Q11. AND Q12.

In each case, given the pictorial view of a solid having two points on its surface, p and q. Draw a front elevation, end elevation and plan of the solid showing the shortest route, on the surface of the solid, between p and q.

Q11. Fig. 11.56

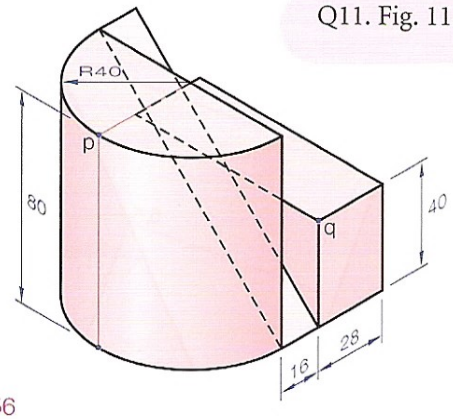


Fig. 11.56

Q12. Fig. 11.57

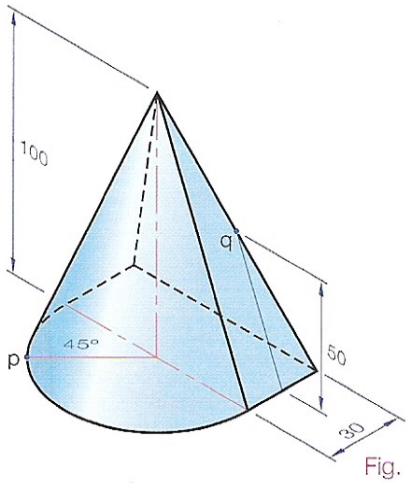


Fig. 11.57

Development of Oblique Solids

To draw the development of an oblique pentagonal prism. Fig. 11.58

(1) Draw the plan and elevation.

(2) The edge lines are true length lines in elevation. Project the ends of these lines perpendicularly.

(3) Choose a starting point for edge 1.

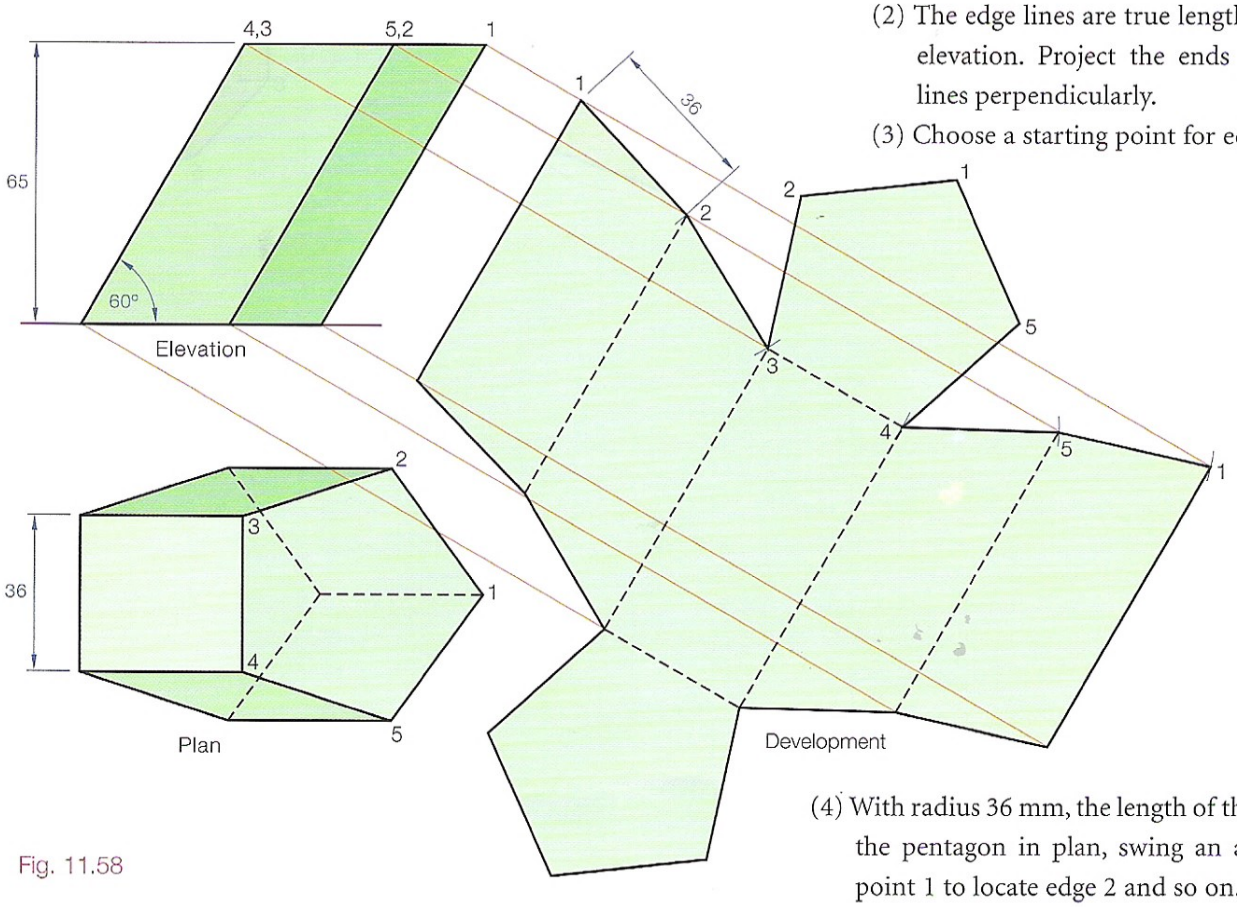


Fig. 11.58

(4) With radius 36 mm, the length of the side of the pentagon in plan, swing an arc from point 1 to locate edge 2 and so on.

