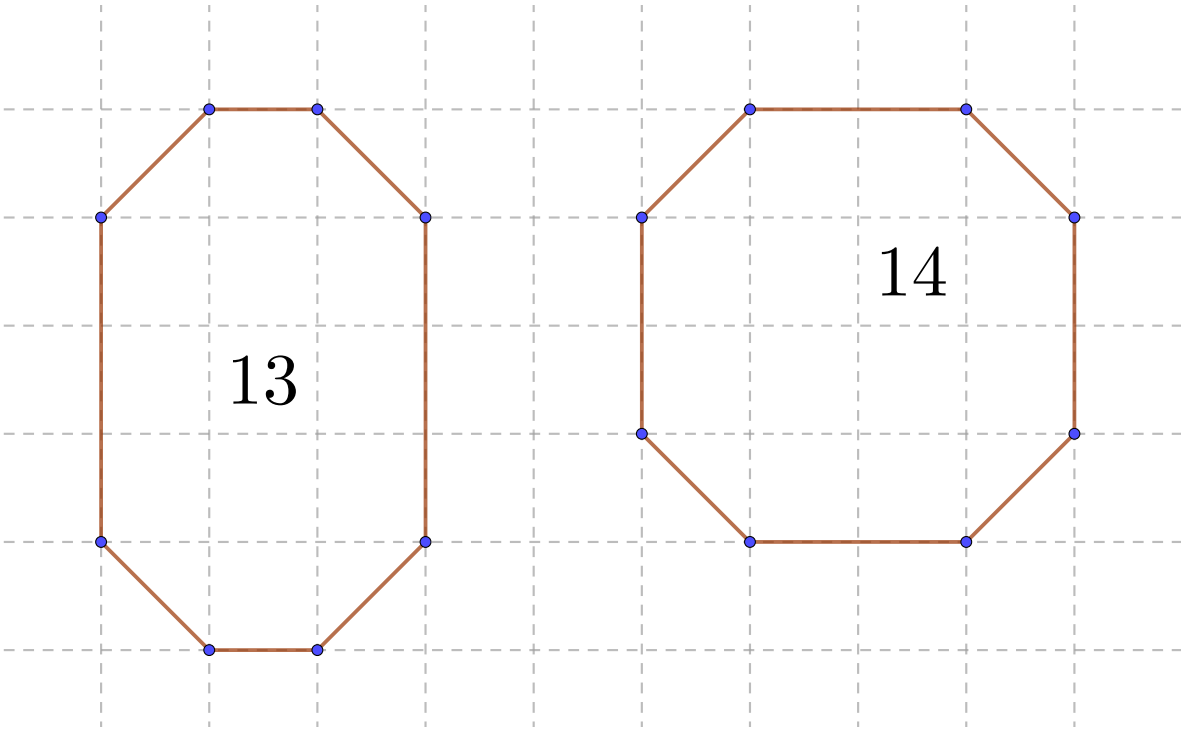
PROBLEM OF THE MONTH, OCTOBER 2019

An octagon is said to be *nice* if all its interior angles are 135°, its vertices are points with integer coordinates, and its area is a positive integer. For example, the figure below shows two nice octagons of areas of 13 and 14, respectively.



Prove that for every positive integer $A \geq 13$, there exists a nice octagon whose area is $= A$. For additional bragging rights, find a nice octagon with no horizontal nor vertical edges, and whose area is as small as possible.

Submit your solutions to professor Dan Ismailescu, Mathematics Department via email at dan.p.ismailescu@hofstra.edu, or bring it in person at 103A Roosevelt Hall.