

1. Let $ABCD$ a quadrilateral. Let X be the trisecting point of AB closer to A . Let Y be the midpoint of BC and Z be the midpoint of CD . Let W be the trisecting point of AD closer to A . Find the position vector of the intersection P of XZ and YW in terms of the position vectors of A , B , C and D . In what ratio does P divide XZ ?

2. Let M be the intersection point of the perpendicular chords AB and CD of circle k whose center is O . Show that $\vec{OA} + \vec{OB} + \vec{OC} + \vec{OD} = 2\vec{OM}$.