Homework for Linear Homogeneous Recurrence Relations with Constant Coefficients

1. In how many different ways can a $2 \times n$ rectangular board be tiled using 1×2 and 2×2 pieces?

2. Solve (and analyze behavior at infinity) the following recurrence relations together with the given initial conditions:

a. $f(n) = f(n-1) + 6f(n-2)$ for $n \geq 2$, $f(0) = 3, f(1) = 6$.
b. $f(n) = 2f(n-1) - f(n-2)$ for $n \geq 2$, $f(0) = 4, f(1) = 1$.
c. $f(n) = 2f(n-1) + f(n-2) - 2f(n-3)$ for $n \geq 3$, $f(0) = 3, f(1) = 6, f(2) = 0$
d. $f(n) = 5f(n-2) - 4f(n-4)$ for $n \geq 4$, $f(0) = 3, f(1) = 2, f(2) = 6, f(3) = 8$
e. $f(n) = f(n-4)$ for $n \geq 4$, $f(0) = 1, f(1) = 0, f(2) = -1, f(3) = 1$

3. Solve the simultaneous recurrence relations

$$f(n) = 3f(n-1) + 2g(n-1)$$

$$g(n) = f(n-1) + 2g(n-1)$$

for $n \geq 1$, $f(0) = 1, g(0) = 2$.