

Chapter 18

Auxiliary Elevations and Plans

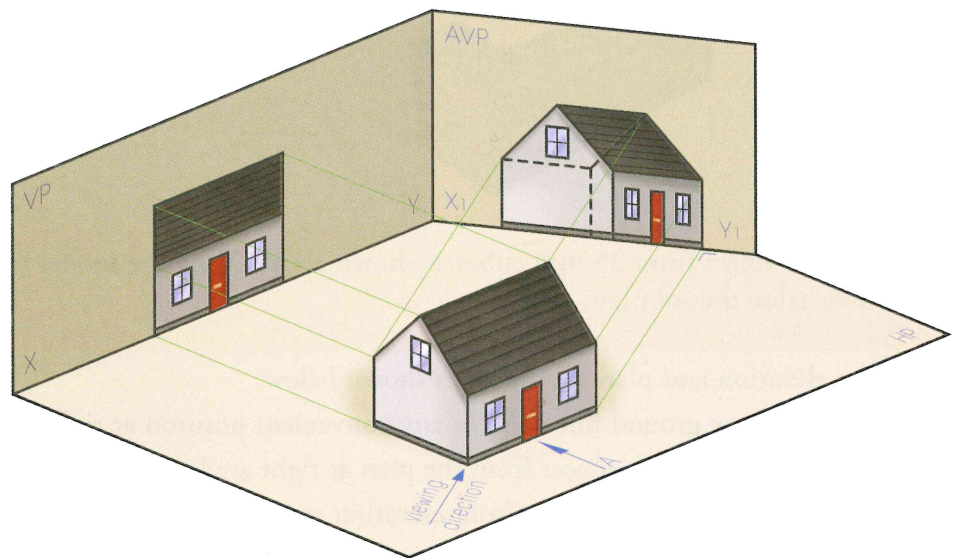
Auxiliary Elevations

The pictorial view of the thatched cottage shown below indicates how the **front elevation** is:

- (i) Obtained from a viewing direction looking in the direction of arrow A.
- (ii) Projected onto the vertical plane, which is positioned at right angles to the viewing direction.

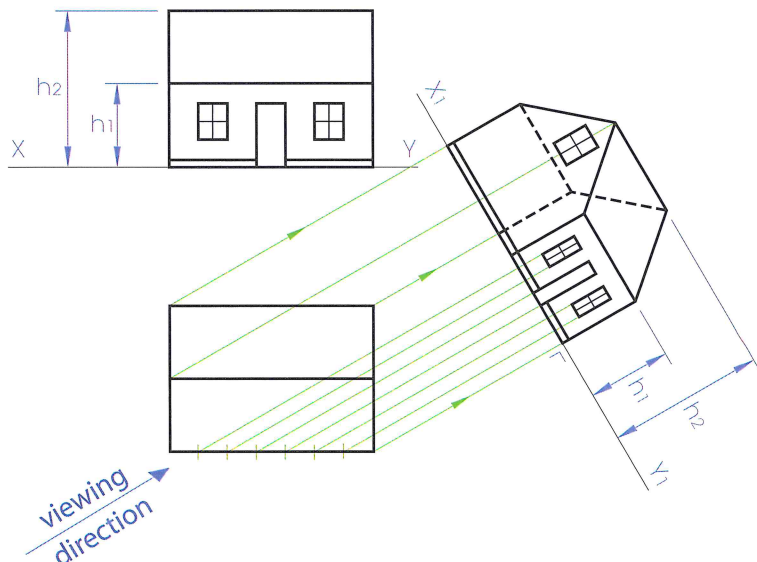
Auxiliary elevations can be obtained by changing the viewing direction. Consider, for example, the new viewing direction also shown below:

- (i) An auxiliary vertical plane (AVP) can be located in any convenient position *at right angles to the viewing direction*.
- (ii) Points on the object are projected perpendicularly onto the AVP and joined in order.
- (iii) The planes are rotated into one plane allowing the views to be transferred to a sheet of paper as shown below.



The line of intersection between the auxiliary vertical plane and the horizontal plane is called the X_1Y_1 line and is the new ground line.

