Name:

**Directions:** Show all work.

1. [4 points] Give a list of distinct integers of maximum size which has no increasing subsequence of size 3 and no decreasing subsequence of size 6. (You do not need to prove your list has maximum size.)

- 2. For  $n \ge 3$ , let  $a_n = -a_{n-1} + 8a_{n-2} + 12a_{n-3}$ .
  - (a) [3 points] Find the general solution to the recurrence.

(b) **[3 points]** Find the solution when  $(a_0, a_1, a_2) = (0, 4, 9)$ .