1. Recall that any isometry of the plane can be written as
   \[ m(x) = Ax + b \]
   where \( A \) is an orthogonal matrix and \( b \) is a fixed vector. Assume that \( \det(A) = -1 \), so \( m \) reverses orientation. Prove that \( m^2 \) is a translation by some vector.

   In problems 2-4, find all isometries of the following infinite patterns:
   
   2. \( \ldots \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \ldots \)
   3. \( \ldots \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \ldots \)
   4. \( \ldots \downarrow \Rightarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \ldots \)