HIGHER LEVEL

To draw the development of the surfaces of a truncated oblique hexagonal prism. Fig. 11.59

The development method is the same as above. The surface on the HP gives true lengths which are used as before to find the edges 1,1 and 2,2 etc.

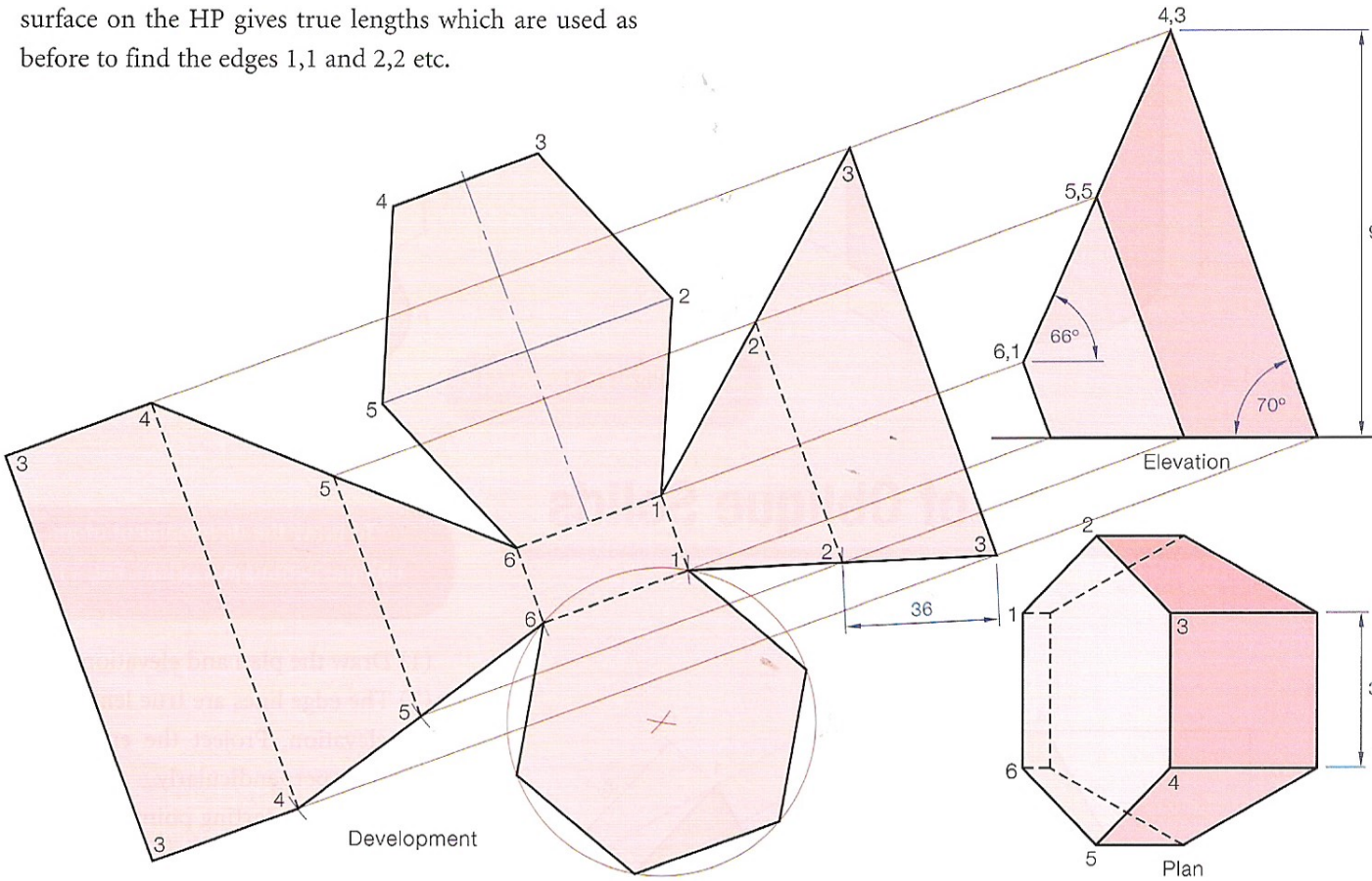


Fig. 11.59

To draw the surface development of an oblique cylinder. Fig. 11.60

(1) Draw the plan and elevation.
(2) Divide the base circle into 12 equal parts.
(3) Project these points to elevation and draw in the generators.
(4) Project out the ends of each generator at right angles.
(5) Choose a starting point 1.
(6) Take distance d from plan and swing an arc from point 1 to locate point 2.
(7) Continue in this manner to locate the other points.
(8) Construct lines parallel to the cylinder edge from each point and find the top edge of the development.

