November 18, 2018

Math battle 9.

1. Is it possible to put in each vertex of any given triangle ABC a number such that for every edge, its length is equal to the sum of numbers at its endpoints?
2. 10 students are solving problems of a math competition. Each of 10 problems was solved by the same number of students, but no two students have solved the same number of problems. One of the students, Max, has solved problems 1 through 5 and has not solved problems 6 through 9. Has Max solved problem 10?
3. Prove that the sum of internal angles of an n-gon (a polygon with n vertices) is $(n-2) \cdot 180°$.
4. Solve the following equation: 2018 $fractions \left\{ \frac{1}{1-\frac{1}{1-\frac{1}{\dots -\frac{1}{1-\frac{1}{1-x}}}}} \right. = \frac{1}{2018}$
5. Let ABC be a right triangle, with $\angle A = 90°$, and $K \in BC$ be such that $AB = AK$. If we know that segment AK bisects the angle bisector CL, what are the angles of ΔABC?