1. Two opposite corner squares are removed from the 10×10 checkerboard to obtain the board shown. Is it possible to tile the board with dominoes?

2. In how many distinct ways can a 2×18 board be tiled with dominoes? For example, there are three tilings of the 2×3 board shown below. If all three dominoes are placed vertically we could denote this by \{\{1, 4\}, \{2, 5\}, \{3, 6\}\}. The other two tiling are \{\{1, 2\}, \{4, 5\}, \{3, 6\}\} and \{\{1, 4\}, \{2, 3\}, \{5, 6\}\}

3. Is it possible to tile a 9×9 board with 40 dominoes and one monominoe? If so, can the monominoe be placed anywhere on the board? What about other boards with an odd number of squares? Develop a conjecture and prove it.

4. Assuming polyominoes can be turned over, how many distinct pentominoes are there? The assumption means, for example, that \(\begin{array}{ccc} & & \\ & & \\ & & \end{array}\) and \(\begin{array}{ccc} & & \\ & & \\ & & \end{array}\) are indistinguishable.