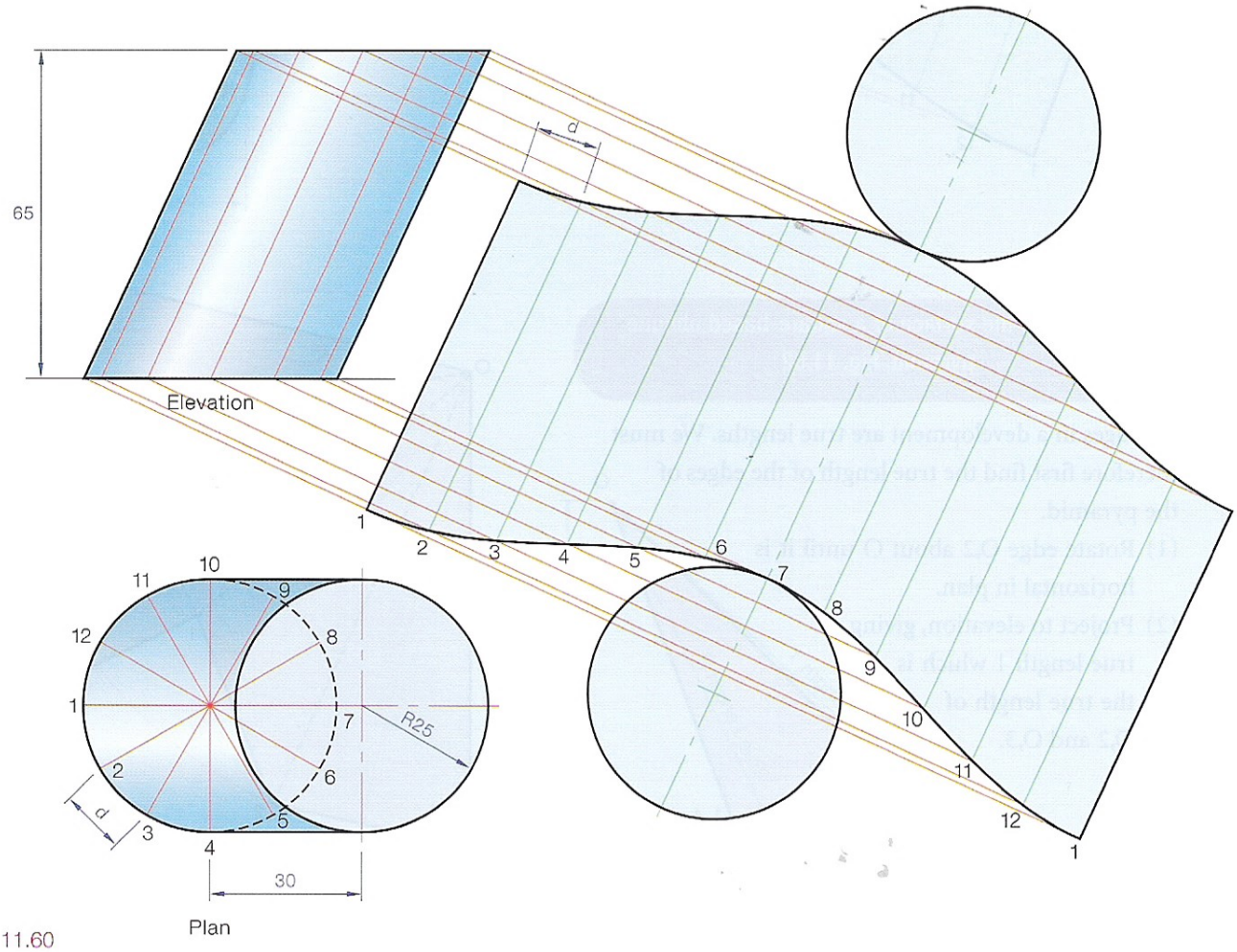


Fig. 11.60

To draw the complete surface development of an oblique truncated cylinder. Fig. 11.61

The construction is as Fig. 11.60.

