29. Find the coordinates of the point on y-axis which is equidistant from the points (–1, 2) and (3, 4). **[**0, 5**]**

30. Find the value of *p* for which the points (–5, 1), (1, *p*) and (4, –2) are collinear. **[**–1**]**

31. If a cone of radius 10 cm is divided into two parts by drawing a plane through the mid point of its axis, parallel to the base. Compare the volumes of two parts. **[**1:7**]**

32. A bucket of height 8cm and made up of copper sheet is in the form of frustum of a right circular cone with radii of its lower and upper ends as 3cm and 9cm respectively. Calculate:
(i) the height of the cone of which the bucket is a part.
(ii) the volume of water which can be filled in the bucket.
(iii) the area of copper sheet required to make the bucket.
[12 cm, 312π cm^3, 129π cm^2**]**

33. Water flows into a tank150m long and 100m broad through a pipe whose cross section is 2dm*1.5dm at the rate of 5 km/hr. In what time will the water be 3 m deep. **[**300 hrs**]** A tent is of the shape of cylinder upto a height of 3m and that a cone with height 13.5m above the ground. Find the cost of painting the inner side of the tent at the rate of Rs.2 per sq.m., if diameter of the base is 28m. **[**Rs.2068**]**

34. A cylinder, the radius of whose base is 18 cm and which is 24 cm high is melted to form small cones of radius 3 cm and height 4 cm. Find number of cones formed. **[**648**]**

35. The radii of the internal and external surfaces of a hollow spherical shell are 3 cm and 5 cm respectively. If it is melted and recast into a solid cylinder of diameter 14 cm, find height of the cylinder. **[**8/3 cm**]**

36. The radii of ends of a bucket 30cm high are 21cm and 7cm. Find its capacity in litres and amount of sheet required to make this bucket. **[**20.02 ltrs, 3069cm^2**]**

37. A right triangle whose sides are 15 cm and 20 cm is made to revolve about the hypotenuse. Find the volume and surface area of the double cone so formed. **[**3768cm^3, 1318.8cm^2**]**

38. The angle of elevation of a jet plane from a point on the ground is 60^0. After flight of 15 seconds, the angle of elevation changes to 30^0. If the jet plane is flying at constant speed of 720 km/hr, find the height of at which the jet plane is flying. **[**$1500\sqrt{3}$ m**]**

39. From a window (60 m high above ground) of a house in a street, the angles of elevation and depression of the top and foot of another house on opposite side of the street are 60^0 and 45^0 respectively. Show that height of the opp. house is $60(\sqrt{3}+1)$ m.

40. The angle of elevation of the top of a hill at the foot of the tower is 60^0 and the angle of elevation of the top of the tower at the foot of the hill is 30^0. If the tower is 300 m high, find the height of the hill. **[**900 m**]**

41. A vertical tower stands on a horizontal plane and is surmounted by a vertical flagstaff of height *h*. At a point on the plane, the angles of elevation of the bottom and the top of the flagstaff are α and β respectively. Prove that the height of the tower is $\frac{h\tan\alpha}{\tan\beta - \tan\alpha}$

42. Without using trigonometric tables evaluate:

$$\frac{\sin25^0\cos65^0 + \cos65^0\sin25^0}{\tan^215^0.\tan^230^0.\tan^245^0.\tan^275^0} + \operatorname{cosec}^2\theta - \cot^2\theta - 2\sec^245^0$$

[0]

43. Prove: $(\sin\theta + \operatorname{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$

44. $\frac{\tan\theta}{1 - \cot\theta} + \frac{\cot\theta}{1 - \tan\theta} = 1 + \tan\theta + \cot\theta = \sec\theta.\operatorname{cosec}\theta + 1$