

MT 453 Elements Day 30

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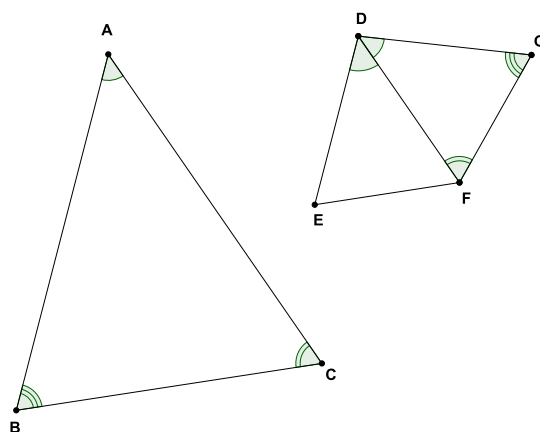
Proposition VI.6

If two triangles have two angles equal and the sides about the equal angles are proportional, the triangles will be equiangular and corresponding sides will subtend equal angles.

This is SAS for similar triangles.

Let $\triangle ABC$ and $\triangle DEF$ have equal angles at A and D , respectively, and suppose that $AB : AC = DE : DF$.

Draw $\angle FDG$ equal to $\angle EDF$ and $\angle DFG$ equal to $\angle ACB$. [I.23]



Then $\angle ABC = \angle DGF$ [I.32]

so $\triangle ABC$ and $\triangle DGF$ are equiangular.

Therefore $AB : AC = DG : DF$ [VI.4]

and $DE : DF = AB : AC = DE : DF$ [V.11], so $DE = DG$.

And DF is common, so $\triangle DEF \simeq \triangle DGF$

and the corresponding angles are equal: $\angle DEF = \angle DGF = \angle ACB$ and $\angle DFE = \angle DFG = \angle ACB$.

Therefore $\triangle ABC$ is equiangular with $\triangle DEF$.

Q.E.D.