

Homework Set 8

DUE: APR 6, 2016 (IN CLASS)

1. Bretscher Section 7.1: 1, 3, 8, 33, 46, 68
2. Bretscher Section 7.2: 22, 35, 42, 43
3. Bretscher Section 7.3: 22, 24, 33, 35
4. Let L_n be the n th *Lucas number*, defined by the recurrent relation

$$L_{n+2} = L_{n+1} + L_n,$$

with $L_0 = 2$ and $L_1 = 1$, so that the first few Lucas numbers are 2, 1, 3, 4, 7, 11, \dots

Find a closed formula for L_n , and use it to compute $\lim_{n \rightarrow +\infty} \frac{L_{n+1}}{L_n}$.

5. Find a closed formula for the n th element a_n of each of the following recurrent sequences:
 - (a) $a_{n+2} = a_{n+1} - a_n$, $a_0 = 0$, $a_1 = 1$;
 - (b) $a_{n+2} = 2a_{n+1} - a_n$, $a_0 = 0$, $a_1 = 1$;
 - (c) $a_{n+2} = 6a_{n+1} - 9a_n$, $a_0 = 1$, $a_1 = -2$;
 - (d) $a_{n+2} = 2a_{n+1} - 2a_n$, $a_0 = 0$, $a_1 = 1$.

In each of the above cases, compute $\lim_{n \rightarrow +\infty} \frac{a_{n+1}}{a_n}$.

6. Read Jeff Jaregui's notes on *Error Correcting Codes*, and write solutions to the Exercises in pages 3 and 7.