Discrete Mathematics 21-228
Exam #2
Friday, May 28

You may use your notes and textbook. Show your work, and justify your results.

1. We select 38 even positive integers, each less than 1000. Prove that there are two of them whose difference is at most 26.

2. Solve the following recurrence:

$$g_{n+1} = -2g_n + 3g_{n-1}$$

for $n \geq 1$, $g_0 = 5$, $g_1 = -3$.

3. Let a_n = the number of different ways to tile a 3 x n grid of squares using 3 x 1 tiles.

   (a) Find a recurrence relation for a_n. State which values of n your recurrence relation is valid for, and give the necessary initial conditions to determine the sequence. List the first six values of the sequence.

   (b) Find the generating function for a_n. Explain how you could determine the values of a_n using this generating function (you need not sctually do this).