

HW 4.4

12. We just add adjacent numbers in this row to obtain the next row (starting and ending with 1, of course):

1 11 55 165 330 462 462 330 165 55 11 1

14. Using the factorial formulas for computing binomial coefficients, we see that  $\binom{n}{k-1} = \frac{k}{n-k+1} \binom{n}{k}$ . If  $k \leq n/2$ , then  $\frac{k}{n-k+1} < 1$ , so the "less than" signs are correct. Similarly, if  $k > n/2$ , then  $\frac{k}{n-k+1} > 1$ , so the "greater than" signs are correct. The middle equality is Corollary 1 in Section 4.3, since  $\lfloor n/2 \rfloor + \lfloor n/2 \rfloor = n$ . The equalities at the ends are clear.