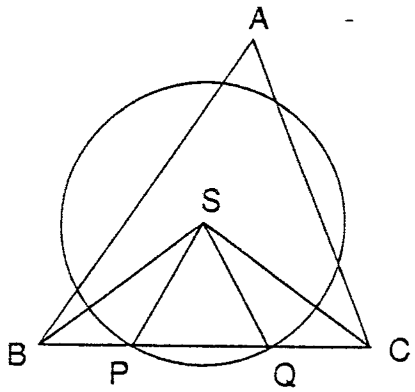
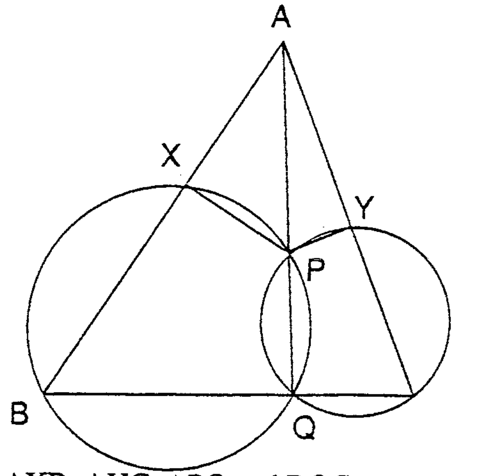
13.



In ΔABC, S is the point of intersection of the perpendicular bisectors of AB and AC. A circle centre S, meets the side BC at P and Q. Prove that

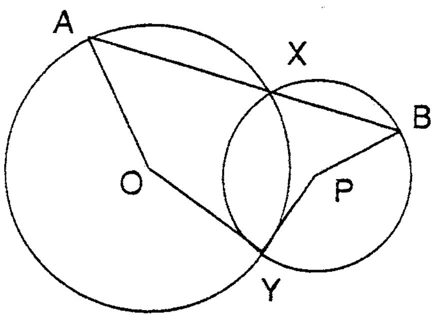
$\Delta SBP \equiv \Delta SCQ$

14.



AXB, AYC, APQ and BQC are straight lines. Prove that AXPY is a cyclic quadrilateral.

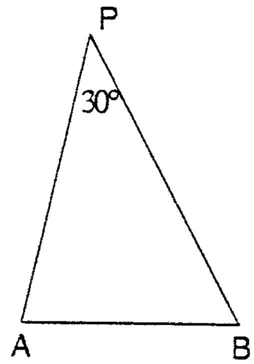
15.



O and P are the centres of the circles; AXB is a straight line.

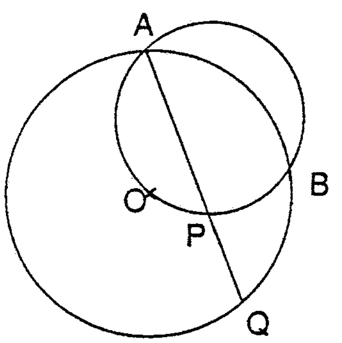
Prove that $\angle AOY = \angle BPY$

16.

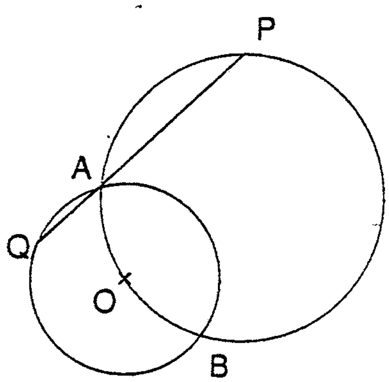


A and B are fixed points. P moves on the plane so that AB subtends an angle of 30° at P. Describe and carry out a construction to draw the locus of P.

17. (a)

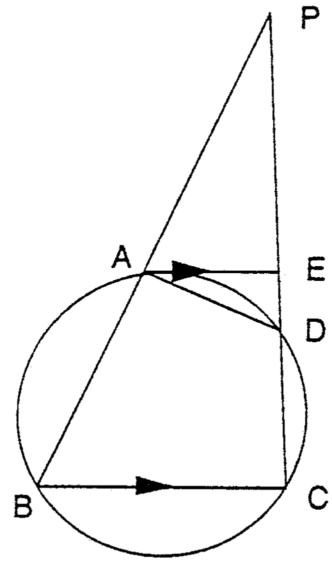


(b)



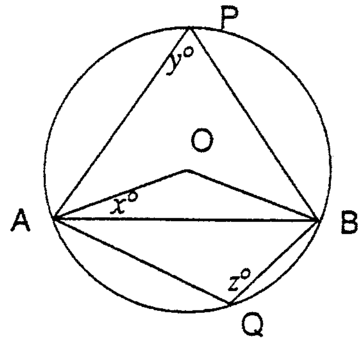
O, the centre of circle ABQ, lies on circle ABP. A, P and Q are collinear. Prove that, in both diagrams, PB = PQ.

