

There are six problems on today's assignment. The first five problems come from the book:

Section 1.9, Exercises 1, 5, 10, 13, 16.

For the sixth problem, recall from class that there are  $\binom{d+2}{2}$  degree- $d$  monomials in  $x, y, z$ .

A. Show algebraically that

$$\sum_{i=0}^d \sum_{j=0}^{d-i} 1 = \binom{d+2}{2}.$$

You might find this algebraic identity helpful:

$$\sum_{k=0}^n k = \sum_{k=1}^n k = n(n+1)/2.$$

B. Explain *why* the double summation from part A answers the counting problem. (I'm looking for something quite different from, "Because part A shows that they are numerically equal.")