Problem of the Week #1
8/24/2020 to 9/6/2020

Let $\mathbb{P}$ be the set of all points $(x, y)$ in the Cartesian plane where $x$ and $y$ are integers, and suppose we wish to color every point in $\mathbb{P}$ with one of the colors Red, White, and Blue. Is it possible to color these points such that both of the following conditions hold?

i. Each color occurs infinitely often in infinitely many lines which are parallel to the $x$-axis.

ii. No line in the plane—that is, not just those parallel to the $x$-axis—contains points of all three colors.

Solutions for this problem can be submitted to Dr. Brian Miceli at bmiceli@trinity.edu. People who submit solutions will be acknowledged on the next problem. If you like these problems, you may be interested in the Putnam Exam, and more information on the Putnam Exam may be found [HERE](#).