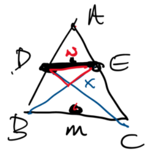
ProblemSession

Monday, October 26, 2020 6:04 PM

$\frac{|AD|}{|AB|} = \frac{|AE|}{|AC|}$



SHOW $\overline{BE}$ & $\overline{CD}$ INTERSECT ON MEDIAN FROM A.

MEDIAN = SEGMENT FROM VERTEX TO MIDPOINT OF OPP. SIDE

$M = MID(BC)$. $N = MID(DE)$

LET $X = \overline{DC} \cap \overline{BE}$ SHOW X ON $\overline{AM}$.

OBSERVE LOTS OF SIMILAR Δ's AROUND.

BY FTS, $\overleftrightarrow{DE} \parallel \overleftrightarrow{BC}$.

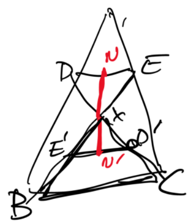
ρ = ROTATE BY $180°$ THRU X.

$\rho(\Delta DXE) = \Delta D'XE'$ CONG.

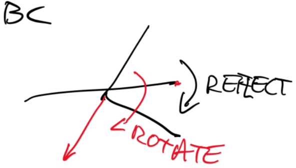
$\rho(N) = \rho(N') = MID(D'E')$

$X \in NN'$

ALSO, $\overleftrightarrow{D'E'} \parallel DE \parallel BC$



NOW PLAY WITH ΔBXC & $\Delta E'XD'$



BECAUSE SIMILAR W/ SHARED SIDE WILL HAVE SAME MEDIAN.

LOOK AT MEDIAN OF ΔABC AM.

$\overleftrightarrow{PQ} \parallel \overleftrightarrow{BC}$ $N' = MID(E'D')$

$N' = MID(\overline{PQ})$ BY SIM.

SO $N' \in AM$.

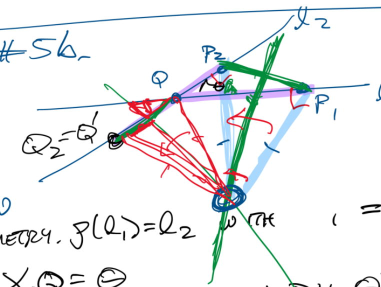
$\overleftrightarrow{AM} = \overleftrightarrow{AM}$

BUT ALSO $N \in N'M$ & $X \in N'M$

IE $A * N * X * N' * M$.

SO $X \in \overleftrightarrow{AM}$.

HW7 #5b.



TAKE $\perp$ BISECTOR OF $\overline{P_1P_2}$ & OF $\overline{QQ_2}$

GIVEN ρ ISOMETRY. $\rho(\ell_1) = \ell_2$ WITH $= P_2$.

WITH $\measuredangle Q = \Theta$

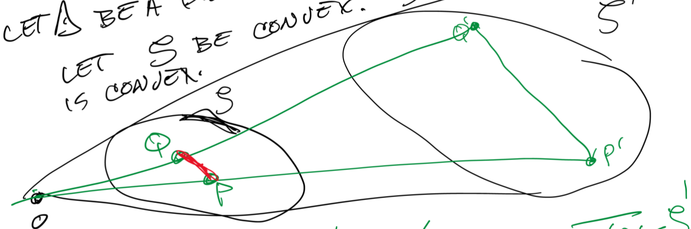
(SHOW ρ IS A ROTATION BY Θ AROUND SOME O.) BLAH BLAH BLAH.

HW5 2a

DILATION OF CONVEX IS CONVEX.

DEF: $\mathcal{S}$ IS CONVEX IF FOR ANY $P, Q \in \mathcal{S}$, THE ENTIRE SEGMENT $\overline{PQ}$ IS IN $\mathcal{S}$.

LET Δ BE A DILATION. LET $\mathcal{S}$ BE CONVEX. SHOW $\Delta(\mathcal{S}) = \mathcal{S}'$ IS CONVEX.



FOR ANY $P', Q' \in \mathcal{S}'$, SHOW $\overline{P'Q'} \in \mathcal{S}'$

Δ^{-1} BE THE INVERSE OF Δ.

$P = \Delta^{-1}(P')$, $Q = \Delta^{-1}(Q')$

KNOW $\overline{PQ} \subset \mathcal{S}$ SINCE $\mathcal{S}$ IS CONVEX.

SO IF $X \in \overline{PQ}$, $\Delta X \in \overline{P'Q'}$

$X \in \mathcal{S}$, $\Delta X \in \mathcal{S}'$ SO $\overline{P'Q'} \subset \mathcal{S}'$

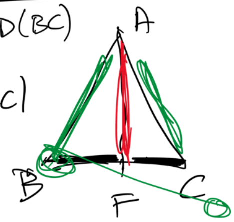
SO $\mathcal{S}'$ IS CONVEX.

HW5 #1 GIVEN $F = \text{MID}(BC)$

AF BISECTS $\angle A \iff |AB| = |AC|$

IS

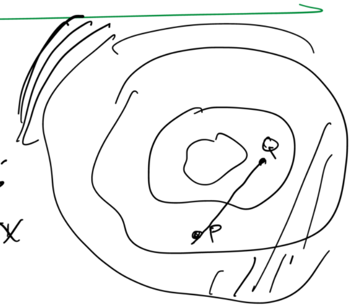
EASY COZ SSS



$C_i \subset C_{i+1} \subset \ldots$

EACH C_i IS CONVEX.

SHOW $K = \bigcup C_i$ IS CONVEX



TAKE $P, Q \in K$.

$P \in C_j \quad Q \in C_K$ FOR SOME j, K

BUT SINCE $C_i \subset C_{i+1}$, LET $m = \max(j,k)$

$P \in C_j \subset C_m$

$Q \in C_K \subset C_m$. SO $P, Q \in C_m$

BUT C_m IS CONVEX, SO $\overline{PQ} \in C_m$

$C_m \subset K$. SO $\overline{PQ} \subset K$.