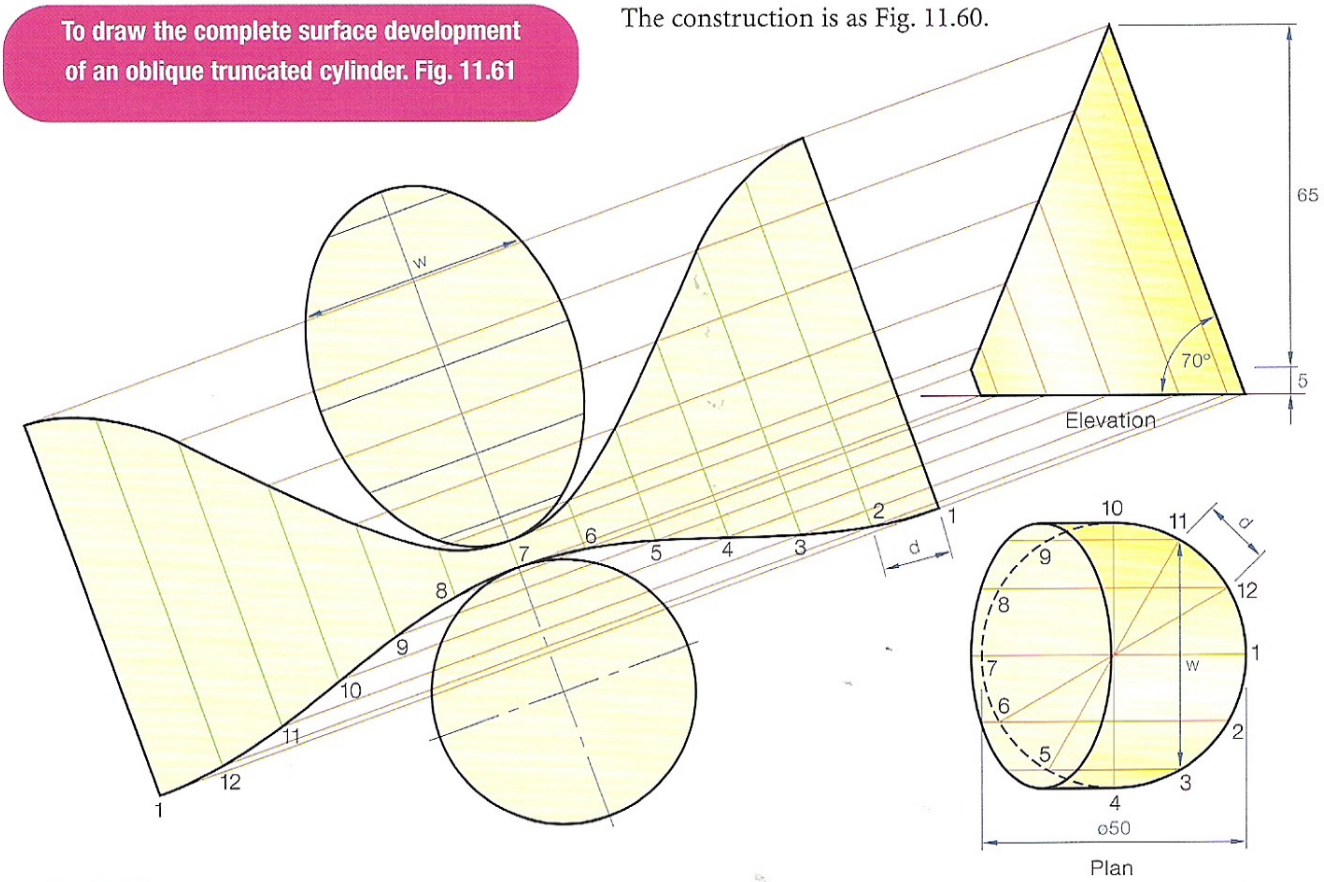


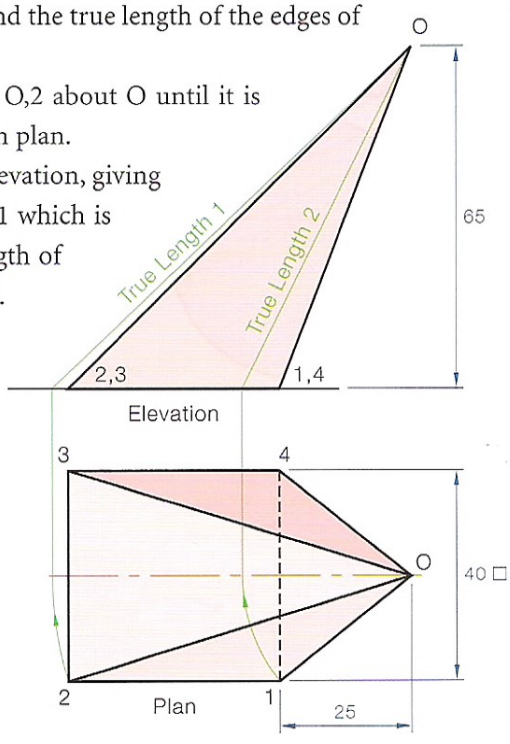
Fig. 11.61

To develop the surface of a square-based oblique pyramid. Fig. 11.62

All edges in a development are true lengths. We must therefore first find the true length of the edges of the pyramid.

(1) Rotate edge O,2 about O until it is horizontal in plan.

(2) Project to elevation, giving true length 1 which is the true length of O,2 and O,3.



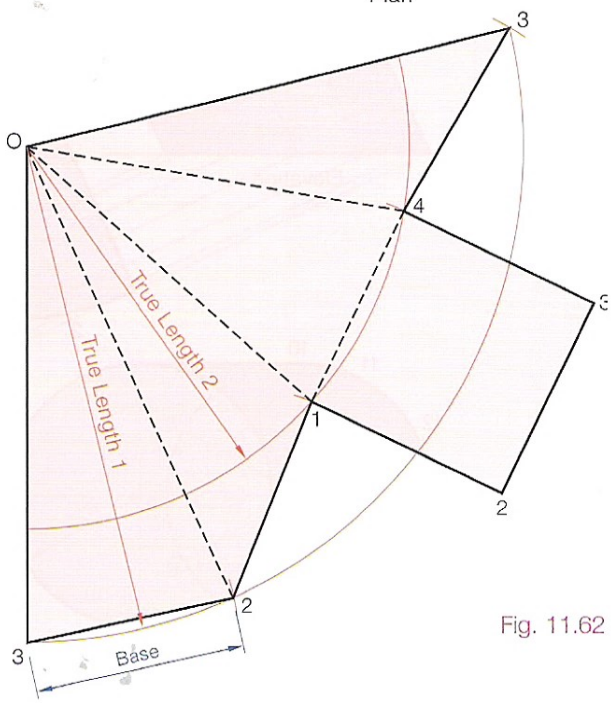


Fig. 11.62

(3) Find the true length of O,1 in a similar way.

(4) Choose a starting point O for the development.

(5) Swing two arcs using the true lengths.

(6) Step the length of the base around and add the base.

To develop the surface of a pentagonal-based oblique pyramid. Fig. 11.63

(1) Find the true length of all the edges. True length 1 shows the true length of edges O,3 and O,4. True length 2 shows the true length of O,2 and O,5. Edge O,1 already appears as a true length in elevation.

(2) Project the cut points in elevation over to these true lengths.

(3) Construct the development as before, using the true lengths found.

