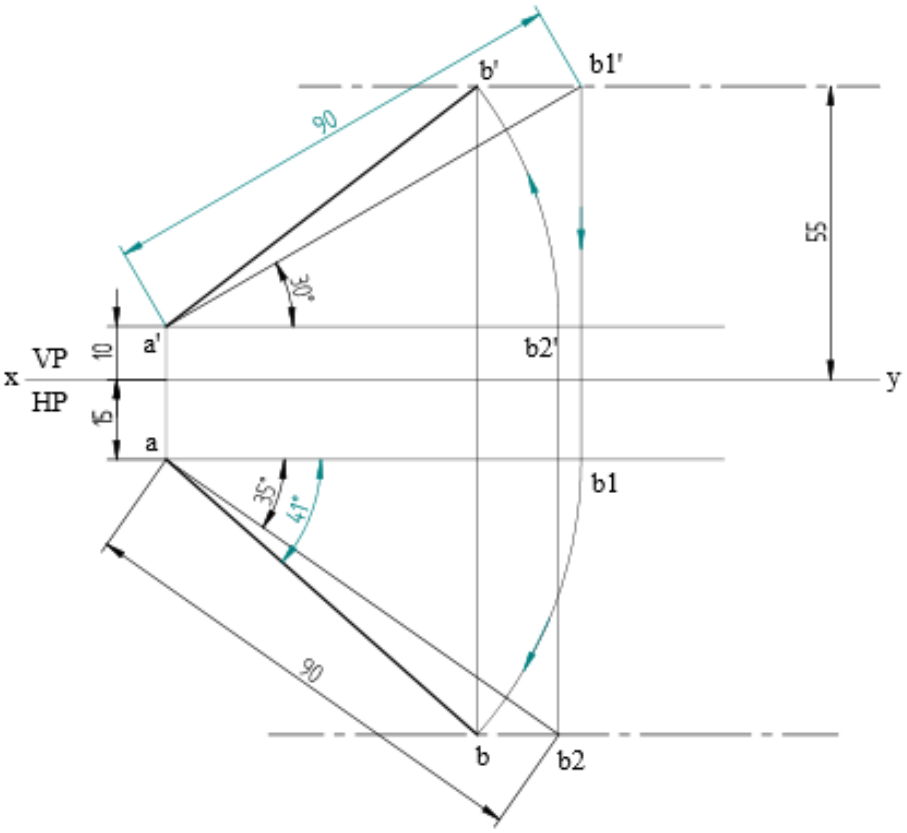


Ans: True length of line = 83mm
Inclination with HP = 33 deg
Inclination with VP = 47 deg

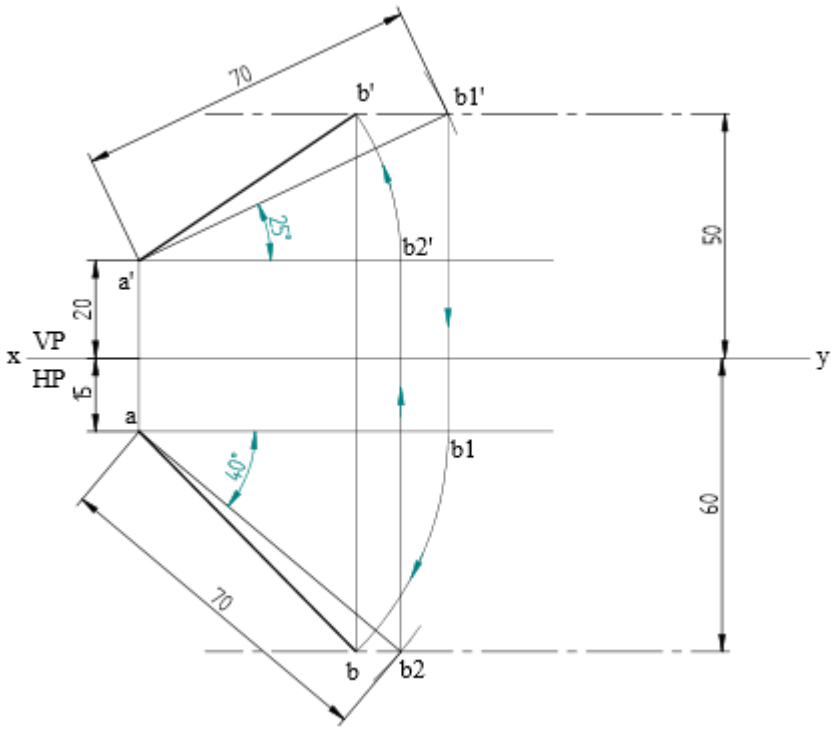
3. A line PQ 85 mm long has its end P 10 mm above HP and 15 mm in front of VP. The top view and front view of line PQ are 75 mm and 80 mm respectively. Draw its projections. Also determine the true and apparent inclinations of the line.



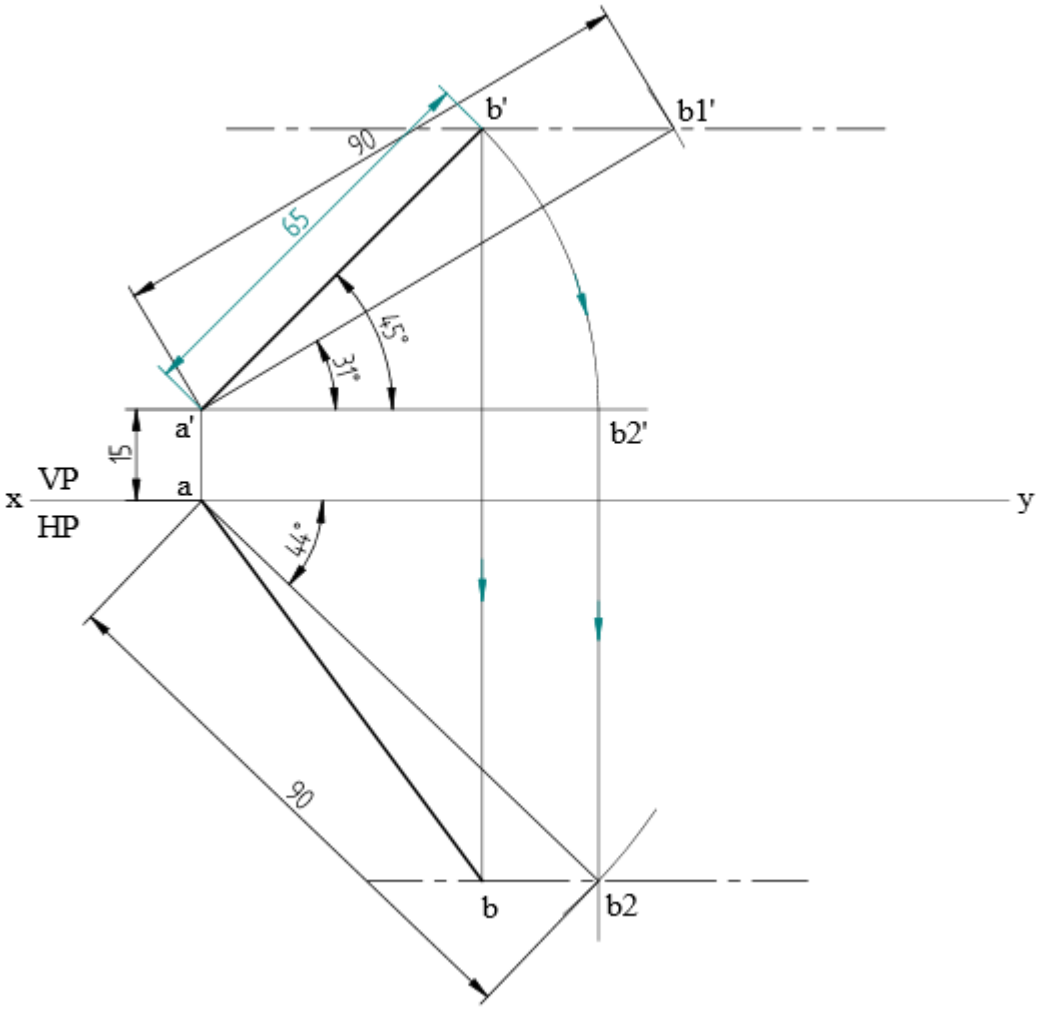
4. A line has its end A 10 mm above HP and 15 mm in front of VP. The end B is 55 mm above HP and line is inclined at 30 deg. to HP and 35 deg. To VP. The distance between the end projectors is 50 mm. Draw the projections of the line. Determine the true length of the line and its apparent inclination with VP.



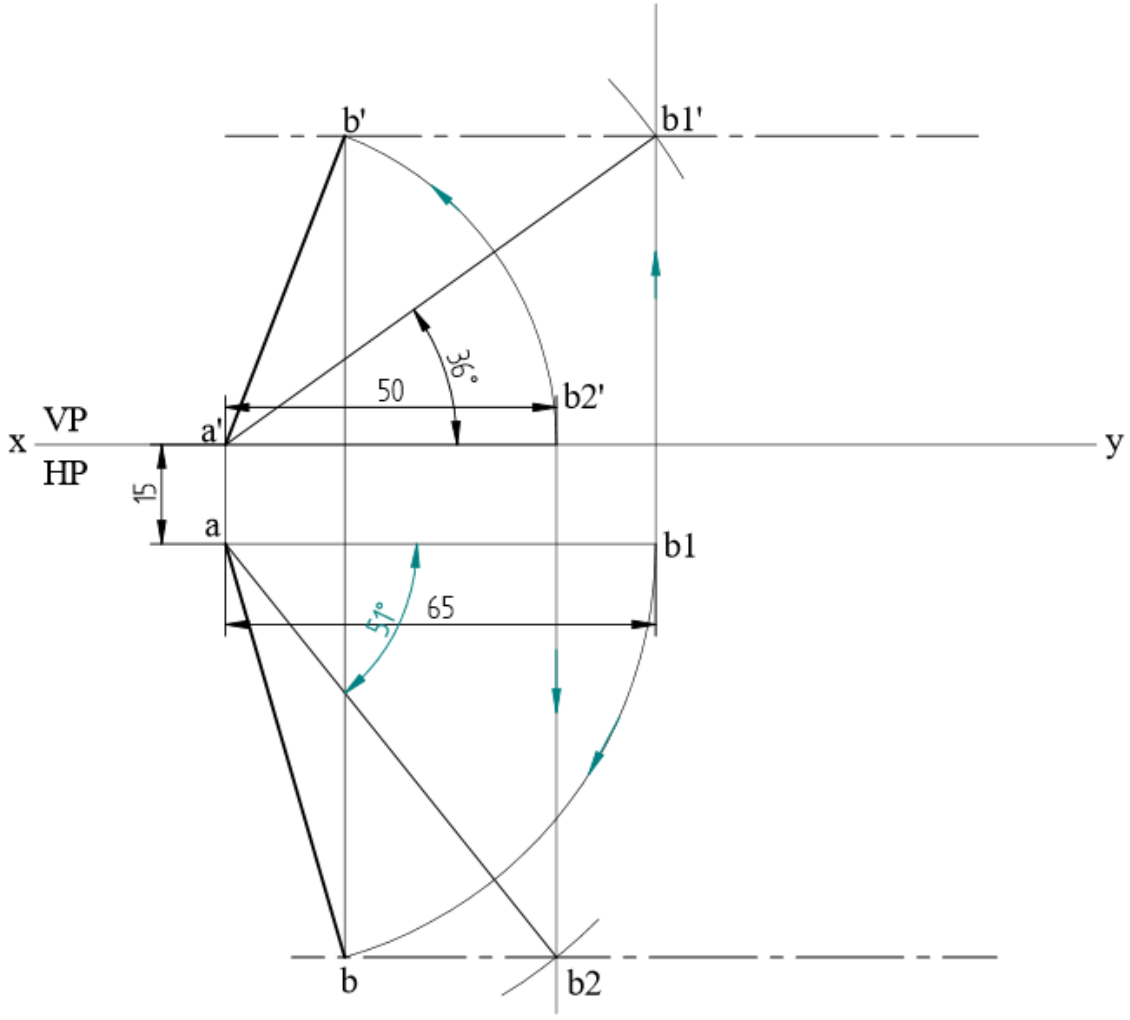
5. A line AB measuring 70 mm has its end A 15 mm in front of VP and 20 mm above HP and the other end B 60 mm in front of VP and 50 mm above HP. Draw the projections of the line and find the inclinations of the line with the both the reference planes of projection.



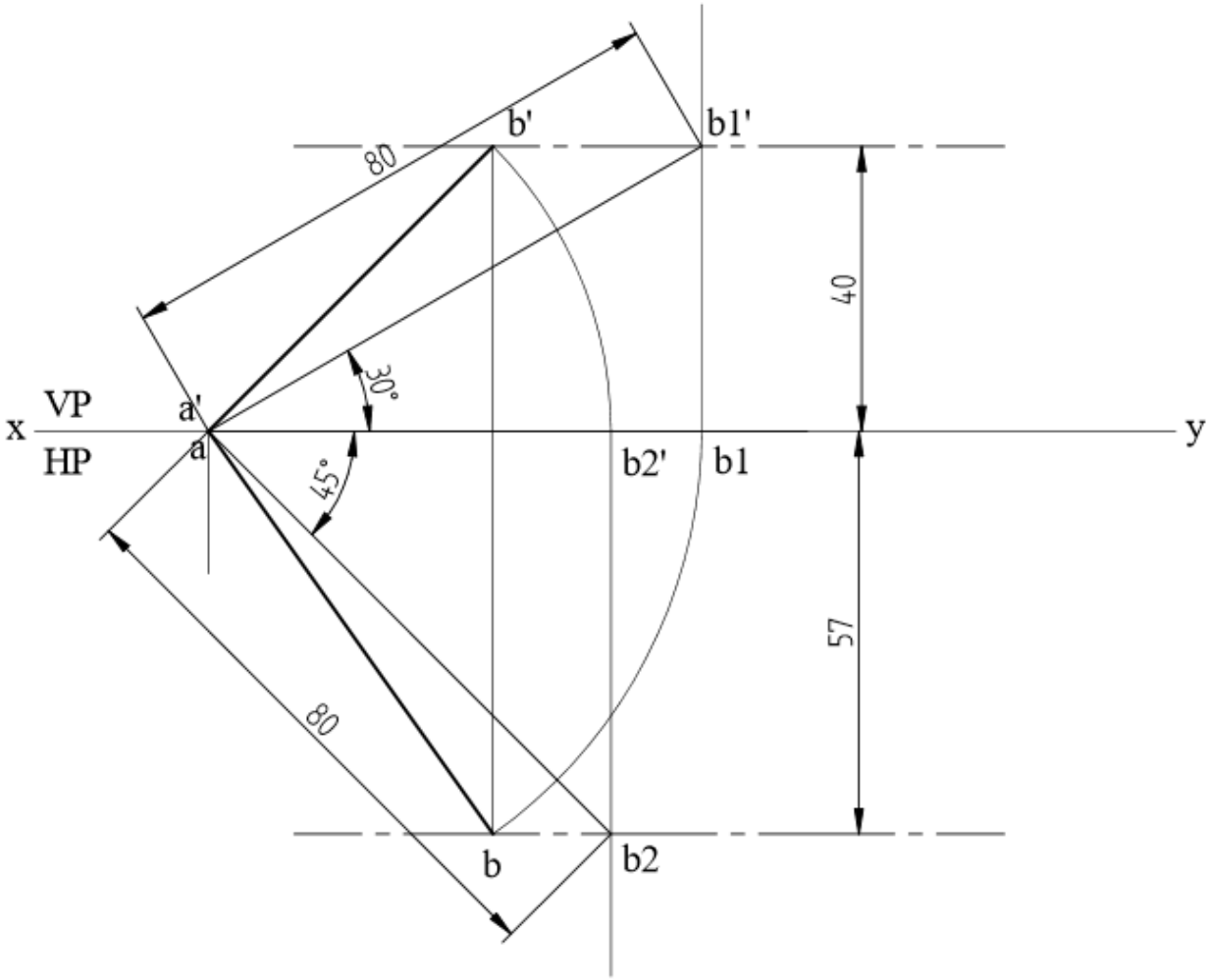
6. The front view of a 90 mm long line which is inclined at 45 deg. to the XY line, measures 65 mm. End A is 15 mm above the XY line and is in VP. Draw the projections of the line and find its inclinations with HP and VP.



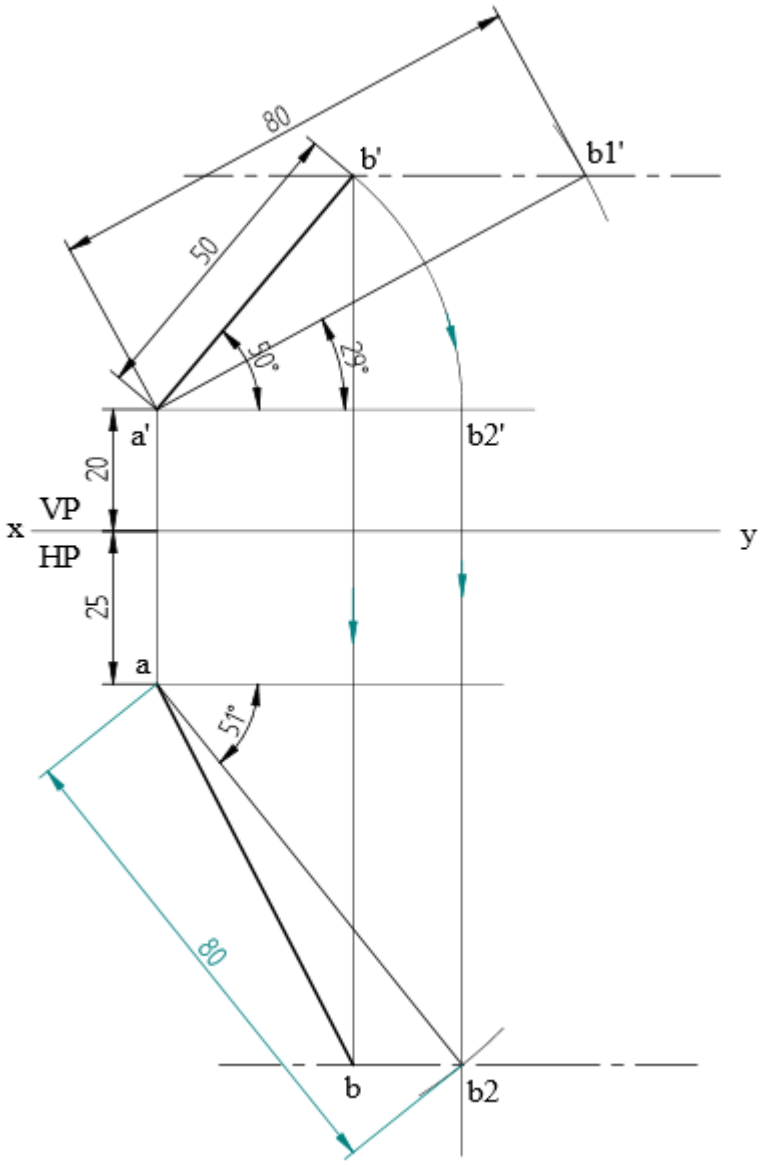
7. The top view of a line AB, 80 mm long measures 65 mm and the length of the front view is 50 mm. The end A is on HP and 15mm in front VP. Draw its projections.



