Chapter 1: The Role of Statistics

Name _____

1. Briefly describe how populations and samples differ.

2. In a psychological study of distance perception, introductory psychology class volunteers were given 5, 10, or 15 extra credit points depending on their level of participation in the experiment. They walked along paths laid out along hallways in the psychology building, and were asked to judge the distance they had walked. Each path distance was between 100 and 200 feet in length, and contained from two to seven 90 degree turns.   The investigators also kept track of class standing (freshman, sophomore, junior, or senior). For each of the variables in this study, determine whether it is categorical or numerical.   For each numerical variable, determine whether it is discrete or continuous:

a) The true length of the path

b) The amount of credit given to the volunteers

c)   The length of the path as judged by the students

d) The number of 90 degree turns

e) Class standing

3. The most important right and responsibility of citizens in a democratic society is voting. The bar chart below shows, for different age groups in the 2000 presidential election in the United States, the percentage of individuals in that age group who are registered to vote.

Voting in the 2000 Elections

% Registered

Age group
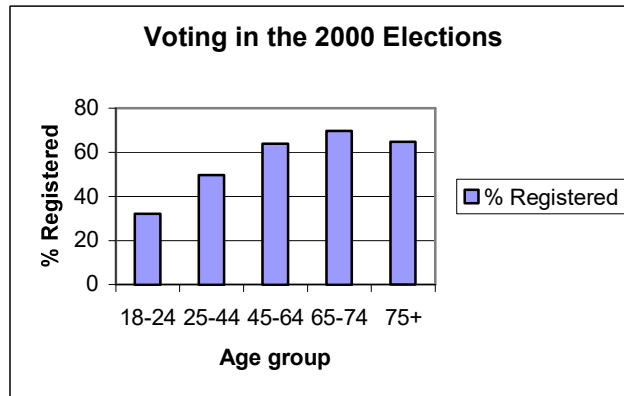
(a) Describe in a few sentences the registration pattern that you see in the data above.

(b) Some individuals argue that the reason for the current level of registration in the 18-24 year-old group is that many of them are college students and would have to vote absentee. In your opinion, would that explain the registration level for the 18 – 24 age-group? Why or why not?

4. Artificial nest have often been used when biologists study predation on birds. It is usually assumed that predators will respond to artificial nests in the same way they do to real birds' nests. A recent experiment was performed to check this assumption for predators of the American robin (*Turdus migratorius*) by comparing the egg loss in three experimental treatments: (1) natural robin's nests, (2) artificial wicker-basket nests placed 30 meters in a random direction from natural robin's nests, and (3) artificial wicker-basket nests placed in a 180 m by 240 m grid around robin's nests. The data below are <u>cumulative</u> counts of eggs predated (stolen or broken and eaten) at 5, 10, and 15 day points of the experiment.

Cumulative count of depredated eggs

Nest type	Original *n*	Day 5 check	Day 10 check	Day 15 check
Natural robin	27	12	17	19
30 m from robin	27	3	12	18
Grid	48	7	32	44

(a) Construct a <u>bar chart</u> to display the cumulative counts for the natural robin nests at their 5-, 10-, and 15-day checks.

(b) Fill in the <u>relative</u> frequency distribution (table) representing the cumulative counts for the artificial nests in the <u>grid</u>. (Do not convert the table to a graph.)

Nest type	Original *n*	Day 5 check	Day 10 check	Day 15 check
Natural robin	27			
30 m from robin	27			
Grid	48			

5. Biologists know that bats have different flight characteristics. Some bats exhibit fast, straight, and long flights; others are moderately slow, and highly maneuverable. The flight capabilities of bats are presumably a function of (a) the characteristics of the bat wings, and (b) the laws of physics. The data presented below are wing weights in grams for certain species of bats from Nicaragua and Costa Rica. Two categories of bat species are represented: fruit-eaters and insect-eaters.

Fruit eaters:
9.9, 11.5, 47.0, 59.6, 18.2, 22.1, 22.9, 15.0, 15.4, 13.3, 38.3, 42.2, 114.3, 105.4, 80.9

Insect eaters:
23.8, 16.1, 4.2, 3.9, 7.5, 3.5, 3.9

a) Construct two dot plots that will allow you to easily compare the distributions of the wing weights for the two categories of bats, fruit-eaters and insect-eaters.

b) Write a short paragraph describing the features of the two plots; what do these plots tell you about the differences in wing weight for fruit- and insect-eaters?