

Homework 1

Fibonacci Numbers & Related Topics

Due Thursday, January 25, 2007

#1. Calculate the first 10 terms of the sequence given by $T_0 = 0$ and $T_n = T_{n-1} + n$ for all $n \geq 1$. The numbers in this sequence are called **triangular numbers**. If we have time, we'll see some interesting properties of these numbers later in the course.

#2. Calculate the first 10 terms of the sequence given by $A_1 = 2$, $A_2 = 5$, $A_3 = 3$, and $A_n = 2A_{n-1} - 4A_{n-2} + A_{n-3}$ for all $n \geq 4$.

#3. Calculate the first 10 terms of the sequence given by $S_1 = 1$, $S_2 = 0$, $S_3 = 1$, and $S_n = 3S_{n-1} - 3S_{n-2} + S_{n-3}$ for all $n \geq 4$. Can you guess a simple formula for S_n ? You **do not** need to prove that your guess is correct.

#4. Calculate the first 10 terms of the sequence given by $x_0 = 0$, $x_1 = 2$, and

$$x_n = \frac{4}{n}x_{n-1} + x_{n-2} + 2$$

for all $n \geq 2$. Can you guess a simple formula for x_n ? You **do not** need to prove that your guess is correct.