9. (14 points) Write

\[
\begin{align*}
&\binom{600}{0}\binom{1100}{700} + \binom{600}{1}\binom{1100}{699} + \binom{600}{2}\binom{1100}{698} + \binom{600}{3}\binom{1100}{697} + \ldots \\
&\ldots + \binom{600}{597}\binom{1100}{103} + \binom{600}{598}\binom{1100}{102} + \binom{600}{599}\binom{1100}{101} + \binom{600}{600}\binom{1100}{100}
\end{align*}
\]

as one binomial coefficient. Explain your work.

Both numbers count the number of 700 men and 1100 women which can be formed from a committee which consists of 600 men and 1100 women.

10. (14 points) Solve the recurrence relation

\[
a_n-5a_{n-1}+8a_{n-2}-4a_{n-3} = 3,
\]

with \(a_0 = 0\), \(a_1 = 3\), and \(a_2 = 13\).

\[
x^3-5x^2+8x-4 = (x-1)(x-2)^2
\]

so the general solution is

\[
a_n = C_1 + C_2 2^n + C_3 n 2^n
\]

Look for a particular solution of the form

\[
a_n = A_n
\]

\[
A_n-5 A(n-1)+8 A(n-2)-4 A(n-3) = 3
\]

\[
A(5-16+12) = 3
\]

\[
A(1) = 3
\]

\[
A = 3
\]

so the general solution is

\[
a_n = C_1 + C_2 2^n + C_3 n 2^n + 3n
\]

\[
a_n = \ldots \quad \frac{3}{7}
\]

\[
a_n = \ldots \quad \frac{3}{7}
\]

\[
a_n = \ldots \quad \frac{3}{7}
\]