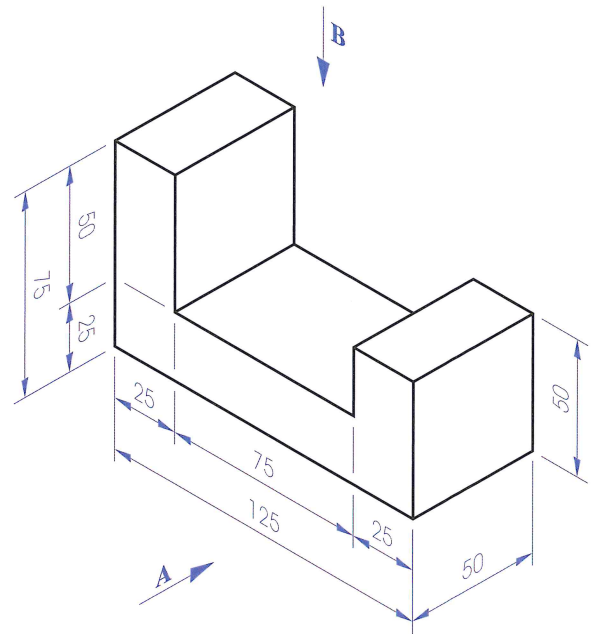
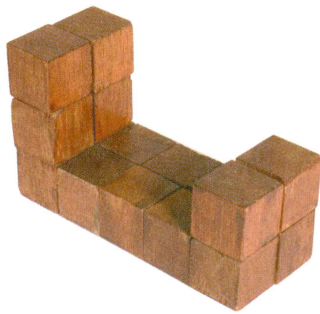
Note that changing the viewing direction relative to the plan will not affect the heights of an object. Accordingly, heights can be transferred from the front elevation to an auxiliary elevation as indicated over.



Example

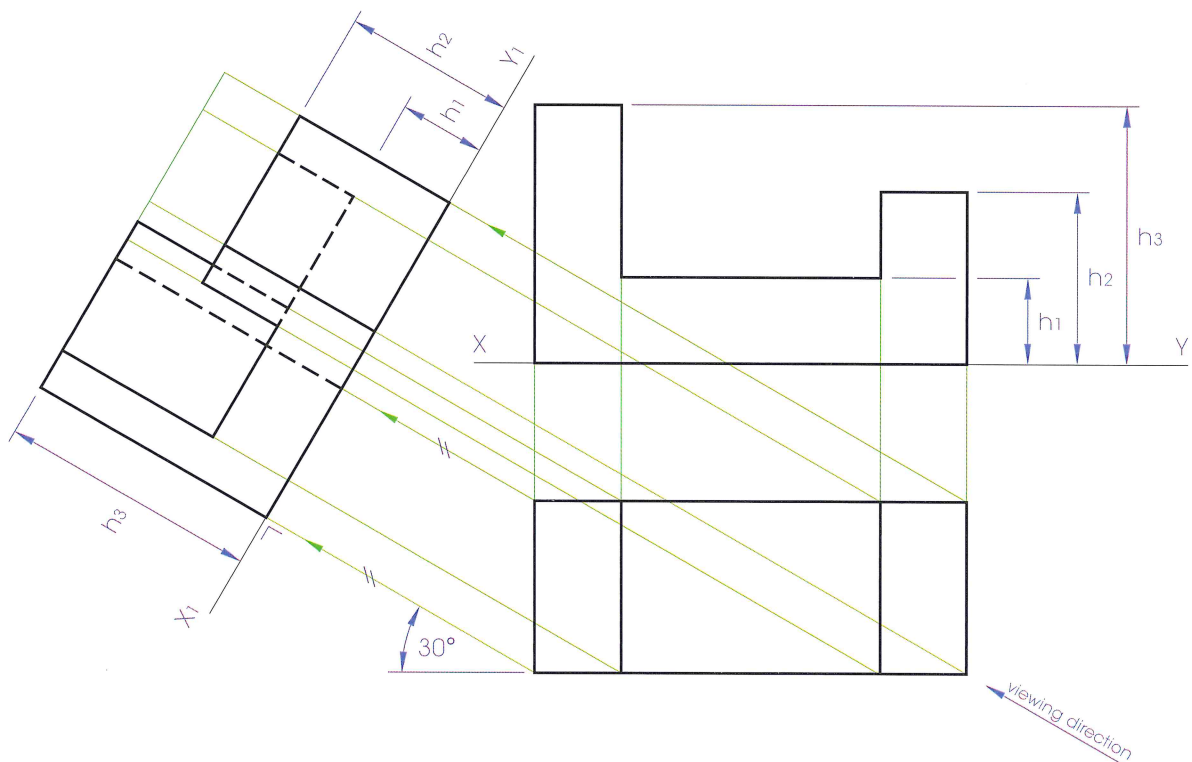
Represent the object shown over by drawing the following views:

