

1. Two oranges on a tree are respectively 1.8 m and 3 m above the ground, and 1.2 m and 2.1 m from a 0.3 m thick wall, but on opposite sides of it. The distance between the oranges, measured along the ground and parallel to the wall is 2.7 m. Determine the real distance between the oranges.
2. Two lines AB and AC make an angle of  $120^\circ$  between them in their front view and top view. AB is parallel to both the H.P. and the V.P. Determine the real angle between AB and AC.
3. Draw an isosceles triangle abc of base ab 40 mm and altitude 75 mm with a in xy and ab inclined at  $45^\circ$  to xy. The figure is the top view of a triangle whose corners A, B and C are respectively 75 mm, 25 mm and 50 mm above the H.P. Determine the true shape of the triangle and the inclination of the side AB with the two planes.
4. Three points A, B and C are 7.5 m above the ground level, on the ground level and 9 m below the ground level respectively. They are connected by roads with each other and are seen at angles of depression of  $10^\circ$ ,  $15^\circ$  and  $30^\circ$  respectively from a point O on a hill 30 m above the ground level. A is due north-east, B is due north and C is due south-east of O. Find the lengths of the connecting roads.
5. The guy ropes of two poles 12 m apart, are attached to a point 15 m above the ground on the corner of a building. The points of attachment on the poles are 7.5 m and 4.5 m above the ground and the ropes make  $45^\circ$  and  $30^\circ$  respectively with the ground. Draw the projections and find the distances of the poles from the building and the lengths of the guy ropes.
6. A room is 6m x 5m x 3.5 m high. An electric bracket light is above the centre of the longer wall and 1m below the ceiling. The bulb is 0.3 m away from the wall. The switch for the light is on an adjacent wall, 1.5 m above the floor and 1 m away from the other longer wall. Find graphically the shortest distance between the bulb and the switch.
7. A room measures 8 m long, 5 m wide and 4 m high. An electric point hangs in the centre of the ceiling and 1 m below it. A thin straight wire connects the point to a switch kept in one of the corners of the room and 2 m above the floor. Draw the projections of the wire, and find the length of the wire and its slope-angle with the floor.