MTH U581: Spring 2008: Prof. C. King

Assignment 3

Due date: Thursday, January 31.
Reading: Sections 3.3 – 3.4.

Problems:

1. p. 233: #5, #6, #8.

2. p. 236: #16, #20.

3. p. 279: #1,#3, #4.

4. Let a, b, n be positive integers with $a + b \geq n$. Prove that

$$\binom{a}{0}\binom{b}{n} + \binom{a}{1}\binom{b}{n-1} + \cdots + \binom{a}{n}\binom{b}{0} = \binom{a+b}{n}$$

5. Using Stirling's formula prove that

$$\binom{2n}{n} \sim (\pi n)^{-1/2}\, 2^{2n}$$

6. Find the probability that among $10,000$ random digits the digit 7 appears not more than 968 times.

7. Find a number k such that the probability is about 0.5 that the number of Heads obtained in 1000 tosses of a fair coin will be between 440 and k.