- An **elevation** looking in the direction of arrow **A**.
- A **plan** looking in the direction of the arrow **B**, projected from the elevation.
- An **auxiliary elevation** with the viewing direction at 30° from the right-hand side.



Build the object from 25 mm cubes as shown above. View the model from the viewing direction to help you visualise the solution.

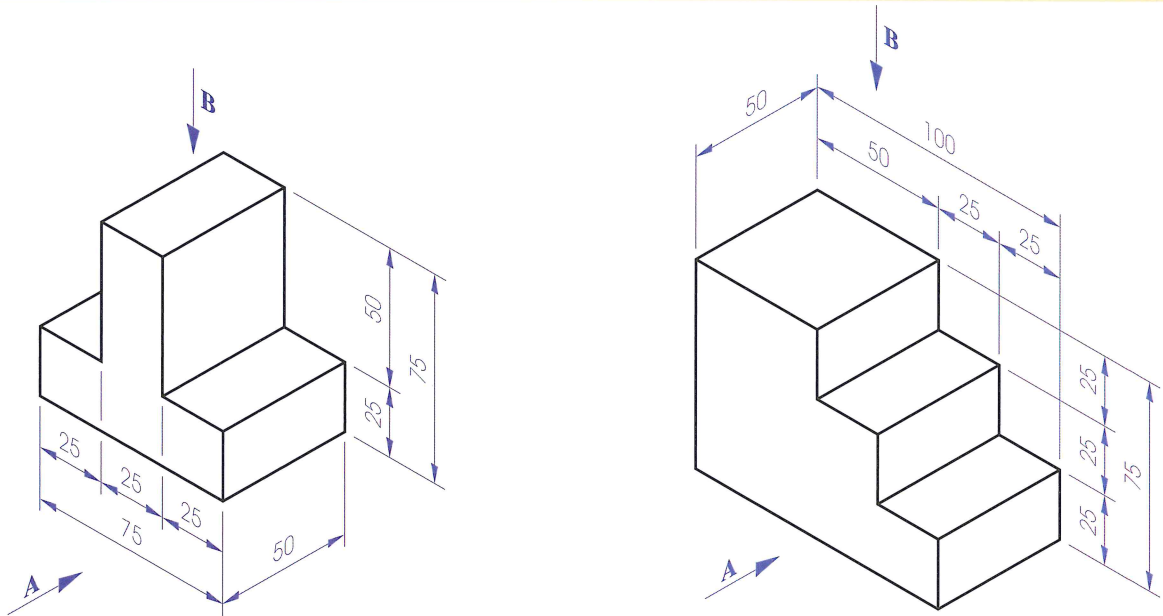
- The elevation and plan are drawn as shown below.
- Draw the new ground line X_1Y_1 in any convenient position at right angles to the viewing direction.
- Project points on the object from the plan at right angles to the new ground line.
- Transfer the heights from the front elevation to the auxiliary elevation.
- Line in the auxiliary elevation as appropriate.



