1. Find a recurrence relation for the number of ternary strings of length \( n \) that contain either two consecutive 0s or two consecutive 1s.

2. Find a recurrence relation for the number of bit strings of length \( n \) that contain the string 01.

3. Find the recurrence relation satisfied by \( R_n \), where \( R_n \) is the number of regions that a plane is divided into by \( n \) lines, if no two of the lines are parallel and no three of the lines go through the same point.

4. Let \( A_n \) be the \( n \times n \) matrix with 2’s on its main diagonal, 1’s in all positions next to a diagonal element, and 0’s everywhere else. Find a recurrence relation for \( d_n \), the determinant of \( A_n \). Solve this recurrence relation to find a formula for \( d_n \).

5. Let \( S(m, n) \) denote the number of onto functions from a set with \( m \) elements to a set with \( n \) elements. Show that \( S(m, n) \) satisfies the recurrence relation
\[
S(m, n) = n^m - \sum_{k=1}^{n-1} C(n, k) S(m, k)
\]
whenever \( m \geq n \) and \( n \geq 1 \), with the initial condition \( S(m, 1) = 1 \).

6. Find a recurrence relation for the number of strictly increasing sequences of positive integers that have 1 as their first term and \( n \) as their last term, where \( n \) is a positive integer.

7. Find a recurrence relation for the number of ternary strings that do not contain two consecutive 0s or two consecutive 1s.

8. Find a recurrence relation for the number of ternary strings that contain two consecutive symbols that are the same.