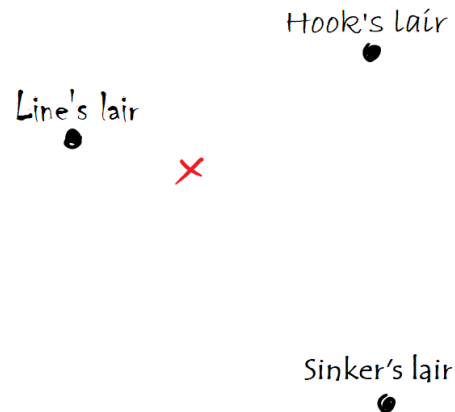


University of Washington Math Hour Olympiad, 2016

Grades 8-10

6. Captains Hook, Line, and Sinker are deciding where to hide their treasure. It is currently buried at the X in the map below, near the lairs of the three pirates. Each pirate would prefer that the treasure be located as close to his own lair as possible.

You are allowed to propose a new location for the treasure to the pirates. If at least two out of the three pirates prefer the new location (because it moves closer to their own lairs), then the treasure will be moved there. Assuming the pirates' lairs form an acute triangle, is it always possible to propose a sequence of new locations so that the treasure eventually ends up in your backyard (wherever that is)?



7. Homer went on a Donut Diet for the month of May (31 days). He ate at least one donut every day of the month. However, over any stretch of 7 consecutive days, he did not eat more than 13 donuts. Prove that there was some stretch of consecutive days over which Homer ate exactly 30 donuts.