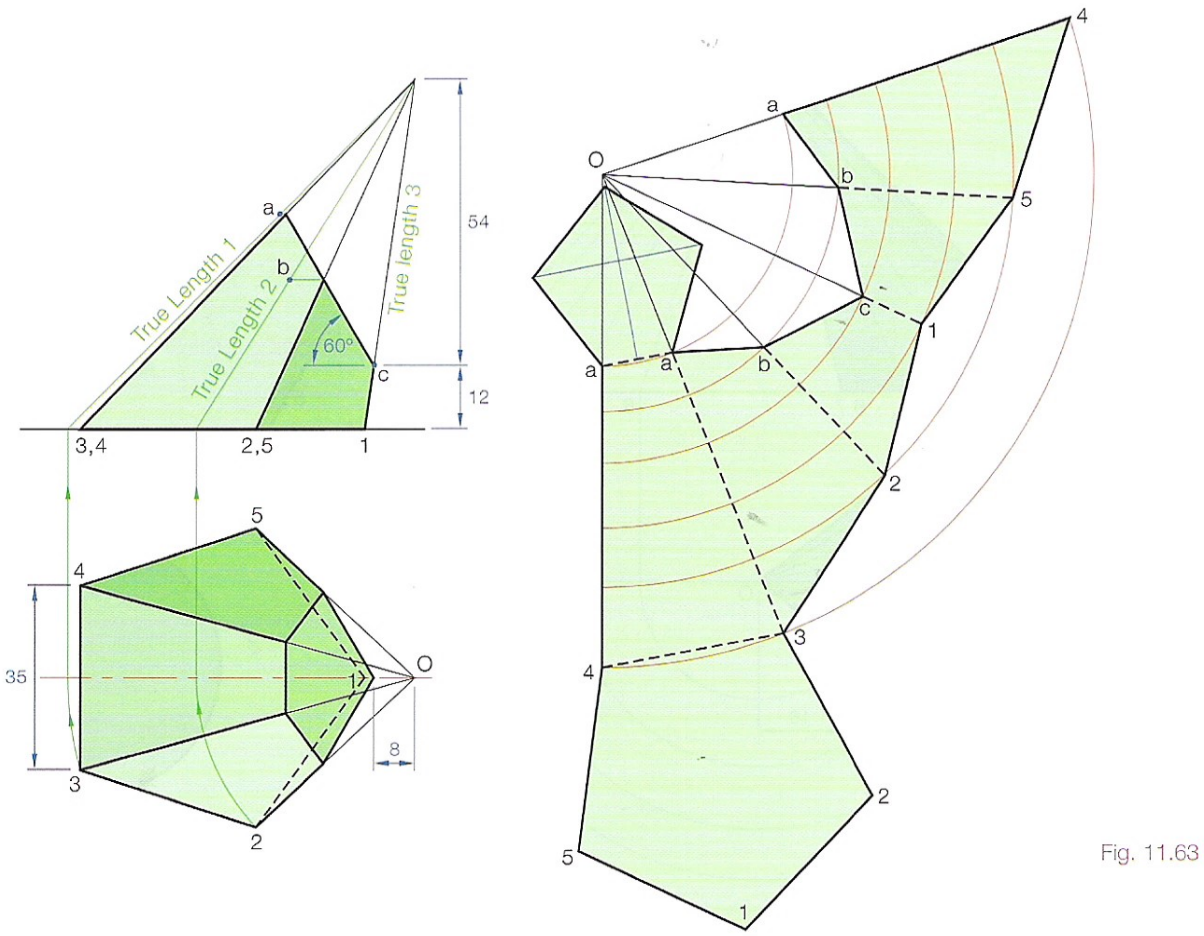


Fig. 11.63

To develop the surface of an oblique cone.
Fig. 11.64

(1) Divide the base circle and draw in the radians.
(2) Find the true length of each radian. Radian O,1 and O,7 are already shown as true lengths.
(3) Start the development with radian O,1.
(4) With the true length of O,2 as radius and O as centre, scribe an arc. With chord length 1,2 as radius and point 1 as centre, scribe an arc to cut the previous arc giving point 2 on the development.
(5) Continue in this way to complete the development.