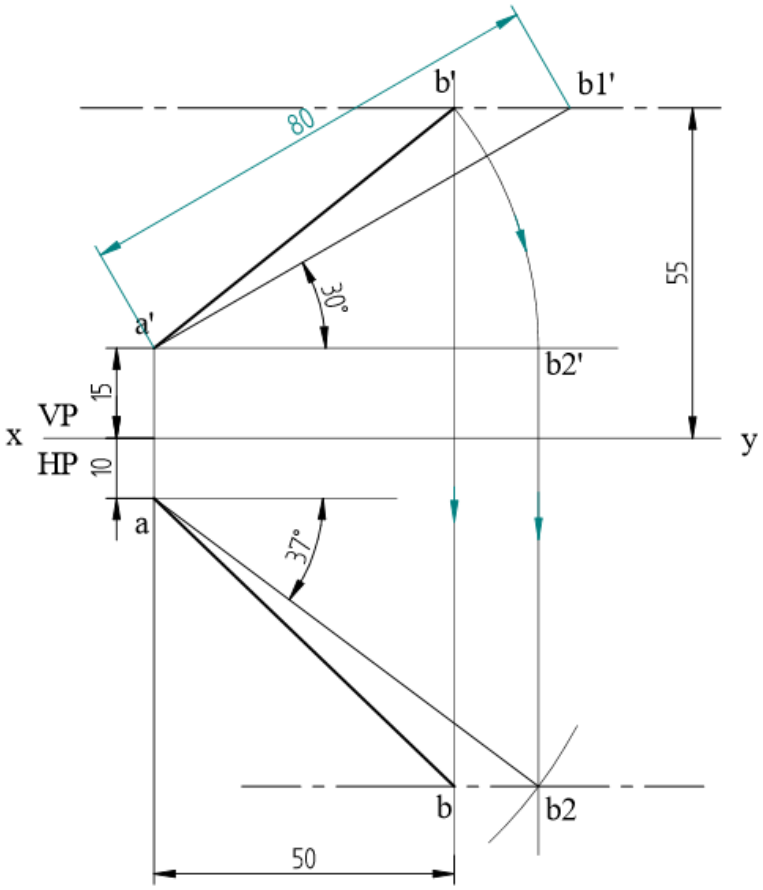
8. A line AB 80 mm long is inclined to HP at 30 deg. and inclined to VP at 45 deg. Draw front and top views of line and determine their lengths. Also measure the perpendicular distance of end B from both HP and VP.



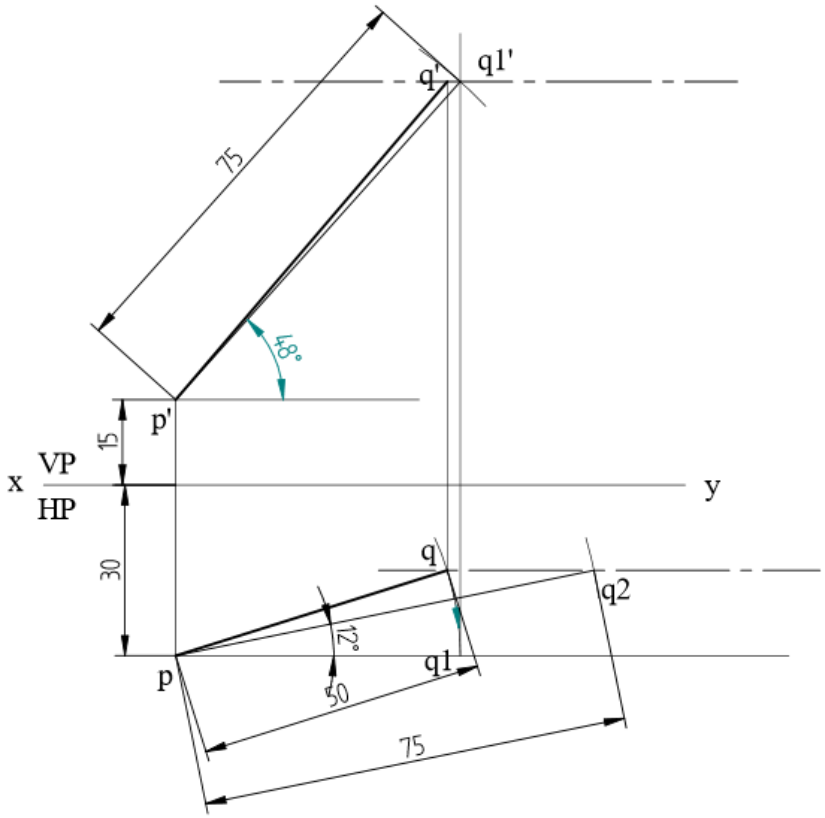
9. The front view of the line PQ 80 mm long measures 50 mm and it is inclined to XY at 50 deg. One end of the line P is 20 mm above HP and 25 mm in front of VP. Draw the front view and top view of the line and find the inclinations of the line with HP and VP.



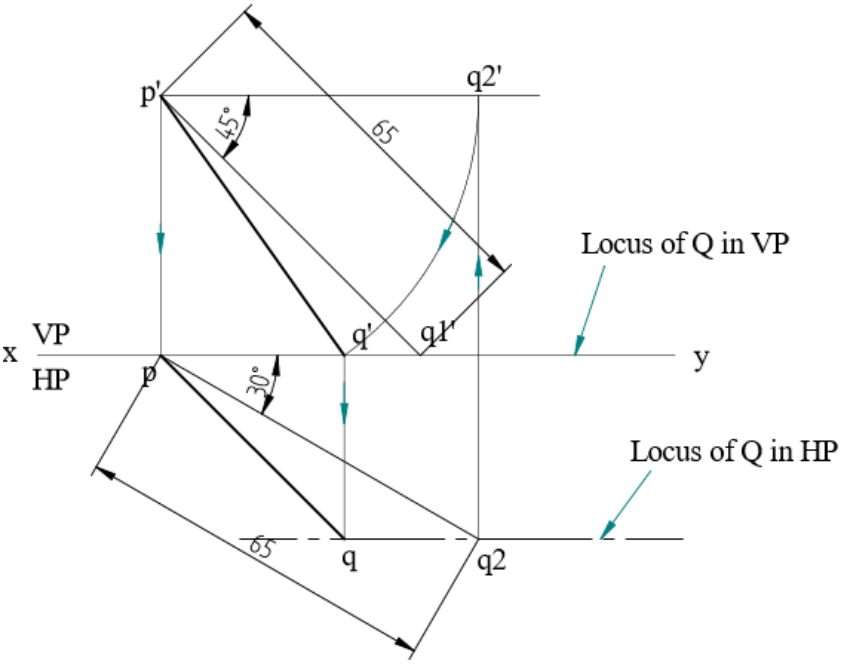
10. A line has its end A 15 mm above HP and 10 mm in front of VP. The end B is 55 mm above HP and the line is inclined at 30 deg. to HP. The distance between the end projectors is 50 mm. Draw the projections of the line and determine the true length of the line and its inclination with VP.



11. The top view of line 75 mm long measures 50 mm. The end P is 30 mm in front of VP and 15 mm above HP. The end Q is 15 mm in front of VP and above HP. Draw the projections of the line and find its true inclinations with HP and VP.

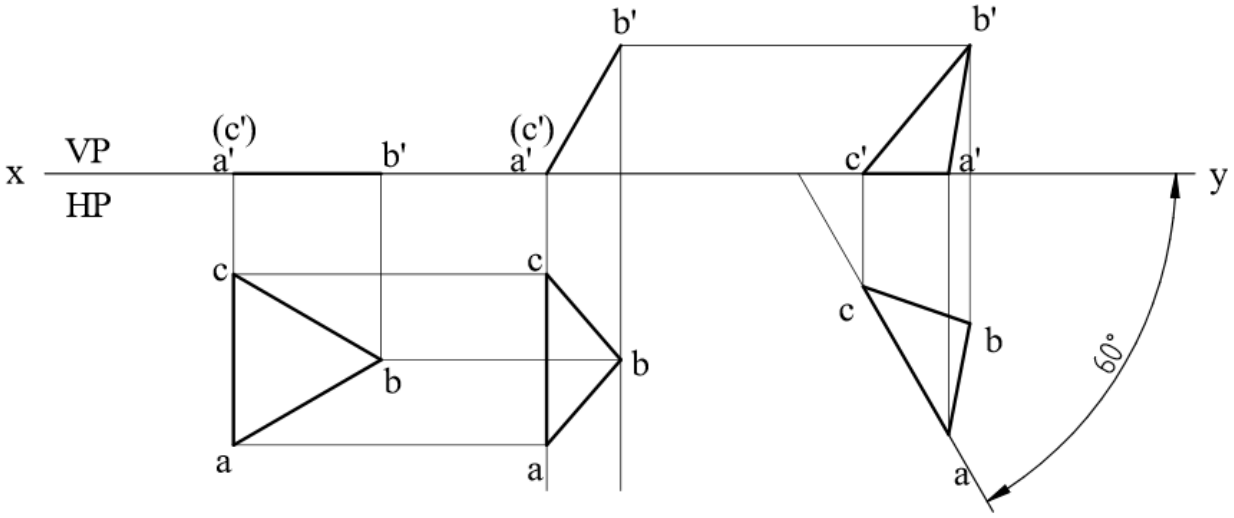


12. A straight line PQ is inclined at 45 deg. to HP and 30 deg. to VP. The point P is in HP and the point Q is in VP. The length of the straight line is 65 mm. Draw the projections of the straight line PQ.

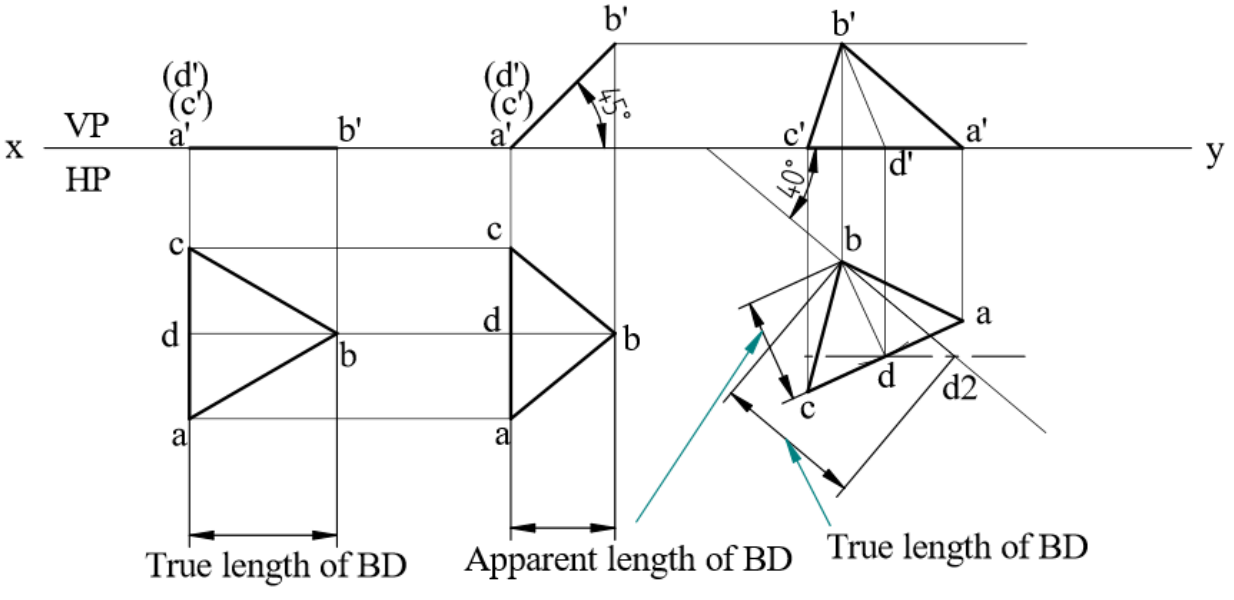


Projection of Plane Surfaces

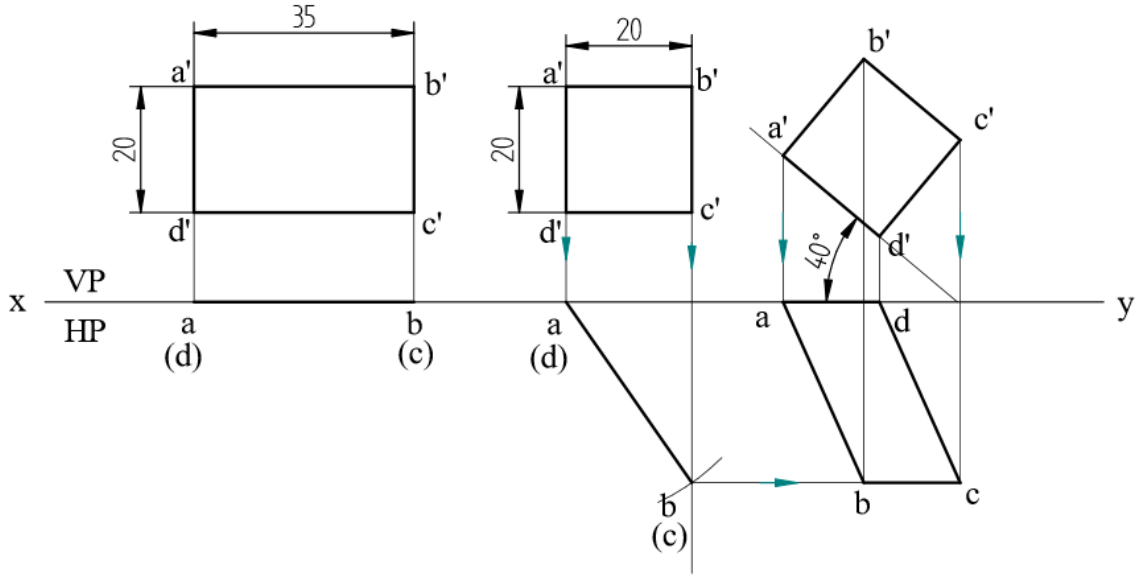
1. An equilateral triangular lamina of 25 mm sides lies with one of its edges on HP such that the surface of the lamina is inclined to HP at 60 deg. The edge on which it rests is inclined to VP at 60 deg. Draw its projections.



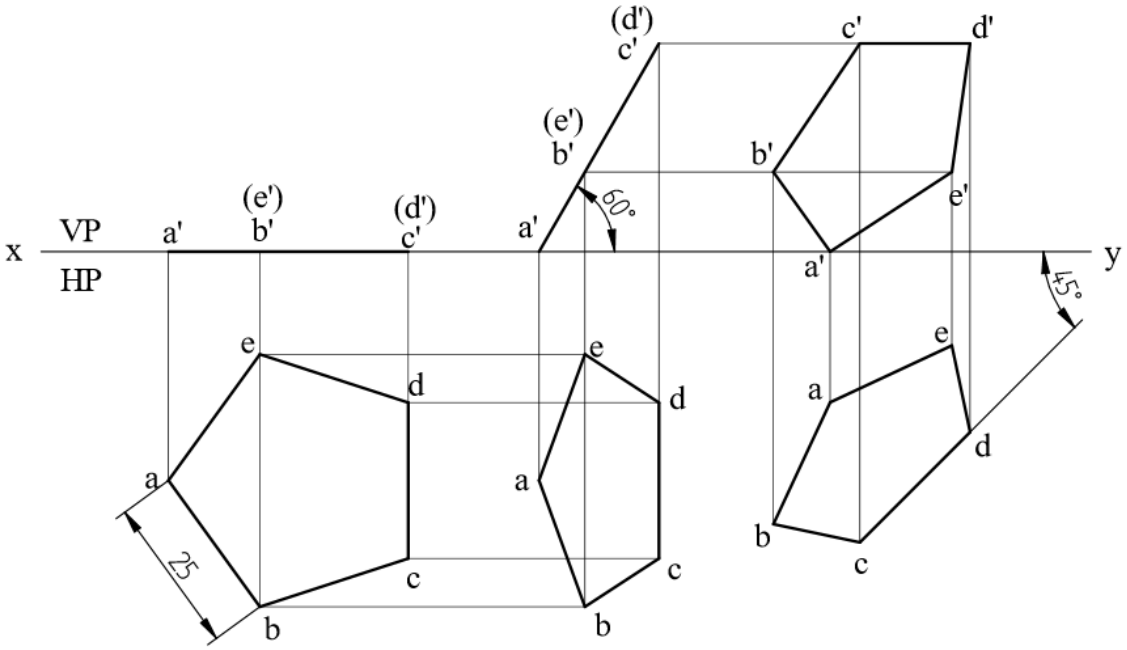
2. An equilateral triangular lamina of 25 mm sides lies on one of its sides on HP. The lamina makes 45 deg. with HP and one of its medians is inclined at 40 deg. to VP. Draw the projections.



