Math 204- Discrete Mathematics, Spring 2010

Quiz 6, May 03, 2010, 15:40 group

Time: 25 minutes

Write your solutions clearly, provide explanation, etc.
Do not forget to write your name and ID No on top of the page!

Problem 1 (8+6 pts).

a. For an integer $n \geq 1$, show that

$$\binom{2n+2}{n+1} = 2\left(\binom{2n}{n+1} + \binom{2n}{n}\right)$$

b. Evaluate the sum

$$\sum_{k=0}^{n} 3^k \binom{n}{k}.$$

Problem 2 (2 pts each). Using the numbers $1, 2, \ldots, 9$, how many vectors of length 6 can be formed in each of the following cases?

a. no even number in the vector,

b. no even number in the vector and numbers cannot be repeated,

c. exactly 2 even numbers in the vector.