1a. Finish the work done in class to find a formula for the kth Fibonacci number, F_k

You must show your work.

b. Use the formula in part (a) to find the 25th, 50th and 100th Fibonacci numbers, F_{25}, F_{50}, F_{100}

2. From text Section 8.3: 1, 15, 16.

3a. For the Fibonacci matrix $A = \begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$, write down A^2, A^3, A^4 and then (using the work done in class) A^{100}.

b. Find B^{101} if $B = \begin{bmatrix} 7 & 12 \\ -4 & -7 \end{bmatrix}$.

4. Suppose Fibonacci had started his sequence with $F_0 = 1$ and $F_1 = 3$ and then followed the same rule $F_n = F_{n-1} + F_{n-2}$ for $n \geq 2$. Find a formula for F_n as we did in class. Show that the ratios $\frac{F_n}{F_{n-1}}$ still approach the golden ratio. That is, prove $\lim_{n\to\infty} \frac{F_n}{F_{n-1}} = \frac{1+\sqrt{5}}{2}$.

5. If each number in a sequence is the *average of the previous two numbers,* that is, $G_n = \frac{1}{2}(G_{n-1} + G_{n-2})$, set up a matrix A that shows how to represent this in matrix form. Diagonalize the matrix A and use $G_0 = 0$ and $G_1 = \frac{1}{2}$ to find a formula for G_n (as we did in class for the Fibonacci sequence). Then compute $\lim_{n\to\infty} \frac{G_n}{G_{n-1}}$.