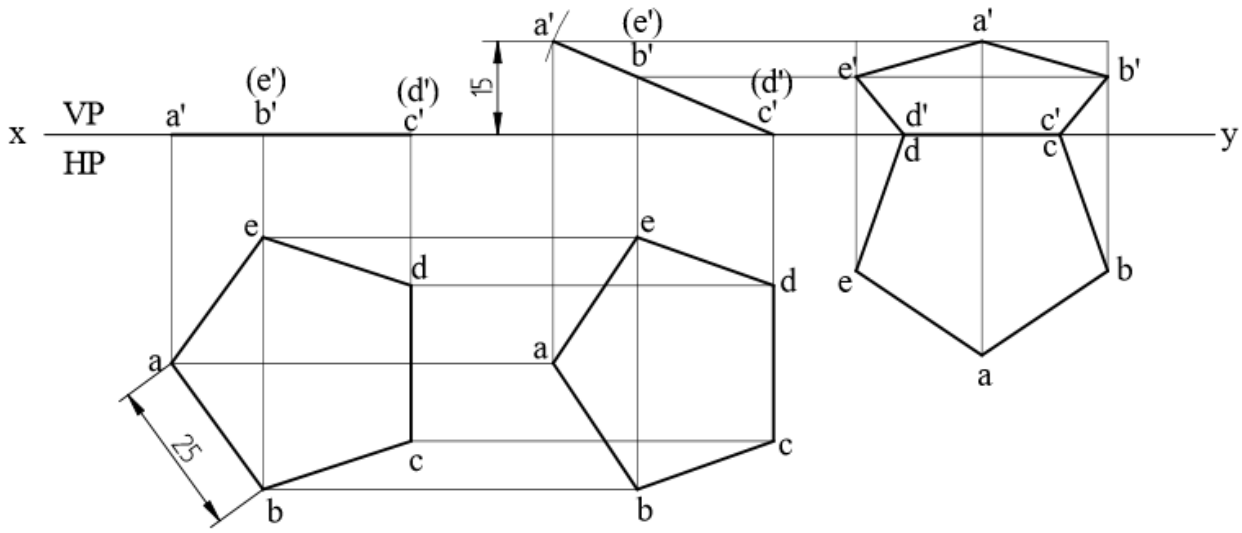
3. A rectangular plate of negligible thickness of size 35x20mm has one of its shorter edges in VP with that edge inclined at 40° to HP. Draw the top view if its front view is a square of side 20mm.



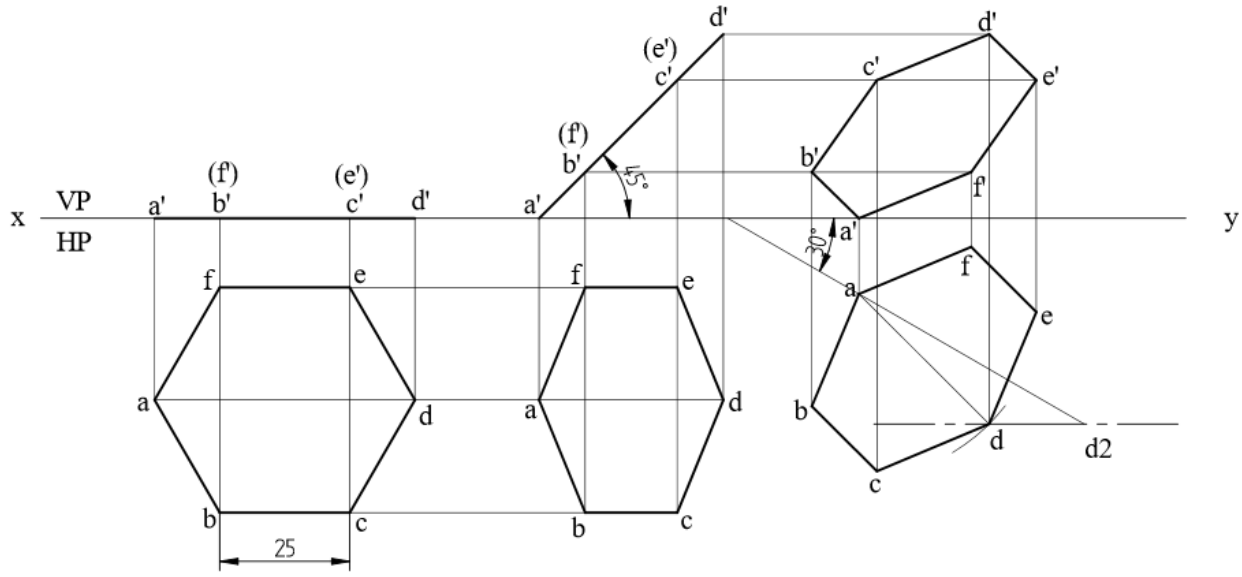
4. Pentagonal lamina of edges 25 mm is resting on HP with one of its corners such that the plane surface makes an angle of 60 deg. with HP. The two of the edges containing the corner on which the lamina rests make equal inclinations with HP. When the edge opposite to the corner makes an angle of 45 deg. with VP and nearer to the observer. Draw the top and front views of the plane lamina in this position.



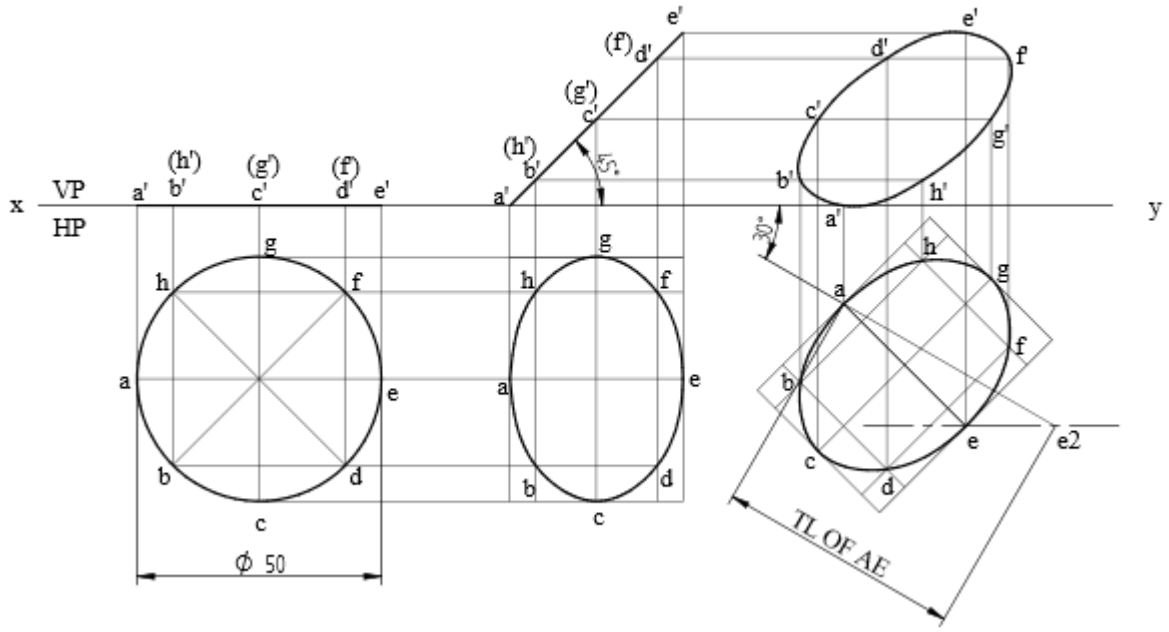
5. A pentagonal lamina of sides 25 mm is having a side both on HP and VP. The corner opposite to the side on which it rests is 15 mm above HP. Draw the top and front views of the lamina.



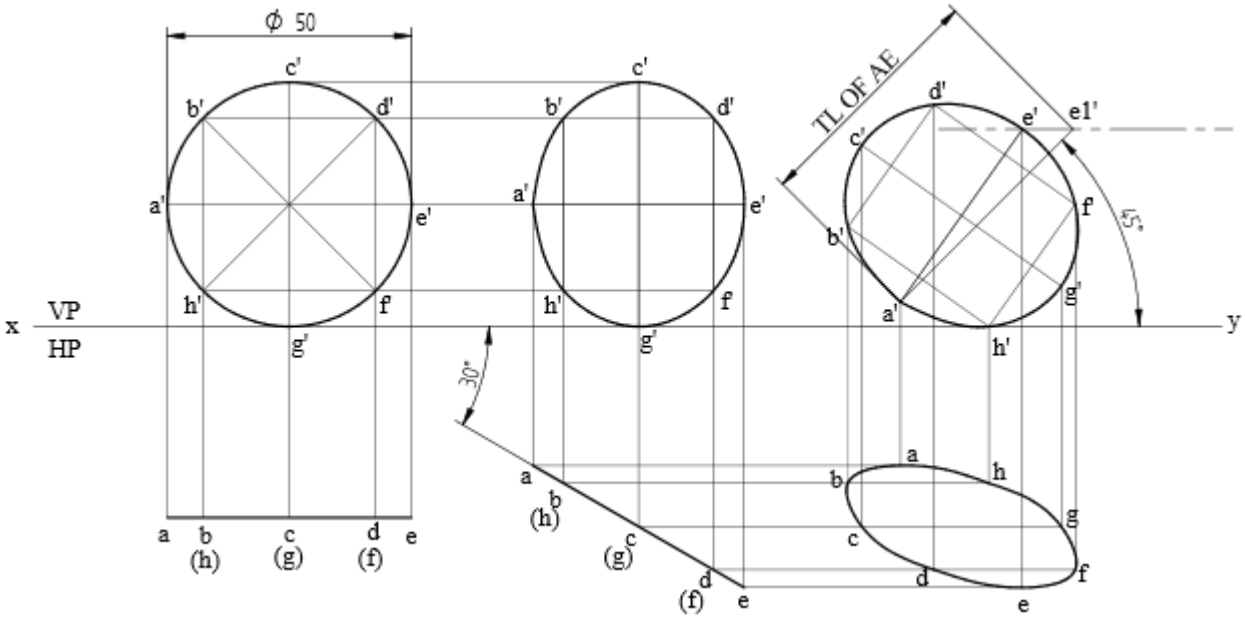
6. A hexagonal lamina of sides 25 mm rests on one of its corners on HP. The lamina makes 45 deg. to HP and the diagonal passing through the corner on which it rests is inclined at 30 deg. to VP. Draw its projections.



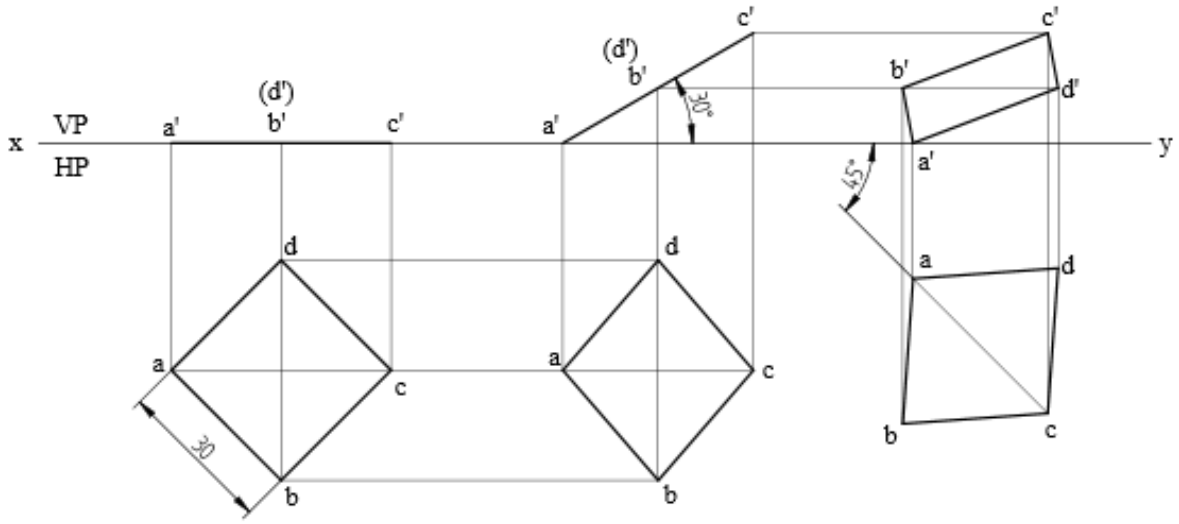
7. A circular lamina of 50 mm diameter rests on HP such that one of its diameter is inclined at 30 deg. to VP and 45 deg. to HP. Draw its top and front views in this position.



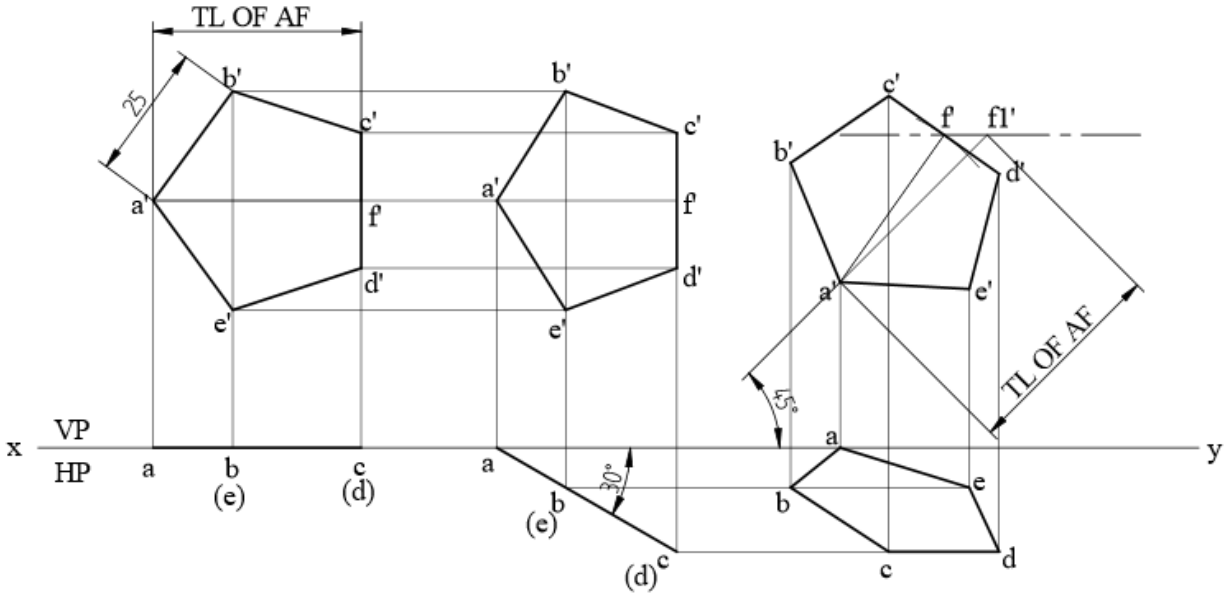
Alternate Solution:



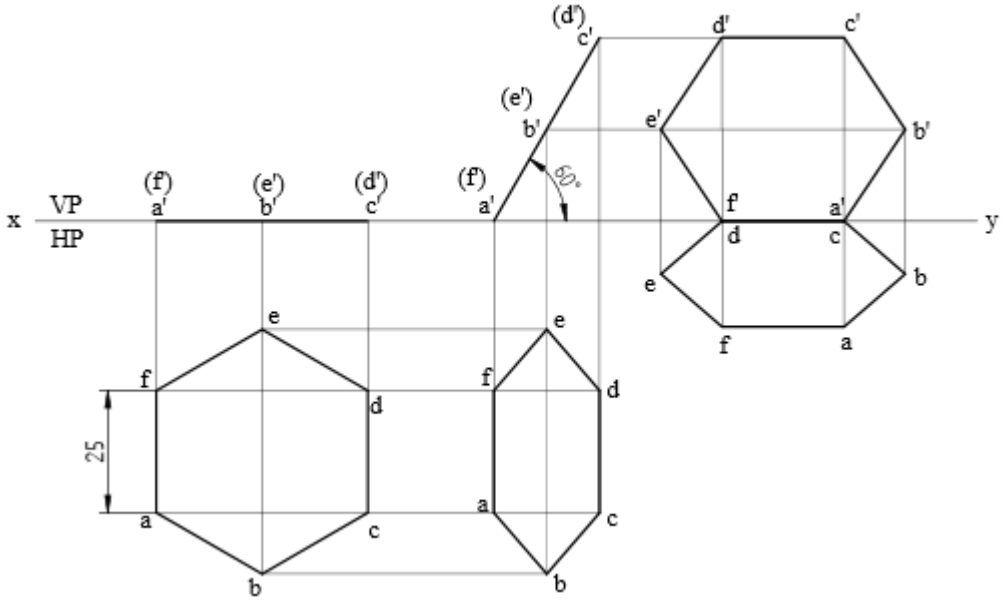
8. A square plate of 30 mm sides rests on HP such that one of the diagonals is inclined at 30 deg. to HP and appears to be inclined at 45 deg. to VP. Draw its projections.



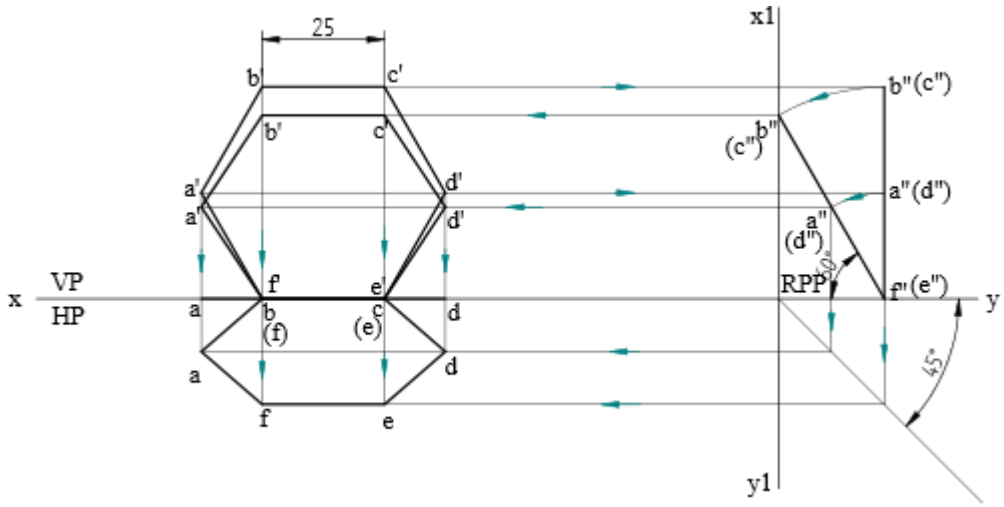
9. A pentagonal lamina having edges 25 mm is placed on one of its corners on VP such that the surface makes an angle 30 deg. with VP and perpendicular bisector of the edge passing through the corner on which the lamina rests is inclined at 45 deg. to HP. Draw the top and front views of the lamina.



