

**Math 464/564 Fall 2017 Homework Number 8- Due Tuesday 10/31/17**

1. Sagan 3.12 #2.

2. Sagan 3.12 #4.

3. Sagan 3.12 #8.

4. Let  $\pi = x_1x_2 \cdots x_n$  be a permutation in  $S_n$  in one-line notation. Say  $\pi$  is 321-avoiding if there does not exist  $i < j < k$  with  $x_i > x_j > x_k$ . (For example the permutation 321 is not 321 avoiding). Let  $f(n)$  be the number of 321-avoiding permutations in  $S_n$ . Express  $f(n)$  as the dimension of a particular Specht module for  $S_{2n}$ . Hint: You will want to construct a bijection between pairs of SYT of a certain shape  $\lambda \vdash n$  and SYT of a certain shape  $\tau \vdash 2n$ .