

Directions: Solve the following problems. All written work must be your own. See the course syllabus for detailed rules.

1. Determine the minimum integer n such that every 2-coloring of $\{1, \dots, n\}$ contains a monochromatic solution to $x + 2y = z$. (Hint: consider the case that 1 and 2 have the same color and the case that 1 and 2 have distinct colors.)
2. [3.1.6] How many odd five-digit integers start with an even digit?
3. [3.1.8] Count the functions $f: \{1, \dots, 7\} \rightarrow \{1, 2, 3, 4\}$.
4. [3.1.14] How many ways are there to color the vertices of a pentagon with three colors such that no two adjacent vertices receive the same color?