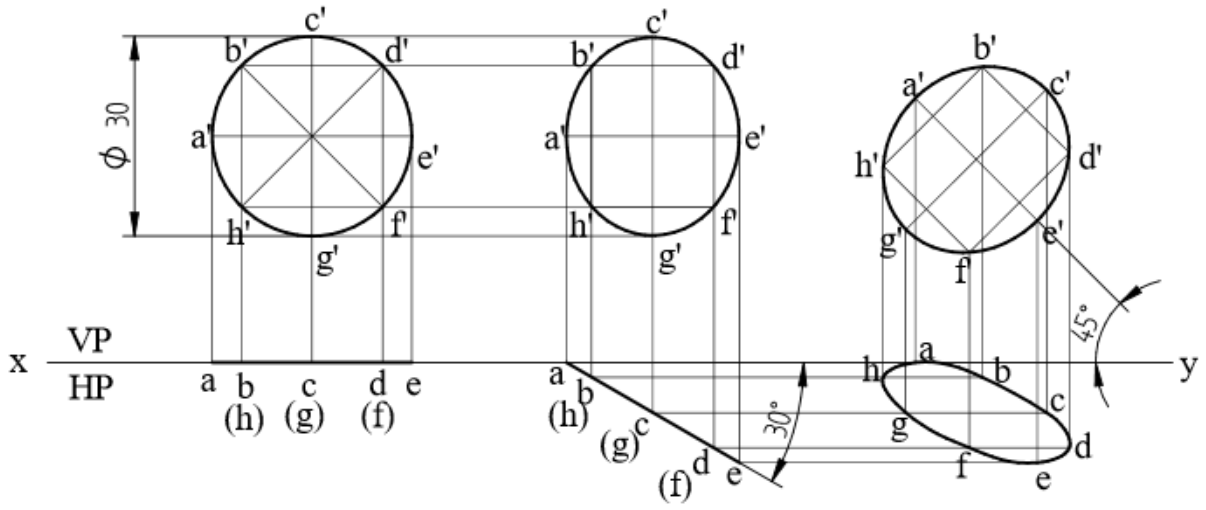
10. A regular hexagonal lamina of sides 25 mm is lying in such a way that one of its sides is on HP while the side opposite to the side on which it rests is on VP. If the lamina makes 60 deg. to HP. Draw the projections of the lamina.



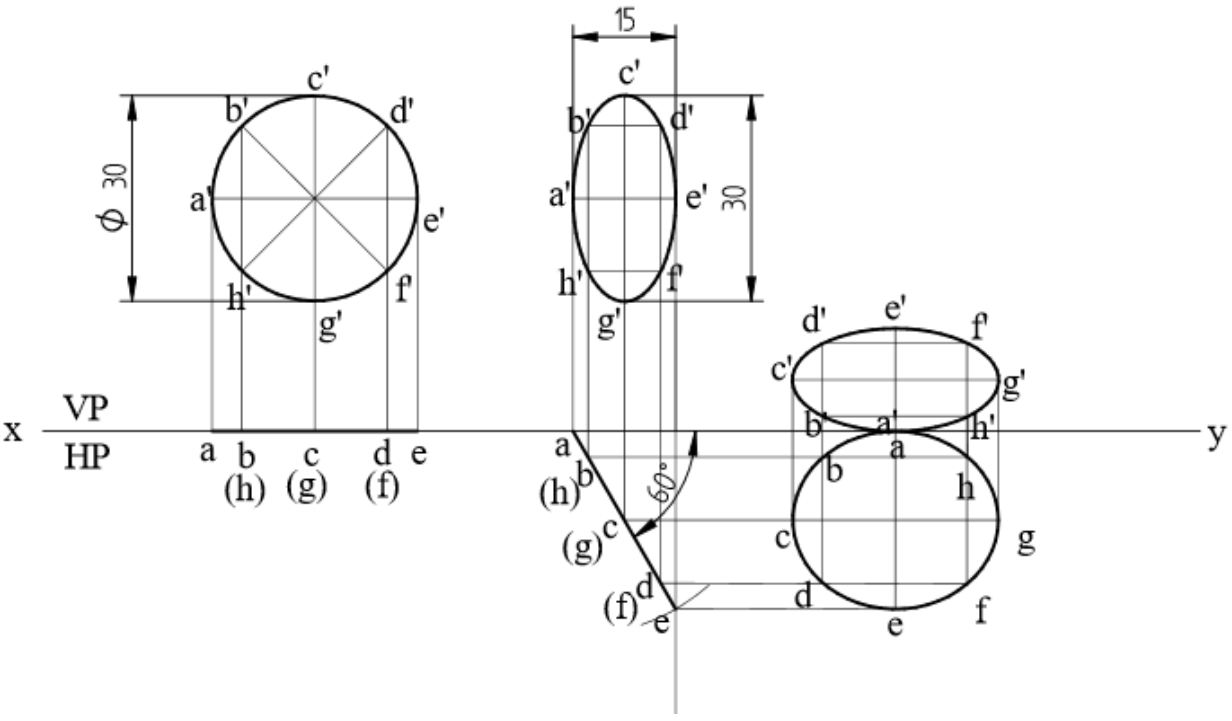
Alternate Solution:



11. A circular lamina of 30 mm diameter rests on VP such that one of its diameters is inclined at 30 deg. to VP and appears to be inclined at 45 deg. to HP. Draw its top and front views in this position.

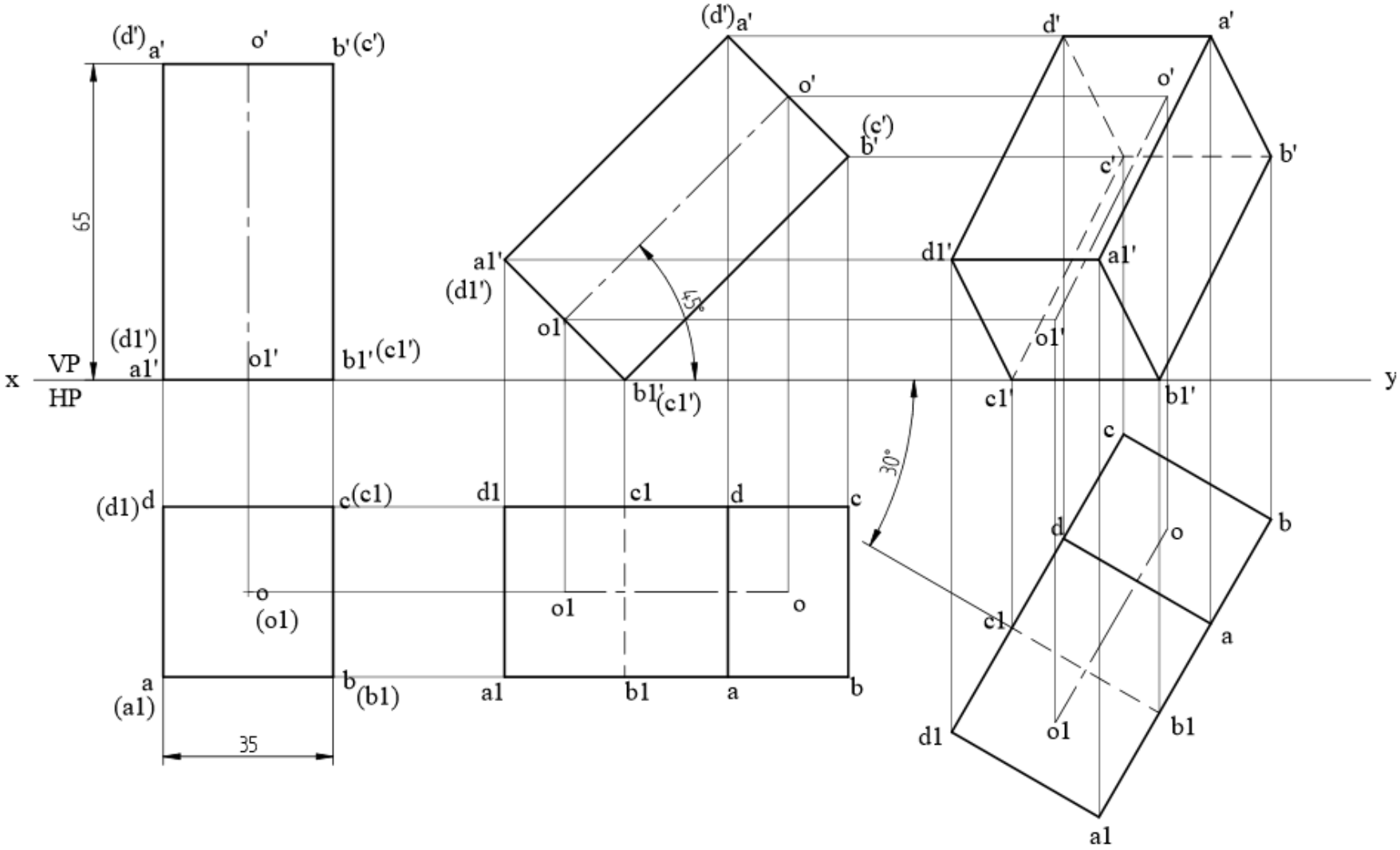


12. A circular lamina inclined to the VP appears in the front view as an ellipse of major axis 30 mm and minor axis 15 mm. The major axis is parallel to both HP and VP. One end of the minor axis is in both the HP and VP. Draw the projections of the lamina and determine the inclination of the lamina with the VP.

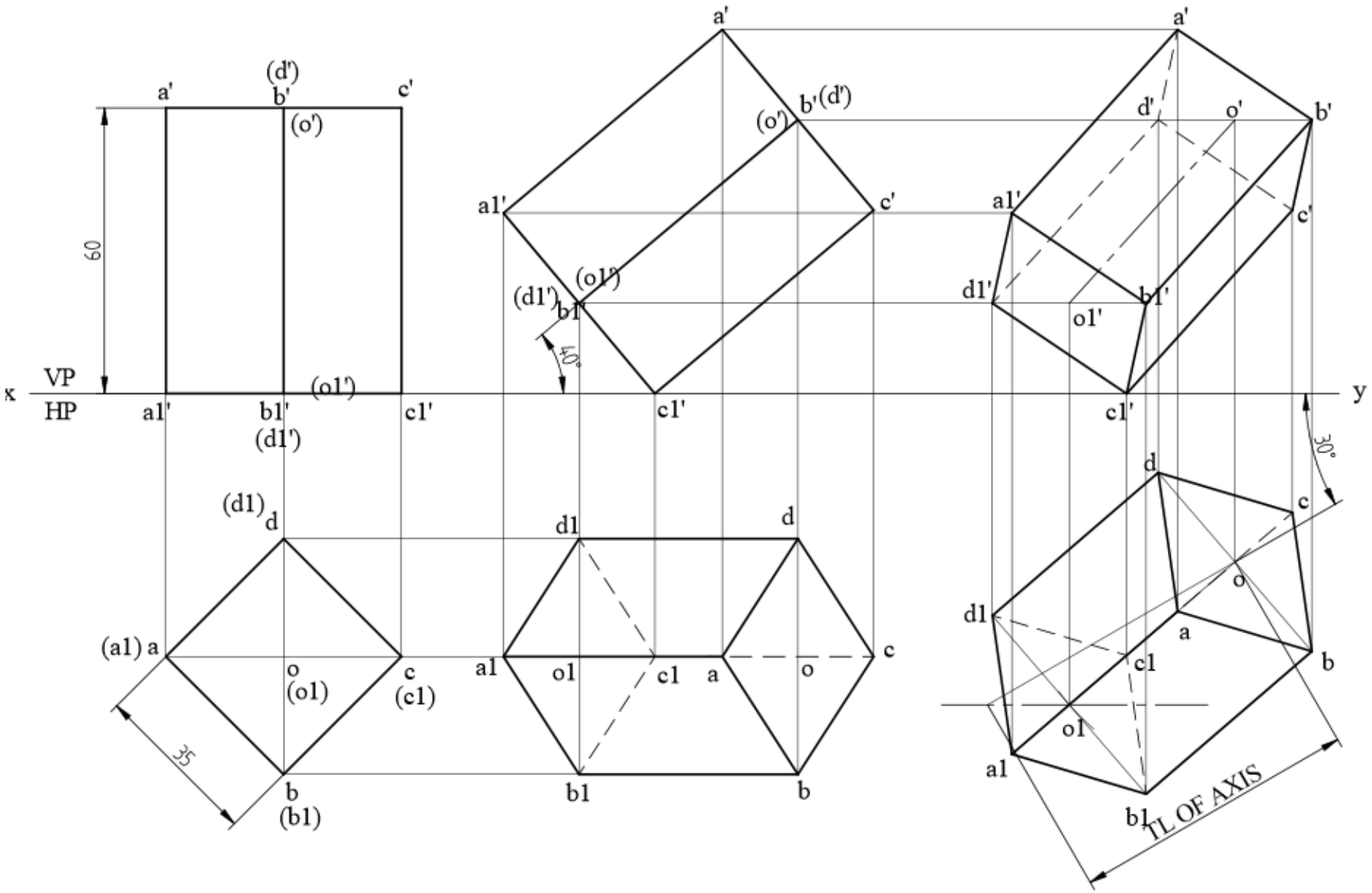


Projection of Solids

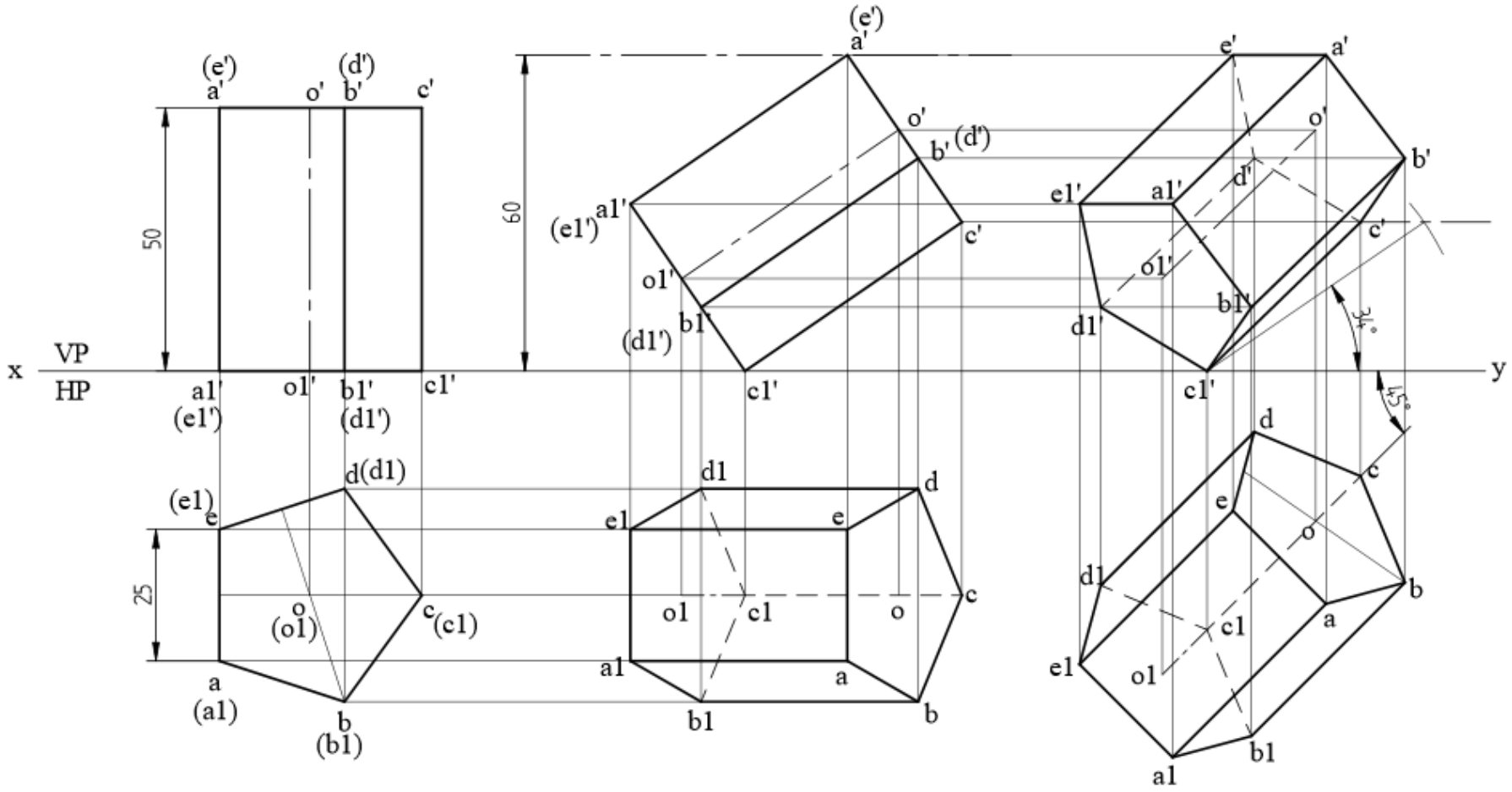
1. A square prism 35mm sides of base and 65mm axis length rests on HP on one of its edges of the base which is inclined to VP at 30°. Draw the projections of the prism when the axis is inclined to HP at 45°.



