

Problem 1: Get to 2022?

Welcome to 2022! Let's see if it is possible to obtain it in a certain arithmetical way. Let $D(n)$ be the sum of the digits of the positive integer n .

1. Does there exist a positive integer n such that $n + D(n) = 2022$?
2. Prove that for any two consecutive positive integers, at least one of them can be expressed in the form $n + D(n)$.

As always, show your work, fully explain and justify your answer. A solution mainly obtained by computers or calculators will not be accepted.

Posting Date 1/15/2022. Submit solutions to Noah Aydin, Mathematics Department, RBH 319 by e-mail or hard-copy by noon on Saturday, Jan 22, 2022. An email submission must be a single pdf file. Hard copy submissions must be dropped in the file holder at my office door (Hayes 319) and must include a time stamp.