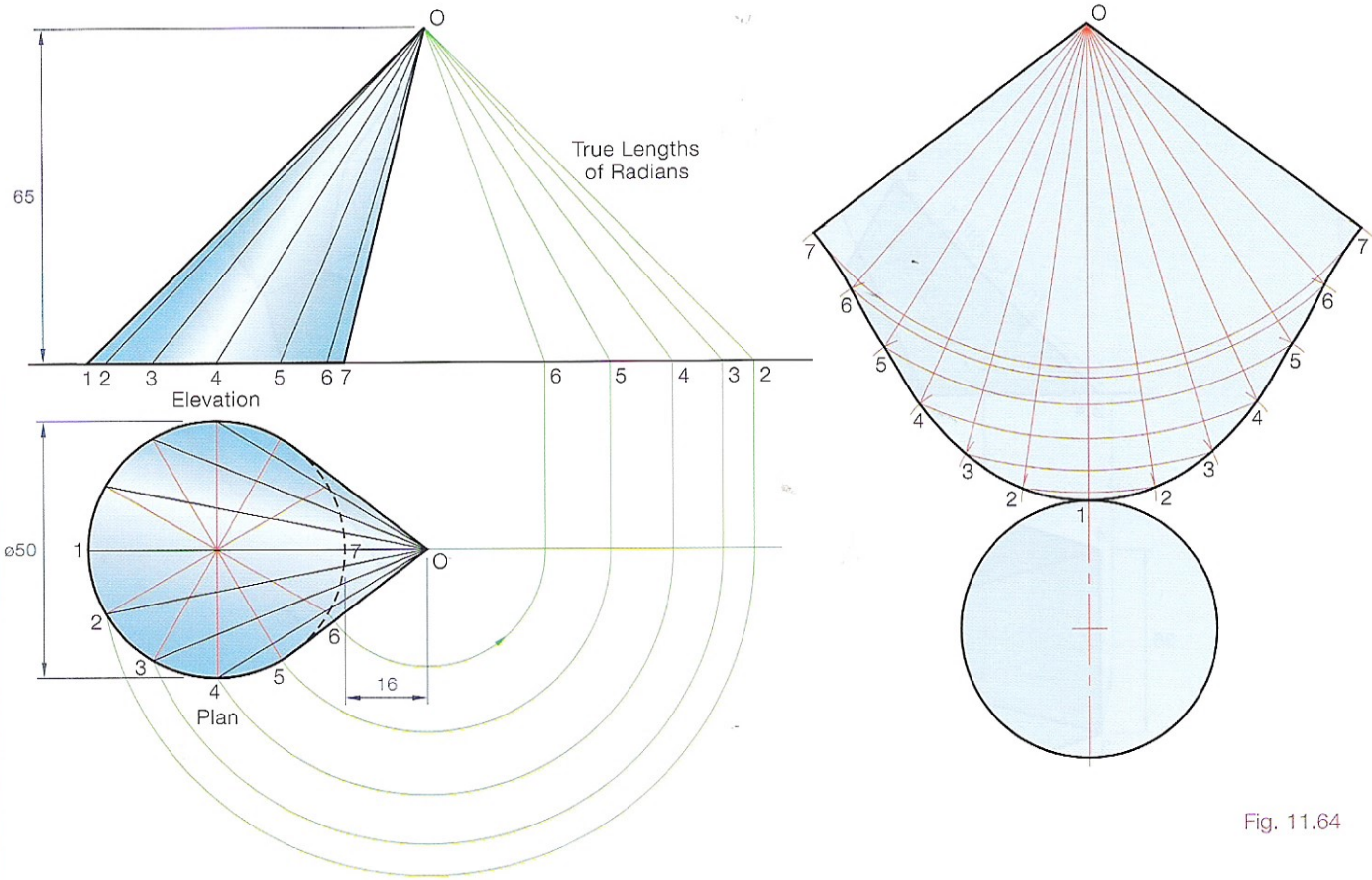


Fig. 11.64

To develop a truncated oblique cone. Fig. 11.65

(1) Develop the full cone as above.
(2) Transfer the cut length of each radian in elevation across to its true length.
(3) Transfer these true lengths to the development.
(4) Add the true shape of the cut surface.