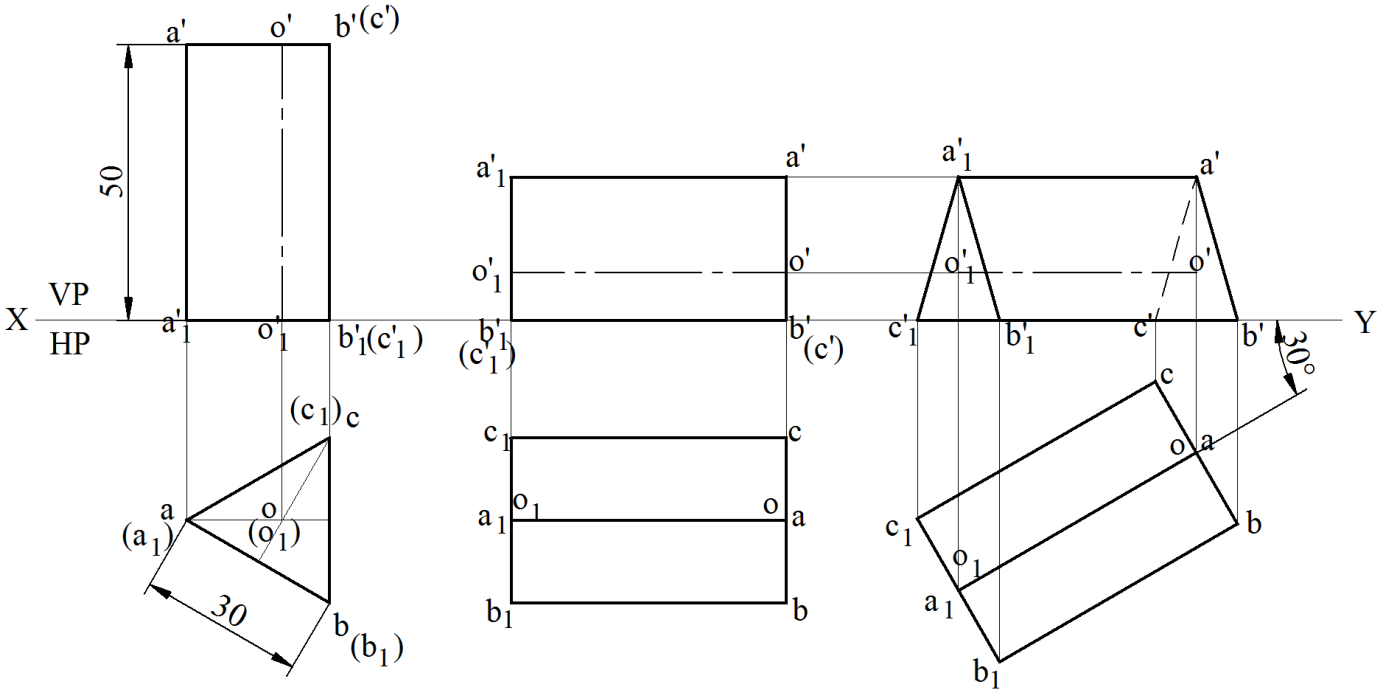
2. A square prism 35mm sides of base and 60mm axis length rests on HP on one of its corner of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the prism when the axis of the prism is inclined to HP at 40° and to VP at 30°.



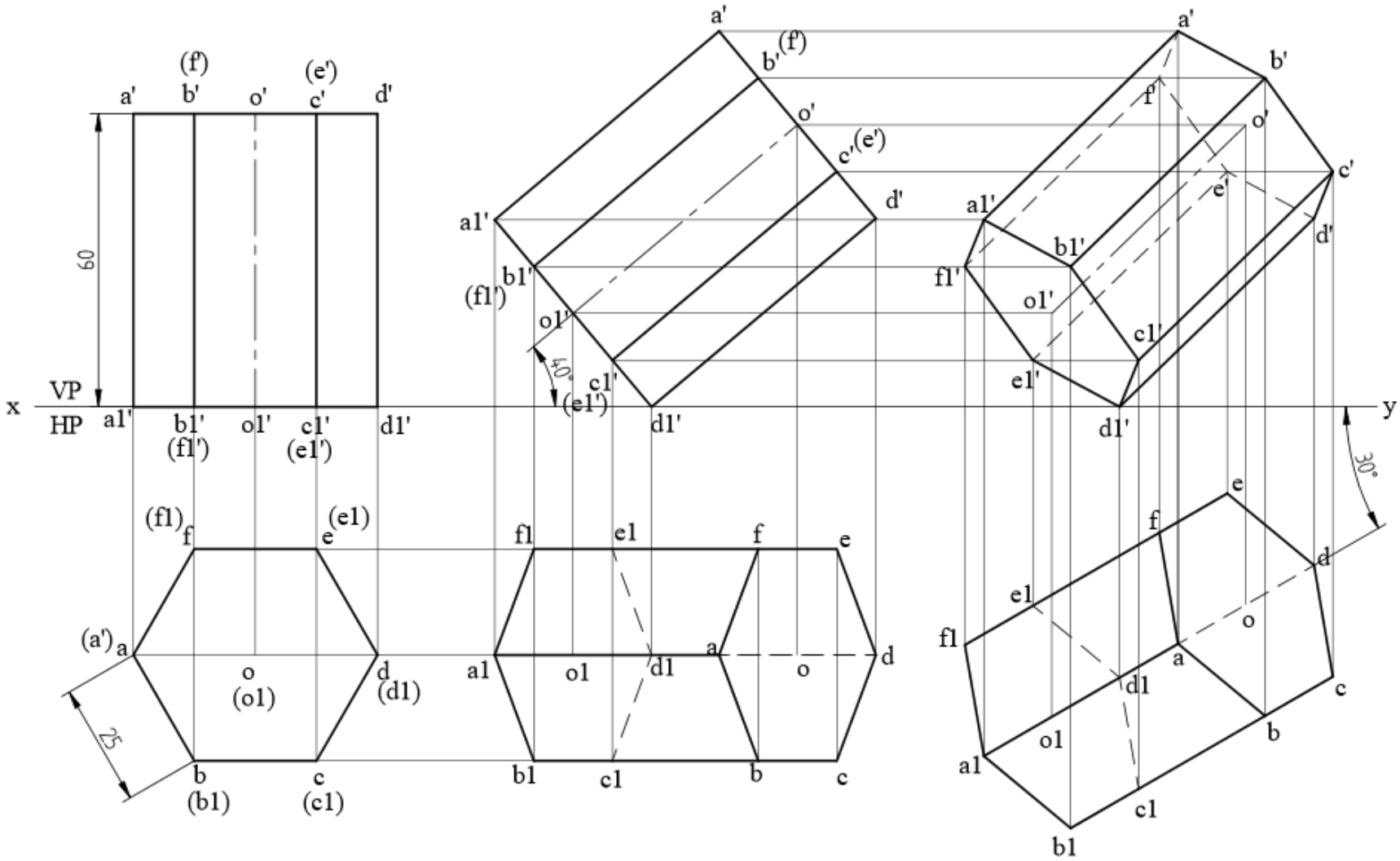
3. A pentagonal prism of base side 25mm and height 50mm is resting on HP on one of its base corners such that the topmost edge is at a distance of 60mm above HP. Draw its projections, when its top view of the axis is inclined at 45^{o} to VP. Also determine the inclination of the longer edge of the prism to HP which contains the resting corner.



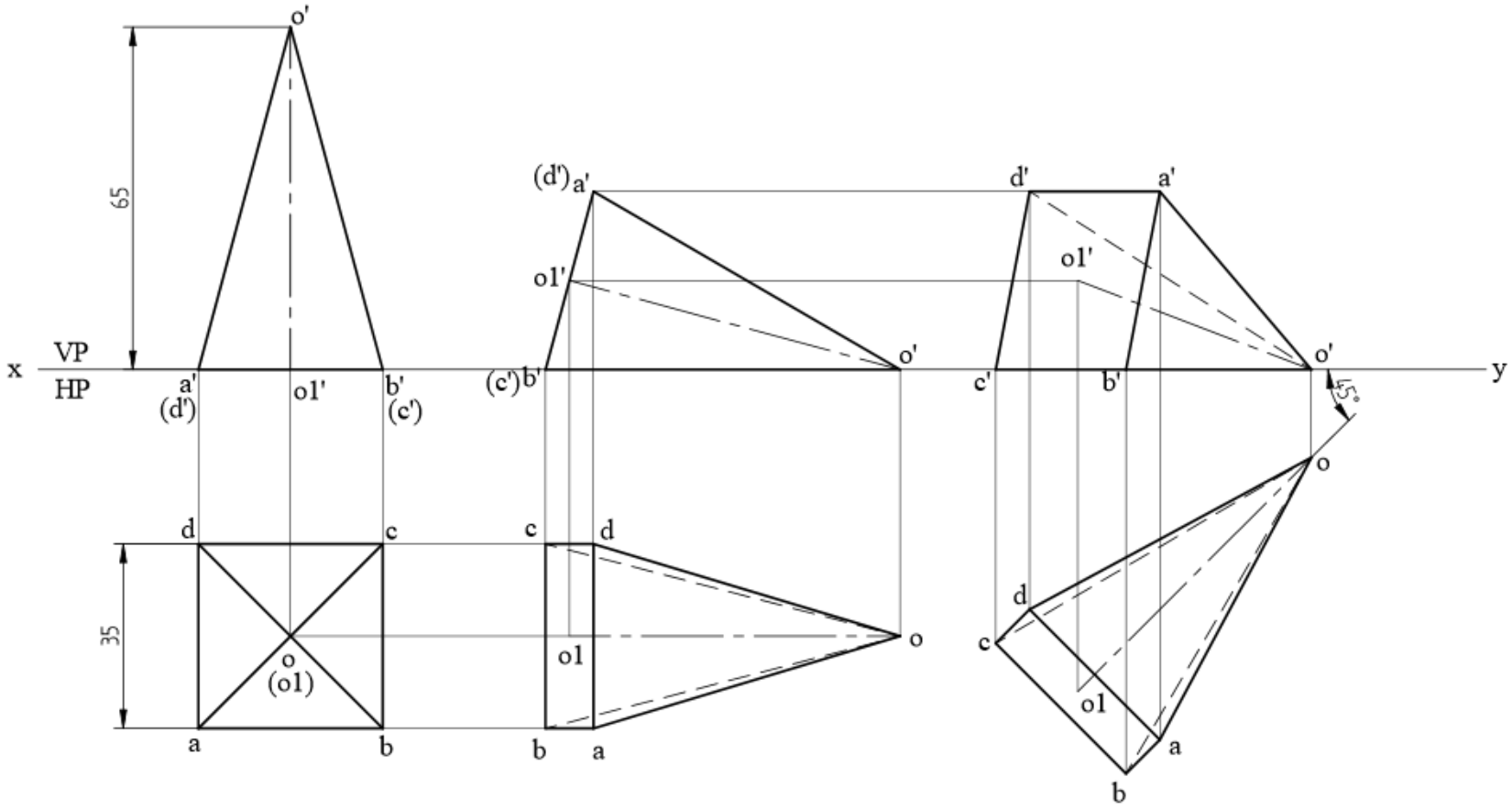
4. A trinagular prism of 30 mm sides of base and 50 mm axis height is resing on HP on one of its rectangular faces. The axis of the prism is inclined at 30° to VP..



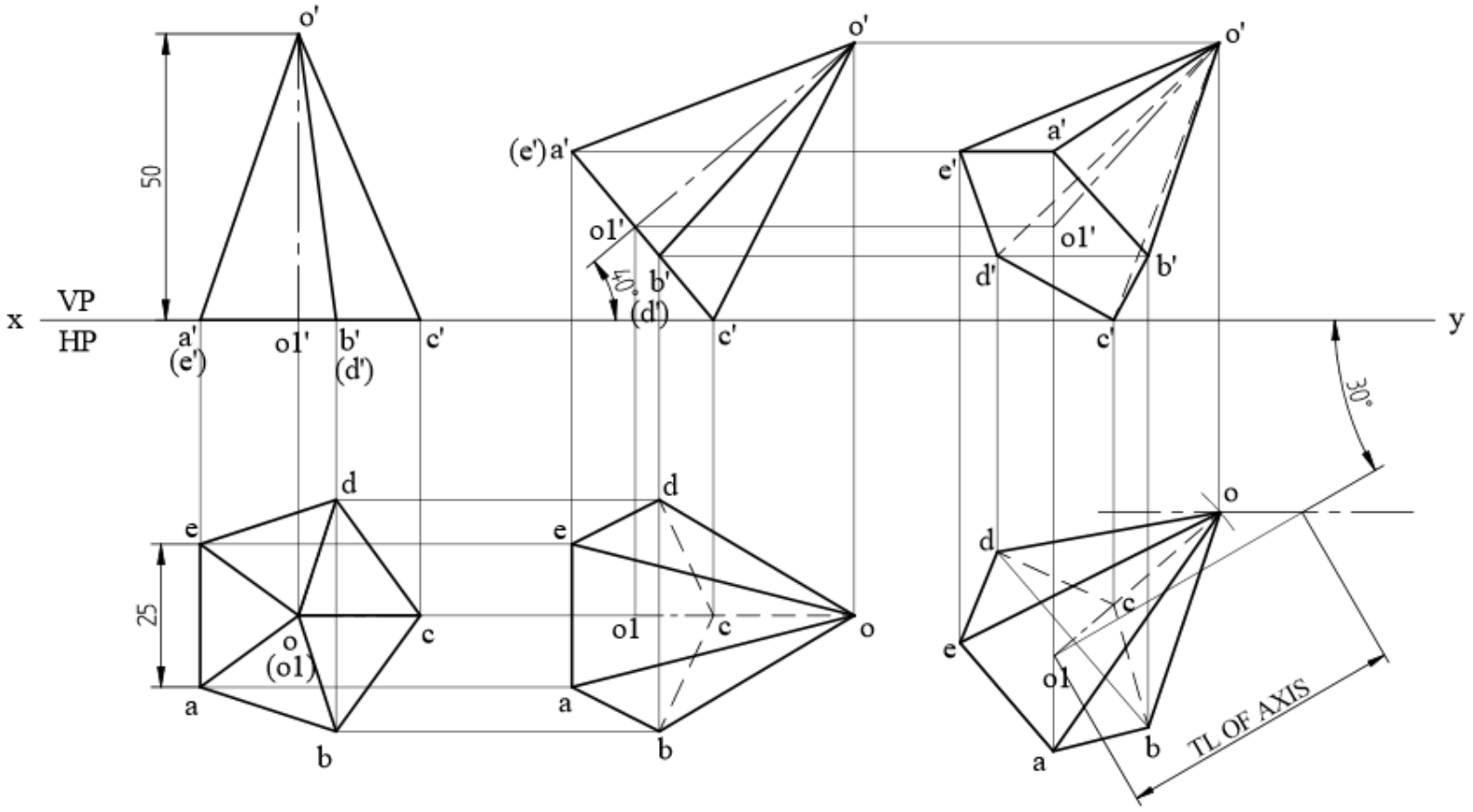
5. A hexagonal prism 25mm sides of base and 60mm axis length rests on HP on one of its corner of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the prism when the axis of the prism is inclined to HP at 40^{o} and appears to be inclined to VP at 30^{o}.



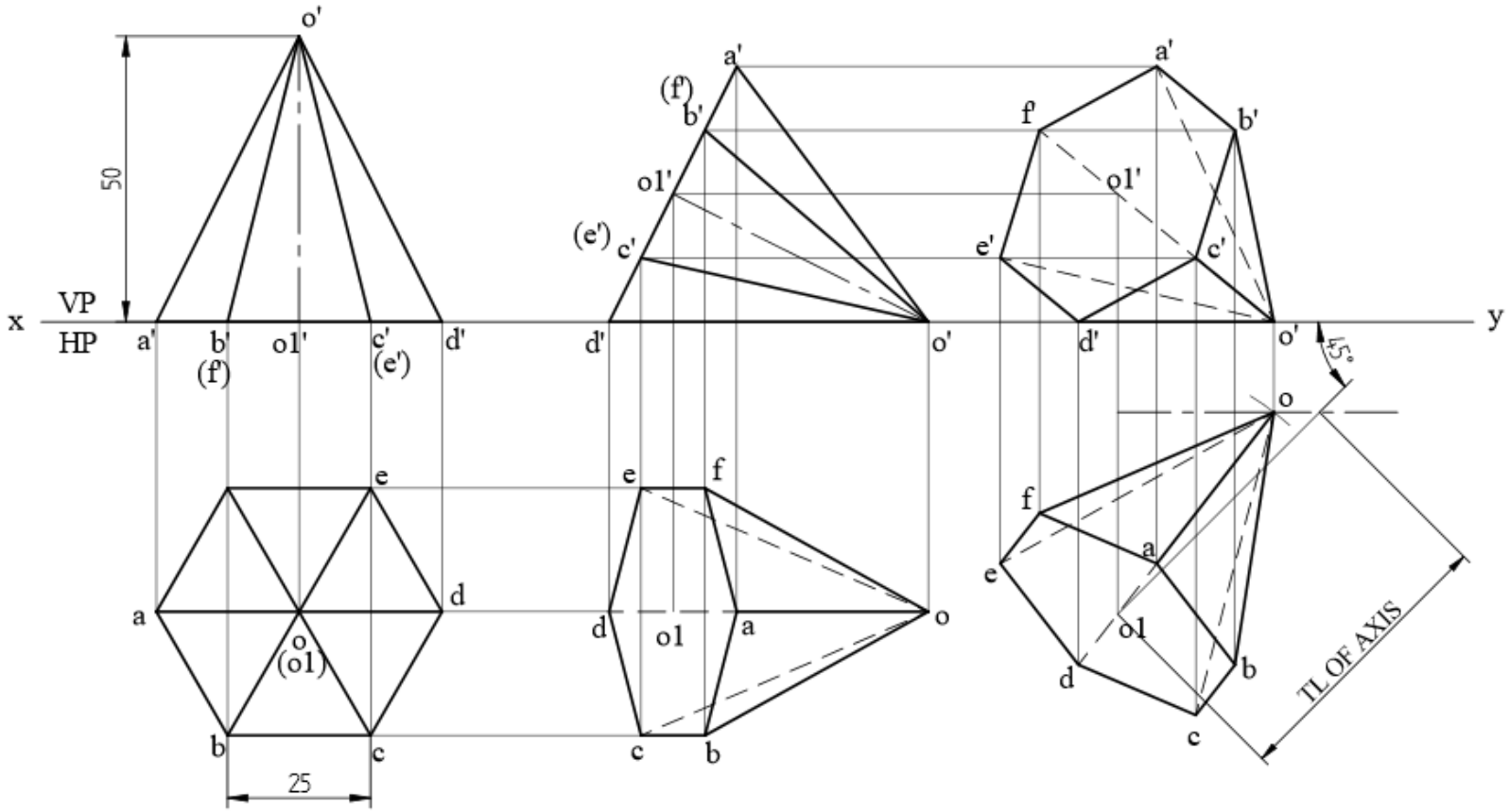
6. A square pyramid 35mm sides of base and 60mm axis length rest on HP on one of its slant triangular faces. Draw the projection of the pyramid when the axis appears to be inclined to VP at 45°.



