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CSC 226 Assignment 3 Written

1. 13! / (2! * 3!) = 518918400

2. 13! / 5! = 51891840

3. (n + k - 1) choose k = (50 + 100 - 1) choose (100) = 149 choose 100 = $6.71*10^{39}$

4. $q_k = (k-1)(1-p)^{k-2}p^2$
   so the summation of $k*q_k$
   = the summation of $k(k-1)(1-p)^{k-2}p^2$
   by the same logic as seen in lecture proving the summation of $k*p_k = 1/p$
   = 2/p

5. It is always 0. Considering the symmetric Pascal's Triangle

Ignoring 0 choose 0
+1 -1 = 0
+1 -2 +1 = 0
+1 -3 +3 -1 = 0
+1 -4 +6 -4 +1 = 0
For all odd n, there are even terms and since (n choose k) = (n choose n-k) the terms are mirrored.
For all even n, (n choose n/2) = the summation of { (n choose 0) + (n choose 1) + … + (n choose n) } \ (n choose n/2)

6. (13 choose 6) - (8 choose 6) = 1688

7. (m+1)*(n+1)