

16. In a 4-gon $ABCD$, AB is fixed in position, AC , BC and AD are given in length.

(a) Find the locus of the middle point of the other diagonal.

(b) Find the locus of the middle point of the line segment joining the middle points of the two diagonals.

17. What is the locus of the point P when the line segment MN which joins the feet of the $\perp$ s PM , PN drawn to two fixed lines OX , OY is of given length.

18. BAC is any chord passing through a fixed point A within a given circle with centre E . Circles described on BA , AC as chords touch the given circle internally at B , C respectively and cut each other at D . Show that the locus of D is a circle described on AE as diameter.

19. AB , CD are two chords of a circle, AB being fixed in position and CD of given length. Find the loci of the intersections of AD , BC and of AC , BD .

NOTE: — Use Exercises 5 and 6, § 171, Part II.

20. A and B are the centres of two circles which intersect at C ; through C a st. line is drawn terminated in the circumferences at D and E . DA , EB are produced to meet at P . Find the locus of P .

21. A transversal cuts the sides BC , CA , AB of a given $\triangle ABC$ at D , E , F respectively. The circumscribed circles of the $\triangle$ s AFE , CED cut again at P . Find the locus of P .

22. From C , any point on the arc ACB , CD is drawn $\perp$ AB ; with centre C and radius CD a circle is described. Tangents from A and B to this circle are produced to meet at P . Find the locus of P .