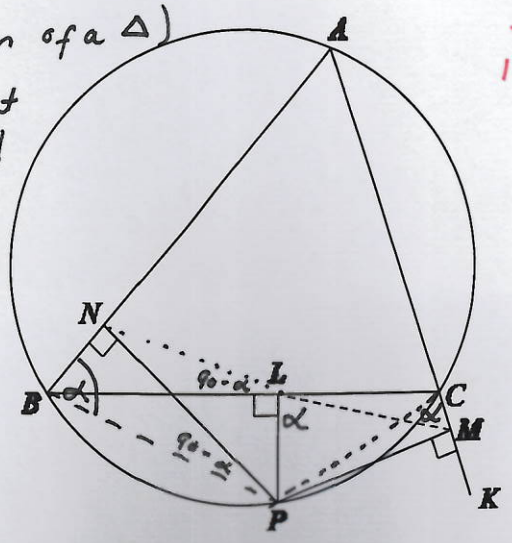
(c) In the diagram, A, B and C are three points on a circle.
P is another point on the circle, lying on the minor arc BC.
Points L, M and N are the feet of the perpendiculars from P to the sides BC, CA and AB respectively.



iv) $\angle BPN = 90 - \alpha$ (angle sum of a Δ)
$\therefore \angle NLB = 90 - \alpha$ (angles at the circumference subtended by the same arc NB)
$\therefore \angle NLB + \angle BLP + \angle PLM$
$= 90 - \alpha + 90 + \alpha$
$= 180°$
$\therefore$ M, L, N are collinear

iv) Anna D
$\angle NLP = 180 - \alpha$ (opposite of cyclic quad BNLP ~~are supplementary~~)
$\therefore \angle NLP + \angle PLM$
$= 180 - \alpha + \alpha$
$= 180°$
$\therefore$ M, L, N are collinear

(i) Explain why P, L, N and B are concyclic. **1**

(ii) Explain why P, L, C and M are concyclic. **1**

Let $\angle PLM = \alpha$.

(iii) Show that $\angle ABP = \alpha$. **2**

(iv) Hence show that M, L and N are collinear. **2**

End of question 14

i) $\angle BNP = \angle BLP = 90°$ (given)
$\therefore$ P, L, N, B are concyclic (equal angles at the circumference are subtended by the same arc)

ii) $\angle BLP = \angle PMC = 90°$ (angles on a straight line, given)
$\therefore$ P, L, C, M ~~are concyclic~~ is a cyclic quadrilateral (the exterior angle of a cyclic quadrilateral is = to the opposite interior angle)
$\therefore$ P, L, C, M are concyclic

iii) $\angle PCM = \alpha$ (angles at the circumference subtended by the same arc PM)
$\therefore \angle ABP = \alpha$ (exterior angle of cyclic quadrilateral ABPC is = the opposite interior angle)