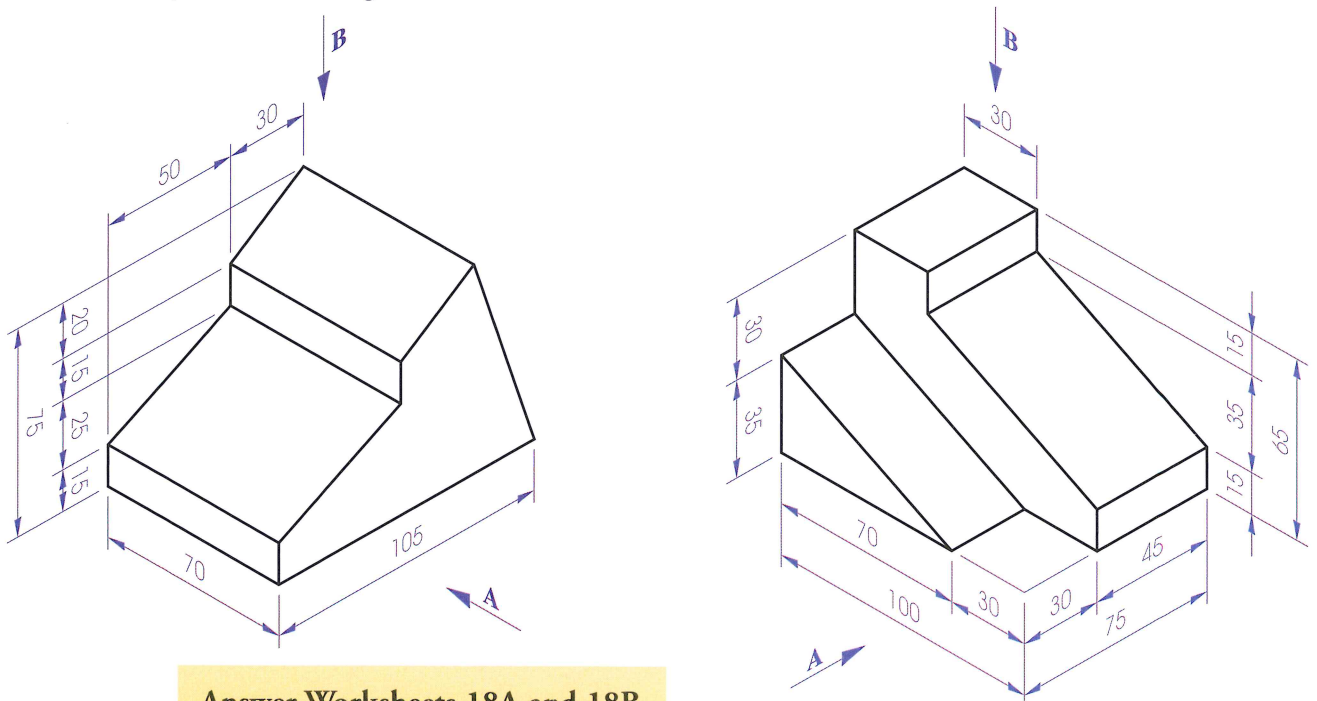
Exercises

- Represent each of the objects shown below by drawing the following views:
 - An **elevation** looking in the direction of arrow **A**.
 - A **plan** looking in the direction of the arrow **B**, projected from the elevation.
 - An **auxiliary elevation** with the viewing direction at 30° from the right-hand side.

Build each of the objects from 25 mm cubes and use the models to help you visualise the solutions.



- Represent each of the objects shown below by drawing the following views:
 - An **elevation** looking in the direction of arrow **A**.
 - A **plan** looking in the direction of the arrow **B**, projected from the elevation.
 - An **auxiliary elevation** with the viewing direction at 45° (first object from the left-hand side and second object from the right-hand side).



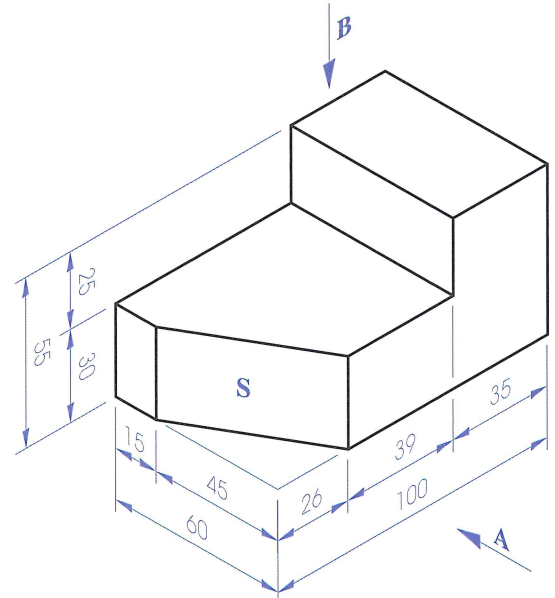
Determining True Shape using Auxiliary Elevations

A surface will appear in true shape in an auxiliary elevation in which the viewing direction is at right angles to that surface.

