MAT 515: Geometry for Teachers

Problem Set 7

Stony Brook University Fall 2019
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Problem 1. (5 points)
Let AA_1 and BB_1 be bisectors of a triangle ABC. Let us denote by O the intersection point of AA_1 and BB_1. Assume that $\angle AOB = 130°$. Find $\angle ACB$.

Problem 2. (4+3 points)

(a) Suppose that $CC_1 = \frac{1}{2}AB$, where CC_1 is a median of a triangle ABC. Prove that $\angle ACB = 90°$.

(b) Consider a triangle ABC and suppose that $\angle ACB = 90°$. Let CC_1 be a median of a triangle ABC. Prove that $CC_1 = \frac{1}{2}AB$.

Problem 3. (5+1 points)

(a) Show that a convex polygon can not have 4 acute angles.

(b) Give an example of a convex polygon with 3 acute angles.

Problem 4. (5 points)
Let CC_1 be an altitude of a triangle ABC. Assume that CC_1 is inside $\triangle ABC$. Let O be a point on CC_1 strictly between C and C_1. Show that if $\angle AOC = \angle BOC$, then $AC = BC$.

Due Date: Wednesday October 23.