

Exam is closed book. You must work independently. Calculators are permitted. Point values are indicated. Good luck!

1. (8 points) A report states that 35% of **all** Americans approve of a proposed tax increase. A pollster wants to confirm this. The pollster selects a random sample of people in San Diego, and 200 agree to be interviewed. Of the 200 interviewed, 73 agree with the tax increase.

- a. What (who) is the population? All Americans
- b. What (who) is the sample? San Diegans
- c. What is the statistic?  $73/200 = 36.5\%$
- d. What is the parameter? 35%

2. (8 points) The following contains a probable source of bias: Maryann wanted to collect information on how many times people eat fast food each week. She decided to collect her data at a local mall. She tried to get people to stop and fill out her survey, but many of the shoppers were in a rush and ignored her. She found that people sitting at the tables and benches near the food court were more willing to help, so she conducted her survey there.

- a. Do you think that her sampling method will give a good indication of the true percentage of people who eat fast food? YES  NO
- b. Using complete sentences, describe the reason why you answered YES or NO above. Describe the source of bias with the collection method (if any) and what you would do to **improve** the sampling method (if anything).

She would be getting more people who eat fast food, since she is sampling people in the food court, most of whom are probably eating fast food. Do the survey some place else - beach, grocery store, etc. where fast food is not being served; maybe give an incentive (prize) for filling out survey

3. (10 points) Suppose that the University is interested in gathering information about the average age of the student body and decides to consider each of the following sampling methods. What sampling technique is being considered in each situation? Give the best answer.

- A. simple random
- B. stratified random
- C. cluster
- D. convenience
- E. systematic
- F. self-selected

self selected F : Have the bookstore pass out a survey form to every student who makes a purchase and have a box available for them to return completed forms.

cluster C : Survey everyone who is in the cafeteria at noon on Tuesday.

simple random A : Have the school computer randomly select 100 student names and look up their ages in the school records.

stratified random B : Divide the student body up into 5 class levels (freshmen, sophomore, junior, senior, and graduate) and then randomly select 100 from each group.

convenience D : Stand by the parking structure and interview everyone that comes by.

4. (5 points) In an interview, 503 of the 625 people polled said that they have been to a Disney theme park. What interval is the population parameter likely to be in? Write the answer using a complete sentence.

$$\text{statistic} = \frac{503}{625} = 80\% \quad \text{error} = \frac{\pm 1}{\sqrt{625}} = \frac{1}{25} = 4\%$$

It is likely that ~~80%~~ 80%  $\pm$  4% or  $\nearrow$  between 76% to 84% of all people have been to a Disney theme Park.

5. (6 points) Suppose that you have a huge bag of M&M's with many different colors of candies. You know that 20% of the M&M's are blue. If you reach into the bag and pull out several samples of 25 M&M's each, what is the likely interval for the number of M&M's you will likely find in your samples? **Show your work!!**

Answer: I am likely to find anywhere from 0 to 10 blue M&M's in each sample.

$$\text{error} = \frac{1}{\sqrt{25}} = \frac{1}{5} = .2 = 20\%$$

$$20\% \pm 20\% = 0\% \text{ to } 40\%$$

$$0\%(25) = 0$$

$$40\%(25) = 10$$

6. (4 points) A report states that 65% of all American children are overweight. Which of the following would be more likely to happen if we were to go out and sample? Circle the correct answer.

- a)  5 children are weighed, and 4 are overweight = 80%  
 b) 100 children are weighed, and 80 are overweight > 80%

Explain why:

80% is not a good predictor of 65% so these are not good samples. There is a better chance of being off in a small sample than a large sample.

7. (4 points) Circle the correct response for each statement.

- a. If the sample size is increased, the confidence level will increase / decrease.  
 b. If the confidence interval is decreased, the confidence level will increase / decrease.  
 c. If the confidence level is to be increased, the sample size must increase / decrease.  
 d. If the sample size is decreased, the confidence interval will increase / decrease.

8. (6 points) Suppose that 75 students each go out and randomly interview 100 people, asking them the question "Do you watch the TV show "Survivor"? The results are shown in the table below.

Percentage saying yes	number samples
21	1
22	1
23	8
24	5
25	8
26	10
27	14
28	11
29	9
30	6
31	8
32	2
33	1
34	1

a. what is the confidence level (probability) that the parameter is between 23 and 31%?

$$69/75 = 92\%$$

b. What is a confidence interval that would give a 84% confidence level?

$$84\% = x/75 \quad x = 63$$

leave out 12

$$50 \cdot 24 + 0 \cdot 30$$

(or 25 to 32)

9. (6 points) Circle T if *always true*, F otherwise.