7.



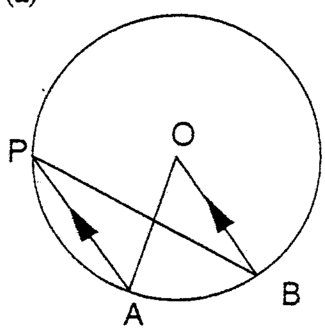
AE || BC
Prove ΔPAE ||| ΔPDA

8.

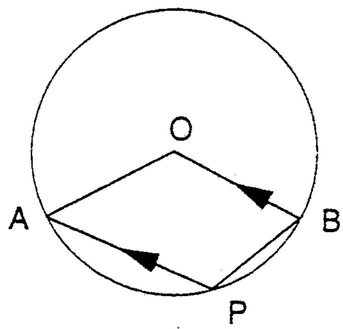


O is the centre of the circle
Prove that (a) $x + y = 90$
(b) $z - y = 2x$

9. (a)



(b)



O is the centre, AP || OB. Prove, in both diagrams, that $\angle AOB = 2\angle OBP$

10. AB and CD are two parallel chords of a circle. The chords AD and BC intersect (internally) at P. Prove that Δ's APB and CPD are isosceles.

11. ABC is an acute angled triangle. The semicircle on BC as diameter meets AB at M and AC at N. MC and NB meet at X. Prove that AMXN is a cyclic quadrilateral.

12. AB is a chord of a circle, centre O. Prove that the circle on OA as diameter bisects AB

EXERCISES 1

2. 25 3. 12 cm 4. 99 cm or 21 cm

16. Construct equilateral Δ's ABC and ABD.
The major arcs, centres C and D, with radius AB are the locus of P.

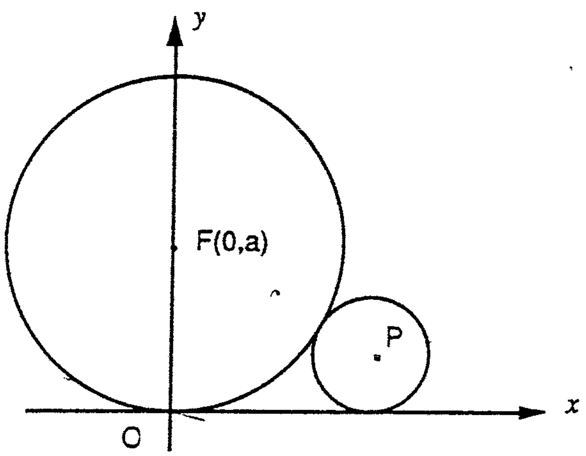
7. The point P moves on a number plane so that $PA = \sqrt{2}\,PB$ where A is $(-3,0)$ and B is $(0,1)$. Show that the locus of P is a circle,find the co-ordinates of its centre, C and show that A, B and C are collinear.

8. A point moves on a number plane so that its distance from the point $(0,3)$ is equal to its perpendicular distance from the line $y = -3$. Determine the equation of the locus of the point.

† 9. (a) What is the perpendicular distance between the point (x,y) and the line $x + y - 1 = 0$?

(b) S is the point $(1,1)$.P moves on the plane so that PS is $\sqrt{2}$ times the perpendicular distance between P and the line $x + y - 1 = 0$. Find,in simplest form,the equation of the locus of P.

† 10.



F(0,a) is the centre of a fixed circle which touches the x axis at the origin. P is the centre of a variable circle that touches both the fixed circle and the x axis. Find the equation of the locus of P.

† 11. $A(a,0)$ and $B(0,\frac{b}{k})$ are points on a number plane with a,b and k positive.

(a) Write down the co-ordinates of P,the point dividing AB in the ratio $k : 1$

(b) Show that,as k varies,P moves on the straight line

$$\frac{x}{a} = \frac{y}{b}.$$

(c) By considering the situation when

(i) k approaches zero

(ii) k increases without limit

determine the precise locus of P.

oOo

LOCUS

1. $(x-1)^2 + (y+3)^2 = 4$ 2. $8x - 10y + 9 = 0$

3. Centre (0,0) , radius 2.

4. (a) $y = mx + 3$, $y = 2mx$ (b) $x = \frac{3}{2m}$, $y = 3$
   (c) The line $y = 3$

5. $8y = x^2 + 16$, parabola

6. $(x-3)^2 + (y-2)^2 = 13$, Centre (3,2)
   radius $\sqrt{13}$.

7. C(3,2) 8. $x^2 = 12y$

9. (a) $\frac{|x+y-1|}{\sqrt{2}}$ (b) $2xy = 1$

10. $x^2 = 4ay$

11. (c) The interval between (0,0) and (a,b).