Name:
ID number:
Department:
Degree Program:
Expected Date of Graduation:

There are 3 problems. Do all problems. Show all your work.

1. 50 Points The following data represents the family sizes for a group of families.
   6, 2, 7, 4, 3, 4, 4, 3, 5, 2, 3, 2, 2, 8, 5, 4, 3, 3, 7.
   1a. Find the Average and Standard Deviation (show all your work, just doing it with a calculator is not enough)
   1b. Find a median. Is there more than one median? Yes or No.
   1c Draw a histogram for this data set with the following categories:
      2
      3
      4 to 5
      6 to 8
      Note: You can do a steam and leaf plot or a regular histogram.

2. 35 points A student wants to make some money and designs a new game in which one picks 5 of the numbers from 1 through 50. A drawing (without replacement) is made. If you have all 5 selected numbers you win a share of the first prize. If you have exactly 4 of the selected numbers you win a share of the second prize. Calculate the probability of winning a share of the first and second prizes.

3. 15 points Your biology teacher is interested in finding out how many goldfish remain in the School’s pond (an unknown integer M). As part of your effort in finding out, you go to the pond and capture 40 goldfish, tag them and return them to the pond. The next day you go back and capture a sample of 30 goldfish and find that 10 of the goldfish in the new catch have the tag you put the day before. Assuming that the population of goldfish in the pond remained the same (say M fish), Find a formula (as a function of M) for the probability $P_M$ of getting the results you obtained the second day. That is 10 marked and 20 unmarked fish in a sample of 30 fish.
Extra Credit (you may take this one home) 10 Points Find the value of M that maximizes this probability ($P_M$). That is, one’s best estimate of the size of the pond’s goldfish population.