Problem 8.1.4

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Abstract—This a simple document explaining a question about the following concepts:
1:- Congruency of Triangles.
2:- Parrallogram Properties.

Problem 1. :-
GIVEN:-

In Triangle, ABC.

=> D is Mid-point of AB.

=> E is Mid-point of BC.

=> F is Mid-point of CA.

TO PROVE:-
ΔABC is divided into four congruent triangles.

PROOF 01:-

ABC is a triangle and D, E and F are the mid-points of sides AB, BC and CA, respectively. then,
AD = BD = $\frac{1}{2}$AB,

BE = EC = $\frac{1}{2}$BC,

AF = CF = $\frac{1}{2}$AC,

now , using the mid-point Theorem,

EF||AB AND EF = $\frac{1}{2}$ AB=AD=BD

ED||AC AND ED = $\frac{1}{2}$ AC=AF=CF

DF||BC AND DF = $\frac{1}{2}$ BC=BE=CE

In Triangles ADF AND EFD.

AD = EF
AF = DE

DF = FD

Therefore, following Triangles are congruent.

ADF $\cong$ EFD

Similarly
DEF $\cong$ EDB
and
DEF $\cong$ CFE

SO,
Triangle ABC is divided into four CONGRUENT Triangles.

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PROOF 02:-

As D and E are mid-points of AB and BC of ABC,

DE||AC

Similarly DF||BC, EF||AB

ADEF, BDFE and DFCE are all parallelograms.

DE is the diagonal of the parallelogram BDFE.

(Since, a diagonal of a parallelogram divides it into two congruent triangles)

Similarly, and

Thus, all the four triangles, BDE, FED, EFC and DAF, are congruent

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