Angle Bisectors of a Triangle

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Theorem R. The angle bisectors of a triangle must meet.

Proof. By way of contradiction, we will show that angle bisectors of a triangle cannot be parallel. Suppose any two angle bisectors of a triangle are parallel, Ray A and Ray B. By definition of angle bisector, each side of the ray must have equal angle amounts on each. We know a side is between these two angle bisectors, in our case AC. By Euclid I.29, we know two interior angles on the same side equal are equal to two right angles. However we know that "any two angles taken together in any manner are less than two right angles." Therefore, we have a contradiction. This means the angle bisectors of a triangle must cross. Refereed by Nicole Hegewald.

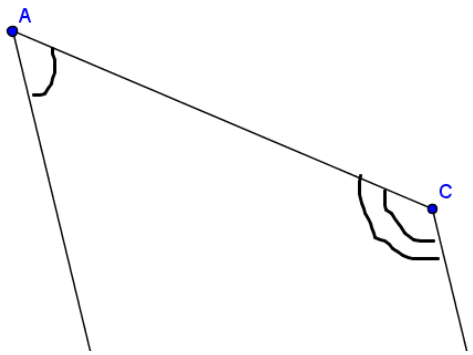

Figure 1: Parallel angle bisectors cannot form a triangle.

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