Homework 6: Games and Geometry

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February 26, 2018

Problem 1.
Consider the system of equations:

$$\begin{cases} *x + *y + *z = 0 \\ *x + *y + *z = 0 \\ *x + *y + *z = 0 \end{cases}$$

Two players take turns replacing the stars with real numbers. The goal of the first player is to make the system have at least one nontrivial solution after all the stars have been replaced, and the goal of the second player is to make the system have no nontrivial solutions. Who has a winning strategy? (A nontrivial solution means a solution which is not $(0, 0, 0)$)

Problem 2.
Kiselev 227, page 89.

Problem 3.
Kiselev 231, page 89.