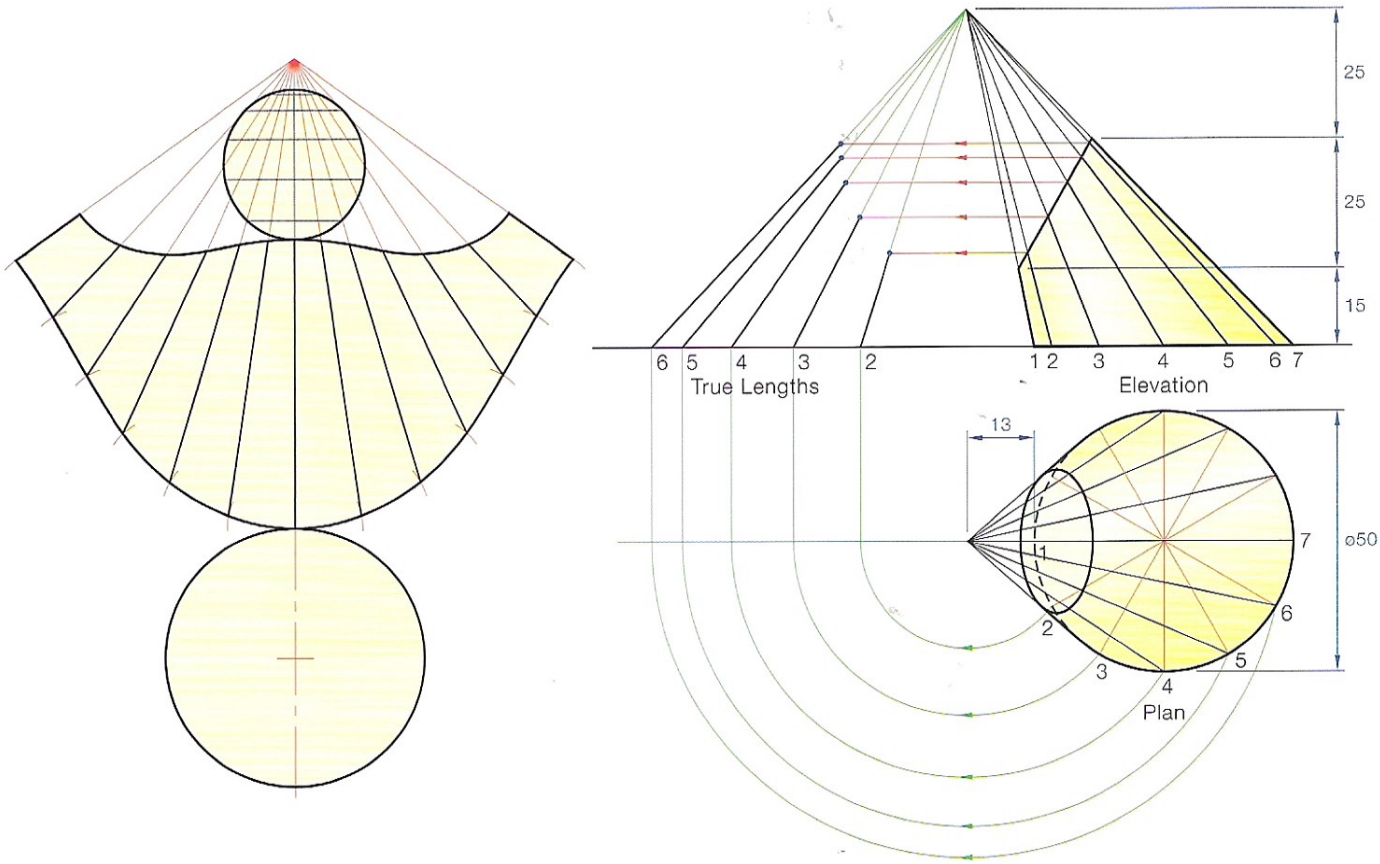


Fig. 11.65

Given the plan and elevation of an oblique pentagonal prism and the development of a label that is to be wrapped around it. Draw the plan and elevation of the prism when the label is in position. Axis ab on the label is to be placed centrally on edge 1,1 of the prism. Fig. 11.66

(1) Develop the surface of the prism as described earlier.
(2) Place the label in position on the development.
(3) All corners and fold points are easily projected back, except corners c and d.
(4) On the development, point d is projected parallel to the edges onto 2,3 which is a true length. Point q is found on 2,3 in plan which is also a true length.
(5) Draw line qq in plan and elevation. It will run parallel to the edges. Corner d is now projected onto line qq.
(6) Similar construction for point c.