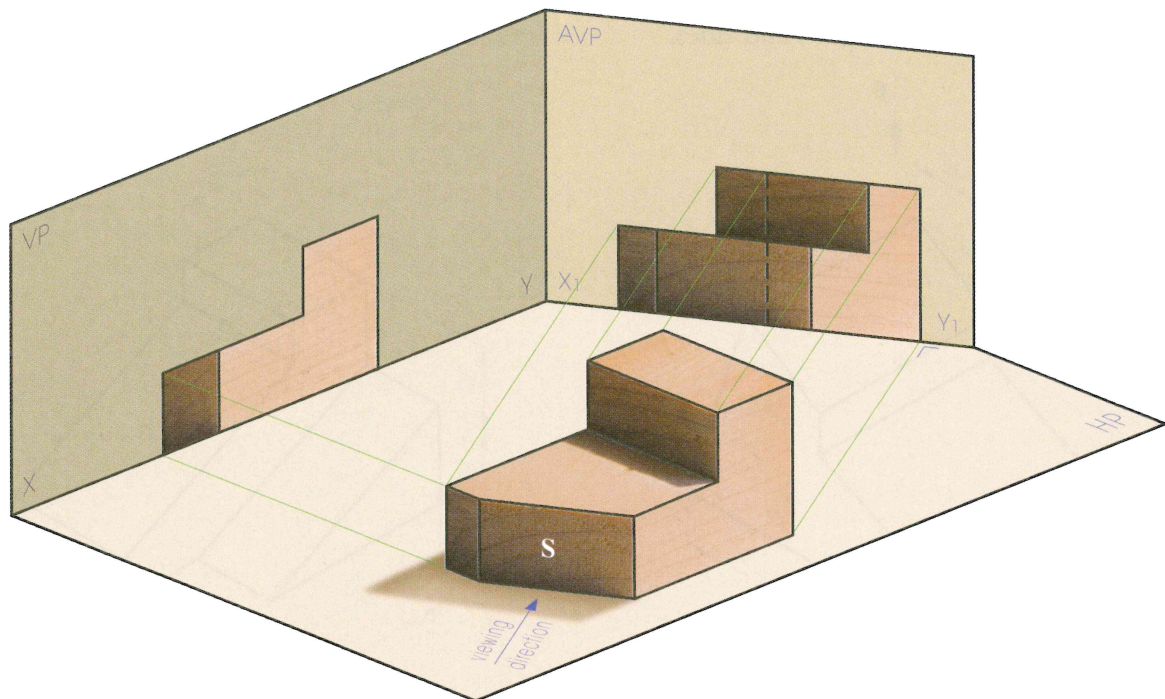
Example

Represent the object shown over by drawing the following views:

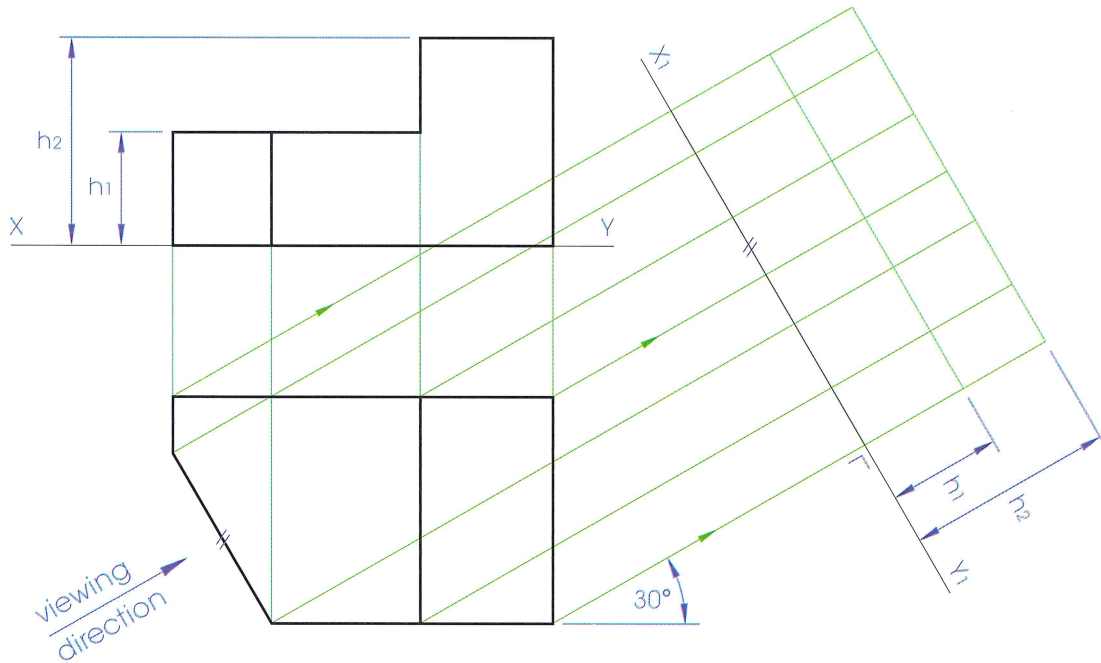
- An **elevation** looking in the direction of arrow **A**.
- A **plan** looking in the direction of the arrow **B**, projected from the elevation.
- An **auxiliary elevation** of the object, which will show the true shape of the surface **S**.



