

General Mathematics and Computational Science I

Exercise 9

October 11, 2007

1. (From Ivanov, p. 20; note that there is a typo in the book!)

Let $S(n, n-1) = 1$ and $(n-1)(k-1)S(n, k) = (n-k)S(n, k-1)$. Deduce that

$$S(n, k) = \binom{n-2}{k-1} (n-1)^{n-k-1}.$$

2. (From Ivanov, p. 21.) Prove the inequality

$$\binom{n}{k} \leq \binom{n}{\lfloor n/2 \rfloor}$$

for $k = 0, \dots, n$.

3. In how many ways can you write the number 4 as the sum of 5 nonnegative integers?