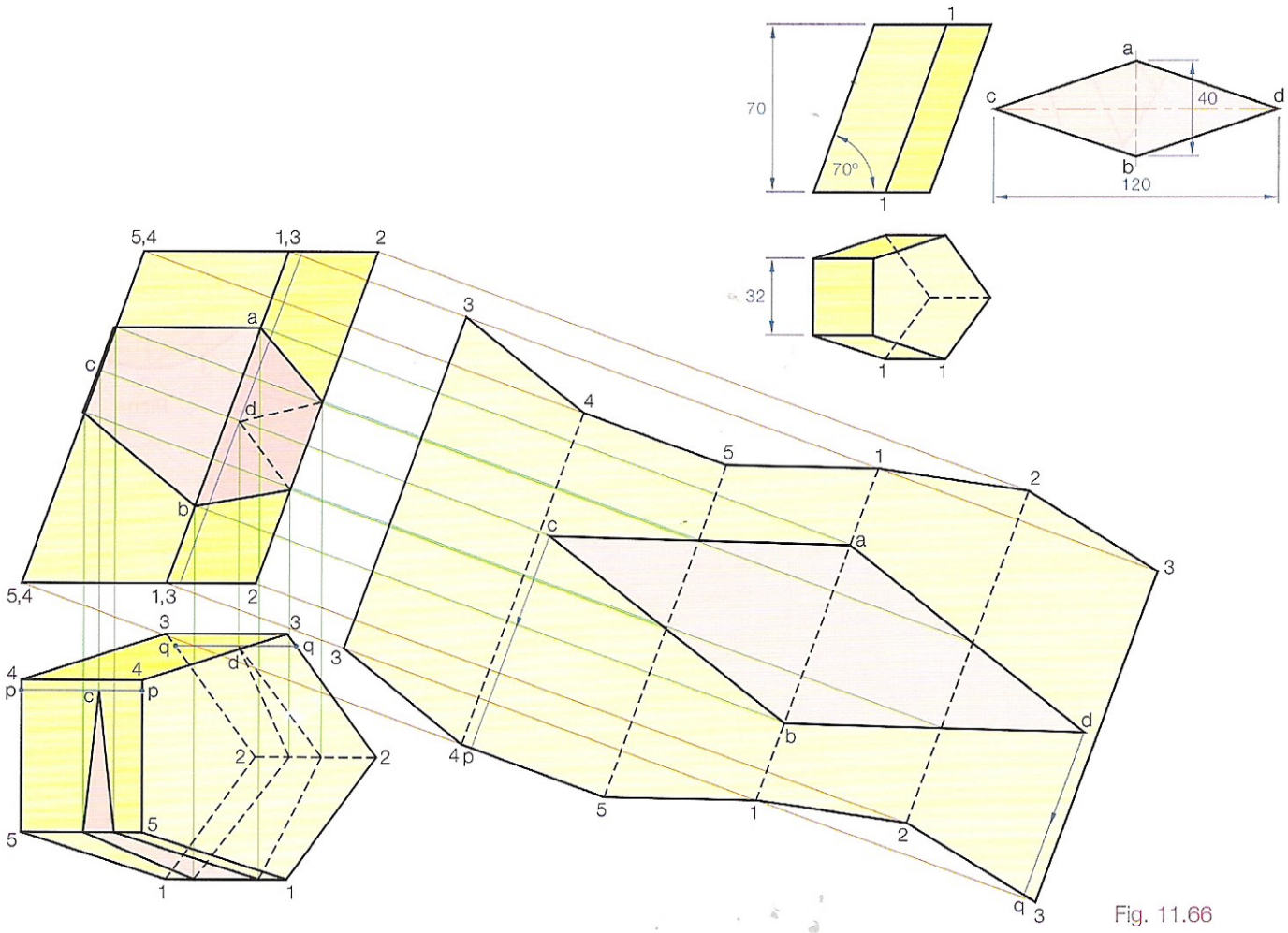


Fig. 11.66

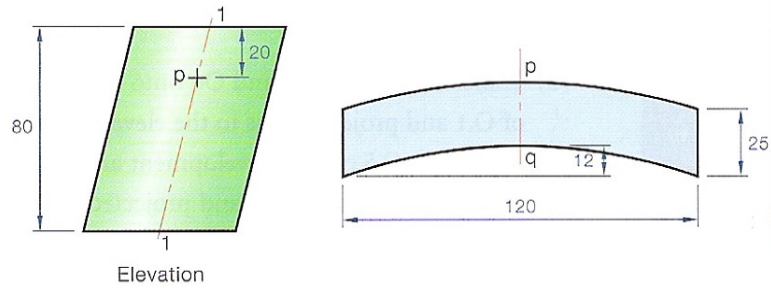


Fig. 11.67

Given the plan and elevation of an oblique cylinder and the development of a label that is to be wrapped around it, Fig. 11.67. Draw the plan and elevation of the cylinder when the label is in position. Point p on the label is to be placed on point p on the cylinder. Axis pq is to line up with line 1,1 on the cylinder surface.

(1) Develop the cylinder and place the label in position.

(2) Where the label crosses the generator lines in the development the points are brought back to elevation and then down to plan.

(3) A generator is drawn through the end of the label. Distance d is a true length and is stepped-off on the plan. The generator is drawn in plan and elevation and the end of the label is projected onto it, Fig. 11.68.

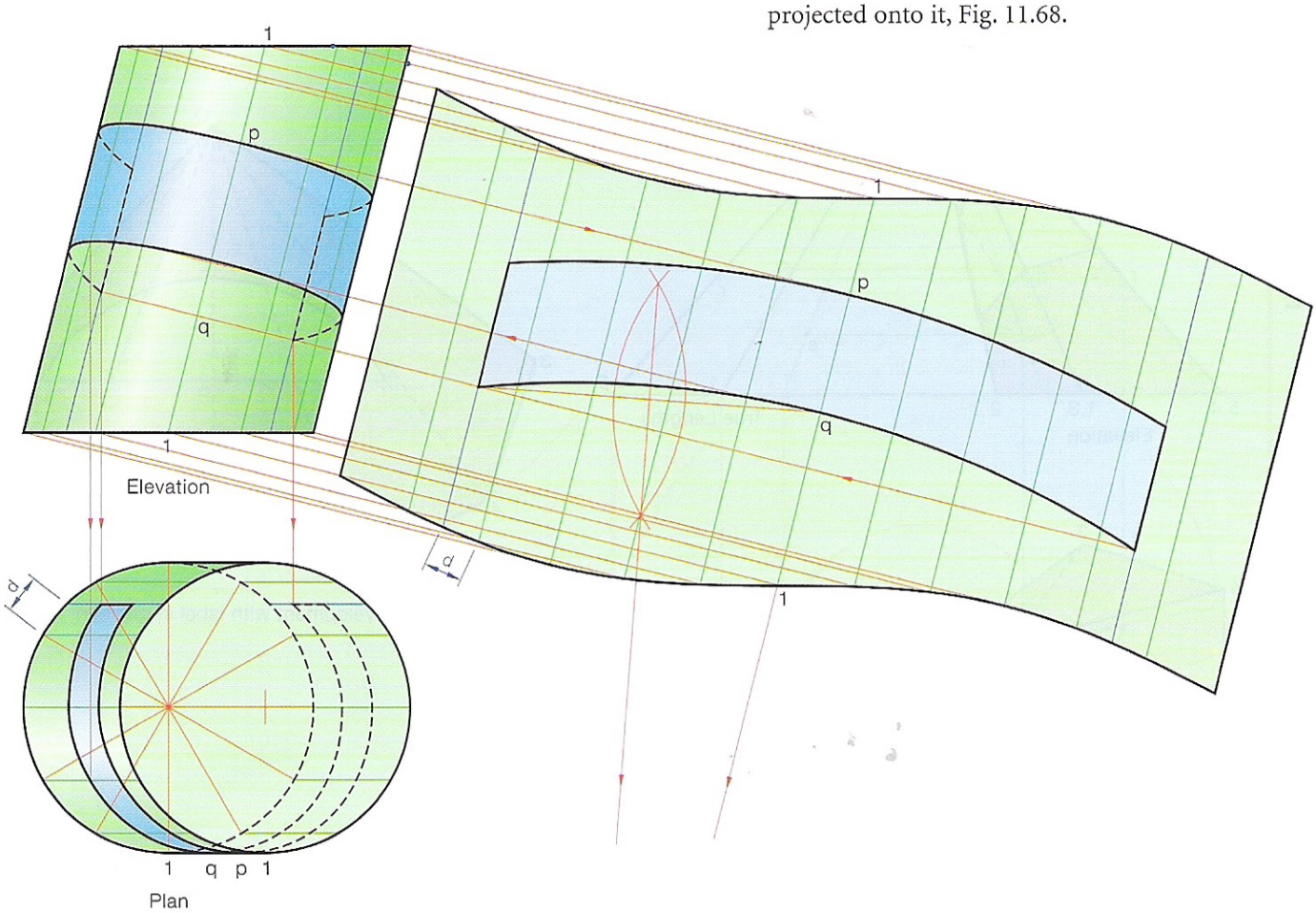


Fig. 11.68