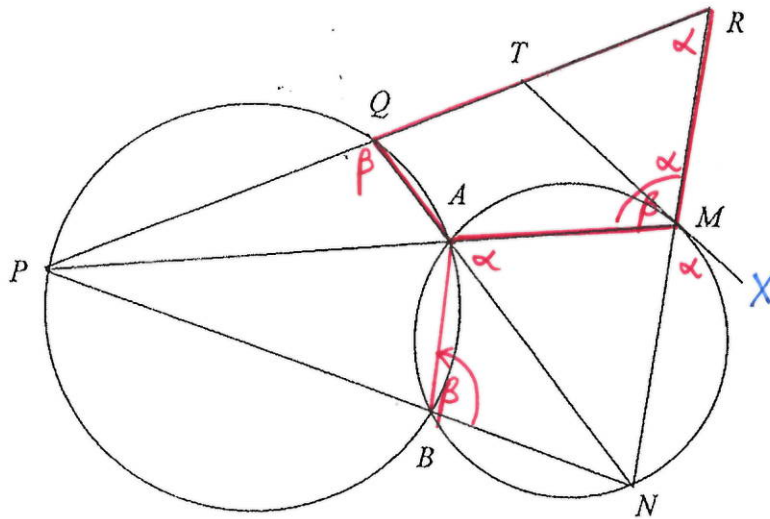


(b)



In the diagram, the two circles intersect at A and B . P is a point on one circle. PA and PB produced meet the other circle at M and N respectively. NA produced meets the first circle at Q . PQ and NM produced meet at R . The tangent at M to the second circle meets PR at T .

(i) Copy the diagram. Show that $QAMR$ is a cyclic quadrilateral. 2

(ii) Show that $TM = TR$. 4

i) construction: Join AB

Let $\angle PQA = \beta$

$\therefore \angle ABN = \beta$ (exterior angle of cyclic quadrilateral $PQAB$ is equal to the opposite interior angle).

similarly $\angle AMR = \beta$ in cyclic quadrilateral $QMAA$

$\therefore \angle PQA = \angle AMR = \beta$

$\therefore QAMR$ is a cyclic quadrilateral (the exterior angle is equal to the opposite interior angle).

Extend TM to X

ii) let $\angle TMR = \alpha$

$\therefore \angle NMX = \alpha$ (vertically opposite angles)

$\angle NMX = \angle NAM = \alpha$ (the angle between a tangent and chord at the point of contact is equal to the angle in the alternate segment)

$\angle NAM = \angle TRM$ (the exterior angle of cyclic quadrilateral $QAMR$ is = to the opposite interior angle).

$\therefore \angle TMR = \angle TRM = \alpha$

$\therefore TM = TR$ (sides opposite equal angles of a Δ)