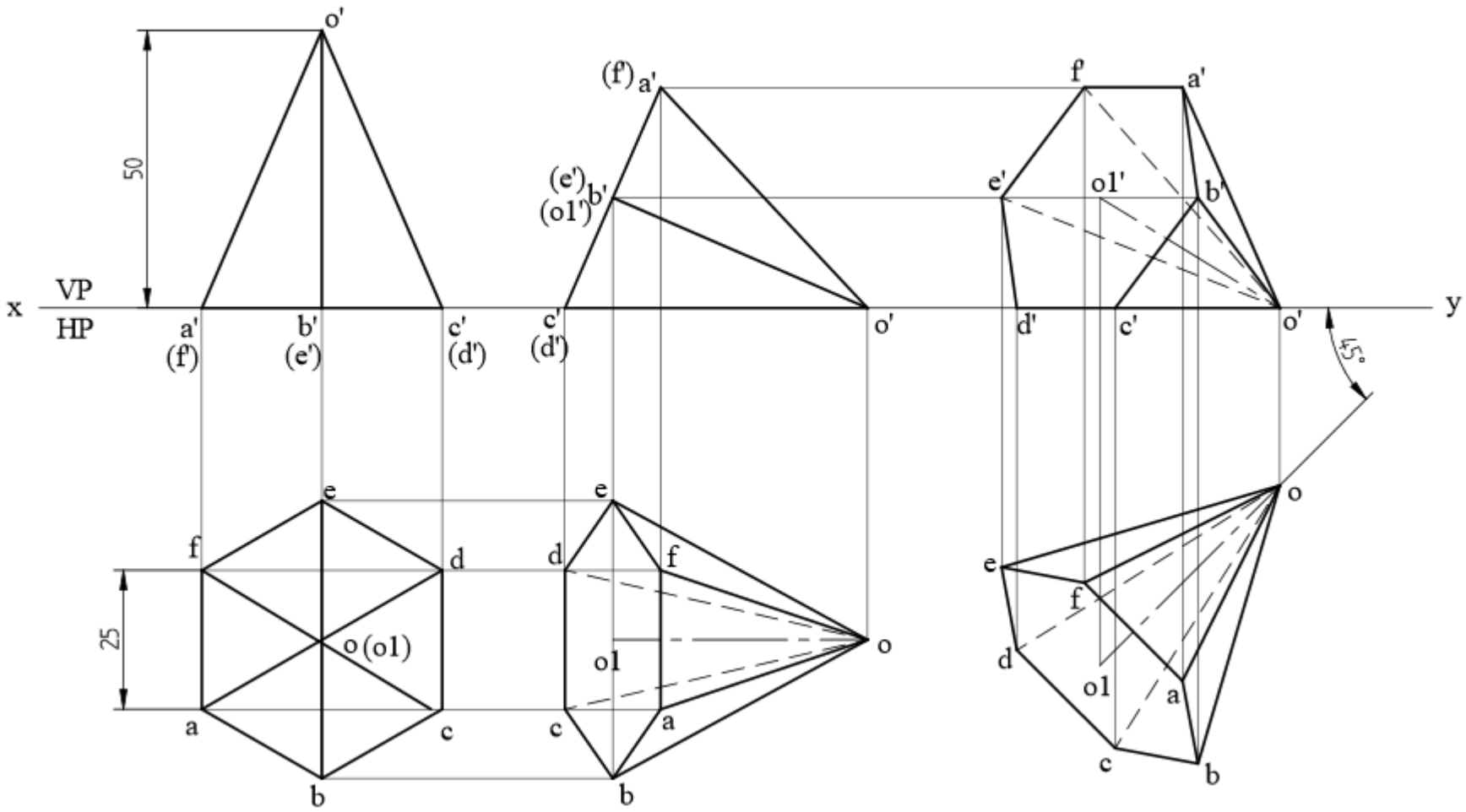
7. A pentagonal pyramid 25mm sides of base and 50mm axis length rest on HP on one of its corners of the base such that the two base edges containing the corner on which it rests make equal inclinations with HP. Draw the projections of the pyramid when the axis of the pyramid is inclined to HP at 40^o and VP at 30^o.



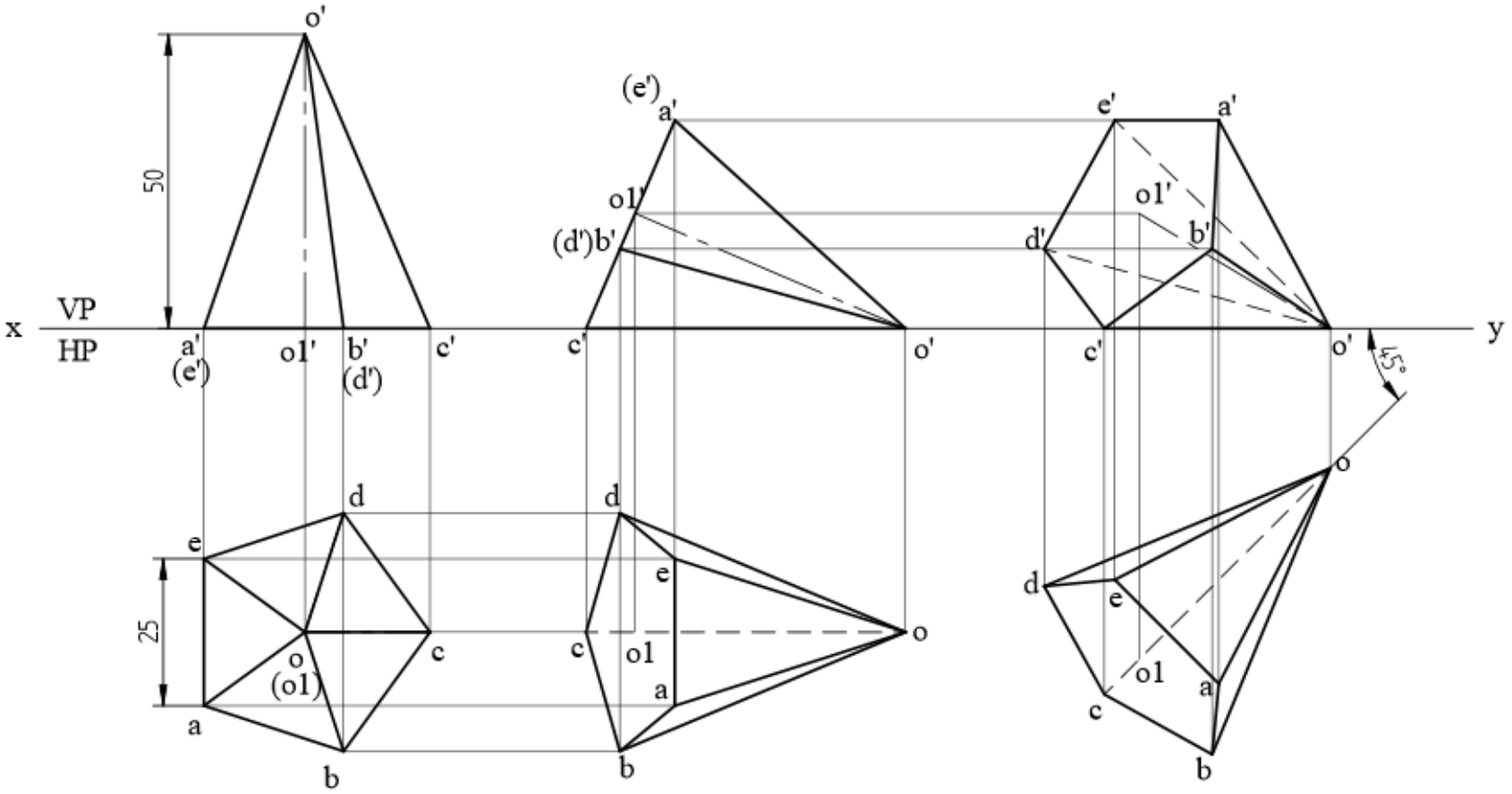
8. A hexagonal pyramid 25mm sides of base and 50mm axis length rest on HP on one of its slant edges. Draw the projection of the pyramid when the axis is inclined to VP at 45°.



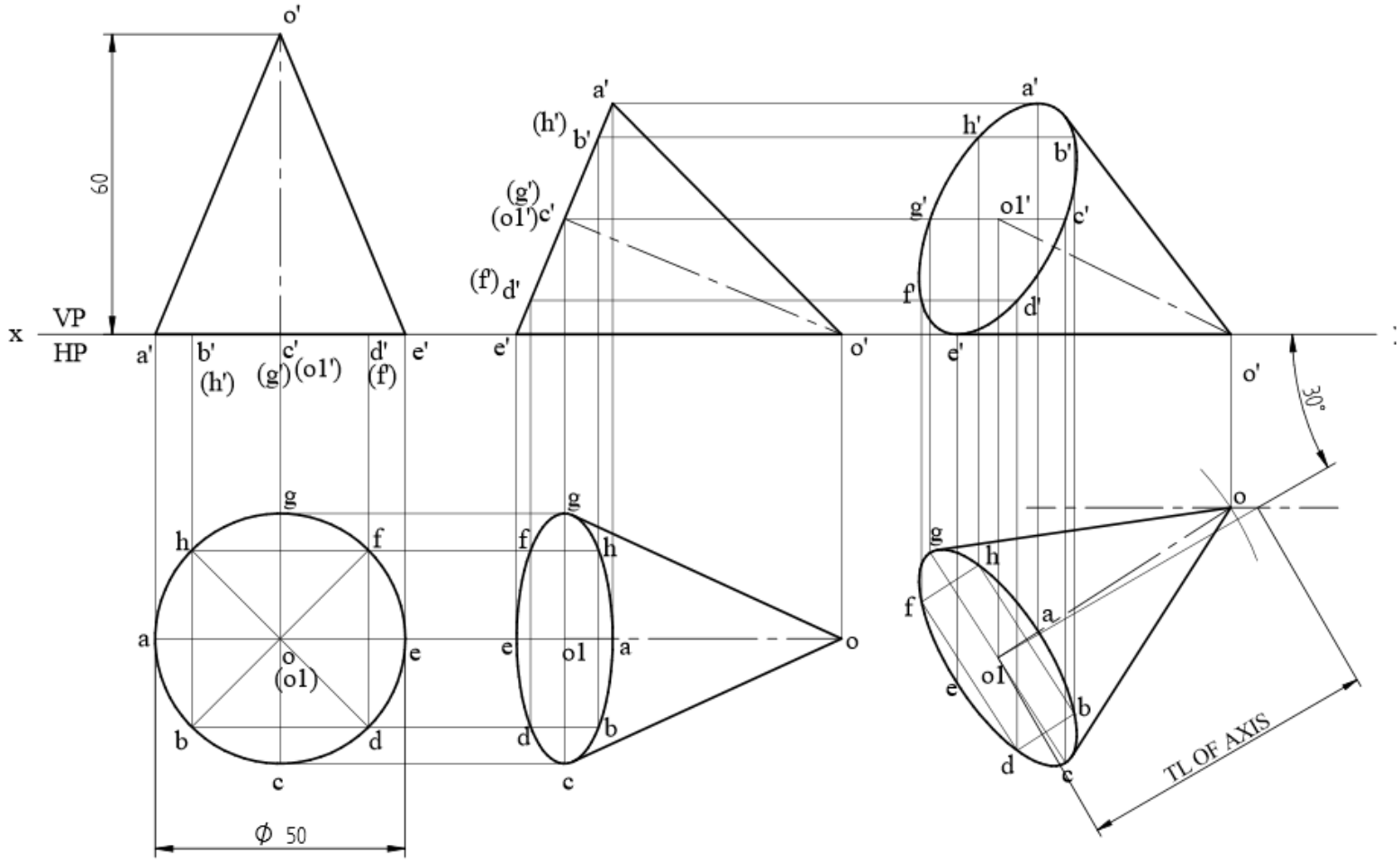
9. A hexagonal pyramid 25mm sides of base and 50mm axis length rest on HP on one of its slant triangular faces. Draw the projection of the pyramid when the axis appears to be inclined to VP at 45°.



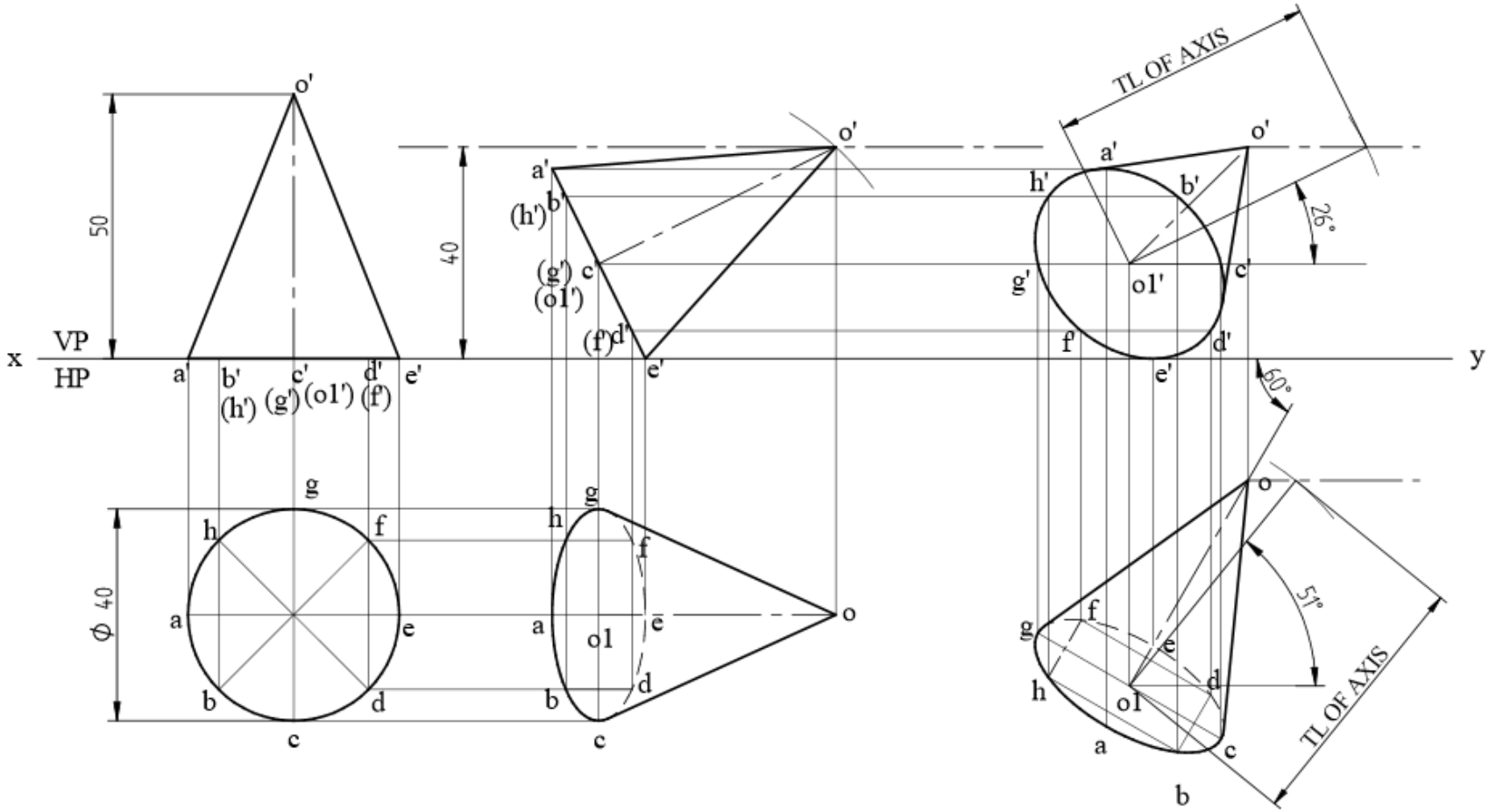
10. A pentagonal pyramid 25mm sides of base and 50mm axis length rest on HP on one of its slant edges. Draw the projection of the pyramid when the axis appears to be inclined to VP at 45°.



11. A cone of 50mm base diameter and 60mm axis length rest on HP on one of its generators. Draw its projections when the axis is inclined to VP at 30^{o}.

