

STA 5172 Practice Midterm 1

February 20, 2014

Name:

FSUID:

Please sign the following pledge and read all instructions carefully before starting the exam.

Pledge: I have neither given nor received any unauthorized aid in completing this exam, and I have conducted myself within the guidelines of the University Honor Code.

Signature: _____

INSTRUCTIONS:

- This is an open-book, open-notes exam. You can refer to your notes, the text, or any other books. You may use a calculator. A normal table is provided at the end.
- Total time is 75 minutes (2:00 P.M to 3:15 P.M.)
- **Show all work**, clearly and in order, if you want to receive full credit. When you use your calculator, explain all relevant mathematics. I reserve the right to take off points if I cannot see how you arrived at your answer (even if your final answer is correct).
- Circle or otherwise indicate your final answers.
- **Answer all the questions in the space provided. You may attach additional sheets if necessary.**
- This test has 4 problems and is worth 80 points. It is your responsibility to make sure that you have all of the problems.
- **Good luck!**

Prob. No.	Max Points	Earned Pts.
1	20	
2	20	
3	20	
4	20	

TOTAL: _____

Question 1. (20 pts.) For a sex linked-disease assume that a male offspring has 50% chance of inheriting it, while a female offspring has only 25% chance of inheriting it. Also assume that 50% of childbirths are male.

- a) What is the probability that a randomly chosen child will be affected by the disease?
- b) Given a child is affected, what is the probability that it is a male child?

Question 2. (20 pts.) The serum cholesterol levels in a population of 21 year old males follows a normal distribution with mean 176 mg/dL and standard deviation 30 mg/dL.

a) What percentage of 21 year old males from this population have serum cholesterol levels between 166 and 186 mg/dL?

b) In this population, what is the serum cholesterol level such that only 3% of the population has a higher level?

Question 3. (20 pts.) A new drug is proposed for people with high intraocular pressure (IOP), to prevent the development of glaucoma. A pilot study is conducted with the drug among 10 patients. Their mean IOP decreases by 5 mm Hg after 1 month of using the drug. The investigator proposes to study 100 participants in the main study. Is this a sufficient sample size for the study to obtain a power of 80% to have the same amount of IOP deduction based on a 5% level of significance? If not, obtain the minimum sample size needed to obtain a power of 80% based on a 5% level of significance. (Assume IOP is normally distributed with a standard deviation of 10 mm Hg)

Question 4. (20 pts.) The operations manager of Medtronics (a reputed medical device company) would like to estimate the mean amount of time a worker takes to assemble a new medical device. Assume that the standard deviation of this assembly time is 3.6 minutes. (Assume assembly time is normally distributed)

a) After observing 120 workers assembling similar devices, the manager noticed that their average time was 16.2 minutes. Construct a 95% confidence interval for the mean assembly time.

b) How many workers should be involved in this study in order to have the mean assembly time estimated up to 15 seconds with 95% confidence?

