QUIZ #5 : MATH 1200 SECTION B - MARCH 7, 2011

Show your work on the following problems. If you have any questions ask me.

(1) Assume $a_{n,0} = a_{n,n} = n+1$ and for $0 < k < n$, $a_{n,k} = a_{n-1,k-1} + a_{n-1,k}$. Make a table of $a_{n,k}$ for $0 \le n \le 3$ and $0 \le k \le n$.

(2) Compute for each $0 \le n \le 3$ and $0 \le k \le n$ table of values of $b_{n,k} = \binom{n}{k-1} + \binom{n}{k} + \binom{n}{k+1}$.

(3) Prove by induction that $a_{n,k} = b_{n,k}$ for all $n \ge 0$ and $0 \le k \le n$.

(4) Assume that $c_0 = 1$ and for $n \ge 1$, $c_{n+1} = 3c_n + (-2)^{n+1}$. Show that $c_n = (3^{n+1} - (-2)^{n+1})/5$ for $n \ge 0$.