

Math 344 Winter 2002

Problem Set 2

§7.2: 12, 15, 16, 17, 23, 27, 30

§7.3: 2, 9, 12, 17, 26, 27, 28, 31, 33

§7.4: 4, 8, 9, 10, 12, 14, 15, 18, 23, 24, 26, 32, 34

Chapt. 7 supplementary problems: 50, 52, 56, 57

Some of the above problems may be open to more than one interpretation. If this is the case try to consider both possible interpretations or at least be clear in your mind how you are interpreting the problem.

A. Prove both combinatorially and algebraically that

$$C(n+1, k) = C(n, k-1) + C(n, k).$$

Understand how this formula gives rise to **Pascal's triangle** (see 7.1 if you are not familiar with Pascal's triangle).

B. In how many ways can n be written as a sum of positive integers if order counts. For example

$$3 = 3 = 2 + 1 = 1 + 2 = 1 + 1 + 1$$

can be so written in 4 ways.

C. Suppose A is a set of $n+1$ numbers between 1 and $2n$. Show that there are distinct $k, l \in A$ such that k divides l .