Name:

Directions: Show all work. No credit for answers without work.

- 1. [2 parts, 2.5 points each] A computer game has 5 different personas: elves, dwarfs, goblins, leprechauns, and minotaurs. There are 4 different skill categories: magic, weapons, construction, and farming. Expertise in each skill area is a binary property: a character is either an expert in an area or not.
 - (a) Players create a character by selecting a persona and a single area of expertise. How many ways are there to form a character?

(b) During the game, a character may gain or lose expert status in the various areas of expertise. How many different types of characters are possible throughout the game?

- 2. [2 parts, 2.5 points each] A zoo has 4 exhibits in the jungle zone, 6 exhibits in the desert zone, and 5 exhibits in the aquatic zone.
 - (a) Standard admission to the zoo includes a complementary photo of the visitor in an exhibit of the visitor's choice. How many ways can a visitor take the photo?

(b) Deluxe admission includes an additional photo. The two photos must be taken at exhibits in different zones. How many ways can a visitor with a deluxe admission choose the exhibits for the two photos?