P1 (10pts). Mr. Brown raises chickens. Each chicken can be described as thin or fat, red or brown, hen or rooster. Four are thin brown hens, 17 are hens, 14 are thin chickens, 4 are thin hens, 11 are thin brown chickens, 5 are brown hens, 3 are fat red roosters, 17 are thin or brown chickens. How many chickens does Mr. Brown have?

P2 (10pts). Consider the following information regarding three sets $A$, $B$, and $C$. Suppose $|A| = 14$, $|B| = 10$, $|A \cup B \cup C| = 24$, and $|A \cap B| = 6$. Which of the following assertions must be true?

- $|C| \leq 24$;
- $|C| \geq 6$;
- $|A \cup B| = 18$.

P3 (10pts). Solve the recurrence $a_n = a_{n-1} + 6a_{n-2}$ with starting terms $a_0 = 1$ nd $a_1 = 3$ (“solve” means find the general formula for $a_n$ for all $n \geq 0$).

P4 (10pts). Suppose we want to pick a number $n$ of painted eggs with the following constraints:

- they must all be red, green, or blue;
- one may not choose more than 2 red eggs;
- one must pick at most 1 blue egg;
- one must pick an even number of green eggs.

How many ways of doing it do we have?