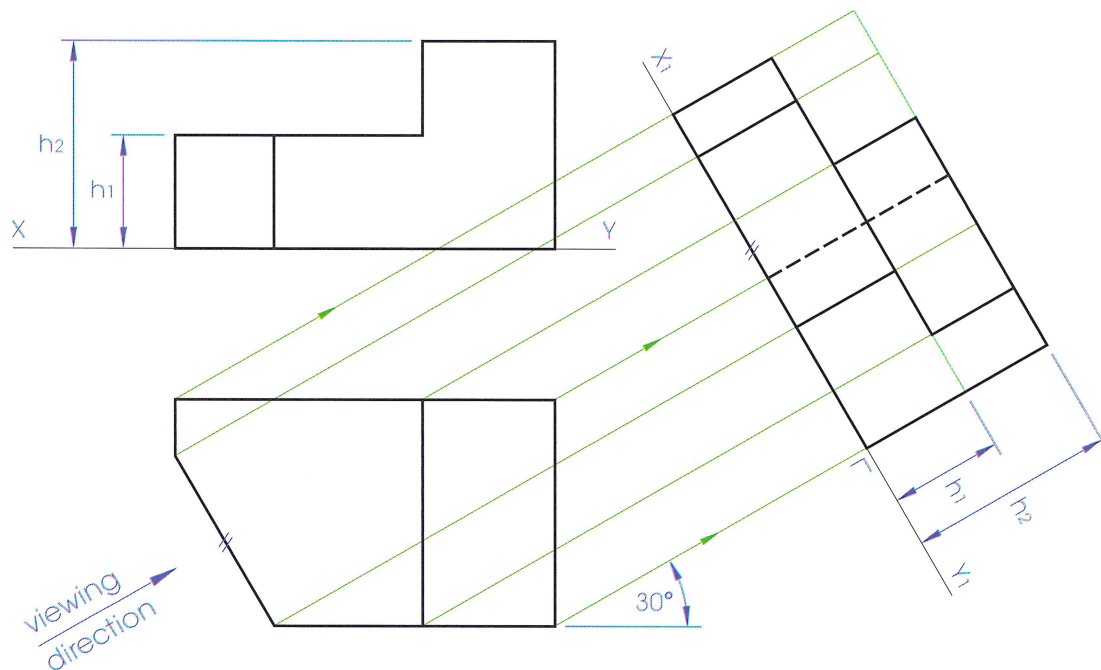
- Consider the pictorial shown below. The true shape of surface **S** will appear in an auxiliary elevation in which the viewing direction is at right angles to the surface **S**, as indicated.



2. The elevation and plan are drawn as shown below.
3. The viewing direction will be \perp to the plan of surface S. Draw the new ground line X_1Y_1 in any convenient position at right angles to the viewing direction (parallel to the plan of surface S).
4. Project points on the object from the plan at right angles to the new ground line.
5. Transfer the heights from the front elevation to the auxiliary elevation.



6. Line in the auxiliary elevation as shown below.



Exercises

The figure below shows pictorial views of some solids. In each case:

- Draw an **elevation** looking in the direction of arrow **A**.
- Draw a **plan** looking in the direction of arrow **B**, projected from the elevation.
- Draw an **auxiliary elevation** of the *entire object*, which will show the true shape of the surface **S**.

