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 sub-tend 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.