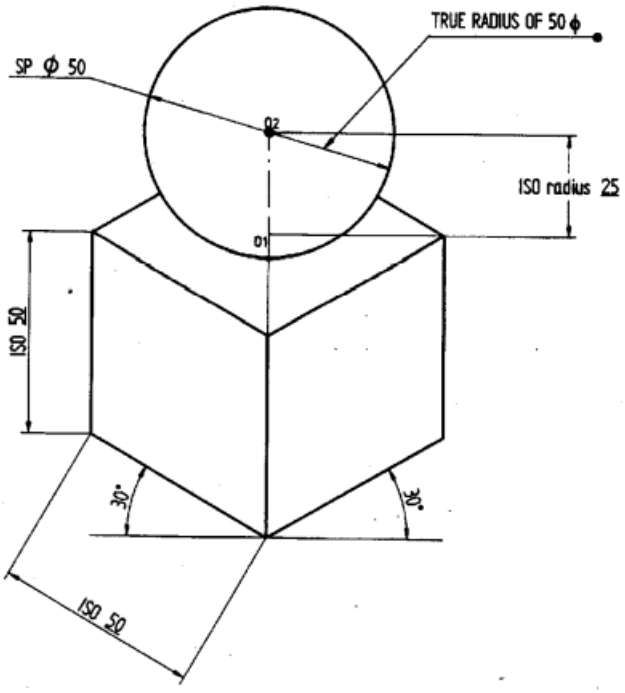


12. A cone of base dia. 40mm and axis length 50mm is resting on HP on a point on the circumference of its base such that its apex is at 40mm above HP and its top view of the axis is inclined at 60^{o} to VP. Draw the top and front views of the solid. Also determine the inclinations of the axis when the base is nearer to the observer.

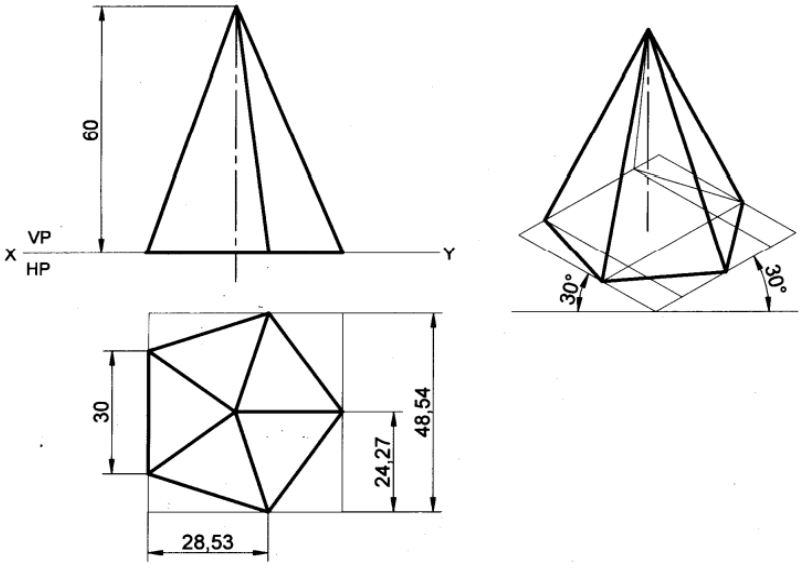


Isometric Projection

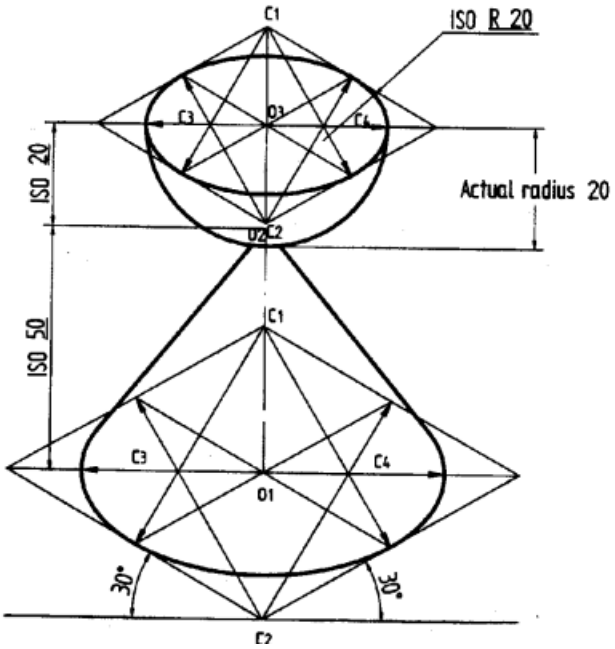
1. A sphere of diameter 50 mm rests centrally on top of a cube of sides 50 mm. Draw the Isometric projections of the combination of solids.



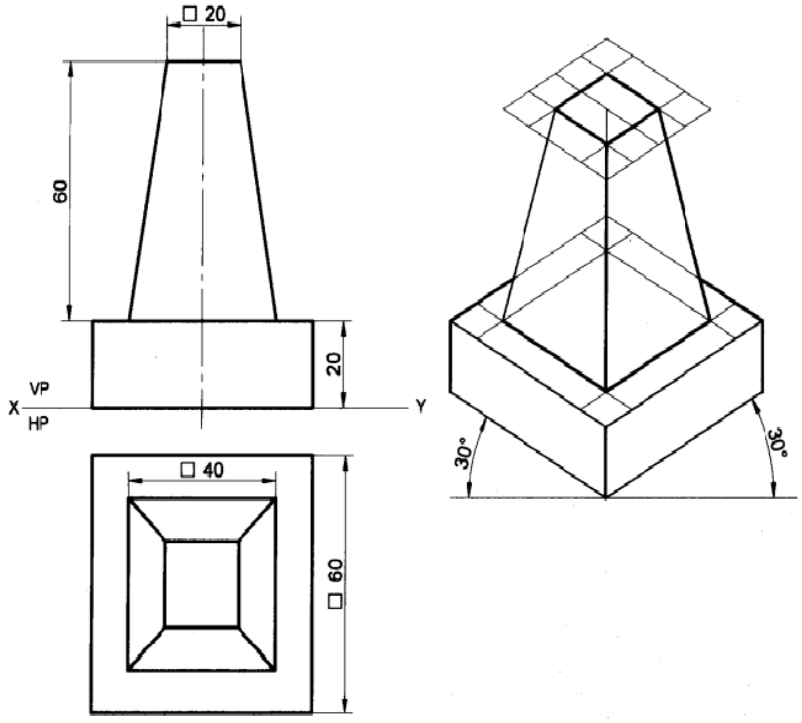
2. A pentagonal pyramid of base side 30 mm and axis length 60 mm is resting on HP on its base with a side of base perpendicular to VP. Draw its isometric projections.



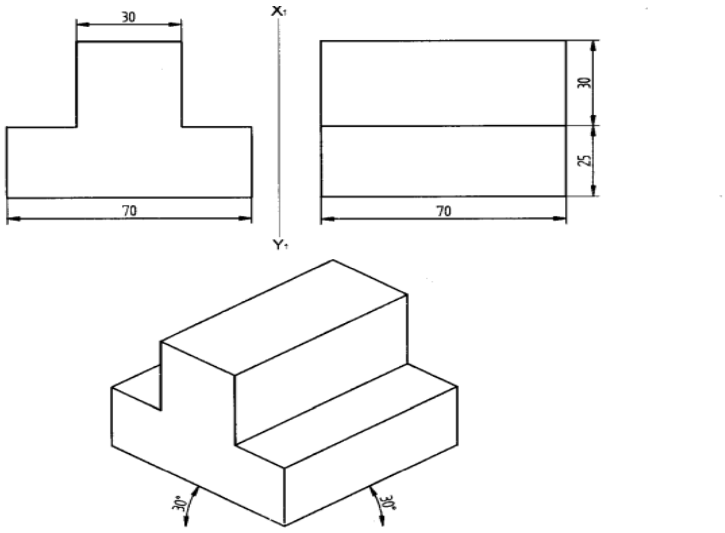
3. A hemisphere of 40 mm diameter is supported co-axially on the vertex of a cone of base diameter 60 mm and axis length 50 mm. The flat circular face of the hemisphere is facing upside. Draw the isometric projection of the combination of solids.



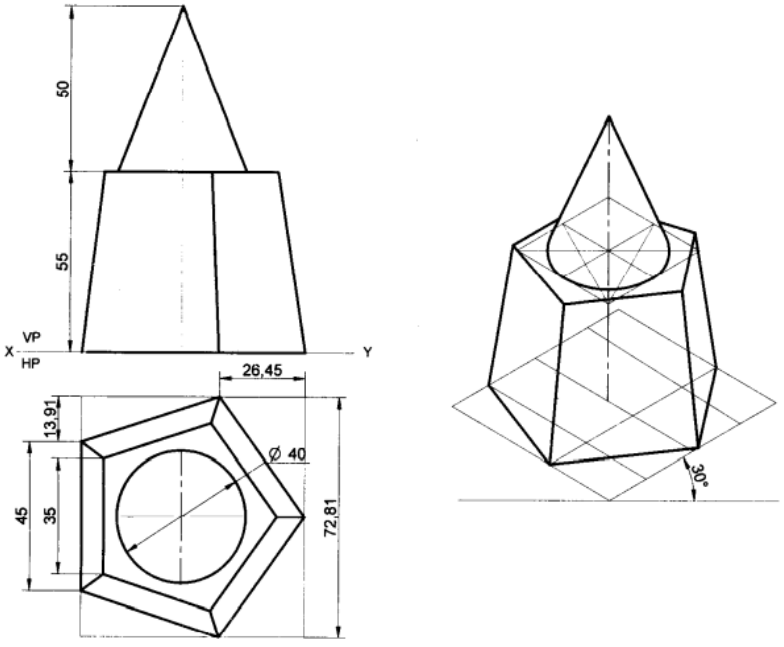
4. The frustum of a square pyramid of base 40 mm, top face 20 mm and height 60 mm rest on the centre of the top of a square block of sides 60 mm and height 20 mm. The base edges of the pyramid are parallel to the top edges of the square block. Draw the isometric projection of the combination of the solids.



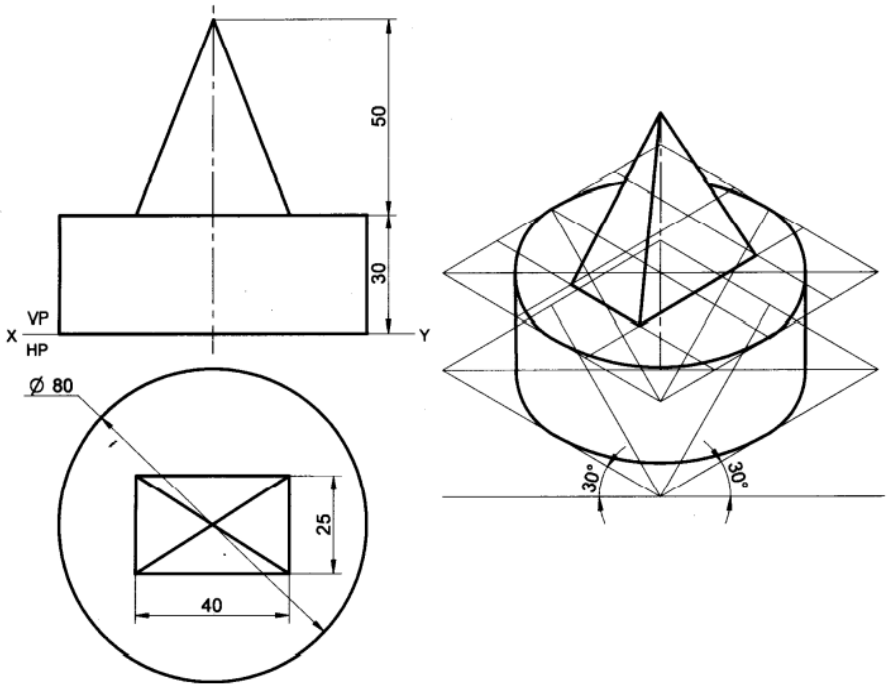
5. A square prism of base side - 30 mm and length - 70 mm is resting on its rectangular face on top of a square slab side - 70 mm and 25 mm thick. Draw the isometric projection of the combination.



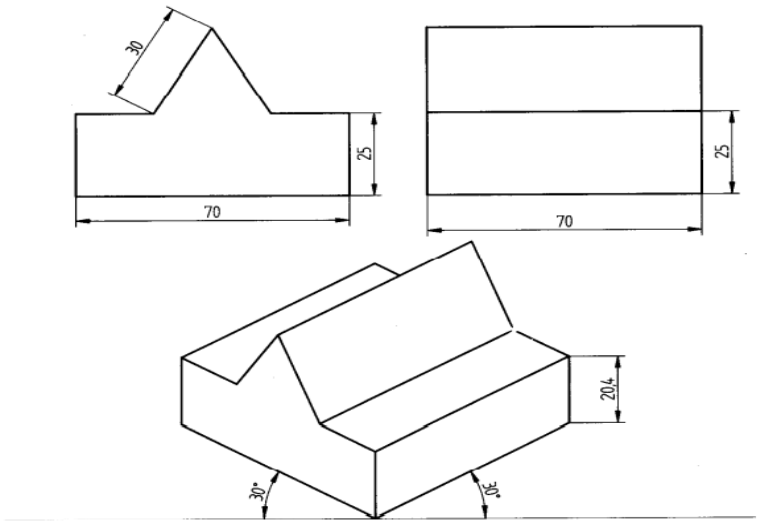
6. A cone of base diameter 40 mm and height 50 mm rests centrally over a frustum of a pentagonal pyramid of base side 45 mm and top side 35 mm and height 55 mm. Draw the isometric projections of the solids.



7. A rectangular pyramid of base - 40 mm x 25 mm and height 50 mm is placed centrally on a cylindrical slab of diameter 100 mm and thickness - 30 mm. Draw the isometric projection of the combination.

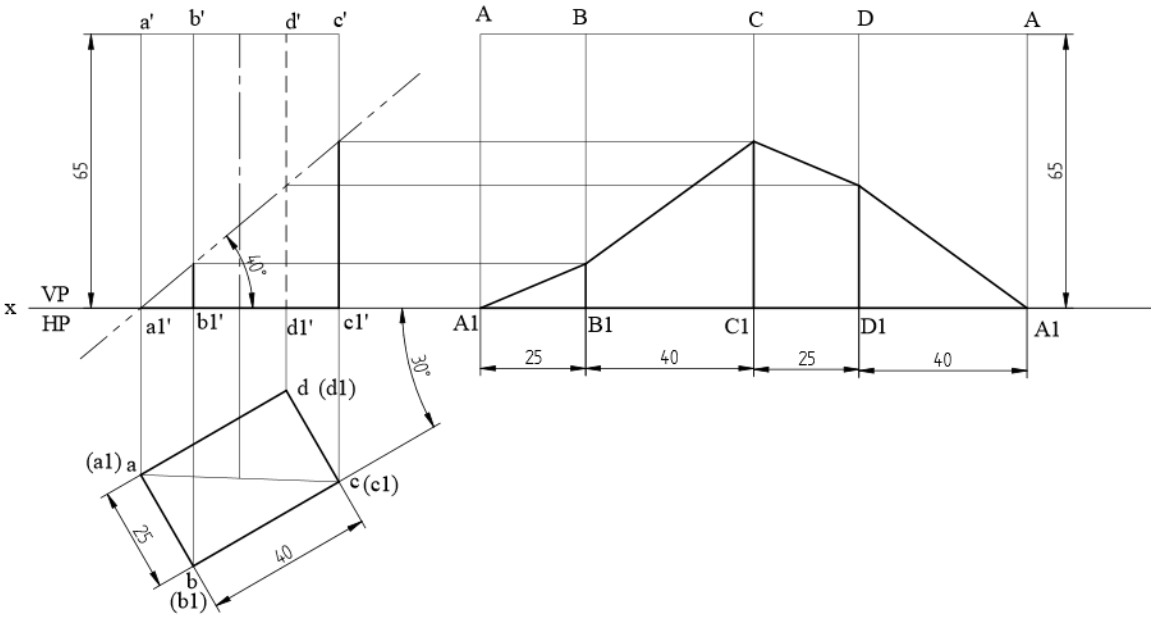


8. A triangular prism base side 30 mm and length - 70 mm is resting on its rectangular face on top of a square slab side - 70 mm and 25 mm thick. Draw the isometric projection of the combination.

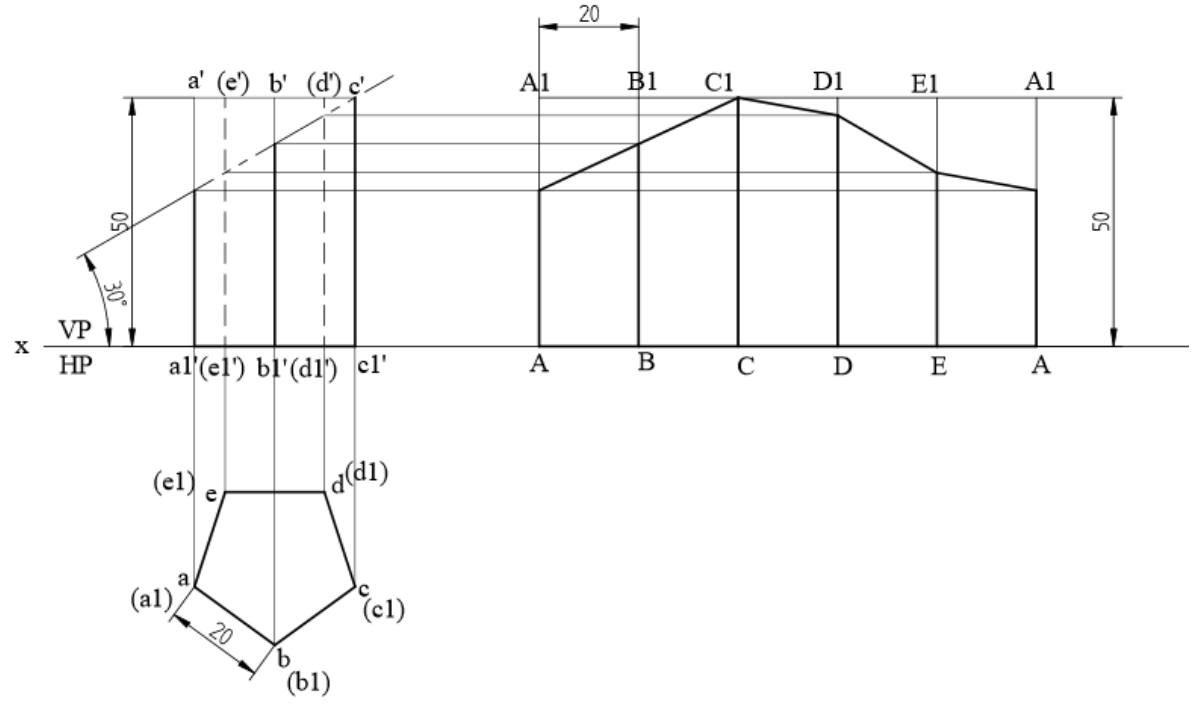


Development of Lateral Surfaces of Solids

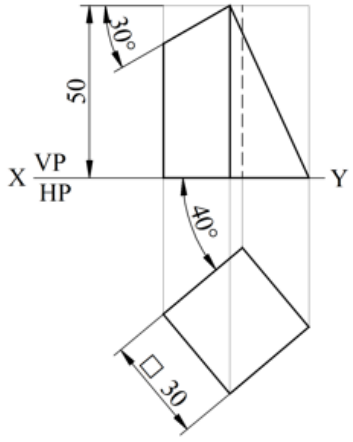
1. A rectangular prism of base size 25 mm x 40 mm and axis length 65 mm is resting on HP on its base with the longer side of base inclined at 30 deg. to VP. It is cut by a plane inclined at 40 deg. to HP and perpendicular to VP and passes through the extreme left corner of base. Draw the development of the lateral surface of the remaining portion of the prism.