- T F Weight is a good example of a *measurement variable*.
- T  F Eye color is an example of a *measurement variable*.
- T  F It is always easy to determine how to measure attributes.
- T F In statistics, the things we measure are called *variables*.
- T F Statistics sometimes give bad predictions of parameters.
- T F For any given statistic, the parameter is more likely to be within 8% than within 3%.

10. (8 points) Fill in the following short answer questions.

- a. You should use a circle/pie graph to show the percentage of data in each category.
- b. If Joey wanted to put the heights of his classmates in order he should use a stem & leaf / line plot
- c. If 21 out of 145 people say they never watch reality TV, this corresponds to 52° degrees on the pie graph.
- d. If 65 out of 145 people say they watch reality TV more than once per week, this corresponds to 45% percentage on a pie graph.  
(44.8)

11. (9 points) The following is a list of 27 mathematics test scores. Use them to determine the following:

93, 81, 59, 69, 82, 73, 61, 77, 95, 84, 88, 71, 85, 97, 63, 72, 89, 80, 60, 98, 91, 62, 78, 83, 76, 81, 94

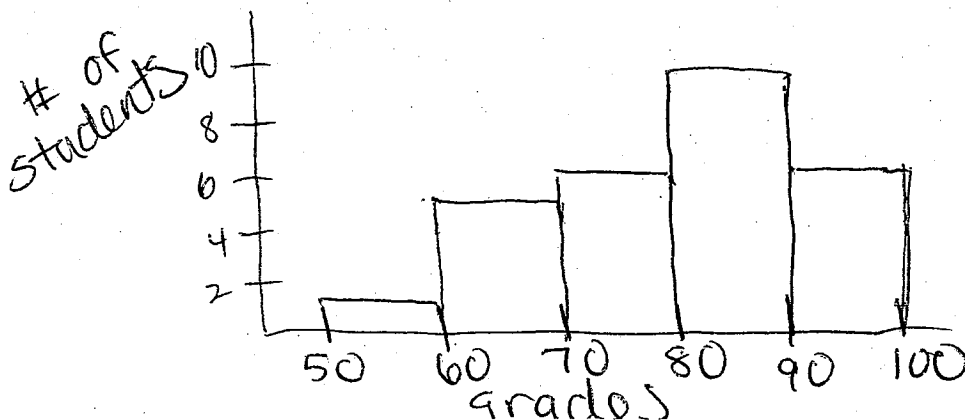
a) Construct an ordered stem and leaf plot for the data.

Stem	leaf
5	9
6	0 1 2 3 9
7	1 2 3 6 7 8
8	0 1 1 2 3 4 5 8 9
9	1 3 4 5 7 8

5	9
6	9 1 3 0 2
7	3 7 1 2 8 6
8	1 2 4 8 5 9 0 3 1
9	3 5 7 8 1 4

- b) How many students earned a C (in 70's) on the exam? 6
- c) How many students earned a C or better on the exam? 21
- d) Carefully make a histogram for this data using an appropriate scale on each axis. Label both axes.

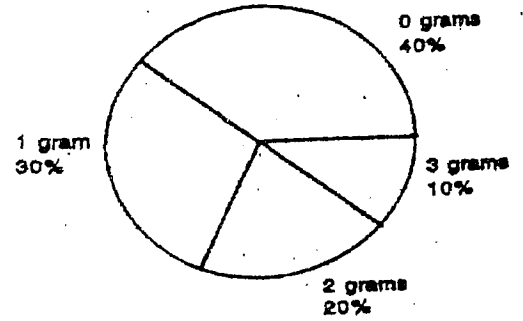


12. (6 points) Some cereals were tested for their fat content per serving. The pie chart shown represents the results of that study:

a. From the graph, can you tell how many cereals were tested? NO

b. If 70 cereals were tested, how many of them had one gram of fat? 21

c. What percentage of cereals had two or more grams of fat? 30%



13. (8 points) Use the bar graph shown answer the following:

a) The number of men represented on the graph is: 38

b) How many men measure size 34? 3

c) What is the smallest waist measurement shown? 30

d) What is the probability that a randomly selected man would measure size 34 to size 38?  $\frac{26}{38} \approx 68\%$

