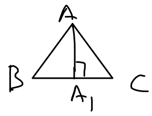
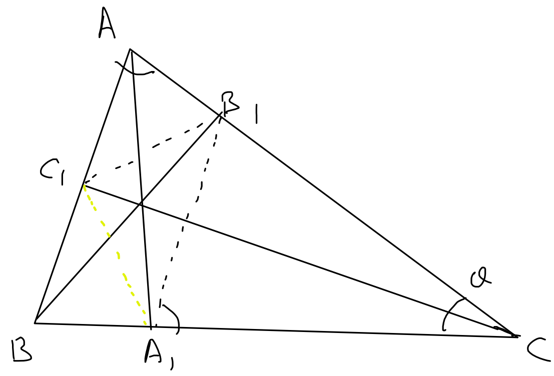
Geometry 14

04 August 2024 10:20



Q) Let ΔABC be acute with heights AA_1, BB_1, CC_1.
Prove that if $A_1B_1 \parallel AB$ and $B_1C_1 \parallel BC$ then $A_1C_1 \parallel AC$.



Ans:- $A_1C = AC\cos\theta \Rightarrow \frac{AC}{A_1C} = \frac{1}{\cos\theta} = \frac{BC}{B_1C}$

$B_1C = BC\cos\theta$ $\quad \angle C = \theta$ is common

$\Downarrow$

$\Delta ABC \sim \Delta B_1A_1C$

$\angle B_1A_1C = \angle BAC$

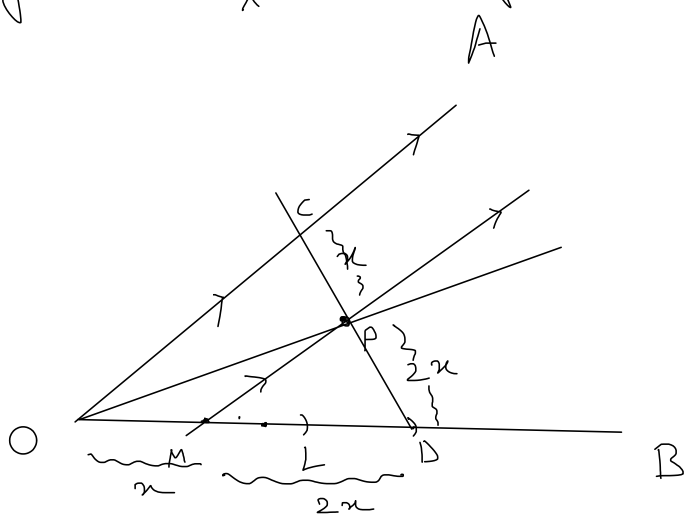
$\angle B_1A_1C = \angle ABC$ as $B_1A_1 \parallel BA$

$\Rightarrow \angle ABC = \angle BAC$ Similarly $\angle ACB = \angle BAC = \angle ABC = 60^\circ$

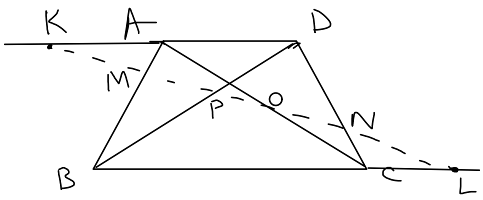
$\Rightarrow ABC$ is equilateral $\Rightarrow A_1C_1 \parallel AC$

Q) Let $\angle AOB$ be a given angle less than 180° and let P be an interior point of the angular region determined by angle AOB. Show with proof how to construct using only ruler and compass a line segment CD passing via P such that C lies on the ray OA and D on the ray OB and $CP : PD = 1:2$.

Ans:-

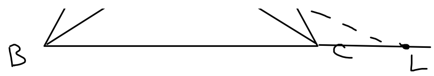


HomeWork

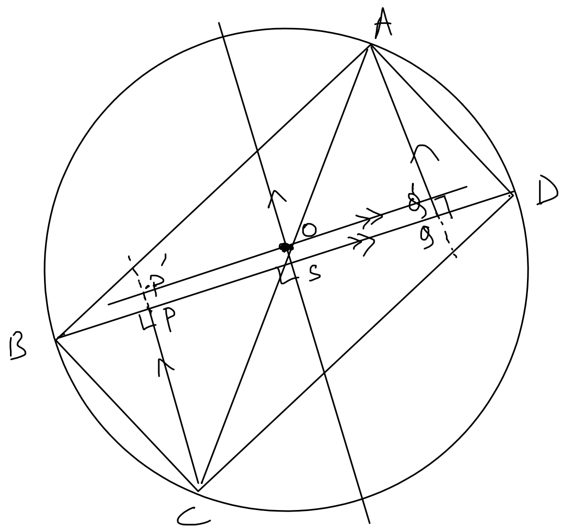


Q) ABCD be a trapezoid. K and L are the points on extended AD and BC beyond

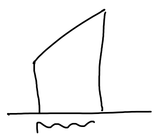
Q) ABCD be a trapezoid. ...
points on extended AD and BC beyond
A and C respectively. KL intersects AB
and CD at M and N. KL intersects AC at O and BD at P.
Prove that if KM = NL then KO = PL.



Q) ABCD is a quadrilateral. AC is the diameter of (ABCD). Prove that the lengths of projection of the opposite sides of quadrilateral on the diagonal BD are equal.



Ans:—



$BS = SD$

$AO = OC$ and

$\overleftrightarrow{PC} \parallel \overleftrightarrow{OS} \parallel \overleftrightarrow{AQ}$. [as all are $\perp BD$]

$\Rightarrow P'O = OQ'$ as $P'Q' \parallel PQ$

$\Rightarrow PS = SQ$

$\Rightarrow BP = QD$