

Problems 2018-1

The following two problems involving two equilateral triangles are taken from [1]. Send a manuscript with a simple solution saying something new or giving a generalization. There is no deadline of submission.

Remark. The contents of this book and [2] are almost the same.

Problem 1. $ABCD$ is a square (see Figure 1), F and E are the points on the sides AB and DA , respectively, such that CEF is an equilateral triangle, G and H are points on the segment EF such that AGH is an equilateral triangle. Prove or disprove that the diameter of the incircle of CEF equals $|AG|$.

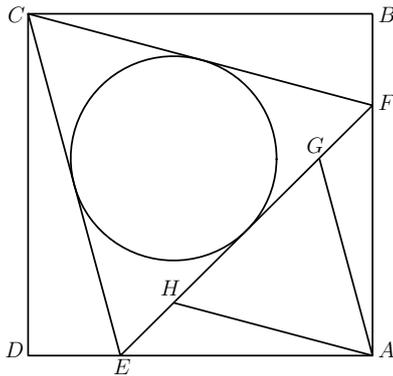


Figure 1.

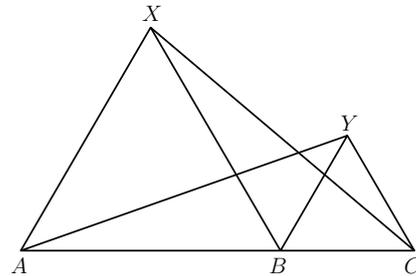


Figure 2.

Problem 2. B is a point on the segment AC (see Figure 2), X and Y are points lying on the same side of the line AC such that ABX and BCY are equilateral triangles. Prove or disprove $|AY| = |CX|$.

REFERENCES

- [1] Shijo Santei (視除算梯), Tohoku University Wasan Material Database, http://www.i-repository.net/il/meta_pub/G0000398wasan_4100005726.
- [2] Sansoku (算則, 雜題五十條), Tohoku University Wasan Material Database, http://www.i-repository.net/il/meta_pub/G0000398wasan_4100005019.

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