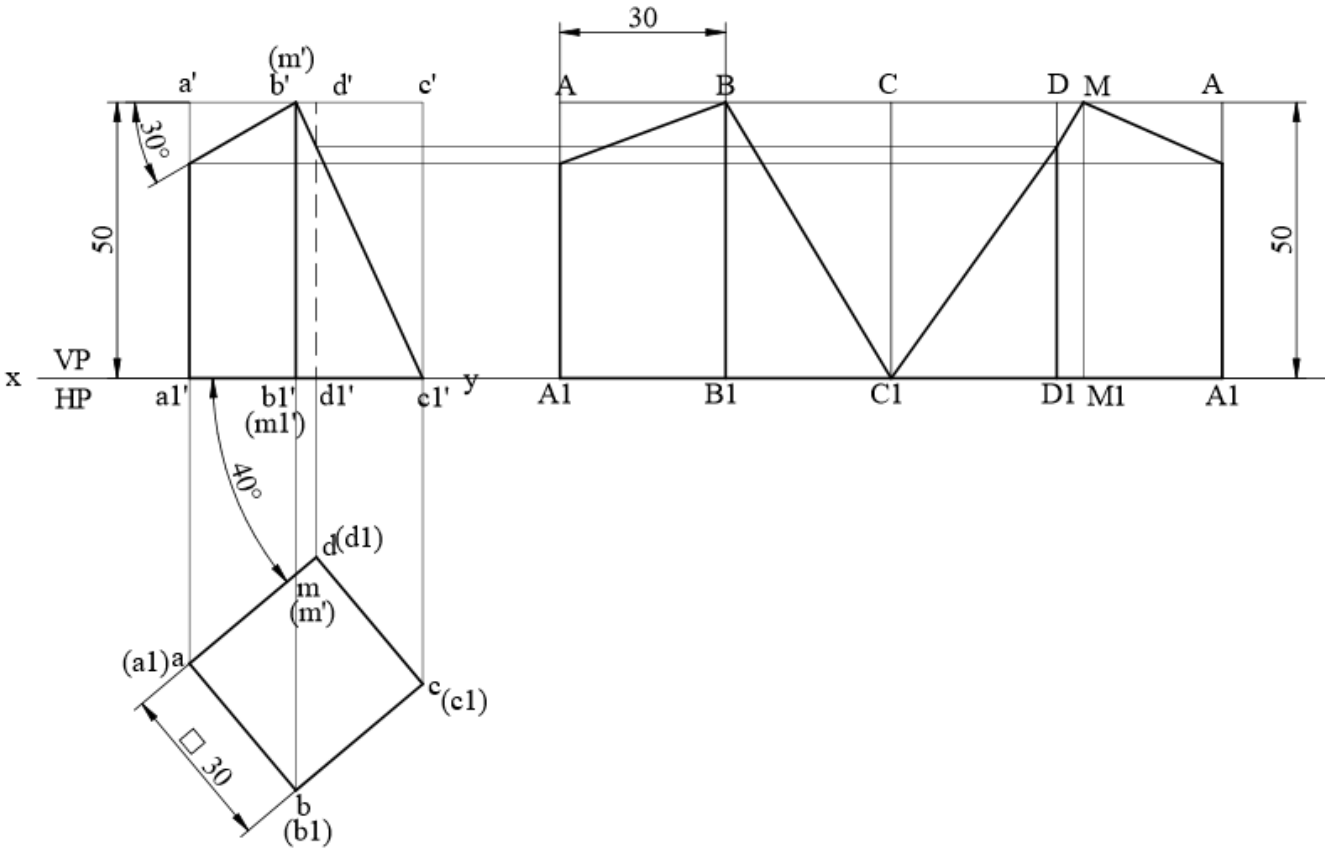


2. Draw the development of the truncated portion of the lateral faces of a pentagonal prism of 20 mm sides of base and 50 mm height standing vertically with one of its rectangular faces parallel to VP and nearer to it so as to produce a one piece development. The inclined face of the truncated prism is 30 deg. to its axis and passes through the right extreme corner of the top face of the prism.

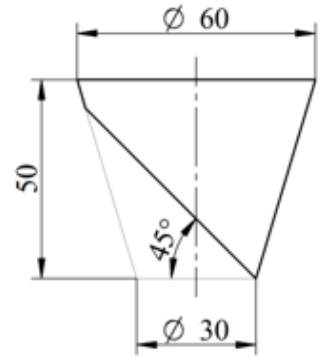


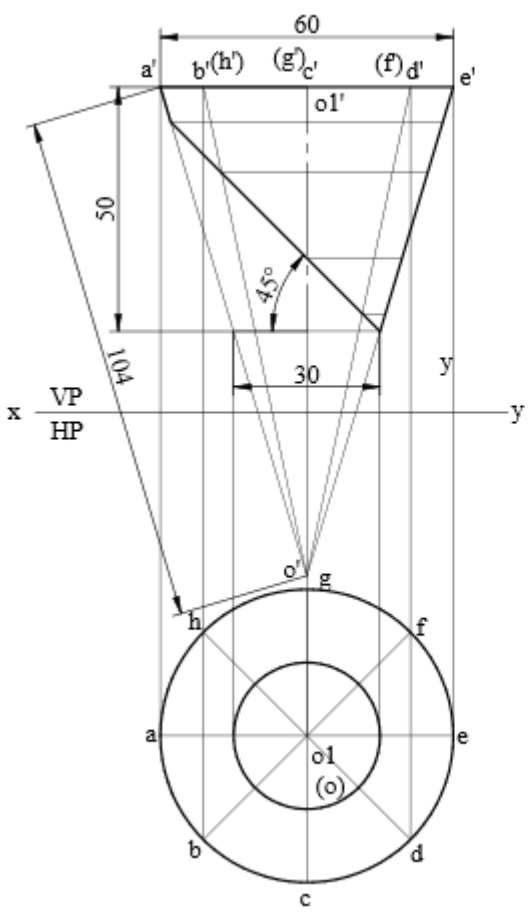
3. A square prism of 30 mm side of the base and height 50 mm is resting with its base on HP such that one of its vertical faces is inclined at 40 deg. to VP. It is cut as shown in the following front view. Draw the development of the lateral surface of the prism.

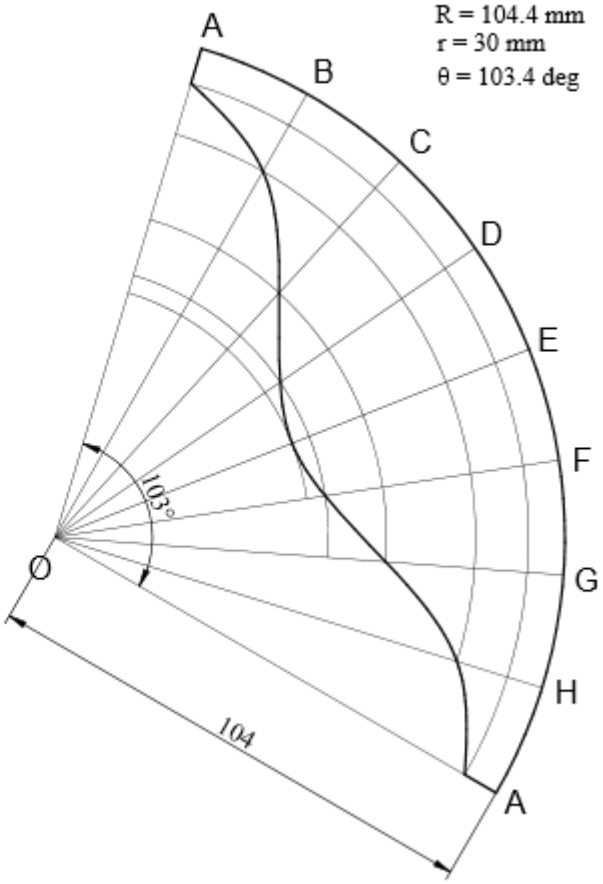




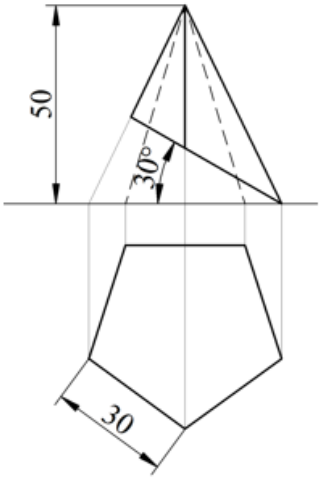
4. Draw the development of the following truncated cone

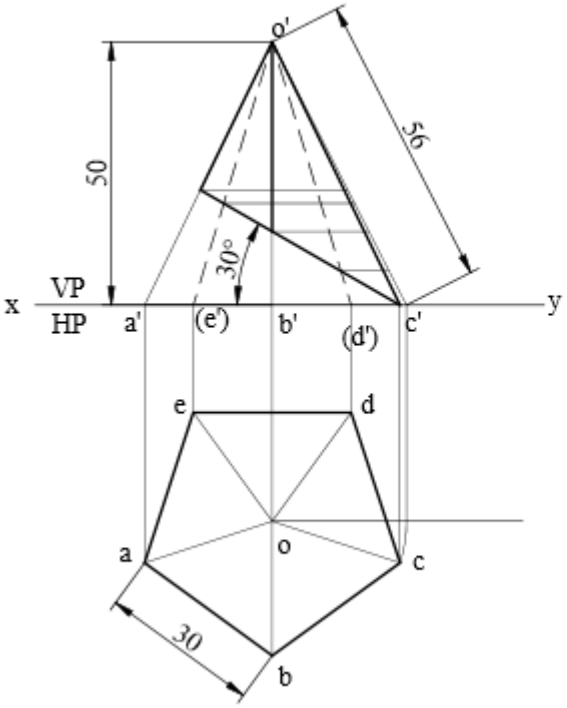


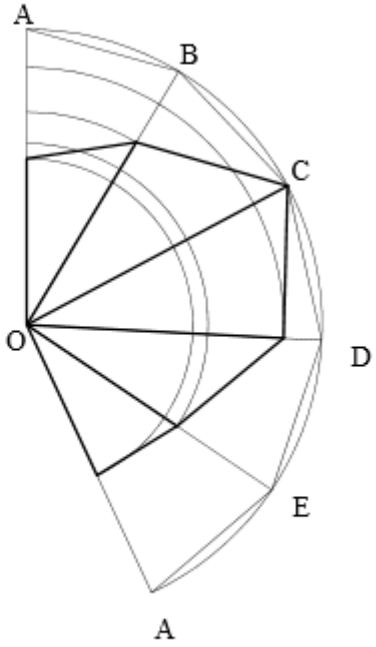




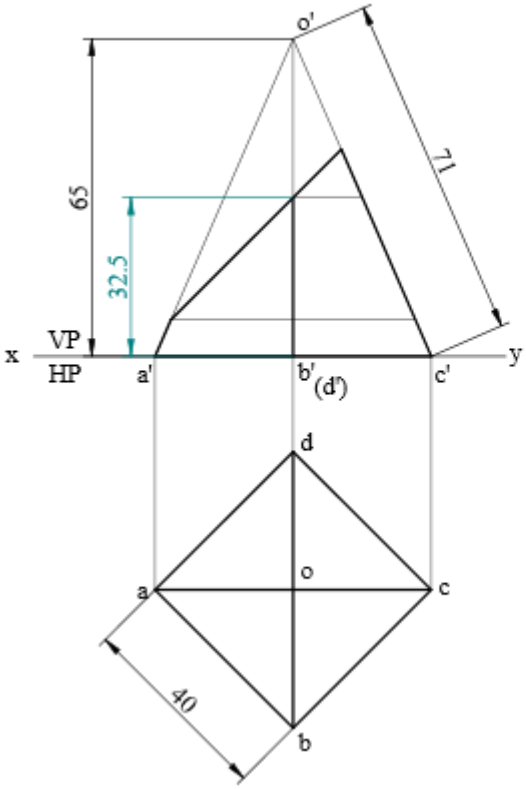
5. A pentagonal pyramid of 30 mm edges of base and 50 mm height rests vertically with one of its base edges parallel to VP and nearer to it. It is cut as shown in figure. Draw the development of the lateral surfaces of the upper portion of the pyramid

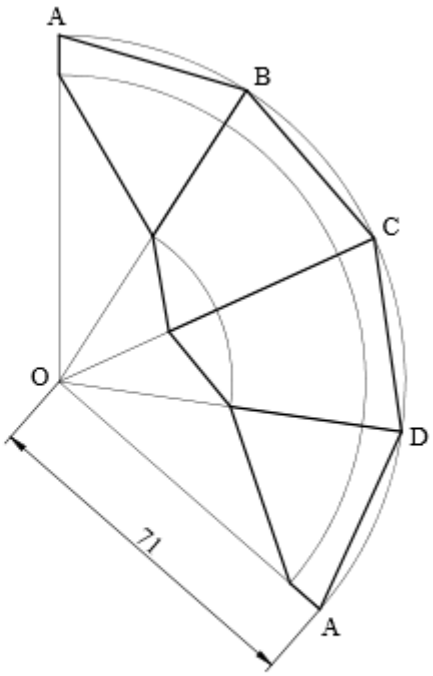




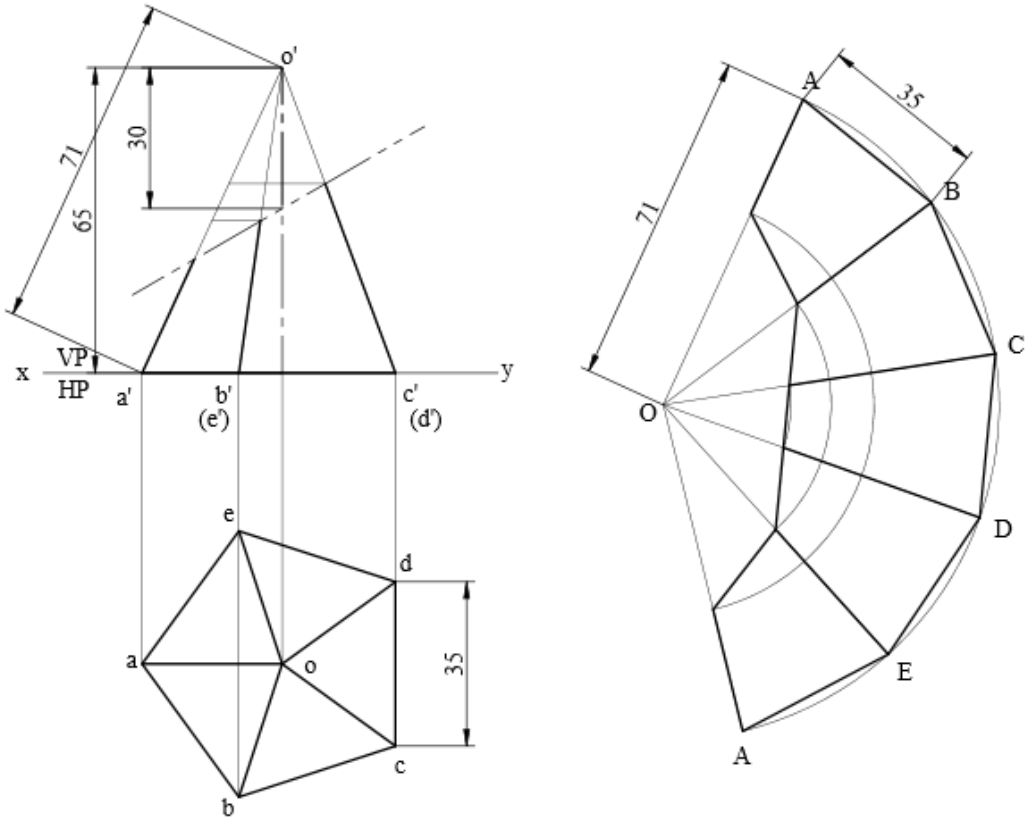


6. A square pyramid base 40 mm side and axis 65 mm long has its base on HP and all the edges of the base are equally inclined to VP. It is cut to with an inclined section plane so as the truncated surface at 45 deg. to its axis, bisecting it. Draw the development of the truncated pyramid.





7. A regular pentagonal pyramid of side of base 35 mm and altitude 65 mm has its base on HP with a side of base perpendicular to VP. The pyramid is cut by a section plane which is perpendicular to the VP and inclined at 30 deg. to HP. The cutting plane meets the axis of the pyramid at a point 30 mm below the vertex. Obtain the development of the remaining part of the pyramid.



8. A vertical cylinder of base diameter 45 mm and axis length 60 mm is cut by a plane perpendicular to VP and inclined at 50 deg. to HP passing through the centre point of the top face. Draw the development of the lateral surface of the cylinder.